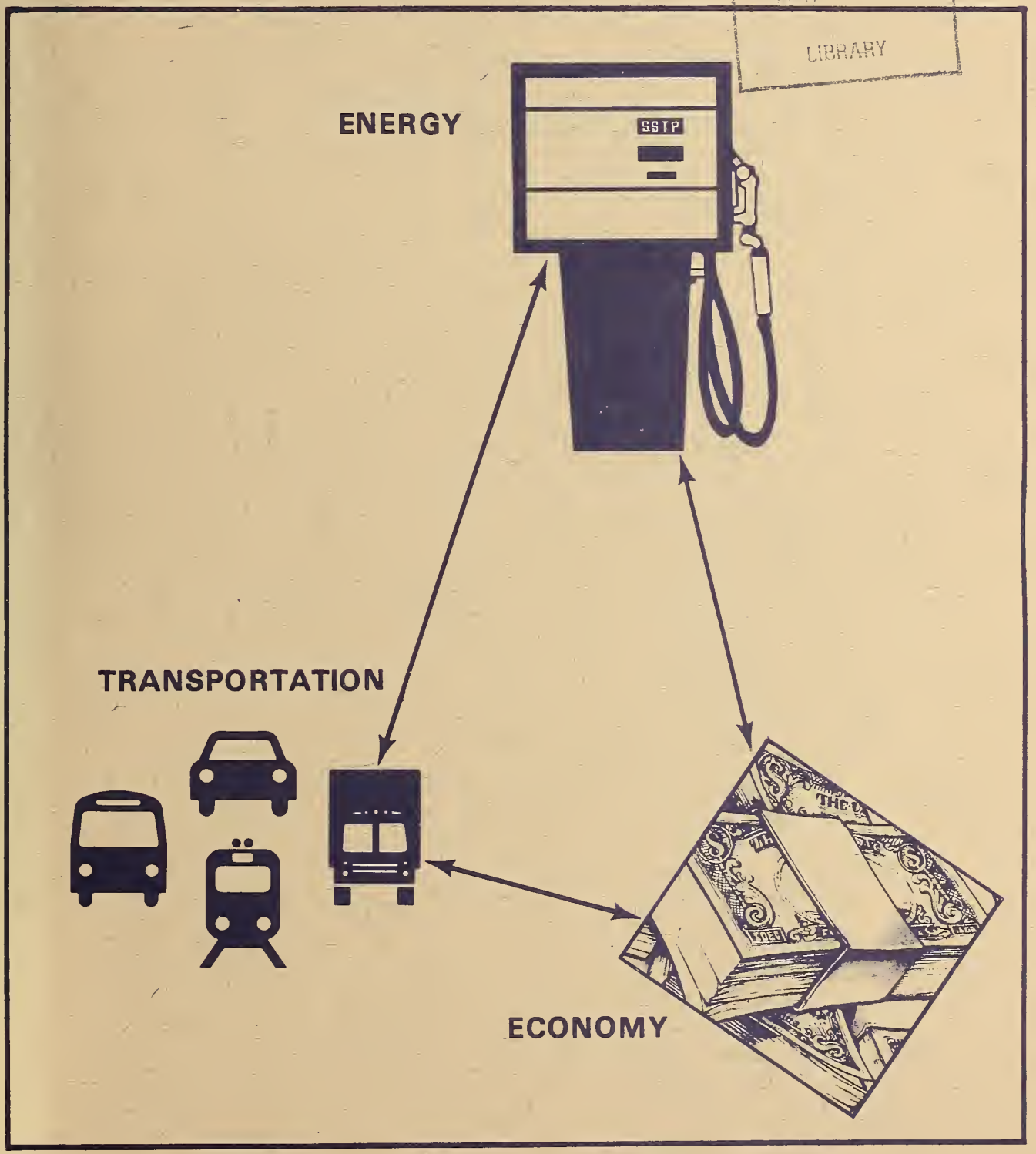
Department of
Transportation

SCENARIO PLANNING:

Energy Considerations in the Long Range Urban Transportation Planning Process



Scenario Planning:
Energy Considerations in the Long Range Urban Transporation Planning Process

May 1983

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FOREWORD

The development of a long range transportation plan has historically been based on forecasts of future development and estimates of the resultant travel demand and facility needs. Recently, however, the rapid changes in a number of factors has made such forecasting difficult. Among the more significant of these changes has been in the area of energy price and supply.

In order to address the problem of uncertainty in the basic factors used in long range planning or strategic planning, particularly energy price and supply and economic factors, the Baltimore Regional Planning Council has undertaken this prototype application of a new technique for developing basic assumptions for strategic planning--Scenario Planning. Funded jointly by the Department of Energy and the Federal Highway Administration and the Urban Mass Transportation Administration of the Department of Transportation, this study was designed to demonstrate the application of a private sector strategic planning method, scenario analysis, in the public long range planning context. We believe that this approach, which allows consideration of the interaction of a variety of long range planning concerns--economic development, energy, land use, and technological change--will be of interest to most planners involved in strategic transportation planning.

Related reports are available on Transportation Energy Contingency Planning and Transportation Energy Management. Information on these reports is available from our offices. Additional copies of this report are available from the National Technical Information Service, Springfield, Virginia 22161. Please refer to report DOT-I-83-20 on your request.

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LIST OF ABBREVIATIONS AND SYMBOLS

GDP	General Development Plan
JHU	Johns Hopkins University, the subcontractor with the Regional Planning Council for this study.
MDOT	Maryland Department of Transportation
MPO	Metropolitan Planning Organization
RPC	The Regional Planning Council, the policy committee and support staff.
TCP	Transportation Control Plan
TSM	Transportation System Management
VMT	Vehicle Miles of Travel
UTPP	Unified Transportation Planning Process

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16. Abstract

This report documents an 18-month study funded by the Department of Energy and the Department of Transportation which aimed at incorporating energy conservation in regional planning framework. The study was a prototype application of scenario analysis in the public planning context. The scenario technique is a comprehensive approach which allows consideration of the interaction of energy issues with transportation as well as other planning concerns such as land use, technological change, and economic development. The project created several hypothetical futures typified by varying levels of oil availability, and constructed sets of policy responses designed to deal with the problems typifying those future conditions. It is concluded that unique insights were gained which would not have emerged in the course of more conventional planning activity; still, because so many new issues were raised, follow-up efforts to fully incorporate the findings and methodology into the continuing planning process are crucial to the ultimate success of the project.

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EXECUTIVE SUMMARY

Purpose of the Study

In Fall, 1981, the Regional Planning Council (RPC) was awarded a United States Departments of Transportation and Energy (U.S.DOT/U.S.DOE) contract to conduct a demonstration project which would develop and apply a methodology to incorporate energy conservation in urban transportation planning and decision making. More specifically, the RPC proposed to examine the long range transportation needs of the region in light of uncertain future energy conditions. Normally, long range planning is based on an extrapolation of trends; the policies and programs suggested by this approach are valid only if current trends continue unaltered. Clearly, this is not always the case, as is exemplified by the highway planning of the mid-1960s which did not anticipate the energy disruptions and related changes in travel behavior of the 1970s. This study employed a planning methodology, called multiple scenario analysis, which is specifically intended to address the uncertainty of the future.

This technique considers the interaction of a small number of key factors (called independent variables). By assuming that these key factors will have widely differing values at some future point, several hypothetical pictures of the future are derived. It is these alternative futures conditions which demand unique public responses and require rethinking of the programs and policy actions generated through traditional planning channels.

In this study, a group of officials from the public and private sectors examined four alternate futures (called scenarios) which were typified by variations in:

1. Availability of energy for transportation;
2. Economic growth; and
3. Technological innovation.

The interactions of the key variables and resulting regional conditions determined a number of key transportation issues, some of which were already part of the conventional transportation planning process and some of which were newly perceived, demanded consideration of new policy and program responses, and suggested important linkages between transportation and other functional areas of the regional planning process. The generation of policies to address the emergence of new concerns was the intent of the study.

Description of the Baltimore Region

The Baltimore Region lies in the lower portion of the northeast corridor which includes Boston, New York, Philadelphia, and Washington, D. C. It is typical of these urban areas and shares the trends and problems commonly associated with them. Most notably:

- o An older central urban core with surrounding suburban areas;
- o A high portion of trip making oriented toward the center but with significant amounts of travel being oriented to widespread suburban locations;
- o A shifting of the employment base from heavy manufacturing to service and trade industries; and
- o New growth directed toward suburban areas.

The Regional Planning Council (RPC) is an association of the governments of Baltimore City and the five surrounding counties. The planning community also includes the Maryland Departments of Transportation (MDOT), Natural Resources, Health and Mental Hygiene, and Planning. The RPC staff conducts various federally mandated planning programs for the region in conjunction with MDOT; and carries out programs in Natural Resources, Land Use, Housing, and Economic Development.

Project Results and Findings

The primary intent of the project was to reassess long range transportation plans, particularly in relation to varying future energy conditions. The results of this concern were evidenced in several specific areas.

The Energy/Transportation Futures panel recommended a number of policies to the RPC and its committees for inclusion in the 1982 GDP. Many of these policies were included in the plan. However, since the GDP must be approved by a wide range of public and private organizations, it is a conservative document, and some of the more innovative policies were not adopted. For example, the panel recognized that systematic reduction in maintenance of low volume facilities might be necessary under certain conditions, but the GDP does not reflect that concept. Similarly, the panel suggested establishment of a regional body to encourage location of new industry to be funded through tax base sharing. This policy was not accepted for the plan. But these and others which were rejected were extremely controversial, and the fact that they were considered in the formal deliberations on the plan has opened them to further consideration in the conventional planning process and greater attention in the work programs of RPC and other planning agencies.

The major findings of the study with regard to energy conservation in the Transportation sector were not conventional or what had been expected prior to the exercise. Instead, the interactions of the key factors--oil availability, economic activity, and technological innovation--emphasized fundamental relationships which pointed to broad problem areas. It was clear that, with adequate oil supplies and healthy economic growth, there would be a pressure for suburban expansion, little inclination to reduce fuel consumption, and reduced market demand for technologies which could reduce travel or increase automobile mileage. It was determined that, under these conditions, the success of familiar conservation techniques would be minimal, and that more presing needs would center on augmenting conventional transit to serve expanding suburban areas, and adapt the

transportation network to the changing needs of a growing industrial base. At the other end of the spectrum, a stagnant economy and chronic fuel shortages would automatically promote conservation, reduce fuel consumption, and sharply reduce the rate of suburban growth. This scenario would yield its own set of problems, revolving around severe transportation revenue shortfalls which derive from reduced fuel consumption, and which preclude adequate maintenance of the highway system and make it impossible to meet growing demands on the transit system.

By establishing these long term relationships between oil availability, economic conditions, development trends, and transportation revenues, the study provided a framework for long term planning and a context for design of specific policies and programs to be developed through ongoing planning activities and intended to address both long and mid-range needs.

Of course, it is impossible to predict the degree to which this one-time project will have lasting impact. The fact that the futures panel was largely comprised of officials who will continue to be involved in regional planning and decision making, and the nature of the project which required their active participation, constitutes a vehicle which could impact the long term orientation of the Futures Study into ongoing planning activities.

The Scenario Process

The broad objective of the study was to reassess the future needs of the region, not in traditional terms of a single future extrapolated from current conditions, but by considering a number of alternative scenarios, each having its unique set of public and private responses. For the outcomes of the process to have the most lasting impact, it was vital that it involve the officials who figure in government decision making. Thus, a panel of seventeen of the most influential officials from local governments, state agencies, and private organizations was recruited and became the group around which the project was structured.

In simplest terms, the exercise was divided into three meetings.

Selection of Independent Variables: The panel's main task in the first session was to agree to a limited number of key factors (called independent variables) which:

- were beyond the control of the region, and
- would have the greatest influence on the region, especially with respect to transportation, land use, and economic development.

The panel finally selected three variables and agreed to general values they might assume over the coming decade. They were:

- Oil Availability
  a. Plentiful
  b. Stable
  c. Shortage

- Economic Growth
  a. Vigorous
  b. Slow
  c. Decline

- Commercialization of Technology
  a. Rapid
  b. Slow

Discuss Interaction of Independent Variables: The first session also included initial discussions as to how these key factors would interact and which future conditions would be most important in considering future regional needs and problems.

After the second session, the staff arrayed the variables to form eighteen cells (skeleton scenarios) and described conditions in selected cells in historic terms. (Figure 1)

Select Skeleton Scenarios: The major business for the second meeting was to select the cells which should be studied in more detail. The scenarios agreed to by the panel are indicated in Figure 1; they were:

- Scenario 5: Labeled the Trend Scenario and considered most likely to occur.
- Scenarios 3 and 7: Labeled Decline and Growth Scenarios, selected as representing polar conditions demanding the two extremes of public and private policy response.
- Scenarios 16 with a shift to Scenario 10 in the middle of the planning period: Labeled the Transition Scenario and selected so that the panel could consider the actions necessary to respond to a major, prolonged supply interruption.

Select and Discuss Dependent Variables: The remainder of the second session focused on a discussion of other region conditions which could be influenced by regional actions (called dependent variables) which would be affected in each scenario. The major scenario--dependent variable interactions perceived by the panel were as follows.

Figure 1

SCENARIO MATRIX

Rapid Commercialization of New Technology

Oil Availability	ECONOMIC GROWTH: Vigorous	Slow, Stable	Decline
Shortage	1	2	
Stable	4		6
Plentiful		8	9

Scenario 3: 1974-1975 in terms of oil supply and economic growth only.
Scenario 5: 1976-1978 in terms of rapid advances in automotive technology.
Scenario 7: 1950s and 1960s.
Scenario 9: 1980 and 1981.

Slow Commercialization of New Technology

Oil Availability	ECONOMIC GROWTH: Vigorous	Slow, Stable	Decline
Shortage		11	12
Stable	13	14	15
Plentiful		17	18

Scenario 10: World War II in terms of non-military technological development and domestic fuel shortages.
Scenario 16: Late 1960s in that few gains were made in transportation technology.
Scenario 17: 1935-1940.
Scenario 18: 1930-1934.

Scenarios selected for further development are shaded.

Independent Variable	Impact on Dependent Variable	
	Primary	Secondary
Oil Availability & Economic Growth		
o Plentiful & Rapid	o More rapid suburbanization	o Increased need for paratransit to supplement conventional transit
	o Increased travel	o Increased transportation revenue
o Shortage & Slow	o Slower suburbanization	o Increased demands on conventional transit
	o Reduced travel	o Reduced transportation revenue
Economic Growth		
o Rapid	o Increased share of growth industries (service, technical)	o Labor force training to match new industry needs
		o Reduced port and rail volumes; increased airport and truck volumes
	o Public infrastructure needs in suburban locations	
o Slow	o Declines in manufacturing	o Labor force training of displaced blue collar workers
		o Underutilized rail and port capacity
		o Reduced transportation revenues
	o Increased need for public infrastructure to attract new industry	
Technology		
o Mini Cars	o Need for new highway configurations	
	o Reduced fuel consumption	o Reduced transportation revenue
o Telecommunications	o Reduced travel	o Reduced transportation revenue

Discuss Policies to Address Scenarios Conditions: Finally, the panel discussed the policy directions which they felt would be most appropriate to address the problems suggested by their selection of scenarios and discussion of dependent variables. For the most part, the suggested policy actions reflected the earlier discussion, but the panel also indicated an interest in promotion of alternate fuels and development of energy contingency planning.

Prior to the final meeting, the staff wrote detailed scenarios which were based on the earlier panel sessions and included suggested policies and their effect on the problems and needs posed by each scenario. The panel was asked to review this material prior to the final meeting. Figure 2 is a comparison of the major elements of the scenarios.

The third session was devoted to identification of policies which would respond to future regional needs as represented by the scenarios. The staff proposals from the written scenarios served as a basis for the panel discussion. The panel generated a very large number of potential policy directions. The broad areas receiving most attention were:

Transportation Policies:

- Conventional public transit must be considered in relation to para-transit and privately sponsored transportation programs.

- The port and airport are dependent on adequate landside distribution and delivery systems; rail and highway considerations must be an integral part of port and airport planning.

- A complete halt in construction of new transportation facilities is unacceptable under any set of future conditions.

- A regional sales tax to fund transportation improvements should be implemented.

Energy Policies:

- Further study of energy use and conservation is needed regardless of future conditions.

Land Development Policies:

- Government promotion of centralized development and residential location near work are desirable but crime, quality of schools, and racial distributions are probably overriding factors in location choice.

Economic Development:

- A regional agency to attract new industry should be formed to better coordinate the effort. Tax base sharing is a potential means of pooling resources and sharing benefits of a regional approach to economic development.

Figure 2

COMPARISON OF SIGNIFICANT REGIONAL TRENDS
FROM EACH SCENARIO

Decline	Trend	Growth	Transition
Energy Use: High prices and depressed economy reduce consumption.	Energy Use: Reductions in fuel consumption through increased auto efficiency.	Energy Use: Stable prices and high levels of economic activity prevent significant reductions in consumption.	Energy Use: High levels of demand prior to interruption sharp reductions forced by shortfall.
Economy: All segments of industry operating at depressed levels. Unemployment is most severe for blue collar and semi-skilled workforce.	Economy: Slow economic growth. Unemployment is most severe for blue collar and semi-skilled workforce.	Economy: Infusion of medical and technical light industry; some revitalization of heavy industry through plant modernization. Unemployment for blue collar and semi-skilled workforce is stable.	Economy: Comparable to conditions in growth scenario with no protracted change following the fuel interruption.
Transportation: . Demand: Auto travel decreases, transit and paratransit increase, coal and grain exports rise. . Supply: No expansion, disinvestment in the highway system, transit service cutbacks.	Transportation: . Demand: Auto travel grows as a result of more non-work trips, little change in transit and paratransit use, coal exports increase. . Supply: Little expansion, disinvestment in the highway system, transit cutbacks.	Transportation: . Demand: Auto travel grows as a result of suburban growth and more non-work trips, transit ridership declines with suburbanization, little change in paratransit, port tonnage and rail volumes decline as light industry assumes high portion of industrial output.	Transportation: . Prior to interruption: Similar to Growth Scenario. . Following interruption: Sharp rise in coal export, reductions in non-work trip VMT, sharp, temporary transit and paratransit increases.

Figure 2 Cont'd.

COMPARISON OF SIGNIFICANT REGIONAL TRENDS
FROM EACH SCENARIO

Decline	Trend	Growth	Transition
		Transportation: . Supply: Competition for funds between expansion and maintenance of the highway system, transit cutbacks.	
Government Revenue: . Sharp declines in MDOT revenue, further eroded by high inflation rates. . Local government revenues decline. . Reduced federal assistance.	Government Revenue: . Slow declines in MDOT revenue. . Constant, local government revenue. . Reduced federal assistance.	Government Revenue: . Stable MDOT revenues. . Modest increases in local government revenue. . Reduced federal assistance.	Government Revenue: . Prior to interruption: Similar to Growth Scenario. . Following interruption: Sharp drops in MDOT revenues with slow recovery through the remainder of the period.

- Unskilled labor and unemployed youth will be a major problem under any set of regional conditions.

- A joint effort by government and the private sector is required for labor force retraining in the coming decade.

Following this session, the staff prepared revised policy statements which were mailed to the panel for a final review. The panel was also asked to indicate which of the policies could be recommended for the 1982 General Development Plan and which should be the subject of further study.

The finalized policy recommendations were presented to appropriate subcommittees of the Regional Planning Council for approval prior to including them in the General Development Plan.

The Futures Study and Ongoing Planning Activities

The study produced three significant substantive findings:

1. A statement that the future transportation needs of the region will, to a great extent, be determined by factors beyond the region's control.

2. A statement that the future could take one of several different courses, each course demanding different sets of public responses.

3. A statement of four sets of often controversial policy recommendations to respond to four widely differing hypothetical futures.

As was the intent, these are concepts which would not have evolved through existing planning activities. But because the study concepts are innovative, they cannot be easily embraced by the conservative, well-established planning procedures and decision making process. Such a change will require major changes in agency work programs, in practice by implementing agencies to allow more flexible response to uncertain and constantly changing needs, and in the attitude of decision makers to new and controversial policies.

The panel was largely comprised of individuals who will continue to be influential in policy and program development and can reasonably be expected to espouse the methodology and results of the futures project. The support of this group is certainly essential to any substantial realignment of the planning process or change in transportation decision making. It remains to be seen if the influence of this group will be sufficient to alter the firmly entrenched practices of the existing planning framework and means that the long term influence of the Energy/Transportation Futures Study Project is uncertain at this time.

I. INTRODUCTION, SCENARIO ANALYSIS OVERVIEW

This study employed a technique known as Multiple Scenario Analysis which was developed in private industry as an alternative to traditional plan making which bases policy on a single set of projections of future conditions. If the projections are incorrect, so too will be the plans on which they are based. Scenario building recognizes this uncertainty by creating a number of hypothetical futures and developing plans to address them. This project was an application of the technique in the public planning sector and was intended to:

- o test the applicability of the methodology to public planning, and
- o produce new substantive insights into the transportation, energy, and development needs of the region.

In practice, the process is somewhat complex, and Chapter III is devoted to a detailed description of this project. However, the following chapters should read with an understanding of the essential elements of the process which are presented at this point. Additional readings on the technique are suggested in the Bibliography.

A. Scenario Analysis Process

Scenario analysis revolves around a panel of individuals who figure in the decision making of the particular organization. It is their task to articulate several alternative views of the future and to determine actions to address each of the possibilities. This occurs through a progression of events which, of course, may be varied but which includes certain basic tasks.

1. The first task for the group is to decide on two or three key factors which:

   a. will greatly affect the organization, and
   b. are largely beyond its control.

   These are referred to as independent variables. The panel also assigns limited and general values to these factors. For example, an independent variable might be the national economy, and values might be fast growth, slow growth, and decline.

2. A matrix is formed showing all possible combinations of the variables and their values. Three variables with three values would form a twenty-seven cell matrix. Each cell outlines a possible future condition called a skeleton scenario.

3. The panel chooses three or four cells which are either:

   a. most likely to occur, or
   b. would demand the strongest actions by the organization if they should.

These cells are developed into full scenarios which will be considered through the remainder of the study.

4. The panel next defines the goals the organization wishes to achieve.

5. They select a limited number of factors (perhaps 10) which:

   a. can be controlled by the organization;
   b. figure in the realization of goals; and
   c. will vary from scenario to scenario.

6. The panel provides the basis for full scenarios through discussion of how the dependent variables will be affected by the scenario conditions and how that will affect attainment of goals.

7. The final step is the development of policies to overcome undesirable effects of (or to take advantage of the opportunities offered by) each of the scenarios. The result is a set of policies addressing each selected scenario. Naturally, some policies may apply to more than one, or even all, of the scenarios.

Throughout the exercise, there is a need for continual dialogue between the panel and staff. It is the role of the staff to accurately translate the panel meetings into the formal structure of the process and to provide backup data for panel discussions.

B. Application in the Baltimore Region

This project followed the model very closely, the major exception being the composition of the panel which was not limited to members of a single organization but was comprised of elected officials, decision makers from various transportation implementing agencies in the region, and members of private industry.

It was the primary intention that the study would yield new perceptions of energy-transportation relationships and policies to address them. But the study was not limited to this area, and the panel also examined land use and economic development issues.

II. DESCRIPTION OF THE BALTIMORE REGION

A. Physical Characteristics

The region is comprised of six jurisdictions: Baltimore City and the surrounding counties of Anne Arundel, Baltimore, Carroll, Harford, and Howard. (See Figure 3) The Baltimore City CBD is the region's urban focal point, but there are significant activity centers or smaller incorporated cities in each of the counties and large areas of intense use in Baltimore, Anne Arundel, and Howard counties. The center of the region is approximately 40 miles from Washington, D. C., less than 100 miles from Philadelphia, less than 200 miles from New York, and just over 400 miles from Boston.

B. Travel, the Economy, and Development Trends

1. Travel Patterns

While a substantial portion of trips are oriented toward downtown Baltimore City, the suburban-CBD commute is not the dominant travel pattern. Of all journeys to work in 1976, 35% had destinations in the city, 17% in Anne Arundel County, and 34% in Baltimore County. The remaining trips were spread among the other jurisdictions and areas outside of the region. This dispersed travel behavior limits the role of conventional transit; in 1980, only 10% of journeys to work trips were made by bus.

Much of Baltimore's economy revolves around its port and port-related heavy industry, so that port facilities and the landside rail and truck transportation are fundamentally important to the region. Yet these facilities have traditionally received little attention in planning at the regional level. Port planning has been conducted at the state level, the rail system has been primarily regarded as the concern of private industry, and only recently has the Maryland Department of Transportation devoted any attention to rail planning. Naturally, the regional planning community is involved in highway planning, but the effort is oriented toward personal travel and little attention is given to special issues associated with truck movements.

2. The Economy

Historically, the backbone of Baltimore's economy has been heavy manufacturing, industry which has experienced considerable erosion since the mid-1970s. In 1965, manufacturing provided 26% of the region's jobs; this had fallen to 22% in 1970 and to only 16% by 1980. Predictably, unemployment rose from 4.2% in 1970 to 7.4% in 1980. Some of the decline in manufacturing was offset by gains in the service and trade sectors which grew by 26% and 16% respectively during the 1970 to 1980 period. Still, it is probably true that the continued well-being of the region for the mid term hinges on a slowing in the decline of its manufacturing base.

Figure 3


JURISDICTIONS OF THE BALTIMORE REGION
TO PHILADELPHIA AND NEW YORK
PENNSYLVANIA LINE
CARROLL COUNTY
HARFORD COUNTY
BALTIMORE COUNTY
BALTIMORE CITY
HOWARD COUNTY
ANNE ARUNDEL COUNTY
CHESAPEAKE BAY
TO WASHINGTON D.C.
RPC '82
0
10
miles
URBAN ACTIVITY CENTER

3. Development Trends

Despite the economic concerns, the region grew in terms of population and employment during the 1970s with the gains showing familiar trends toward suburbanization. From 1970 to 1980 Baltimore City lost both jobs and population, while the figures for all of the counties increased. The greatest numerical gains were in the urban counties; Anne Arundel showing a 70,000 population increase and 23,000 job increase. Baltimore County gained 70,000 jobs during the period. The smaller, more rural counties (Carroll, Harford, Howard) showed the greatest percentage increases, particularly Howard where both employment and population increased twofold. The figures are shown in Table 1. Clearly, these trends can be expected to lead to increasingly diverse travel patterns with attendant rises in miles of travel, greater difficulties in providing traditional transit service, and demands to expand the highway system in newly developing areas.

C. The Planning Community

1. The Council

The Baltimore Regional Planning Council (RPC) is an association of the governments of Baltimore City and the five surrounding counties. It provides a forum for communication and coordination among them. In addition, representatives of the State Departments of Transportation (MDOT), Natural Resources, Health and Mental Hygiene, and Planning, and the State Legislature are also members. The RPC has policy subcommittees which advise it on transportation, economic development, energy, and housing.

2. The Staff

The RPC staff (consultant for this project) is comprised of five divisions: Transportation, Economic Research and Information Systems, Housing, Environmental Resources (including land use and energy), and Administration. The Director of the Transportation Division is also director of the federally mandated Unified Transportation Planning Program (UTPP), which is staffed by the RPC, Maryland Department of Transportation (MDOT), and the region's member jurisdictions. Significantly, the UTPP director, in his role as a member of the RPC staff, receives input from the Executive Director, thereby linking land use, economic development, and energy concerns with transportation planning.

3. Institutional Relationships

There are several aspects of the region which have bearing on planning activities.

a. Coordination is perhaps somewhat simpler than in other regions of

Table 1

POPULATION AND EMPLOYMENT TRENDS FOR THE BALTIMORE REGION
1970 to 1980

Jurisdiction	1970 (x 1000)	1980 (x 1000)	Percent Change
POPULATION			
Baltimore City	905.8	786.8	- 13%
Anne Arundel County	298.0	370.8	+ 24%
Baltimore County	620.4	655.6	+ 6%
Carroll County	69.0	96.4	+ 40%
Harford County	115.4	145.9	+ 26%
Howard County	62.4	118.6	+ 90%
Region Total	2,071.0	2,174.0	+ 5%

Jurisdiction	1970 (x 1000)	1980 (x 1000)	Percent Change
EMPLOYMENT			
Baltimore City	451	425	- 6%
Anne Arundel County	122	145	+ 19%
Baltimore County	233	305	+ 31%
Carroll County	23	32	+ 39%
Harford County	42	48	+ 14%
Howard County	26	53	+104%
Region Total	897	1,008	+ 12%

comparable size because the local government structure is less fragmented, consisting of only six independent entitles.

b. RPC was created by state legislature to coordinate all comprehensive planning for the region. This charge has demanded a close working relationship between RPC and the Maryland Department of Transportation (MDOT) and creates a favorable environment for aligning RPC's regional policy role with MDOT's program and project implementation responsibilities. As a logical extension of this relationship, RPC and MDOT share the role of Metropolitan Planning Organization (MPO) for the Baltimore Region which further strengthens the ties between the two agencies.

c. Unlike other jurisdictions whose federal funding is filtered through state implemented programs, Baltimore City is the direct recipient of Interstate, Urban and Primary System funds. The City's control of these monies gives them a unique autonomy and ensures at least a minimum level of highway investment in the core of the region.

d. The structure of Maryland's Transportation Trust Fund has significant bearing on transportation planning. None of the state collected user fees, operating receipts, or transportation taxes are earmarked with regard to mode or geographic location. Thus, port, airport, rail, highway and transit programs are all funded from a single source meaning that there is never a guarantee of a minimal level of spending on any particular mode in any particular location from year to year. The statewide capital program for transportation is prepared by MDOT through consultation with its modal administrations (Highways, Transit, Air, Port, and Rail), the elected officials of individual counties, and RPC and other planning and operating agencies. Naturally, balancing expenditures among modes and jurisdictions is a consideration in this process, but the single funding pool does ensure that the merits of individual projects are given primary attention.

III. PROJECT RESULTS AND FINDINGS

The study was designed to reassess long range transportation needs and issues as they would vary across a range of future regional conditions. Within this general objective, it was hoped that the effort would accomplish several, more specific ends. They were:

- o Contribute to the 1982 General Development Plan (GDP) and future work programs;
- o Examine the relationship among Energy Conservation, Transportation, and Regional Development;
- o Reevaluate long range needs of the region; and
- o Integrate long and medium range planning.

Beyond the substantive aims, it was intended that use of the scenario process would:

- o Gain support for the study results from regional policy makers;
- o Educate the decision makers involved in the project; and
- o Test and further develop the scenario analysis technique for application to long range regional planning.

A. Contribute to the 1982 General Development Plan and Future Work Programs

1. Influence on the 1982 GDP

The Futures Study's direct contribution to the 1982 GDP and ongoing planning work was in the form of policies generated by the study and recommended by the Futures Panel to various subcommittees of the Regional Planning Council (the Economic Development, Transportation Steering, and Energy Policy Advisory Committees) and the General Development Plan Advisory Committee.

The panel's recommendations ranged from policies which were conventional and well established in the existing planning process to some which were new and highly controversial. The familiar policies were all accepted for the 1982 Plan as were some new, but not especially radical concepts such as:

- o Integration of goods movement into the ongoing Transportation planning process, and
- o Encouragement of the use of mini-cars.

More controversial ideas were, for the most part, not accepted for the GDP. Among the most significant were:

- o Reduction in pay scales of transit workers,
- o Creation of a regional agency to promote economic development and to be funded through tax base sharing, and
- o Recovery of transit operating deficits from jurisdictions.

The reasons for the omission of these policies from the GDP are fully discussed below, but two should be pointed out here. Many of the panel's recommendations were designed for particular scenarios and were often not appropriate for the GDP which assumes a single, trendline future. Similarly, the panel recognized that the further study of the full impact of some of their recommendations would be required prior to actual implementation. These were recommended for the GDP, with that caveat, to call attention to the issues they reflected. The policies in this category were generally not accepted for the GDP whose focus is operational programs rather than planning activities.

Figure 4 lists the panel's policy recommendations which were and were not included in the 1982 GDP. It also indicates those policies aimed at particular scenarios and those recommended for further analysis prior to actual implementation.

2. Influence on the Traditional Planning Process

The effect of the futures work is expected to extend beyond those policies which appear in the GDP. They are:

a. Work programs of the RPC and other agencies:

Although the work programs for 1983 were well formulated prior to completion of the Futures Study, there is enough latitude in many of the work items to reflect the concerns of the panel. For instance, an upcoming study to establish priorities for highway programs will probably place more emphasis on the balance between maintenance and new construction as a result of the study recommendations for this issue.

Figure 5 lists the study recommendations which will be addressed by specific work elements in 1983.

b. The Regional Planning Forum

Though the more innovative ideas generated by the project were not accepted as a part of regional policy, it is important that they were introduced into the formal deliberations over the GDP, for this has

FIGURE 4

FUTURES PROJECT POLICY RECOMMENDATIONS FOR THE 1982 GENERAL DEVELOPMENT PLAN

PART I: RECOMMENDATIONS INCLUDED IN THE GDP

Policy	Panel Recommendation
Energy Conservation	
1. Increase the priority of programs to encourage use of paratransit and alternative work schedules, parking management to promote ridesharing and transit use.	For further analysis, all scenarios.
2. Coordinate conventional transit and paratransit operations to increase utilization of both.	For further analysis, all scenarios.
3. Establish energy contingency plans which outline organizational structure and responsibilities of government and private sector.	For implementation, all scenarios.
4. Encourage local government, industry, and residential complexes to examine use of alternative energy sources.	For implementation, all scenarios.
5. Develop plans to exploit appropriate alternative and local fuel sources, especially in the event of oil shortfalls.	For implementation, all scenarios.
6. Support studies of energy use and conservation methods.	For implementation, all scenarios.

FIGURE 4 Cont'd.

Policy	Panel Recommendation
Energy-Land Use Relationships	
1. Encourage new residential development in designated areas by targeting public investment.	For implementation, all scenarios.
2. Encourage appropriate conversion of the existing single family housing stock into apartments.	For implementation, all scenarios.
3. Develop a regional highway maintenance scheme which supports regional land development policies.	For implementation, Decline Scenario.
Energy-Transportation Revenue Relationships	
1. Priority will be placed on programs directed toward maintaining transportation services with existing facilities. Specifically: a. Increase priority of programs to reduce peak hour traffic loads. b. Supplement conventional transit with paratransit in areas where cost-effective service is not possible.	For further analysis, all scenarios.
2. Give priority to maintenance of existing facilities in capital budgets.	For further analysis, Decline & Trend scenarios.
Energy-Economic Development Relationships	
1. Integrate goods movement into the transportation planning process.	For further analysis, all scenarios.
2. Identify employers whose labor, transportation, and energy requirements are compatible with regional goals.	For implementation, all scenarios.

FIGURE 4 Cont'd.

Policy	Panel Recommendation
3. Identify suitable land parcels for prospective employers.	For implementation, all scenarios.
4. Coordinate supply of public services and facilities to attract desirable industrial development.	For implementation, all scenarios.
5. Upgrade skills of the unemployed to match projected industry needs.	For implementation, all scenarios.
6. Establish private sector job training programs to upgrade skills of local labor force to match evolving job opportunities.	For implementation, all scenarios.
Technology	
1. Encourage the use of low performance mini-cars, especially in the fleets of local governments.	For implementation, all scenarios.

PART II: RECOMMENDATIONS NOT INCLUDED IN THE GDP POLICY

Policy	Panel Recommendation
Energy Conservation	
1. Establish contingency plans which include:	
a. Budgeting of funds to stockpile fuel.	For further analysis, all scenarios.
b. Gasoline sales purchase plans with provision for implementation.	For further analysis, all scenarios.
c. Procedures for use of school bus fleets to supplement public transit.	For further analysis, all scenarios.

FIGURE 4 Cont'd.

Policy	Panel Recommendation
d. Allocation of fuel among municipal vehicle fleets.	For implementation, all scenarios.
Energy-Land Use Relationships	
1. Concentrate new residential development near existing employment and commercial centers.	For implementation, all scenarios.
2. Discourage sprawl by charging the full measure of public costs to private developers.	For implementation, all scenarios.
Energy-Transportation Revenue Relationships	
1. Reorganize transit labor and operating procedures to reduce payscales commensurate with comparable labor skills in other occupations.	For further analysis, all scenarios.
2. Establish priorities for the selective reduction in maintenance of highways; institute cutbacks in transit service on a route-by-route basis, eliminating those which require significant operating subsidies and cannot be justified by overriding social objectives.	For implementation, Decline Scenario.
3. Revise public funding of conventional transit by recovering operating deficits from jurisdictions according to the socio-economic benefit derived by each.	For further analysis, Trend Scenario.
4. Impose an inflation sensitive, regional revenue source dedicated to	Recommended as a work program element only.

FIGURE 4 Cont'd.

Policy	Panel Recommendation
transportation investment. Return half of the revenues to local governments; pool half for projects and services with regionwide benefits.	
Energy-Economic Development Relationships	
1. Create a regional agency to promote economic development which would: a. Provide a structure for regional cooperation in promoting new industrial development. b. Be funded by a system of tax base sharing.	For further analysis, all scenarios.

opened them to further consideration in the future. That many of the panel members hold prominant places in the planning community can only add to the probability that continued attention will be given to the issues raised in the Futures Study.

3. Factors Preventing Greater Immediate Influence

One of the chief reasons for proposing a scenario analysis was that it was seen as a methodology for overcoming a fundamental problem in traditional long range planning which assumes a single future and generates plans which may or may not be useful, depending on the validity of the single set of projections. Ideally, it was hoped that the 1982 GDP would embody the concept of long range planning for a spectrum of possible futures. The current plan is not based on anticipation of alternative futures and does not include many of the potentially useful policy ideas introduced by the panel. While this was something of a disappointment, given the relation between the Futures Study and development of the GDP, a more significant impact was probably not possible. Two factors were mentioned above, that the study policies designed for particular scenarios and those recommending only further analysis were not appropriate for the GDP. More significant are three additional considerations:

a. Project and GDP Schedules

Actually, the 1982 document constitutes a slice through a continuing process at a given point in time. Thus, conceptually, preparation of the 1982 GDP began following publication of the 1977 GDP. As a result, much of the substantive material and analysis was well underway when the futures project began. Since most goal and policy statements are extensions of the plan's analysis, the energy futures recommendations were not an integral part of the document. Earlier scheduling of the project would have allowed many of the substantive findings of the panel to be incorporated into the appropriate sections of the GDP, and the final policy statements would have been a more logical extension of the Futures Project.

b. Character of the GDP

The energy futures study was intended to generate new, perhaps controversial, concepts while the GDP is a more conservative document by token of the fact that it must be approved by a very wide range of public and private organizations, local governments, and citizen groups.

c. Futures Project Design

This project was not a perfect test of scenario analysis as a tool for plan development. If it had been the main function of the project to provide input to the GDP, much greater impact would have

FIGURE 5

FUTURES PROJECT POLICY RECOMMENDATIONS TO BE ADDRESSED IN THE 1983 REGIONAL PLANNING COUNCIL WORK PROGRAM

Policy	Planning Study
o Increase the priority of programs to encourage use of paratransit and alternative work schedules.	Employer-based TSM Project.
o Increase parking management efforts to promote use of transit during peak periods and in congested areas.	Parking Management Policies Study.
o Remove barriers and provide incentives to private sector development of jitney and vanpool operations.	Private Transit Providers Study.
o Coordinate paratransit to supplement conventional transit service in areas and to groups which cannot be cost-effectively served by conventional transit.	Private Transit Providers Study.
o Integrate goods movement in the transportation planning process, especially landside impacts of port improvements.	Study of Landside Access to the Port.
o Establish transportation energy contingency plans.	Energy Contingency Planning.
o Assign priority to maintenance of existing services and facilities (over new construction) in transportation improvement programs with emphasis on investments which support development in designated growth areas.	Highway Priorities Project.
o Identify land parcels appropriate for the location of new employers.	Regional Industrial Land Inventory, Feasibility Study.

been expected. The futures work would have been conducted along lines optimal for input to the GDP while, at the same time, the plan development process would have been structured to receive input from the energy futures program.

B. Relationships Among Energy Conservation, Transportation, and Regional Development

1. Relation in the Traditional Planning Process

The existing planning process has, for some time, recognized the direct relationship between energy conservation and transportation, and the issues are addressed through well established Transportation System Management (TSM) and Transportation Control Plan (TCP) programs which seek to reduce overall travel. The relation between energy use and land development was formally stated in the 1977 General Development Plan which demonstrated the savings in energy and other resources which would be expected from a concentrated development scheme wherein new growth would be encouraged only within existing urban areas or at the periphery of designated growth centers. The 1982 GDP reaffirmed the benefits of centralized growth and, most planning activities at the regional and local levels are aimed at implementation of the centralized scheme.

2. Relation in the Energy/Transportation Futures Study

The Futures Study did not readdress these firmly entrenched issues. For it to have done so would have accomplished little and would have missed much of the strength of the scenario methodology which lies in its ability to extend beyond apparent cause-effect relationships, and focus attention on more complex interaction of a number of factors. Specifically, in this study, energy became a pervasive factor, producing impacts through every aspect of the region. Conservation became, not an end in itself, but a necessary reaction to exogenous factors as well as a variable creating its own set of problems which also had to be addressed.

Figures 6 and 7 show, in simplest terms, the way in which key factors beyond the control of the region (independent variables) interacted to create certain conditions which, in turn, determined the most pressing transportation issues in the two scenarios which represent the two extreme alternatives considered by the panel. Figure 6 depicts the Decline Scenario, embodying the most pessimistic set of assumptions; Figure 7 shows the Growth Scenario which was based on the most optimistic assumptions about the future. As can be seen, conservation in the transportation sector never became a pressing need to be addressed by policy action. In the Decline case, it was the feeling that market realities would promote conservation without incentives from government; while in the Growth Scenario, stable prices and ready supply meant that fuel saving would

Figure 6

SCHEMATIC DIAGRAM OF DECLINE SCENARIO

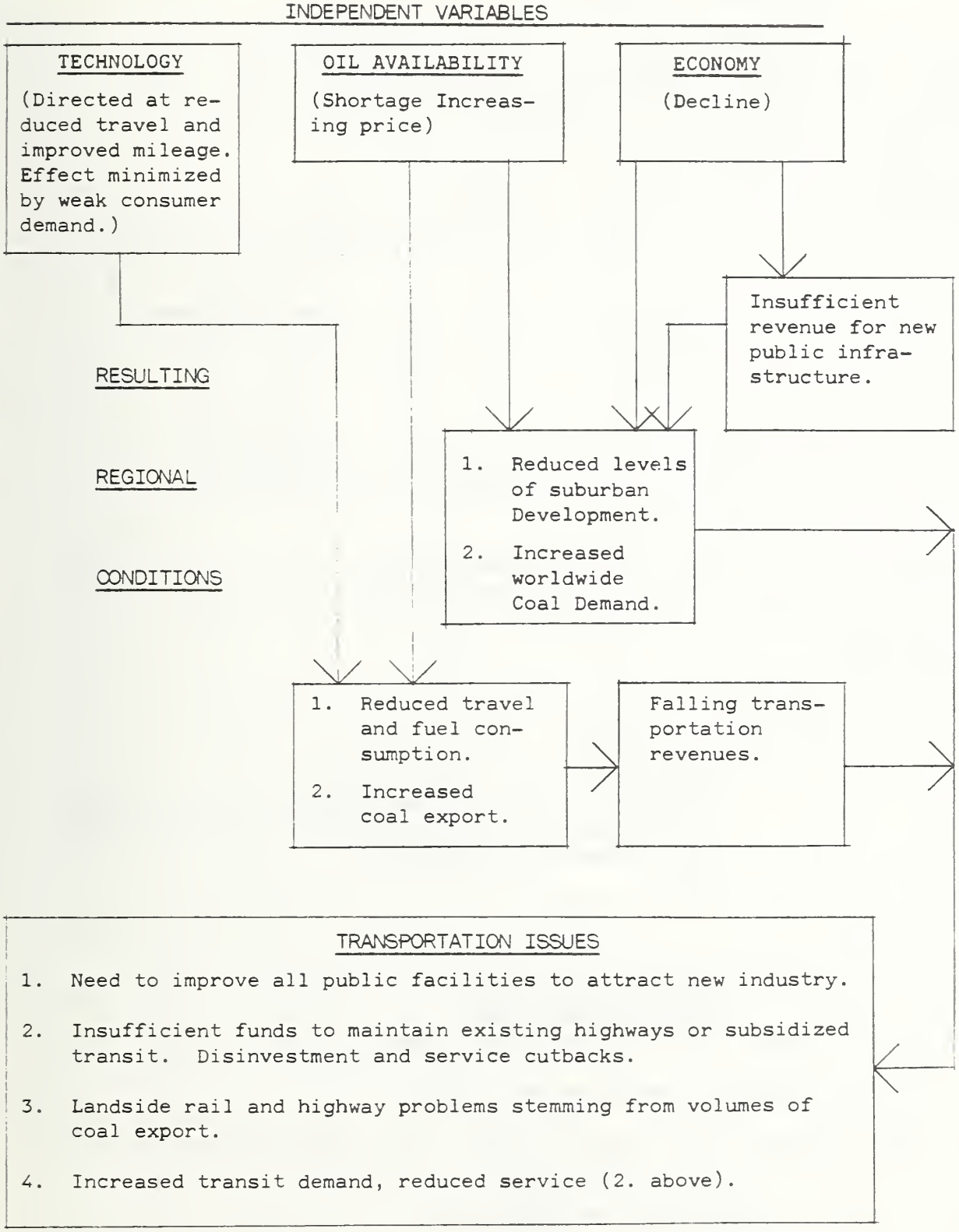
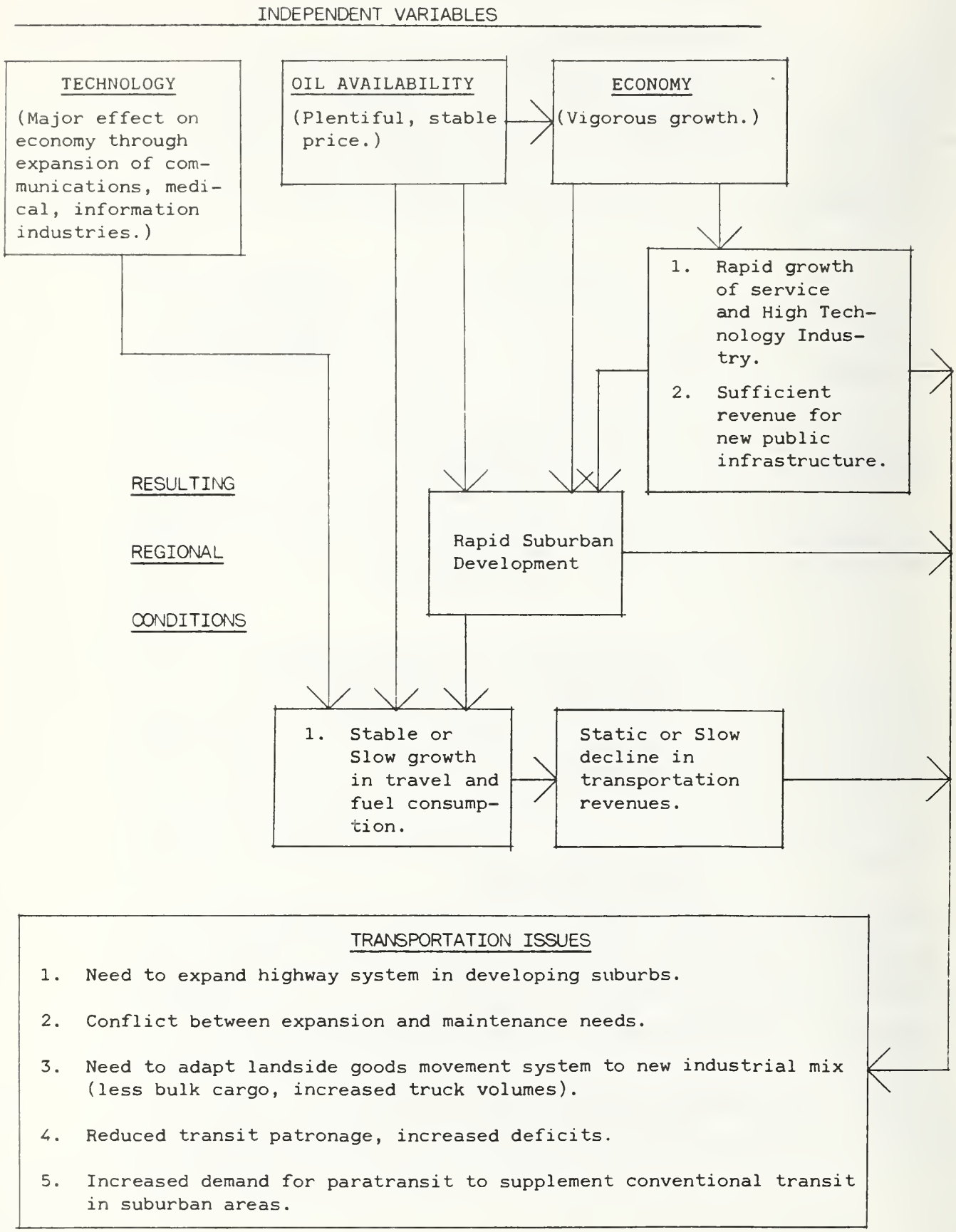


Figure 7

SCHEMATIC DIAGRAM OF GROWTH SCENARIO



have less importance and would require less attention than other conditions. (Figures 6 and 7 depict only the interactions leading to transportation issues and for only two scenarios. The full range of issues considered is presented in the written scenarios in Appendix E.)

The transportation issues shown in Figures 6 and 7 are very different and the other scenarios also pose unique sets of problems. However, in the most general terms, there was a common interplay of factors for all of the scenarios which can be described as:

- Economic growth will (a) be affected by technology and oil supply; and (b) will determine levels of new land development and influence amounts of travel, (c) thereby altering demands on the transportation system.

- Oil availability will (a) influence economic growth and land development. (b) These three will act together to detemine amounts of travel; and thus (c) transportation revenues which will determine (d) the ability to meet new transportation demands.

- Technology may act to ease or increase regional problems, but its significance depends on collective market decisions made at the margin which defy long range projection. (The general effects are noted in Figures 6 and 7.)

  These basic relationships do not, of course, suggest the value of the fully developed scenarios in defining policy directions, but they do illustrate the pattern of thinking which shaped the project.

C. Reexamination of the Long Range Needs of the Region; and Integration of Long and Medium Range Planning

1. Reexamination of Long Range Needs

The development of scenarios defined conditions which would evolve over the ten year horizon of the study and which would vary with major exogenous factors (oil availability, economic growth, and commercialization of technology -- the independent variables). In turn, these conditions established long range needs and issues which would demand some response from state and local governments. The issues of overriding importance identified during the course of the study were these.

- Revenue declines (federal, state, local) will create a need to develop:

  . new public funding sources, and
  . shared public/private financing arrangements.

- Revenue declines coupled with decreasing ridership will create pressure to:

  . increase transit fares;
  . develop new sources to cover operating deficits; or
  . institute service cutbacks.

- Maintenance demands of existing systems (water, sewer, transportation) may exhaust funds for expansion into growing suburban areas.

- New development will be in new suburban areas; the central urban core will lose population and jobs. This will:

  . decrease efficiency of conventional transit, and
  . increase the need for paratransit to serve low density areas.

- Changes in the industrial mix (from heavy manufacturing to emerging technology and service industries) and port developments (channel dredging, volume of coal exports) will place new demands on landside goods movement facilities (rail and highway) requiring major capital investment.

- Decline of the manufacturing industry will create a need for massive training and retraining to realign the skills of the labor force with changing employer needs.

- Economic growth in the coming decade will depend on:

  . provision of public infrastructure to attract growth industries, and
  . training of a labor force with skills required by growth industry.

Again, this listing does not reflect the full measure of the scenario analysis (more detail is provided in Appendix E). It does illustrate the broad direction of the study which provided an explicit statement of future concerns. Since these are only implicit and loosely defined in conventional plan making, the study has provided a reevaluation of long range regional needs.

2. Integration of Long and Medium Range Planning

Within the project, the long range needs were linked to mid-range planning by the policies developed in response to the scenario conditions and recommended for inclusion in the 1982 GDP. These policies are listed in part A of this chapter; in most cases, the relation to the general issues listed above is apparent, but detailed discussion of the expected impact of the policies on specific scenario conditions is contained in the full scenarios in Appendix E.

3. Future Influence of the Energy/Transportation Futures Study

Most of the long range needs have not been articulated in the traditional planning process, have received little attention by the regional planning community, and are not well-addressed by existing projects or programs. Clearly, it was impossible to fully develop many of the issues raised during the course of the project or to fully evaluate all of the policies which were proposed. If the Futures Study is to have any lasting benefit, it will require considerable shifting in the ongoing planning process to further pursue its initial findings.

D. Support of the Study Results from Regional Policy Makers

This application of the scenario process is an ideal vehicle for gaining support for the policy outcomes, in that the panel was deeply involved in analysis of the factors which produce them and, thus, has a greater appreciation for their value and implications. This differs from the procedure in the traditional planning process where staff conducts the analysis, develops policy options and recommends them to decision makers who may only partially understand the rationale behind them. The success of the scenario effort in this regard hinges, then, on participation by those who are influential in the decision making structure. In this case, elected officials from each of the jurisdictions comprising the region and influential leaders from various planning and implementing agencies ensured that this objective was achieved to some degree. The panelists and their positions are listed in Figure 8.

It was pointed out above that the value of the project depends on the degree to which its findings are incorporated into the ongoing planning process. For this to occur will require that the panelists introduce the planning experience into their continuing planning roles. The only indication at this point that they will do so is the post project surveys which show that participation in the process has influenced the approach that a majority of panelists bring to their ongoing activities, and identified for them areas where they felt the normal planning process should be improved or taken in new directions. But the surveys do not suggest the degree of commitment of the panelists or how influential they might be as advocates of change.

E. Education of Decision Makers (Panelists)

The educational value of the project was seen as giving decision makers a better understanding of the trends and conditions from which policy directions derive. At the beginning of the project, it was realized that the panel would have to deal with large quantities of information on national and regional trends and conditions in energy, transportation, and economic and land development; and discuss the implications of this information on future regional conditions. It was expected that this process would alter many of the views and opinions held by the panelists at the outset of the study. To measure the extent to which this would occur, the panel was asked

to complete the same questionnaire prior to its first meeting and again after its final session. The survey which focused on energy conservation strategies, transit demand, ridesharing, government investment priorities, and land use is contained in Appendix A. A comparison of the before and after responses revealed that the panel's opinion changed on twenty-six of the fifty-five questions in the survey. The significant opinion shifts were these:

- Transit: Following the project, the panel showed less faith in conventional transit as a solution to urban transportation problems, especially its ability to

  . efficiently serve low density suburbs,
  . improve access to jobs,
  . significantly contribute to fuel savings.

- Paratransit: During the project, the panel became less optimistic about the potentials of paratransit to gain new ridership and, thus, its ability to solve many transportation problems.

- Fuel Supplies and Conservation: After the project, the panel was more pessimistic about fuel price increases and the portion of family budgets it would consume. They also believed more strongly that higher prices were the only way to reduce consumption, but, inconsistently, became more firmly committed to incentives to increase the use of high mileage vehicles.

- Government Priorities: The panel's priorities for transportation investment shifted; the importance placed on highway expansion and maintenance and transit expansion dropped; the importance placed on ridesharing, port expansion, and landside freight movement facilities increased.

- Satisfaction with Data Available for Decision Making: After the project, the panel displayed less satisfaction with information available to them in the course of their planning activities. They felt the greatest need for information on transit user rates, land development patterns, and home to work trip data.

Of course, the surveys do not provide a basis from which to make firm generalizations. However, two observations seem reasonable:

1. The panel became more analytical during the course of the project. The declining faith in transit and paratransit suggests a greater appreciation for the interaction between these modes and other factors such as land use patterns and gasoline prices. Certainly, the growing dissatisfaction with information available to them for decision making would confirm this observation.

2. The responses suggest a departure from the attitudes which are implicit in the ongoing planning process; that transit and paratransit can assume substantially larger roles in the transportation system and the central attention normally given to highway investment.

Of course, it is impossible to say if these are temporary or permanent attitude changes, and what will be their influence on continuing planning activities.

The survey dealt almost entirely with transportation and energy and, to a lesser extent, land use; and thus, measured only one aspect of the panelists' opinions. Economic development, labor force education, and government revenues were major topics in the study, and it is reasonable to expect that there were notable attitude changes in these areas.

F. Test and Further Develop the Scenario Analysis Technique for Application to Long Range Regional Planning

The Energy Futures Study employed a technique where alternative future conditions are described in terms of the interaction of a limited number of key factors (independent variables); the identification of and values assigned to those factors is determined by a panel whose final task is to determine policies which respond to the future conditions described by the scenarios they have created. While constructing plans on the basis of a number of alternative futures has been widely practiced, the exact methodology used in this effort had previously been employed only by industry and not tested in the context of a council of regional governments. Of interest to other potential public sector users are:

- The actual procedure for conducting such an effort as well as problems which have been encountered and successful aspects; and

- The suitability of this technique to planning in the public sector.

These are discussed in detail in Chapters IV and V.

IV: THE SCENARIO PROCESS

An abbreviated description of the scenario process and this study is contained in Chapter I. The following is a step-by-step documentation of the project as it was executed with comments on:

- o considerations which determined various actions;
- o problems encountered; and
- o potential solutions to those problems.

A. Staff Preparation Prior to the First Panel Meeting

Materials developed for the first meeting are contained in the technical appendices.

1. Set Project Objectives

a. The project was intended to:

- . Contribute to the 1982 GDP and Future Work Programs.
- . Examine the relationships among energy conservation, transportation, and regional development.
- . Reevaluate long range needs of the region, and integrate long and medium range planning.
- . Gain support for the study results from regional policy makers.
- . Educate the decision makers involved in the project.
- . Test and further develop the scenario analysis technique for application to long range regional planning.

b. Considerations:

The multiple scenario analysis technique allows for considerable flexibility in this regard. For example, we could have set a limited objective of examining the implications of various energy futures on transportation revenues or confined the study to transit needs across a range of future energy supplies. Instead, our objectives were broad, and there was no effort to limit the substantive content of the study. This was felt appropriate since the undertaking was intended to demonstrate the methodology and would involve regional decision makers whose interests extend beyond transportation. It was realized that this would mean many issues would not be fully developed.

2. Select Panel

a. The panel members and their titles are shown in Figure 8.

b. Considerations:

. Because a major objective of the project was to gain support for the plans and issues it generated, it was necessary to achieve a good representation by those influential in the planning and decision making structure of the region.

. Given the subject of the study, it was also desirable to include representatives from public energy and transportation agencies.

. It was hoped that representation by the private sector would provide a valuable new perspective to a process largely confined to the public sphere.

Naturally, the panel has great bearing on the substance of the project. For example, limiting membership to officials from transportation agencies would probably have increased the attention given to transportation and reduced the concern with economic issues.

3. Establish Meeting Schedule

a. Pertinent project dates were:

EVENT	DATE	TIME ELAPSED
Contracted project start	July 20, 1981	
First Panel Meeting	October 21, 1981	3 months
Second Panel Meeting	December 10, 1981	2 months
Third Panel Meeting	March 25, 1982	3 months
General Development Plan Adoption	October 15, 1982	N/A
Final Project Report	January 19, 1983	10 months

b. Considerations:

. The timing and duration of the meetings was determined by balancing:

- limitations on the panelists' time;
- the necessity to cover minimal amounts of materials and allow the panel to become involved in the process;
- the necessity for staff work between meetings; and
- overall project schedule.

Figure 8

PANEL MEMBERS

The Honorable J. Hugh Nichols* - County Executive, Howard County; Chairman, Regional Planning Council
The Honorable Walter S. Orlinsky - President, Baltimore City Council
Mrs. Florence Beck Kurdle - Planning and Zoning Officer, Anne Arundel County; Chairwoman, General Development Plan Committee
Ms. Honora M. Freeman - Assistant to County Administrative Officer, Baltimore County; Vice-Chairman, RPC Transportation Steering Committee
The Honorable Louis B. Scharon - President, Board of County Commissioners, Carroll County
The Honorable Barbara Kreamer - Member, Harford County Council
The Honorable Ruth U. Keeton - Member, Howard County Council
Dr. James P. Chandler - Regional Planning Council; Vice-Chairman, General Development Plan Committee
The Honorable Catherine I. Riley - Maryland House of Delegates; Co-Chairman, Joint Legislative Energy Committee
The Honorable J. Thomas Barranger - County Executive, Harford County; Chairman, RPC Transportation Steering Committee
Mr. Donald Clark - Vice President, Business Communities Department, McCormick Properties, Inc.; RPC Regional Economic Development Committee
Dr. Paul Massicot - Director, Maryland Energy Administration, Department of Natural Resources
Mr. Frederick L. Dewberry - Deputy Secretary, Maryland Department of Transportation
Mr. Frederick Gottemoeller - Deputy Administrator, State Highway Administration, Maryland Department of Transportation
Mr. David A. Wagner - Administrator, Mass Transit Administration, Maryland Department of Transportation
Mr. Walter E. Woodford, Jr. - Director of Engineering, The Rouse Company
Mr. James Hobbs II - Director of Transportation, General Motors Corporation, GM Assembly Plant

* Ex-Officio panel member.

These factors suggested three, day-long sessions with the dates for the last two remaining flexible and dependent on the outcome of the previous sessions and the consequent requirements for staff work.

c. Problems Encountered:

In none of the day-long sessions was it possible to adequately cover all of the agenda items, meaning that much of the work which was intended to be accomplished through group discussions was actually done through mailings, telephone straw votes, and staff produced proposals with panel comment and approval. Specific instances are cited where they are significant.

d. Potential Solutions:

Two possibilities were considered:

- Imposition of a rigid structure on meetings to save time. This was rejected because it would have precluded much of the free-wheeling discussion from which many of the projects' most valuable ideas arose.

- Increasing the number of sessions. This was rejected because of heavy demands on the panelists' time.

Post-project interviews indicate that the panelists were generally satisfied with the meeting length and frequency.

4. Prepare and Distribute Pre-Project Questionnaire to the Panel

The questionnaire was intended to measure changes in attitude of the panel members over the course of the project.

The full questionnaire is contained in Appendix A, Part I; the before and after results are discussed in Chapter III.

5. Prepare and Distribute Background Materials to the Panel

The objective in selecting the background material was to prepare the panel members for the first session. The materials included:

a. Listing of panel members (Figure 8);

b. Description of the scenario building process (Appendix B, Part II);

c. Background data (statistical description of significant regional trends with the emphasis on energy and transportation) (Appendix B, Part III);

d. Listing of the energy, transportation and land use goals of the RPC, State Department of Transportation, and local governments (to aid in selection of study goals in the first meeting) (Appendix B, Part IV).

The use of these materials is more fully discussed below in relation to the panel sessions.

6. Dry Run of Process by Staff

a. A considerable amount of time was devoted to staff discussion of how the process should work in a textbook sense and how that model should be altered for this project. Following this, two half day sessions were devoted to abbreviated dry runs of the entire scenario process with RPC department heads and JHU faculty acting as panelists.

b. Considerations:

It was agreed that the panel, within the general framework of the process, should be allowed to pursue the directions it felt most important since much of the potential value of the process lay in the group dynamics. This, however, introduced a good deal of unpredictability into the meetings. The dry run was tremendously helpful as a predictor of what should be expected, what problems might be encountered, and a general understanding of the dynamics of scenario analysis. Because of its great value, it may have been preferable to conduct the dry run as one of the very early steps in preparing for the actual meetings. The knowledge gained from actual participation would have been valuable in developing background material and developing project schedules and meeting agendas.

B. The First Panel Meeting

The minutes of the first panel meeting are contained in Appendix B.

1. Description of the Scenario Process

a. The materials sent to the panel included a diagram and a description of the process (see Appendix B, Part II). This material was reviewed as the first item.

b. Problems Encountered:

Scenario building is far more complex than it seems from simply reading a description of the process. During the sessions, the panel is asked to consider the interaction of a number of primary factors (independent variables--this study was limited tc three), their cross impacts on some lesser factors (dependent variables such as housing supply or vehicle miles of travel), how these interactions affect the

region's goals, and, finally, what impact policies might have on the resultant conditions. It is almost certainly true that the panel will act more effectively and devote less time to extraneous discussion if these interactions are firmly implanted and kept in mind throughout.

c. Potential Solutions:

Two factors would seem valuable in keeping the panelists aware of the scenario process and their progress:

. A large graphic, diagraming the process which can be referred to at the beginning of and during each session.

. The role of the panel moderator:

Although this project did not seek to impose a rigid structure on the meetings, the moderator was in a position to constantly relate the panel discussion to the more formal elements of the process. This demands that the moderator be deeply involved in the staff work throughout the exercise and argues against use of some prominant figure who is involved only during the meetings.

2. Review of Background Data

a. Review and discussion of the data which had been distributed to the panel prior to the first meeting. The material is included in Appendix B, Part III; it was summary information on regional and national trends in:

. Transportation
. Land Use
. Energy supply and costs
. Population, employment, and personal consumption
. Government revenue and expenditure
. Environment

At this point, the panel also requested the staff to develop additional data prior to the second meeting.

b. Considerations:

The materials were intended as a reference for the panel during various phases of the scenario process. Two considerations determined the selection and format of the material:

. It was the intention to allow the panel to develop the issues they considered most important to the future of the region. Thus, the

data constitutes a wide ranging description of the region with no special emphasis on any particular topic. It is unlikely that emphasizing a particular topic would have influenced the direction of the study because most panelists had concerns which they wished to address during the study and were not willing to confine the discussions to the issues suggested by the background data.

. The data was presented in graphic form. This placed least demand on the panelists' time, increased the probability that they would review it, and made it a more useful tool during the meetings.

3. Discussion of Study Guidelines

a. For this project which was intentionally left open, the study guidelines included only the time horizon (10 years) and geographic limits (the city and five surrounding counties).

b. Considerations:

The guidelines have a tremendous bearing on the content of the study. For example:

. If the staff had requested that the study be confined to transportation and energy, economic growth would not have been included as one of the key factors (independent variables) affecting the region and many of the significant relationships between economic development and transportation would not have been raised.

The panel insisted that the study have a ten year time horizon. A twenty year time frame would have focused more attention on development in automotive technology and telecommunication alternatives to travel.

4. Selection of Goals and Evaluation Criteria

a. The goals of the region's six jurisdictions, the 1977 GDP, and the State Department of Transportation had been mailed to the panel (Appendix B, Part IV) to provide guidance in selecting goals for the study. The panel members from the public sector were adamant that governmental goals must be very general to gain public concensus and indicated that the region's present goals should be used in the Futures Study. The staff was charged with consolidating the goals from the mailout and developing evaluation criteria.

b. Considerations:

According to the literature on scenario analysis, selection of specific, measurable goals will guide the remainder of the study. As the scenarios are developed, future conditions will emerge which prevent goal achievement. The panel develops policies which will

alter the conditions so that goals will be attained. The evaluation criteria are indicators, preferably quantifiable, which measure goal achievement and, thus, the success or failure of selected policies. For example, if a goal were: a twenty percent reduction in regional motor fuel consumption; a reasonable policy response might be: promotion of transit and ridesharing; and the evaluation criteria measuring the success of the policy would be: gasoline and diesel fuel sales over a certain period. In this way, the analysis revolves around measurable goals and the actions necessary to attain them under varying sets of circumstances posed by the alternative scenarios.

c. Problems Encountered:

Clearly, the use of general goals in the study meant that it would be less orderly than had been intended. It is not possible to trace the impact of a given scenario on a general goal such as "Provide a balanced transportation system." Given that undefinable relationship, policies cannot be shaped to respond to specific requirements and conditions posed by the scenarios do not provide a specific direction for the panel in determining the key policies of greatest significance for the future. Instead, they must respond in a general way to the overall situation suggested by the scenario. Also, the weight of the policy recommendations is weakened because it is impossible to say "This policy must be adopted to achieve this goal, which is endangered by this supply of energy."

This disparity from the ideal situation certainly need not reduce the value of the exercise; it did, however, mean that the impact of scenarios on goals and the relation to policies was too complex to be fully explored during the panel sessions, forced this important aspect of the process to be more deliberately examined by the staff, and deprived the panel of the full value of one aspect of the exercise. Further, as suggested above, the value of the policy recommendations was somewhat less since it was difficult to trace out a policy's particular significance in attaining a particular goal in the face of a particular set of regional problems.

d. Potential Solutions:

Two alternatives might be considered:

. It would have been possible for the staff to draft a set of hypothetical goals based on those actually adopted by the region. For example, one might have been "Reduce the expenditure on transportation as a portion of Gross Regional Produce by one percent per year" which could have easily been measured, traced through the scenarios and is not inconsistent with existing goals. But forcing this hypothetical mechanism on the system would probably have had little value for many panel members who were interested more in substantive results and less the theory of the process.

. To some extent, this difficulty would have been reduced if the scope of the study had been more limited; for instance, if the only concern had been the transportation-energy relationships that would have greatly reduced the number of goals and policies and made the task more manageable for the panel and staff. This is not to say that the broad scope employed for this project does not have offsetting advantages, but to point out that a tradeoff exists which should be considered.

5. Selection of Independent Variables and Their Values

a. Independent variables are the factors which will be the primary determinants of the final scenarios. As the term implies, they are conditions beyond the control of the institution being studied (in this case, the Baltimore Region). The panel was asked to consider the factors which would have the greatest influence on the region over the coming ten year period. Their discussion generated an initial list which included federal transportation policy, natural resources, national economic development patterns, and the national political climate. The staff explained that the variables would be arrayed in a matrix, with certain cells constituting the basis for the scenarios, and requested that the list be reduced to three variables which would limit the cells to a manageable number. The panel was also asked to consider value ranges for each of the selected variables. The final panel concensus was for these variables and values:

. Energy Availability: Stable and Short Supply
. Economic Growth: Vigorous, Slow/Stable, Decline
. Technological Innovation: To Increase, to Decrease Trip Making

b. Considerations:

Naturally, the independent variables shape the study. For example, if Energy Availability, Technological Innovation, and Federal Transportation Policy had been chosen, the study would have had a far stronger transportation orientation.

6. Discussion of Skeleton Scenarios

Using a chalk board, the staff drew and labled a twelve cell matrix showing all possible combinations of the variables and their values, with each cell representing a scenario or possible future for the region. The panel was asked to consider three or four cells which would be developed into full scenarios; it was suggested that the selected scenarios should include:

o Scenarios which are most likely to occur, and

o Scenarios which might be unlikely but which would demand the strongest policy action.

The panel discussed the matrix briefly and agreed that final selection would be made at the second panel meeting.

7. Summary of First Session and Setting Dates for the Second Session

   a. The summary was intended to reinforce for the panel its progress through the process.

   b. Considerations for the date of the next session were: time required for staff preparation; continuity of the process; and schedules of the panel members. The second meeting was scheduled for approximately a month and a half later.

C. Staff Preparations Prior to the Second Panel Meeting

1. Response to Panel Requests for Data from the First Meeting

   a. In the first panel meeting, the panel requested that the staff complete three tasks prior to the second meeting:

      . Prepare additional data on regional and national conditions and trends to be used during ensuing discussions.

      . Consolidate the goals of the local governments, the 1977 GDP, and the Maryland Department of Transportation (MDOT) into a single listing to be used as goals for the study.

      . Develop evaluation criteria to measure attainment of the goals.

      These materials were prepared and mailed to the panel. The data is contained in Appendix C, Part II, and the goals and evaluation criteria are shown in Figure 9.

   b. Problems Encountered:

      The problems associated with general goals were discussed above under B.4. These were reflected in the evaluation criteria which frequently failed to measure the full intent of a particular goal. For example, travel times and number of trips per capita became measures for the goal "Provide for adequate movement of people to promote land development goals."

   c. Potential Solutions:

      These are discussed under B.4.

2. Develop Scenario Skeletons

   a. When independent variables have been selected and their values chosen, they are arrayed to form a matrix showing all of their possible combinations. The cells in the matrix are called skeleton scenarios in

Figure 9

STUDY GOALS AND EVALUATION CRITERIA

Goals	Scenario Policy Evaluation Criteria
TRANSPORTATION	
Provide for adequate movement of people to promote land development goals.	o GRP lost due to inadequate transportation facilities.
Provide for adequate movement of goods and services to promote economic development goals.	o Amount of fuel used per ton mile.
Respect social and natural environments.	o Roads with E or F service levels and rail shipping times.
Maintain mobility for all segments of the population in face of severely increasing transportation costs plus uncertainty of fuel supplies.	o Amount of land taken for transportation facilities.
LAND DEVELOPMENT	
Promote a centralized development pattern.	o Distribution of new building permits in/outside development areas.
Foster growth in planned urban areas, for all uses.	o Relative economic and social strength of city. - % of public school children passing national exams. - differential in crime rates between city and suburbs.
Maintain and revitalize existing communities.	
Provide appropriate public services, facilities and land use designs for planned growth areas which will be competitive with other regions.	o Average trip length. o Amount of inadequate capacity of sewerage and highway facilities.
Preserve prime agricultural land for farming.	o Amount of agricultural land lost to urban development.

Figure 9 Cont'd.

Goals	Scenario Policy Evaluation Criteria
ECONOMIC DEVELOPMENT	
Promote economic development through retention and expansion of existing enterprises and the attraction of new activities.	o GRP/per capita. o Unemployment rate.
Promote fullest and diversified employment.	o Growth in disposable income.
Opportunity for every citizen to achieve economic wellbeing.	o State and local taxes as a proportion of per capita income.
Generate public revenues to provide necessary services.	
Promote a diversity of economic enterprises which meet present and future needs, that is a distribution of jobs in industrial, commercial, service, governmental and agricultural activities.	
NATURAL ENVIRONMENT	
Preserve the natural environment.	o Change in air and water quality levels amount contributed by transportation sector.
Increase benefits of the natural environment to the public.	o Average travel time to a major park facility.
HOUSING	
Promote adequate choice of decent homes.	o Percent of homes in area served by transit (for non-auto households). o Vacancy rate. o % of household budget spent on housing. o % substandard stock.

Figure 9 Cont'd.

Goals	Scenario Policy Evaluation Criteria
ENERGY	
Increase efficient use of energy resources.	o BTUs used in transportation sector.
	o BTUs used per capita.
Increase utilization of indigenous resources.	o % of energy produced in region.
Increase conservation of petroleum.	o Passenger miles/gallon.
GOVERNMENT DECISION MAKING	
Improve government capability to respond to changing conditions.	o Time required to plan and implement transportation and land use development projects.
Reduce implementation time of public projects.	o Number of separate regulatory reviews required.
Target employment programs to meet specific economic development objectives.	
Clarify government's role in provision of housing in region.	
Improve government capabilities to measure preservation of the environment.	
Improve government capacity to mediate conflicts between environmental preservation and economic development.	

that they contain the fundamental elements which will determine an alternative future or scenario.

b. The panel's discussion of independent variables in the first session was tentative and meant to provide the staff with enough guidance to more carefully specify exact dimensions and values of the independent variables for final panel approval at its second meeting. The staff presented the proposed variable definitions and the justifications for determining them in the form of a memo which was mailed to the panel prior to the second meeting. Appropriate excerpts are shown below.

o ENERGY AVAILABILITY

"CONSIDERABLY DIFFERENT SCENARIOS WILL RESULT IF ENERGY AVAILABILITY IS INTERPRETED AS THE AVAILABILITY OF ALL FORMS OF ENERGY OR THE AVAILABILITY OF OIL ONLY. SINCE THE AVAILABILITY OF ALTERNATIVE FUELS CAN BE EXPECTED TO BE DEPENDENT AND, THEREFORE, COVERED UNDER TECHNOLOGICAL AND COMMERCIAL INNOVATION, IT IS RECOMMENDED THAT THE PRESENT INDEPENDENT VARIABLE BE REVISED TO 'OIL AVAILABILITY.'

THE PANEL CHOSE AS DESCRIPTORS OF ENERGY AVAILABILITY 'STABLE' AND 'SHORTAGE.' THE IMPLIED DEFINITION OF 'STABLE' AS APPLIED TO OIL AVAILABILITY IS THAT OF EQUILIBRIUM BETWEEN SUPPLY AND DEMAND SUCH THAT A SMALL INCREASE IN DEMAND WILL RESULT IN A CORRESPONDING SMALL INCREASE IN PRICE."

"'SHORTAGE' IS TAKEN TO IMPLY A DEMAND IN EXCESS OF SUPPLY WITH THE SUPPLY LEVEL BEING RELATIVELY INSENSITIVE TO SMALL PRICE INCREASES. THE PANEL IS ASKED TO CONSIDER THE DEPTH OF THE SHORTAGE, E.G., MODERATE (A SHORT FALL OF 10% OR LESS) OR SEVERE (SHORT FALL OF 15% OR MORE), AND THE FREQUENCY AND DURATION OF THE SHORTAGES OVER THE TIME SPAN OF THE SCENARIO.

THE STAFF SUGGESTS THAT FOR THE SCENARIO SELECTION PROCESS A DESCRIPTOR 'PLENTIFUL SUPPLY' BE EMPLOYED IMPLYING EASY AVAILABILITY OF OIL TO MEET SMALL INCREASES IN DEMAND WITH LITTLE OR NO EFFECT ON THE PRICE OF OIL."

o ECONOMIC GROWTH

"ECONOMIC GROWTH CAN BE RELATED TO THE REAL CHANGE IN THE GNP OR, ON A REGIONAL BASIS, GROSS REGIONAL PRODUCT (GRP). VIGOROUS ECONOMIC GROWTH WOULD THEN IMPLY A REAL ANNUAL GROWTH OF GNP OF ABOUT 3 TO 4% WHILE SLOW, STABLE GROWTH CAN BE TAKEN AS 0 TO 2%. IN ACCORD WITH THE PANEL DISCUSSION, THE DECLINING ECONOMIC SCENARIO WILL BE ASSUMED TO REPRESENT A DECREASE IN GNP, PERHAPS IN THE ORDER OF 2% ANNUALLY.

OTHER ECONOMIC MEASURES SUCH AS EMPLOYMENT, PRODUCTIVITY, CAPITAL AVAILABILITY, ETC., WILL BE TREATED AS DEPENDENT VARIABLES AND WILL BE ADDRESSED IN THE DISCUSSIONS OF THE SPECIFIC SCENARIOS."

- o TECHNOLOGICAL INNOVATION

  "IN THE TEN YEAR TIME FRAME CHOSEN FOR THE SCENARIO DEVELOPMENT, THE DEVELOPMENT AND COMMERCIALIZATION OF NEW TECHNOLOGY FROM THE INITIAL CONCEPT STAGE WILL BE RARE. RATHER THE NEW TECHNOLOGY INTRODUCED INTO THE SCENARIO SHOULD BE CURRENTLY IN THE LATTER STAGES OF DEVELOPMENT OR EARLY COMMERCIALIZATION. THE CONCEPT OF INNOVATION WILL ALSO INCLUDE 'LOW TECHNOLOGY INNOVATIONS' THAT REPLACE CURRENT TECHNOLOGY, E.G., INCREASED USE OF ENERGY SOURCES SUCH AS SMALL SCALE HYDROELECTRIC POWER, RENEWABLE RESOURCE DEVELOPMENT, ETC.

  OVER THE TIME FRAME OF THE SCENARIO, IT IS LIKELY THAT THE COMMERCIALIZATION OF NEW TECHNOLOGIES THAT CONTRIBUTE TO BOTH A REDUCTION AND AN INCREASE IN THE NUMBER OF TRIPS WILL OCCUR NEARLY SIMULTANEOUSLY, IF INDEPENDENTLY. A SCENARIO THAT ASSUMES THE DEVELOPMENT OF ONE OF THESE TECHNOLOGIES (E.G., TRIP REDUCTION) WHILE EXCLUDING THE OTHER TECHNOLOGY (E.G., TRIP INCREASES) IS LIKELY TO BE A LOW PROBABILITY SCENARIO. THE STAFF, THEREFORE, RECOMMENDS THAT BOTH FORMS OF INNOVATION BE CONSIDERED IN ANY INDIVIDUAL SCENARIO DEVELOPMENT AND THAT THE DESCRIPTORS FOR COMMERCIALIZATION BE TAKEN AS 'RAPID' OR 'SLOW' COMMERCIALIZATION OF NEW TECHNOLOGY WHICH WOULD HAVE AN IMPACT ON TRANSPORTATION.

  RAPID COMMERCIALIZATION CAN THEN BE TAKEN TO MEAN THAT A SIGNIFICANT PORTION OF A CURRENT ACTIVITY OR TECHNOLOGY HAS BEEN REPLACED BY NEW TECHNOLOGY OR ACTIVITY. FOR EXAMPLE, 10% OR MORE OF ALL URBAN AUTOMOBILE TRIPS IN 1992 WILL BE MADE IN ELECTRICALLY-PROPELLED AUTOMOBILES. SLOW COMMERCIALIZATION WILL THEN IMPLY THAT NEW TECHNOLOGY WILL HAVE LITTLE OR NO IMPACT ON CURRENT ACTIVITIES OR TECHNOLOGY. FOR EXAMPLE, LESS THAN 5% OF URBAN AUTOMOBILE TRIPS IN 1992 WILL BE MADE IN ELECTRICALLY-PROPELLED AUTOMOBILES."

c. The staff also arrayed the variables in an 18 cell matrix and wrote brief descriptions of the conditions in selected cells based on the more sharply defined dependent variables. The matrix was similar to the one shown in Figure 1, and the descriptions for selected cells were:

   - o Scenario 7 - may be representative of the 1950s and 1960s.
   - o Scenario 18 - may be representative of the period from 1930 to about 1934.

- Scenario 17 - may represent the period from 1935 to 1940.

- Scenario 5 - may be considered to be represented by the period from 1976 to 1978 since there was rapid commercialization of new automotive and electronic technology.

- Scenario 9 - may represent 1980 and 1981.

- Scenario 10 - may represent WW II in that non-military technological innovation was delayed, and there was a domestic shortage of fuel.

This material was also sent to the panelists so that they could consider it prior to selecting the scenarios to be more fully developed during their second meeting.

4. Develop a Proposed List of Dependent Variables

a. The dependent variables, together with the independent ones, determine the scenario conditions. Their values are determined by the independent variables but are also subject to control by regional policy. There can be a very close correspondence between these and the evaluation criteria except that:

   - they can be more general (e.g., an evaluation criteria might be vehicle miles of travel (VMT) while the dependent variable would be personal travel and goods movement); and

   - they need not directly correspond to the study goals (e.g., housing might be a dependent variable even if there were no housing goals in the study).

   While the dependent variables may be discussed in broad and subjective terms in the scenarios, it is desirable to assign, at least informally, specific dimensions to them (e.g., housing supply available to a certain portion of the population).

b. The staff prepared a tentative listing and mailed it to the panel with a memo indicating that they would be asked to:

   - add to or delete from the list, and

   - discuss how the dependent variables would be affected in the chosen scenarios

   during the second meeting. (The final listing of dependent variables is shown in Figure 11. It does not differ substantially from the initial staff listing.)

c. Considerations:

As with the goals and overall scope of the study, there should be careful consideration of the number of dependent variables since the cross impacts of all elements of the scenarios becomes increasingly complex as the number of factors grows. Obviously, more careful attention can be paid to a small number of variables; while on the other hand, limiting the variables risks that some very important relations with the independent variables will be ignored.

5. Minutes of the First Meeting

a. Minutes were written and distributed to the panel; they are contained as Appendix B, Part I.

b. Considerations:

The sessions were taped. The tapes combined with the detailed minutes were extremely valuable to the staff in developing scenarios and other materials intended to respond to the general direction provided in the panel discussions.

6. General Comments on Staff Preparation Prior to the Second Meeting

a. Meeting Format:

o Problems Encountered

The objective for the meeting format was to have a free flow of ideas among panel members while keeping the discussion within the formalized limits of the scenario building process.

o Potential Solutions

Much of the staff preparation for the second session concerned strategies to keep the panel aware of the scenario framework without becoming mired in its complexities. It was decided that the best overall approach would be to provide a number of large charts showing the process components (flow diagram of the process, scenario matrix, list of dependent variables) prominantly displayed and providing a constant context for the panel. This was felt to be preferable to the moderator assuming a more dominant role and guiding the panel through the process. It was, however, decided that some aspects of the next session would demand a very structured discussion (for example, how each of the dependent variables would change in each of the selected scenario skeletons) and that the staff must insist on some degree of formality for those phases.

Figure 1 (Scenario Matrix), Figure 10 (Flow Diagram of the Scenario Process), and Figure 11 (Dependent Variable Listing) were replicated on 30" x 40" boards and used in the following meetings.

b. Time Limits During Panel Meetings:

- o Problems Encountered

  There had not been time in the first session to complete all of the scheduled items. Thus, the staff was charged with finalizing goals and developing lists of dependent variables and additional data requested. This material was voluminous, and the panel review was critical since it would replace an event which was to have taken place in the first session.

- o Potential Solutions

  In light of this, a great deal of staff effort was devoted to developing formats which would condense the material and make it as palatable as possible in order to encourage a thorough review by the panel.

D. The Second Panel Meeting

1. Description of the Scenario Process

a. A 30" x 40" version of Figure 10 was used to review the process and show the panel how far it had progressed.

b. Considerations:

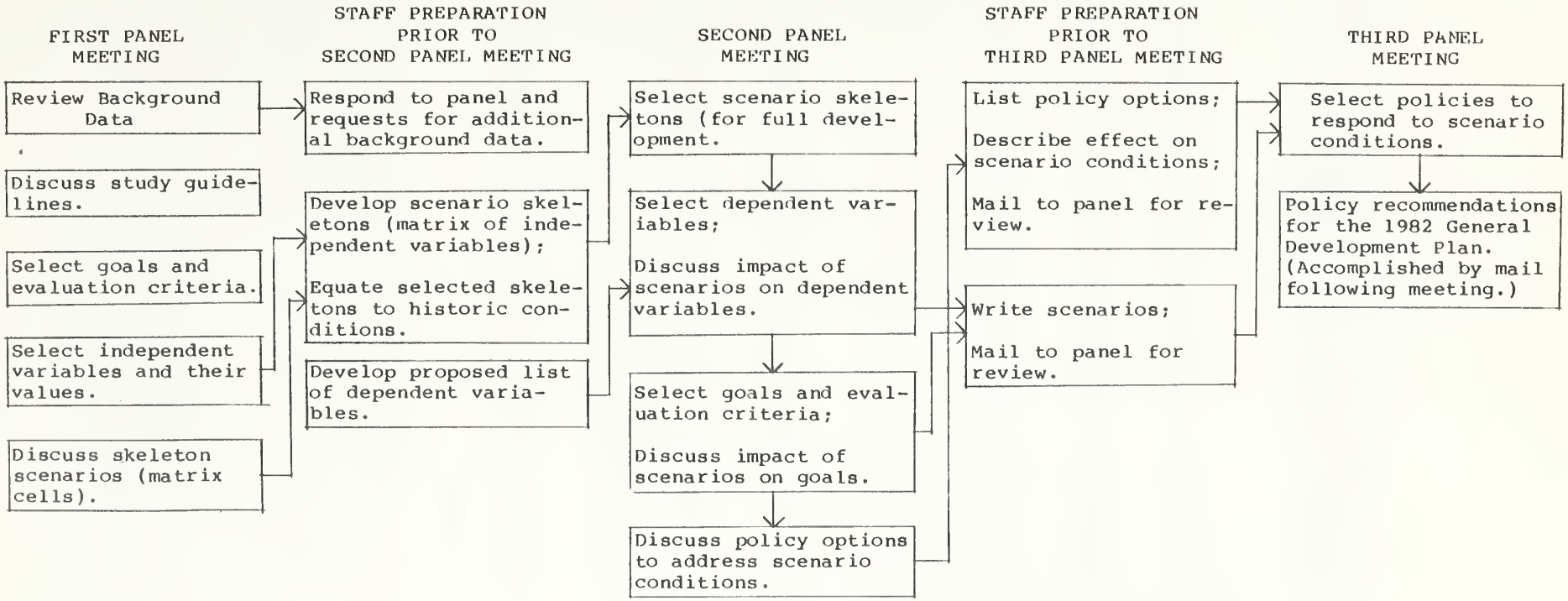
The review was felt necessary because of the complexity of the formal process.

2. Selection of Scenario Skeletons

a. As discussed under C.2, the staff had carefully defined and assigned values to the independent variables selected during the first meeting and arrayed them in an 18 cell matrix (Figure 1). The matrix was displayed on a 30" x 40" board. The panel was first asked to approve the definitions and values for the independent variables, which they did. They were then asked to select three or four of the cells (skeleton scenarios) to develop into full scenarios. This was accomplished through discussion, which led to general concensus. Agreement was reached on cells 3, 5, 7 and a transition from 16 to 10 from Figure 1. These were labled Decline, Trend, Growth, and Transition Scenarios respectively and represent the following combination of factors: cell 3 presents the most pessimistic view of the

Figure 10

DIAGRAM OF THE SCENARIO PROCESS



future; cell 7, an optimistic view; and cell 5, a middle ground. The combination of cells 16 and 10 was included to examine the policy actions necessary to maintain favorable economic conditions in the face of a major fuel supply interruption.

b. Considerations:

To fully develop all of the cells would clearly have been unmanageable; thus, the need to select a few of particular significance.

3. Selection of Dependent Variables and Discussion of the Impact of Scenarios on Dependent Variables

a. The staff had prepared a chart showing a list of proposed dependent variables and blank spaces where the impact of the scenarios could be recorded (see Figure 11). A 30" x 40" version of this chart was used as a focal point for the discussion. The panel was first asked to recommend additions to the list. They were then asked to discuss the interactions between the dependent variables and the conditions posed by the scenarios. There were two aspects to this discussion:

- The direction of change. For example, it was felt that personal travel would be less in the Decline than in the Growth Scenario.

- The aspects of the dependent variables which would be most important. For example, the worldwide oil shortage would increase coal exports in the Decline Scenario and create very different problems than in the Growth Scenario where a rapid turnover in the industrial mix was expected to increase the use of air freight and cause capacity problems at the airport.

It was during this discussion that most of the relationships discussed in Chapter III, Parts B and C were voiced.

b. Problems Encountered:

This portion of the session was intended to be highly structured consisting of an orderly progression through the list shown in Figure 11. The panel discussion was slowed perceptibly by imposition of this formality, making it necessary to relax the procedure and allow freer exchange. Beyond this, time did not permit the panel to address all of the dependent variables in equal depth. Consequently, it was necessary for the staff to fit the panel's ideas into the formal structure of the process, in some cases on the basis of only very brief discussion. The balance between free expression and the structure of scenario building and time constraints were recurring problems throughout the process. This left for the staff the task of fitting the panel's ideas into the structure of the process.

Figure 11

IMPACT OF SCENARIOS ON DEPENDENT VARIABLES

DEPENDENT VARIABLES	3 Decline Econ Oil Tech	5 Trend Econ Oil Tech	7 High Growth Econ Oil Tech	16---10 Transition Econ Oil Tech
Personal Travel				
Goods Movement				
Road System				
Public Transit (MTA)				
Regional Jobs				
Unemployment				
Housing				
Energy Consumption				
Institutional				
Obsolete Infrastructure				
Development Density				
Paratransit				

c. Potential Solutions:

One panel member suggested that making the session rigid and formal from the start might have inhibited initial discussion, but that the panel would have adapted and displayed the same enthusiasm as they did in the less structured setting. The informal structure was probably a satisfactory forum for examining the broad relations between energy and a wide range of future regional needs. Certainly, in the case of dependent variable discussion, the results are felt to be satisfactory.

4. Selection of Goals and Evaluation Criteria and Discussion of the Impact of Scenarios on Goals

a. The panel approved the goals and evaluation criteria which the staff had prepared and mailed prior to the meeting (see Figure 9). Discussion of the impact of the scenarios on the goals was waived in favor of more pressing agenda items.

b. Considerations:

The function of specific goals in the scenario process and the panel's preference for general goals is discussed in Part B of this chapter.

The chosen goals were so general that it would have been impossible to differentiate the impact of the scenarios on most of them; so that this aspect of the study would have had little value. Moreover, there was an implicit consideration of goals during the discussion on dependent variables so that much the same thing was accomplished. For example, in considering personal travel as a dependent variable, the panel recognized that personal travel needs must be satisfied and that actions to accomplish that would vary depending on future conditions.

5. Discussion of Policy Options to Address Scenario Conditions

a. The staff had prepared a handout listing general policy areas which would serve to focus the panel discussion. The handout is included as Figure 12. The panel was asked to consider specific policies within the areas shown on the handout, keeping in mind the conditions in each scenario. The policies mentioned were:

- staggered work hours, flextime arrangements;
- parking management strategies;
- extension of paratransit;
- airport development;
- promotion of alternate fuels;
- labor force training;
- support of energy contingency plans;
- location decisions for public facilities.

Figure 12

GENERAL POLICY AREAS

TRANSPORTATION

1. Investment policies:
   highways-maintenance, capacity expansion
   transit-subway expansion, bus service expansion.
2. Policies resulting in incentives for ridesharing.
3. Parking management policies.
4. Policies related to provision of facilities for goods movement--rail, truck, port.

LAND USE

1. Policies impacting location of new residential units and employment.
2. Policies impacting expansion of sewer, water facilities.
3. Policies placing constraints/shifting public costs on developers.

ECONOMIC DEVELOPMENT

1. Policies to provide facilities to develop markets competitive with other areas.

ENERGY

1. Policies to improve the efficient use of petroleum products.
2. Policies to encourage alternative fuels.

GOVERNMENT DECISION MAKING

1. Policies affecting capital budget priorities.
2. Policies affecting government revenues.

Time limitations precluded listing of additional policies or discussion of their influence on scenario conditions. It was agreed that the staff would prepare a final listing of policies and indicate their applicability for each of the scenarios. Discussion of the impacts on the scenarios would occur at the next meeting.

b. Problems Encountered:

During this stage of the process, it was the intent that the panel develop a tentative list of policies aimed at achieving the study goals under each scenario. Two problems were most apparent in this stage.

- o The absence of a few specific study goals meant that the policies should address the whole gamut of problems and opportunities posed by the scenarios with only an implicit, undefined endpoint condition to serve as a guide. A more confined effort would have allowed very thorough consideration of a limited number of key actions.

- o Meeting time constraints which did not allow the panel to devote sufficient time to this issue and forced the staff to do most of the initial thinking on policy actions.

c. Potential Solutions:

The broad base of the study is considered a tradeoff, more than a failure. If the goals and the study had been confined only to transportation and energy, many of the interactions with land use and economic development would have received little attention, and their secondary impacts on transportation lost. Beyond this, as the panel pointed out in the first meeting, single, specific goals are so foreign to the public planning process that to base the study on them would probably have seriously reduced the credibility of its results.

Because the policies had to address so many areas and because only a limited time was available for discussion during the meeting, the staff was left with the task of developing a proposed list of policies with guidance provided by the general discussion. The staff also would indicate the effect of the policies in each scenario. The listing would be sent to the panel for their review and serve as a basis for their discussion of policies during the final meeting. This alternative was thought undesirable since it meant that one of the most significant aspects of the study would be given very little emphasis. In retrospect, it may have been less a sacrifice than had been thought because the mailout allowed the panel members to give more deliberate and careful consideration to each policy and, further, to view them in the context of the scenarios. This level of attention

would probably not have been given during a group discussion. Additionally, this interim task may have added some continuity which, given the time between meetings, was of some concern.

6. Summary of Second Session and Setting Dates for the Third Session

See Part B.9 of this chapter. The next meeting was tentatively set for three and one-half months later, depending on progress of staff work.

E. Staff Preparation Prior to the Third Panel Meeting

1. List Policy Options and Describe Effect on Scenario Conditions

a. The purpose of this work is discussed in Part D.5 of this chapter. It was developed in conjunction with the scenario writing described in E.2. The material which was mailed to the panel is contained in Appendix C as Attachments B and C to the minutes of the third panel meeting.

b. Considerations:

Considerable effort was devoted to formatting the material in the most succinct and clear way. It is felt that this was of value in gaining a careful review by the panel.

2. Write Scenarios

a. One staff person was assigned the responsibility of writing each scenario. The task of each writer was to take the input from the panel meetings and trace the effect of the independent variables, or scenario conditions, on the dependent variables and the evaluation criteria chosen to measure goal attainment. The resultant descriptions of future conditions would form the basis for listing policies and judging their impacts.

Considerable staff time was devoted to the process prior to the final writing for staff discussion of each scenario. It was agreed that each scenario would include certain common elements (e.g., employment rates, inflation, housing production) based on a review of the discussions in the earlier panel meetings. The staff persons would work through a draft including all of the elements and present it to the rest of the staff. The staff would comment on the reasonableness of assumptions, impact of policies and point out cross impacts which might not have occurred to the writer. When this had been done for each scenario, they were reviewed collectively for consistency. An important aspect of this last phase was to identify which policies were appropriate for all scenarios (e.g., ridesharing) and which were applicable to particular ones (e.g., a regional development agency has greater importance in a growing economy).

The final version of the scenarios which include policies and their effects are contained in Appendix E; a tabular summary is shown in Figure 13.

b. Problems Encountered:

Analytically, scenario building is best suited for computer analysis. An ideal situation would have allowed all of the scenario ingredients to be quantified, related by cross-impact elasticities and fed into a computer. Within the time frame of the study, it was impossible to develop such models or to adequately quantify the many variables being considered. Still, it is important to note that much of the power of scenario building lies in the interaction of quantified variables which establish firm limitations and force consideration of new policy directions. (For example, it was possible, even without computer simulations, to demonstrate that in a declining scenario with fuel shortfalls, traditional highway revenue sources would preclude capital spending of any kind by the end of the period. This extreme condition demanded consideration of policies such as tax base sharing and restructuring of transit operations which would never arise through the traditional planning framework.)

c. Potential Solutions:

The staff meetings which provided qualitative judgements on the interaction concerning the variables was probably the best alternative to computer analysis. Many of the variables would have been very difficult to accurately quantify and would have probably demanded an impossibly large research effort.

3. Mail Draft Scenarios to Panel for Review

a. The completed scenarios were mailed to the panel two weeks prior to the final session. The panel was asked to review the scenarios for possible revisions and as preparation for the last meeting.

b. Considerations:

The scenarios were each about twelve typewritten pages. It was realized that this volume of material would be forbidding. Therefore, a great deal of effort was devoted to developing formats and summaries which would facilitate the panel's review.

4. Phone Panel Members for Comments on the Draft Scenarios

a. Staff contacted panel members and requested comments on the draft scenarios.

Figure 13

COMPARISON OF KEY SCENARIO CONDITIONS
1983 - 1992

Variable	SCENARIO Decline	Trend	Growth	Transition*
Gross National Product	-1/2/year	+1%/year	+3%/year	+3%/year
Gross Regional Product	-1%/year	+1%	+4%/year	+4%/year
Inflation	10-15%/year	8-9%	6-8%	6-8%
Interest	15-20%/year	12-15%	9-12%	9-12%
Oil Availability	Tight	Available	Plentiful	Tight after supply disruption
Oil Price Change[1]	+1%/year	+2%/year	0%/year	0%/year; +65% in disruption year
Fleet Miles per Gallon	Increase most	Increase	Increase	Increase
Non-Traditional Auto as % of Total Fleet	5%	2%	1%	2%
Population Change	0 - (-1/2%/year)	0 - 1/2%/year	1%/year	1%/year
Population Location	Slow but Concentrated for New Growth	Slow but Concentrated for New Growth	Dispersion continues but Slower	After disruption experience concentrated Growth
Household Affordability	15%	25%	50%	50%
Unemployment Region City	 10% 15%	 7% 12%	 5% 8%	 5% 8%
Vehicle Miles of Travel (VMT)	1/2%/year	+1 1/2%/year	+3-5%/year	3% after disruption
Transit Service	Ridership ↑ Service ↓ Operating Revenue ↓	↓ ↓ ↓		↑ ↑
Paratransit Use	Strong Increse	Some Increase↑	Little Change	Strong after supply disruption

* Scenario similar to Growth Scenario until 1989 when there is a petroleum supply disruption.

[1] Relative to rate of inflation.

b. Considerations:

Because the scenarios were not mailed until two weeks before the final session, revisions prior to the meeting were not possible. They were, however, included in the final versions. The phone calls also served to encourage panel members to prepare for the final meeting.

5. Minutes of the Second Session

See Part C.5 of this chapter. Minutes of the second meeting are contained as Appendix C, Part I.

F. Third Panel Meeting

1. Description of the Scenario Process and Status of Work

See Part D.1 of this chapter.

2. Review of Scenarios

a. A handout comparing major factors across the scenarios was prepared (see Figure 13). The panel had made recommended comments on revisions to the scenarios during the staff phone calls or by mail, so that no additional discussion was necessary.

b. Considerations:

It is felt that this phase was a successful combination of staff preparation, panel review, and use of actual meeting time. It was assumed that the panel had reviewed the mailed out material and made appropriate comments before the meeting. This agenda item became a formality, leaving most of the day available for discussion of policy responses to the scenario conditions.

3. Discuss Policy Impacts on Scenario Conditions

a. In addition to the mailed out scenarios, tables which listed the policies applicable to the scenarios and their impacts (described in Part E.1) had been mailed prior to the meeting. (They are in Appendix C, Attachments B and C to the minutes.) The panel had been asked to review this material in order to facilitate the discussion of policies during the final session which was intended to provide a final list of policies to be recommended for inclusion in the 1982 GDP. These tables and the scenario summary (Figure 13) were used as working documents during the meeting.

b. Problems Encountered:

Despite staff efforts to condense and minimize the material, the broad range of the study resulted in voluminous policy and policy impact statements. Because of this great volume, the mailed out policies did not provide an ideal vehicle for systematic consideration of each policy, but, coupled with apparently good preparation by the panel, they were sufficient to produce an orderly exploration of the implications of the policies and revisions to them.

The substance of the discussion is summarized in Appendix D, Part I.

4. Policy Recommendations for the 1982 GDP

a. It was agreed that the staff would revise the policies in accordance with the panel discussion. These would be mailed to the panel members who would indicate, first, which policies should and should not be included in the GDP; and second, whether for implementation or for further analysis and study by the RPC. The majority vote of the panel would determine the recommendation for each policy.

b. Problems Encountered:

The staff was again forced to perform a task which would have better been addressed by the panel because of the time limits of the meeting.

G. Staff Work Following the Third Panel Meeting

1. Revise Policies and Mail to Panel for Approval

a. The staff, using comments received prior to the third session and the discussion at that session, revised the policy statements. The mailed materials also indicated the applicability of the policies to each scenario and included space for the panelists' comments concerning inclusion in the 1982 GDP.

The staff compiled the panel responses and developed a final listing showing the policies and the majority opinion of the panel as to how the policy should be treated in the GDP. The final policy listing and recommendation is contained in Appendix F.

b. Problems Encountered:

Although the panel was cooperative in reviewing and returning the material, this solution obviously does not permit the group interaction which would have been desired. This was particularly true with respect to which policies should be recommended for the GDP

where a majority vote was far less satisfactory than reaching concensus during the meeting. However, there was strong agreement among the panelists on most policies. Beyond this, most of the panelists were involved in preparation and approval of the plan through their roles in the continuing planning process, and this provided them with a second opportunity to express opposition to the final recommendations in instances where they disagreed.

2. Minutes of the Third Panel Meeting

See Part C.5 of this chapter. Minutes of the third meeting are in Appendix D.

3. Presentation of Panel Recommendations to RPC Committees for Inclusion in the 1982 GDP

a. The final panel policy recommendations were presented to various policy subcommittees of the RPC (Energy Policy Advisory Committee, Economic Development Committee, Transportation Steering Committee) and the General Development Plan Advisory Committee. These bodies were free to revise or delete the panel's recommendations.

b. Considerations:

Much of the more innovative and controversial policy developed during the process was lost during the approval process. This was probably inevitable since the Energy Futures Study was intended to develop new concepts while the GDP, due to the fact that it must receive approval from such a wide range of interest groups, is a very conservative document.

The fact that the majority of the panelists were influential members of the regional planning community did ensure that the recommendations were given a far more serious consideration than if they had come from another source such as the conclusions of a staff analysis. (Panel members and their positions are listed in Figure 8.) This was particularly true of the items which were recommended for additional study which, it would seem at this point, will have a good deal of impact on the work agendas of the RPC staff and the advisory committees in the coming year.

4. Distribute Post-Project Questionnaire to Panel, Compare Responses with Pre-Project Questionnaire

a. A questionnaire identical to that completed by the panelists prior to the first meeting was mailed (see IV A.4) and the results compared as a measure of how participation in the process had changed the panelists' attitudes on various energy and transportation issues, thereby providing an indication of the educational value of the scenario process.

The results of the pre and post-project responses are discussed in Chapter III, Part E; a copy of the questionnaire is in Appendix A, Part I.

b. Considerations:

Not all panel members completed the post-project questionnaire despite follow-up phone calls by the staff. This is not surprising since the qeustionnaire was lengthy and the time spent probably had little apparent value to the panelists. Because it was agreed that responses would be anonymous, it constitutes a problem in that it is not always certain if changes in responses result from altered views or different representation.

5. Develop and Distribute a Survey for Panelists' Evaluation of the Project; Conduct Telephone Survey of Selected Panelists

a. A brief survey was developed and mailed to the panelists as a vehicle for critiqueing the substantive and procedural aspects of the project. Five of the most active members, representing a cross section of the panel, were contacted for a more detailed discussion of the same material. The questionnaire is contained in Appendix A, Part II.

b. Considerations:

Response to this final survey was poor despite follow-up phone calls by the staff. The phone surveys were much more productive and elicited a number of valuable ideas which are reflected throughout this report.

V: THE FUTURES STUDY AND ONGOING PLANNING ACTIVITIES

Despite immediate contributions to the General Development Plan, the development of new issues and the educational value for the panelists and staff, the project was primarily intended to provide a new approach to planning, and its success in this regard can only be measured by any lasting improvements it creates in the continuing planning and decision making process. Of course, it is impossible to make any judgement at this time; but it is important to point out that the nature of existing planning efforts are not conducive to the input provided by the scenario work. This is not to say that change will not occur, only that it will not come easily or rapidly.

A. Summary of Study Findings

As a substantive planning exercise, the Energy/Transportation Futures Study project made three extremely important statements.

1. Key Issues

It explicitly stated and documented the idea that the region is subject to forces beyond its control which have great bearing on public policy. Specifically, the scenarios demonstrated the effect of oil availability, national economic growth, and technological change on a broad range of issues. Those most significant for transportation planning being:

- Conflicts between maintenance and expansion of existing transportation systems;
- Transit service and its relation to paratransit;
- Freight distribution systems; and
- Transportation revenues.

2. Uncertain Futures

It made explicit the idea that the future needs of the region will vary widely, given differing sets of externally determined circumstances.

3. New Policies

It generated a number of unconventional ways to deal with the extreme conditions posed by alternative, hypothetical futures. The most significant were:

- Establishment of new revenue sources and regional tax base sharing.

- o Restructuring of transit pay scales.

- o Cooperative development of public transit and private paratransit services.

- o Planned disinvestment in some highways and cutbacks in transit services.

B. Conflict Between the Futures Study and Conventional Planning

These are concepts which would not have been produced through the conventional planning process; in fact, they are, to a large extent, incompatible with it. This is so for each of the three features of the study mentioned above.

1. Key Issues

Although the issues identified as having the greatest significance in the scenarios are addressed in current work programs, firmly established and often legislatively mandated commitments to other topics do not allow the substantial efforts which would be required to fully develop them. For instance, examination of landside goods movement needs would require new models capable of translating port traffic and economic activity into rail and truck volumes, as well as the data base to calibrate them. Complete analysis of highway maintenance needs, transit operations, and transportation revenues would involve similarly large efforts requiring access to data often not made available to regional planning agencies.

2. Uncertain Futures

The idea of planning for several alternative futures demands a flexibility and responsiveness which would often be impossible to achieve given the timeframe required for implementing major capital projects or changing major programs, the ponderous review and budget approval procedures, and the earmarking of large portions of transportation funds.

3. New Policies

The controversial policies recommended in the study conflict with the conservative regional decision making process which, because it has no executive authority, can achieve action only through political concensus. Moreover, its sphere of influence, and thus its control over changes at the state level, as would be required for some of the study policies, is limited. The same can be said for establishing meaningful partnerships with the private sector which is also suggested in some of the policy areas.

C. Prognosis

It is evident that, for the scenario work to have more than a one time impact, there must be a continuing advocacy for the ideas it developed. Already, some are in place:

- The study findings and policy recommendations were introduced into formal discussions of the 1982 General Development Plan, and this exposure has presented them as subjects for further debate.

- Some of the new ideas have been included in upcoming work programs of the RPC so that these issues will remain alive in the planning community.

- The regional decision makers who were involved in the actual development of the scenarios and related policies can be expected to bring the experience to their continuing work.

These factors may provide impetus for further consideration of the study findings. Still, the conflict between the scenario results and the continuing planning process are fundamental and deeply entrenched. Surely, substantial change will not be rapid, but, hopefully, a process of slow assimilation.

Appendix A

Part I. Panel Questionnaire

Part II. Post Project Panel Survey

Appendix A, Part I
TRANSPORTATION/ENERGY FUTURES STUDY

PANEL QUESTIONNAIRE

PURPOSE

Each panel member will be requested to complete the questionnaire prior to the first panel meeting and again after the final meeting. The purpose of the questionnaire is to obtain a measure of the panel members' change in attitudes, understandings, and expectations regarding transportation as a result of the panel's activities. Anonymity of the panel members will be maintained in the tabulation of questionnaire responses and recording of changes in attitudes.

Approach: The questionnaire consists of four sets of questions. The first set contains a series of statements reflecting attitudes and projections concerning transportation, energy, and land use. Each panelist is requested to indicate his/her level of agreement or disagreement with the statements. The second set of questions request a ranking, in order of importance, of a set of factors or goals. The third set of questions are open-ended and require brief written responses. The fourth and final set of questions pertain to the present transportation planning and decision making process of the Baltimore region. Responses to some of these questions are expected only from those panel members who participate in or are familiar with the current planning process.

Question Set A

Instructions: Set A consists of a series of statements pertaining to transportation-energy issues and relationships. Please indicate your attitude regarding these statements by placing a check (✓) in the appropriate column.

	Agree	Agree but with reservations	Disagree but with reservations	Disagree
1. The single most important cause of urban sprawl is the wide-spread availability of the automobile.				
2. A properly implemented and operated public transit system can shape and guide land use in the region.				
3. Regional centers are capable of being served efficiently by public transit.				
4. Current public transit could attract substantially more passengers by reducing fares.				
5. Current public transit could attract substantially more passengers by expanding service routes to the suburbs.				
6. Current public transit could attract substantially more passengers by increasing frequency of service.				
7. Current public transit could attract substantially more passengers by increasing peak hour service.				
8. Current public transit could attract substantially more passengers by increasing off-peak-hour service.				
9. By the Year 2000, the costs of owning and operating an automobile will be so high that public transit ridership will be more than double its present level.				
10. Improving air quality will be a primary factor in regional transportation policy during the next 20 years.				
11. Current air quality standards can only be satisfied by both stringent control of individual motor vehicle emissions and measures that restrict motor vehicle use.				
12. A comprehensive, accessible, reasonably-priced public transportation system can increase job accessibility and reduce unemployment.				

Question Set A - (Continued)

	Agree	Agree but with reservations	Disagree but with reservations	Disagree
13. Public transit should concentrate on the trips to and from the Central Business District.				
14. Transit would be saturated with patrons if it provides a convenient trip, taking about as long as the same trip by automobile and with little or no waiting or transfers.				
15. A concerted public and private campaign to promote ride-sharing (car-pools, van-pools, etc.) could more than double the number of people involved in these activities.				
16. To be effective, transportation planning must be performed on a regional basis.				
17. The provision of a minimum level of public transit is the responsibility of government.				
18. Over the next two decades the price of a gallon of gasoline will increase at a rate greater than the general rate of inflation.				
19. Some form of gasoline rationing will be in effect in the Baltimore region by the Year 2000.				
20. Highways will be less congested twenty years from now than they are today.				
21. By the Year 2000, car-pooling and van-pooling will be the regular mode of travel for at least 25% of commuter work trips in the Baltimore region.				
22. The Baltimore subway system will be extended beyond the 7 mile Phase I configuration by the Year 2000.				
23. Growth within the Baltimore region will occur primarily around existing and/or new regional centers.				

Question Set A - (Continued)

	Agree	Agree but with reservations	Disagree but with reservations	Disagree
24. Changes in automobile technology will significantly reduce the demand for oil as the predominant transportation energy source.				
25. Transportation is a primary determinant on the form of new growth within the region.				
26. The need for efficient and timely movement of goods has not received sufficient attention within the Baltimore region.				
27. A significant amount of transportation fuel will be produced from municipal waste, farm products, or other indigenous raw materials by the Year 2000.				
28. Only through high fuel prices will there be substantial public conservation of energy.				
29. In 1978 freight transportation accounted for 9% of GNP. More efficient operations could significantly reduce this cost.				
30. Personal income spent for heating, electricity, and gasoline in 1975 was about 10%. This will increase to 15% or more by 1990.				

Question Set B

Instructions: In the following questions you are asked to rank a group of factors according to level of importance or priority. Please indicate your ranking by assigning an "H" to the high priority or important factors and an "L" to those factors that are low priority or of lesser importance.

1. Please indicate the priority you would attach to the following characteristics of any transportation system.

___ extent of coverage

___ ease of use

___ all weather service

___ low cost to local governments

___ safety

___ dependable service

___ reasonable travel times

___ energy efficient

___ cost to user

___ other _____

2. Indicate the level of importance or priority people attach to the following criteria when choosing between transit and the auto for travel.

___ convenience to origin and destination of trip

___ travel time

___ comfort

___ cost

___ safety

___ dependability

___ other _____

3. Indicate the level of importance or priority industry attaches to the following critera when choosing industrial locations.

___ transportation accessibility

___ local labor market

___ cost of land

___ zoning compatibility

___ provision of sewerage, water, and electricity

___ acceptability from local residents

___ financing

Question Set B - (Continued)

4. Indicate the level of importance or priority people attach to the following criteria when choosing commercial locations.

___ transportation accessibility

___ local labor market

___ cost of land

___ zoning compatibility

___ provision of sewerage, water, and electricity

___ acceptability from local residents

___ financing

5. Indicate the level of importance or priority people attach to the following criteria when choosing residential locations.

___ accessibility/proximity to work

___ housing cost

___ schools, amenities and quality of public service

___ taxes

___ financing

6. Please indicate the priority you would assign to the following social goals when making transportation investment decisions.

___ conserve energy

___ reduce transit costs

___ improve air quality

___ provide service to the transportation disadvantaged

___ improve goods movement

___ stimulate the economy

___ reduce travel time

Question Set C

Instructions: The questions in Set C are open-ended in nature and require brief written responses describing your opinions and expectations concerning various subjects pertaining to regional transportation.

1. In Baltimore, users are currently paying for approximately 50% of transit operating costs. In your opinion, what % of operating costs should be recovered from the farebox?

2. By what percentage would you expect transportation energy use to decrease if transit ridership increased from 10% of all trips to 30% of all trips?

3. In what sectors of the Baltimore region do you expect to find significant population growth during the next two decades (e.g., central city, inside beltway, suburban areas outside beltway, rural areas)?

4. What, if any, changes in household demographics over the next 20 years will have a significant impact on regional transportation needs?

5. 13% of personal income was spent on personal transportation in 1960, by 1977 it rose to 14%. What do you believe it will be in 1990? In 2000?

6. List what you feel will be the two or three major issues related to transportation during the next 20 years.

7. What urban development patterns do you feel are preferable for the Baltimore region (e.g., regional centers, small town centers, suburban infilling, low density development)?

8. What major forces will shape future transportation investment decisions over the next 20 years in the Baltimore region? Which of these forces do we have control over?

9. Should incentives be implemented to promote transportation energy conservation? If so, list some examples.

10. What role do you expect the Federal government to take with respect to transit over the next 20 years (capital expenditures, operating expenses, service to transportation disadvantaged, pollution control, etc.)?

11. To what extent should private developers be required to participate in the supply of transportation facilities?

12. What types of information would you find useful in estimating future transportation needs?

Question Set D

Instructions: Set D consists of a series of questions pertaining to the transportation planning and decision making process. Those panelists not familiar with current procedures need not respond to all questions.

1. How do you feel about technical transportation and energy information you receive?

1	2	3	4	5
very satisfied				have strong reservations

(Check if you have no access to technical information ___.)

2. How much influence do you possess over:

	great deal				none at all
a) implementation of decisions made by you	1	2	3	4	5
b) quality of technical information available to you	1	2	3	4	5

3. How much control do you see yourself having over the following aspects of decision making:

1 = great deal . . . 5 = none at all

a) problem identification

1 2 3 4 5

b) alternatives identification

1 2 3 4 5

c) alternatives analysis

1 2 3 4 5

d) public review

1 2 3 4 5

e) generation of support

1 2 3 4 5

f) implementation

1 2 3 4 5

g) evaluation of past decisions

1 2 3 4 5

4. Please indicate how you feel about current governmental transportation priorities. Circle appropriate number.

1 = too much emphasis

2 = adequate emphasis

3 = too little emphasis

a. new highway construction	1	2	3
b. maintenance of existing highways	1	2	3
c. expansion bus transit system	1	2	3
d. maintenance of existing bus transit	1	2	3
e. rapid transit	1	2	3
f. ride sharing	1	2	3
g. bicycling/pedestrian facilities	1	2	3
h. intercity rail	1	2	3
i. port facilities	1	2	3
j. airport facilities	1	2	3
k. freight movement facilities	1	2	3

5. Planning loses its usefulness when it is carried out more than ___ years in the future.

6. What do you see as wrong with the urban transportation planning process as currently practiced?

7. How well do present institutional structures (both public and private) lend themselves to the introduction of new ideas and technologies?

Promotes Innovation				Inhibits Innovation
1	2	3	4	5

Appendix A, Part II

POST PROJECT PANEL SURVEY

ENERGY/TRANSPORTATION

FUTURES STUDY QUESTIONNAIRE

1. Were the objectives of this study made clear to you?

1	2	3	4	5
very much so				not at all

2. Was the scenario building process adequately clear to you?

1	2	3	4	5
very much so				not at all

If not, what was unclear?

3. Was the panel of proper size and diversity? Yes_____ No_____

If not, how could it have been improved?

4.(a) Was the resource material provided sufficient in terms of level of detail (e.g., Background papers, goals and evaluation criteria, scenarios, and policy options)?

1	2	3	4	5
too much				too little

(b) What additional material should have been included?

5. Did the staff adequately respond to panel requests? Yes_____ No_____

If not, with what data or directions should the staff have improved its response?

6. What resource materials did you find most useful?

7. Did you sense a bias in either the resource material or in staff direction of the panel discussion? Yes_____ No_____

If so, what?

8. Did participation on the panel alter your perception of regional issues and problems? Yes_____ No_____

If yes, please explain.

9. Based on your participation in this study, what is the most important area of long range transportation planning that is not currently addressed in the region?

10.(a) Is the scenario methodology helpful for long range transportation planning?

1 2 3 4 5

very much so not at all

(b) Is it worthwhile to occasionally devote a day to meetings with similar format to the panel sessions?

1 2 3 4 5

very much so not at all

11. Will participation in the study influence your approach to the way you work on regional issues? Yes_____ No_____

If yes, in what way?

12. How could this project have been improved (e.g., change format of panel sessions; change length and number of meetings; reallocate tasks among sessions; or reassign tasks among panel and staff)?

Appendix B

Part I. Minutes of the First Panel Meeting

Part II. Description of the Transportation/Energy Scenario Process

Part III. Data on National and Regional Trends

Part IV. Goals of the Regional Planning Council, the Maryland Department of Transportation, and Local Governments

Appendix B, Part I
MINUTES OF THE FIRST PANEL MEETING

The first Energy/Transportation Futures Study Panel meeting was held on October 21, 1981 at the Baltimore Engineering Center. The meeting was called to order at 9:30 a.m.

Review of Background Material, Administrative Matters

Brief presentations were given on the study and its objectives, the relation to the General Development Plan, the scenario development process, the goals of the process, and the objectives to be accomplished by the panel as part of the process.

The panel moderator discussed her role in guiding the direction of panel activities and established the format for the session. Permission was requested of the panel to permit tape recording the session with the proviso that the tapes would be used for staff purposes only. No objections were voiced, and it was agreed that each session could be recorded.

The initial topic for discussion was the data on national and regional trends which had been included in the background materials mailed prior to the meeting.* To supplement the material presented in the Background Paper, the Panel requested a paper by former Metro Center staff member Gail Swartz on economic Development, information regarding future changes in automobile technology, and information on specific topics relating to energy and the region.**

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* Included in this Appendix.

** The Swartz article and an article on automotive technology forecasts were mailed to the panel prior to the second meeting. They are too voluminous for inclusion in this report. The information on specific topics is included in Appendix C.

In the accompanying discussion, the Panel addressed many topics pertaining to future transportation, land use, and energy related trends. Among those discussed were the following:

1. Goods movement and the need to reduce in-transit inventory costs.

2. The size, efficiency, and technology of future automobiles.

3. The impacts of advances in communictions on personal travel.

4. Changing needs, both people and transportation, of new industries.

5. Need for a regional approach to be competitive with other trade centers in attracting new industry.

6. The transportation planning process and the need for faster reaction, improved coordination, and the ability to stop or redirect projects as priorities change.

Discussion of Goals for Inclusion in the Study

This discussion centered on the listing of goals of the local jurisdictions which had been included with the background materials mailed prior to the meeting.* It was recommended by the panel that the staff review Carroll County and Harford County Master Plans for additional goals. RPC energy related goals from the 1977 General Development Plan were also suggested for inclusion.

* See this Appendix for these goal statements.

Most of the panel seemed to agree that political considerations dictated vague "motherhood goals" for the region and that these goals are evident and did not require substantive discussions. They also seemed to feel that they would prefer that the evaluation criteria for these goals be prepared by the staff for their review rather than to discuss them at the meeting.

Establish Study Guidelines

The next topic of discussion was the setting of scenario parameters. The Panel consensus was that a 10 year time frame should be used and that the study focus on the Baltimore Region, with the inclusion of interactions with the Washington Region to the extent that activities may influence development in Baltimore.

Select Independent Variables to Form Matrix

The first item of discussion in the afternoon session was the identification of independent factors that will affect the Baltimore Region. Factors identified by the Panel included:

1. Energy costs, availability;

2. Federal transportation policies;

3. State transportation policies;

4. Automobile costs;

5. Demographics;

6. Technological changes;

7. Economy;

8. Housing;

9. Political shifts

10. Public attitudes;

11. Development of other competing trade centers;

12. Federal environmental regulations;

13. Availability of natural resources; and

14. Shifting public-private sector roles and user's fees.

The Panel was then asked to reduce this list to three or four primary independent variables and to assign value ranges to the selected variables. After much discussion, the Panel agreed to consider four variables. The four were: energy availability, economic growth, technological innovation, and demographics. The value ranges assigned to each of the four variables were as follows:

Energy Availability
- stable
- shortage

Economic Growth
- vigorous
- slow, stable
- decline

Technological Innovation
  increase trip-making
  decrease trip-making

Demographics
  population increase
  population decline.

It was then suggested that population increase or decline could be considered under each scenario and hence demographics could be treated as a dependent variable. This was agreed to by the panel, with the remaining three variables to be used for constructing the skeleton scenarios.

Discuss Matrix Cells (Skeleton Scenarios)

The final Panel activity of the day was a discussion of the scenario skeletons that resulted from the twelve possible combinations of independent variables and assigned value ranges. The Panel's preliminary choices of scenarios for development fell at the extremes of the scenario spectrum as well as on one or two intermediate scenarios that reflected a continuation of current trends. The final selection of scenarios for development will occur at the second panel meeting.

Project Administration

The meeting was concluded with a summary of the day's accomplishments. Tentative dates of December 10 or 11 were selected for the second meeting, and the session was adjourned.

Appendix B, Part II

DESCRIPTION OF TRANSPORTATION/ENERGY SCENARIO PROCESS

Transportation planning has often been unable to adequately provide for long range needs in our complex and dynamic society. Relying upon trends, transportation planners have functioned as long range projectors of existing needs rather than guiders of transportation demand in the context of a complex set of human goals and values.

Scenario building is an alternative method for conducting long range transportation planning. The process is based on the development of hypothetical sequences of events for the purpose of focusing attention on causal processes and decision points. Scenarios can serve both as an educational tool for those involved in their generation and as a means for proposing planning policies.

Development of the scenario process involves three panel meetings. The objective of the first panel meeting is to consider a broad spectrum of possible future conditions which can be used, along with trend factors, as a framework for developing scenarios. These factors are influences upon the region over which the region has little control (such as national economy) and called Independent Variables.

A number of activities will occur during this meeting. Energy, transportation, and land use trends provided in a background paper will be briefly reviewed. The panel will review existing goals and objectives and agree on those to be considered throughout the scenario process. They will also select criteria that will be used to assess the influence of various scenarios on the goals that are chosen. Basic study guidelines will be agreed upon to set some boundaries to the panel discussions. Next, construction of the scenarios will begin. The panel will use brainstorming techniques to identify the three or four most significant independent variables and to examine how they might vary in the future. The variables will be arrayed to form a matrix with each cell in the matrix describing a different future condition.

The final activity of the meeting will be to identify dependent factors which will vary in the future and which are subject to control in the region (e.g., land use patterns). The panel also will list policy areas with likely influence on the dependent variables.

Between the first and second panel meetings, RPC and JHU staff will prepare technical information on the dependent variables and other issues identified by the panel in the first meeting. This information will be distributed to panel members prior to the second meeting. Staff also will detail the matrix of independent variables by developing descriptions of the conditions of each cell.

In the second session, the panel will select a limited number of possible futures (skeleton scenarios) from the full array of cells created in the first session. (If the panel assigns three future hypothetical values to each of three variables, the matrix would contain 27 cells. Normally, the selected skeletons would include the most probable futures plus unlikely futures which would have major policy implications if they occur.) Once the scenario skeletons are selected, the panel will relate dependent variables, regional goals and policy actions to the scenario skeletons established by the panel. The panel will discuss the future impacts implied by the scenarios on socio-economic conditions and regional goals, and will consider policy areas to deal with those impacts.

Following the second meeting, RPC and JHU staff will write fully developed scenarios. This work will entail projection of future conditions (independent variables) for each scenario and impacts of the policy directions selected by the panel. These draft scenarios will be sent out to panelists for review and rewriting prior to the third and final panel meeting.

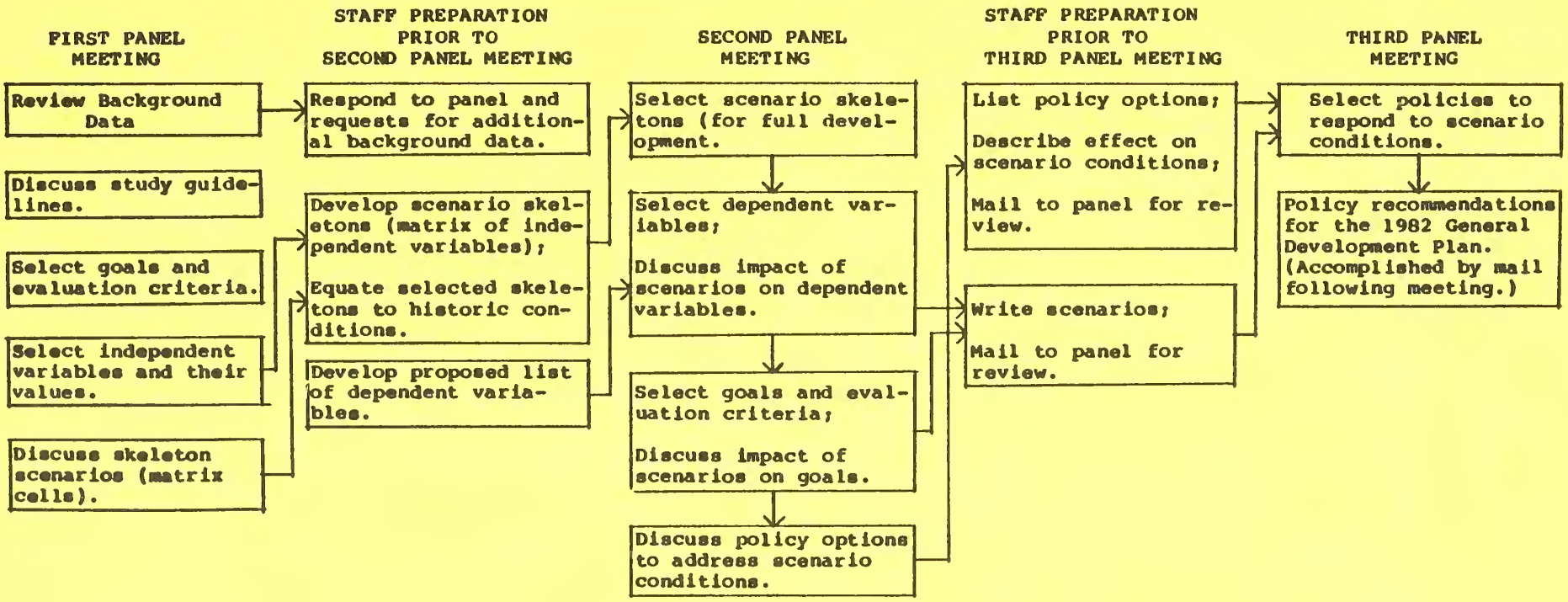
In the final session, the panel will use the scenarios to examine the effects of selected policies on future conditions in the region.

The objective of the meeting is to develop recommendations to the Regional Planning Council on policy options for inclusion in the 1982 General Development Plan. Such options would presumably include issues related to transportation issues, energy, land use and economic development.

Two types of recommendations are expected to result from the panel's work. First will be baseline recommendations; those which relate to high probability scenarios and those which are viable across all scenarios. Second will be conditional policy recommendations, i.e., those recommendations which would depend upon the evolution of significantly different futures for the region.

Following the final panel meeting, staff will present the panel's recommendations to the GDP Committee and TSC for their consideration. In addition, RPC and JHU staff will evaluate the panel and scenario methodology as a long range planning tool and prepare a report on the entire process by January, 1983.

DIAGRAM OF THE SCENARIO PROCESS



Appendix B, Part III

DATA ON NATIONAL AND REGIONAL TRENDS

Trends in Socio-Economic, Energy, Transportation, Land Use Conditions

Regional Population and Employment Trends

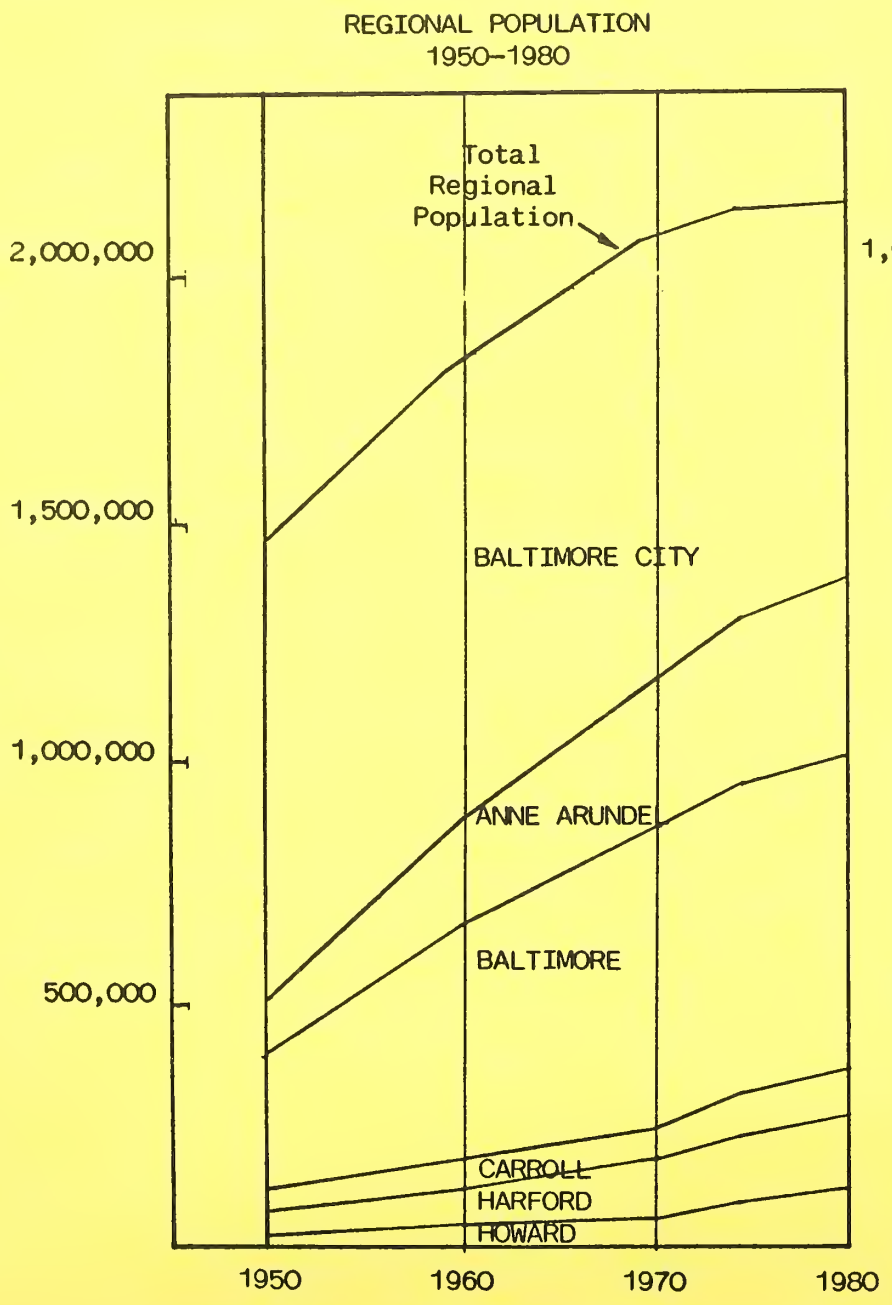
Household Consumption of Energy and Transportation Trends

Government Revenue and Expenditure Trends

Land Use Trends

Environment and Natural Resource Trends

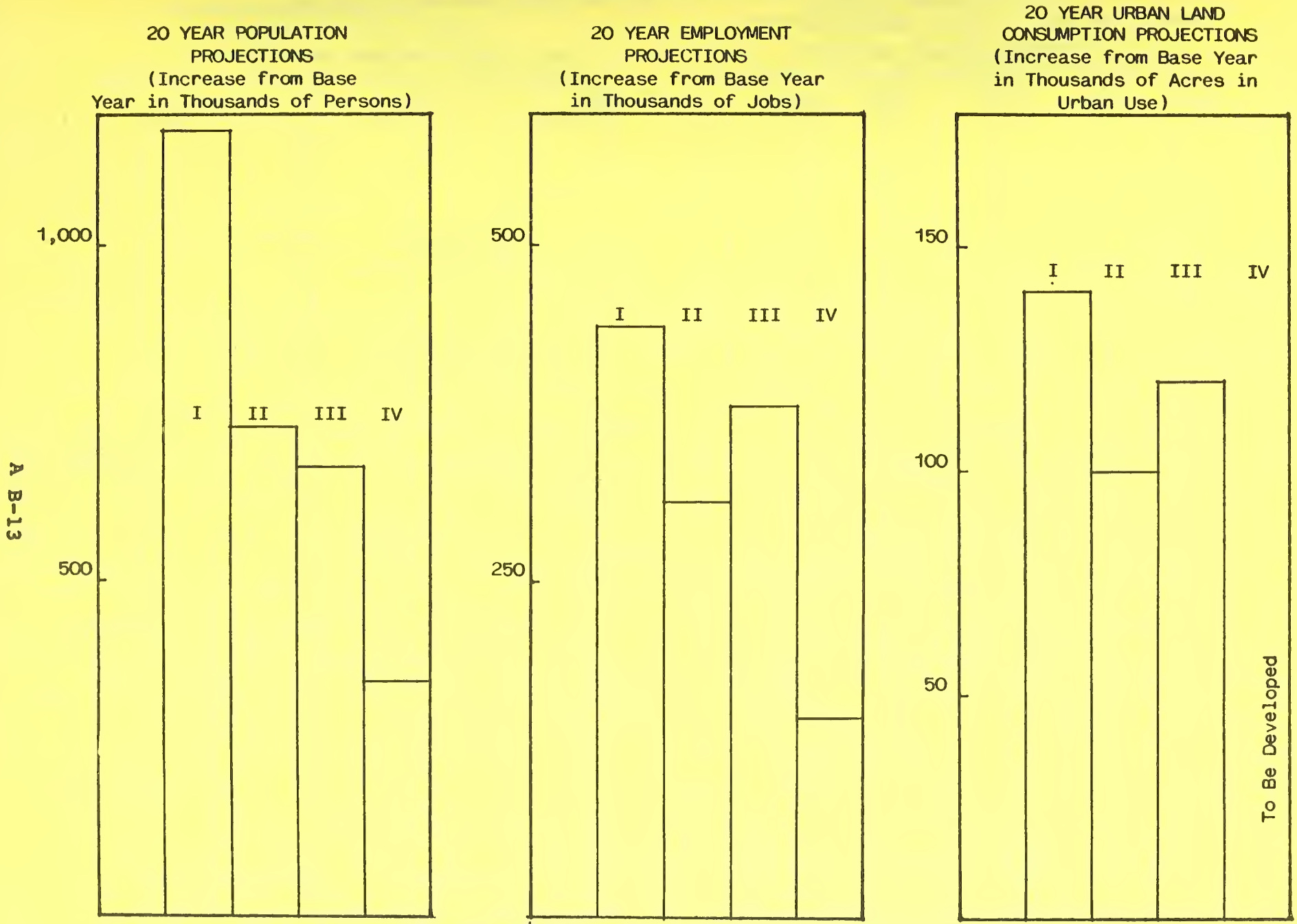
Energy Demand, Supply, and Price Trends and Projections



Source: Round II Cooperative Forecasts, RPC, 6/81

Source: Economic Indicators, RPC, p. A-7

COMPARISON OF GDP POPULATION, EMPLOYMENT AND URBANIZATION PROJECTIONS

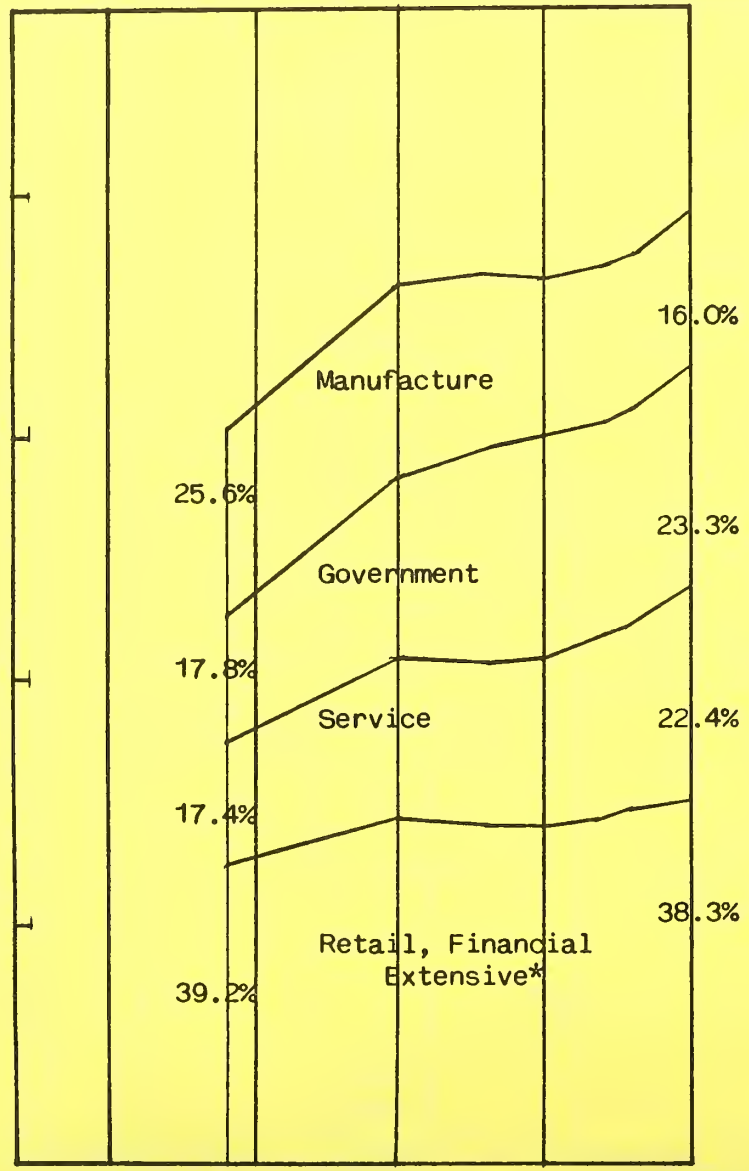


A B-13

I 1967 GDP; II 1972 GDP; III 1977 GDP*; IV 1982 GDP (preliminary figures)

* RPC adopted high growth scenario. Projections of stable growth scenario similar to IV were considered but not adopted.

REGIONAL EMPLOYMENT BY INDUSTRY TYPE

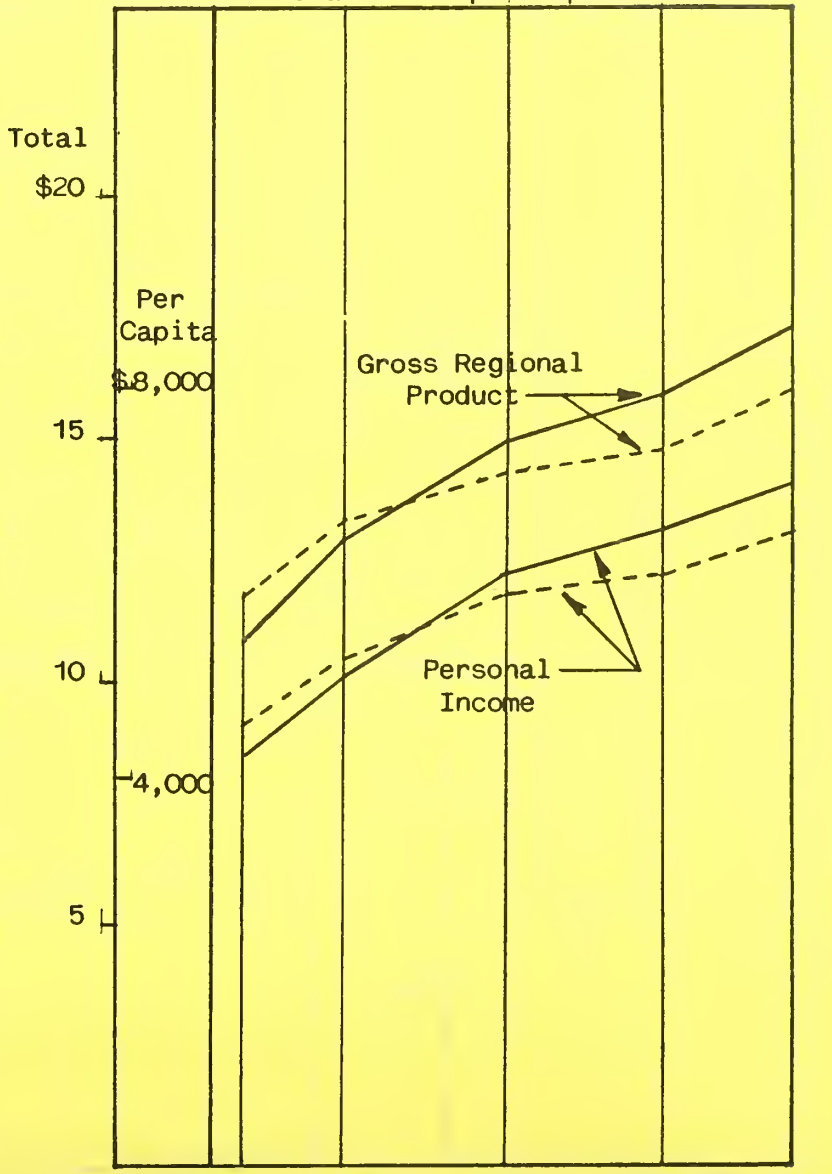


Source: Employment Changes 1964-1970 and Economic Indicators, RPC, p.49 and p. A-9

* Extensive Employment includes Transportation, Construction, Wholesale Trade & Communications

GROSS REGIONAL PRODUCT & PERSONAL INCOME

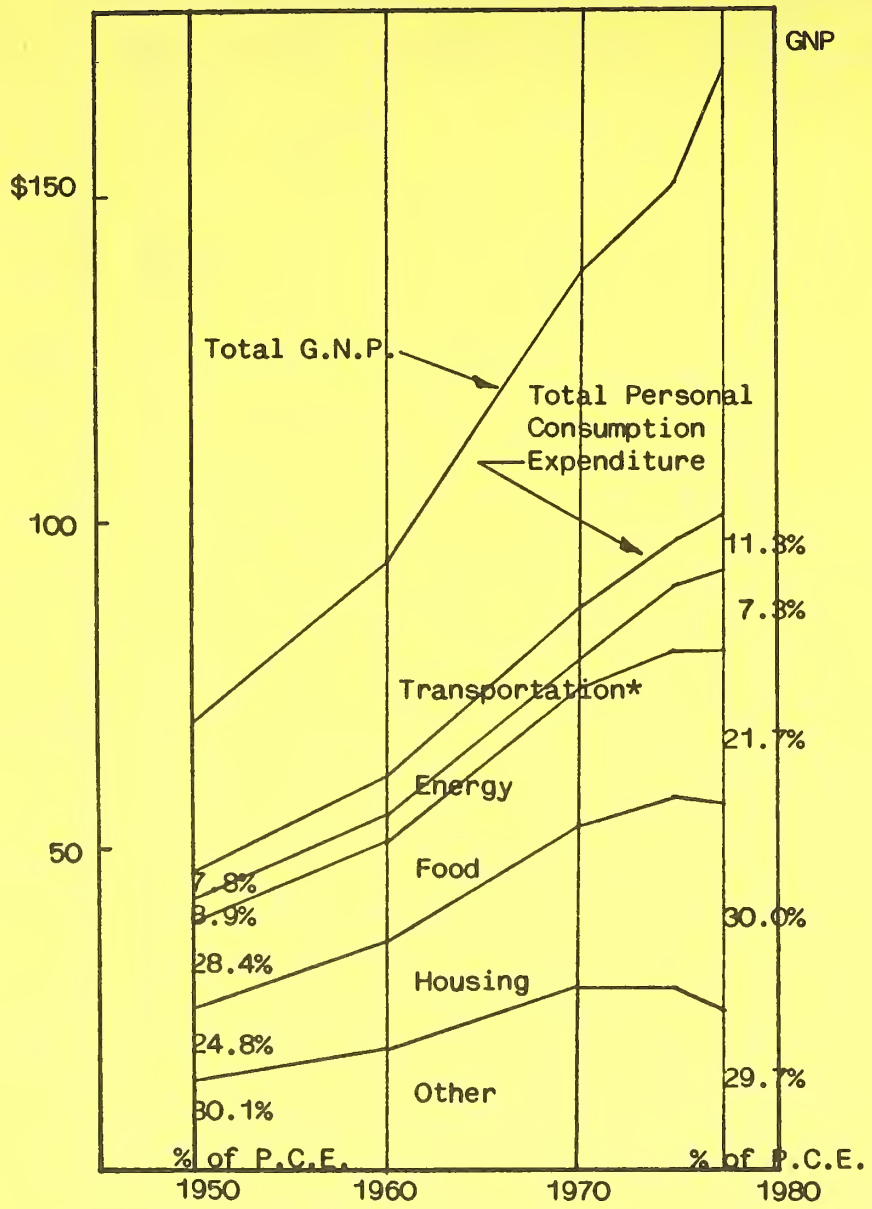
(1975 Constant Dollars)
Billions for Totals
Thousands for per Capita



Source: Economic Indicators, RPC, p. B-84, p. A-2 (population)

——— Regional Total - - - - - Per Capita

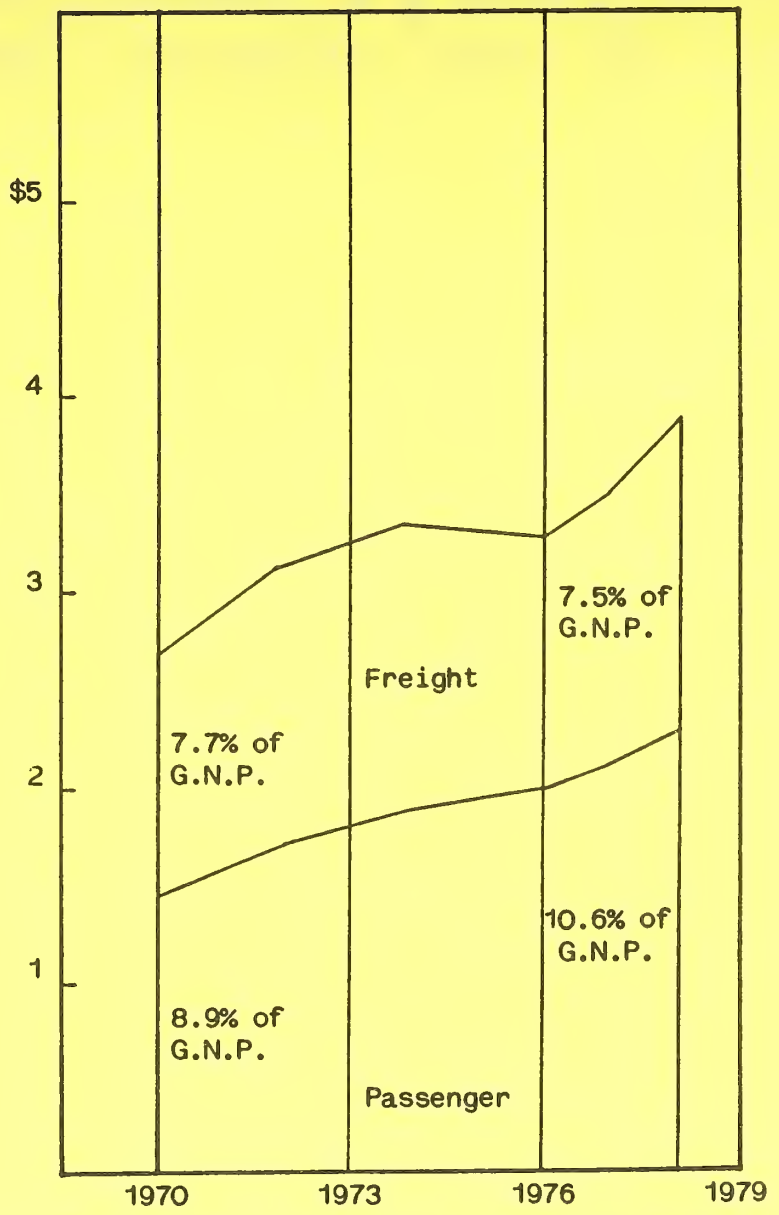
NATIONAL PERSONAL
CONSUMPTION (P.C.E.) TRENDS
(Trillions of 1975 Dollars)



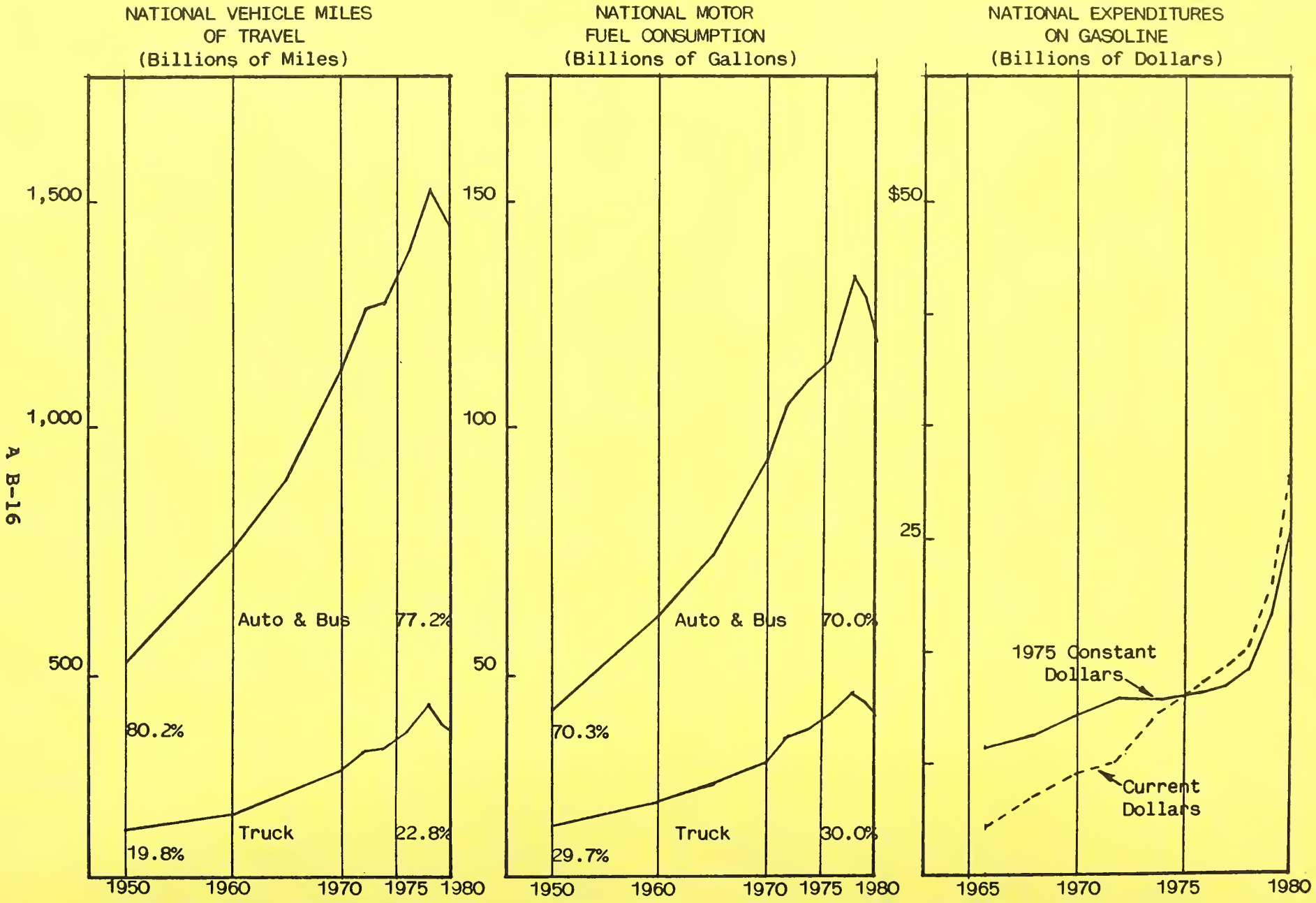
Source: Transportation Energy Conservation Data Book, Ed. 3, DOE, pp. 6-18, 6-20, 6-23

* Net of Motor Fuel

NATIONAL TRANSPORTATION
EXPENDITURE AS A % OF GNP
(Trillions of 1975 Dollars)

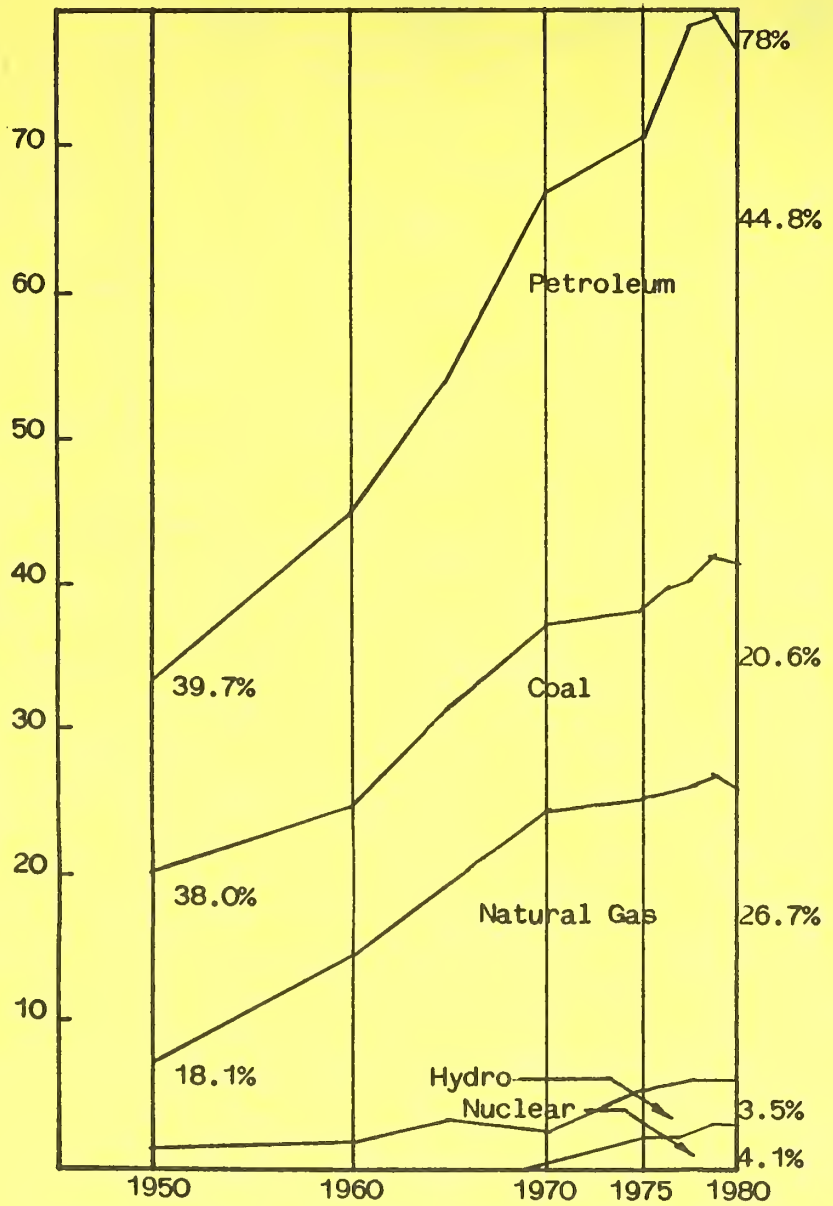


Source: Motor Vehicle Facts and Figures, 1976 (p. 86) & 1980 (p. 81



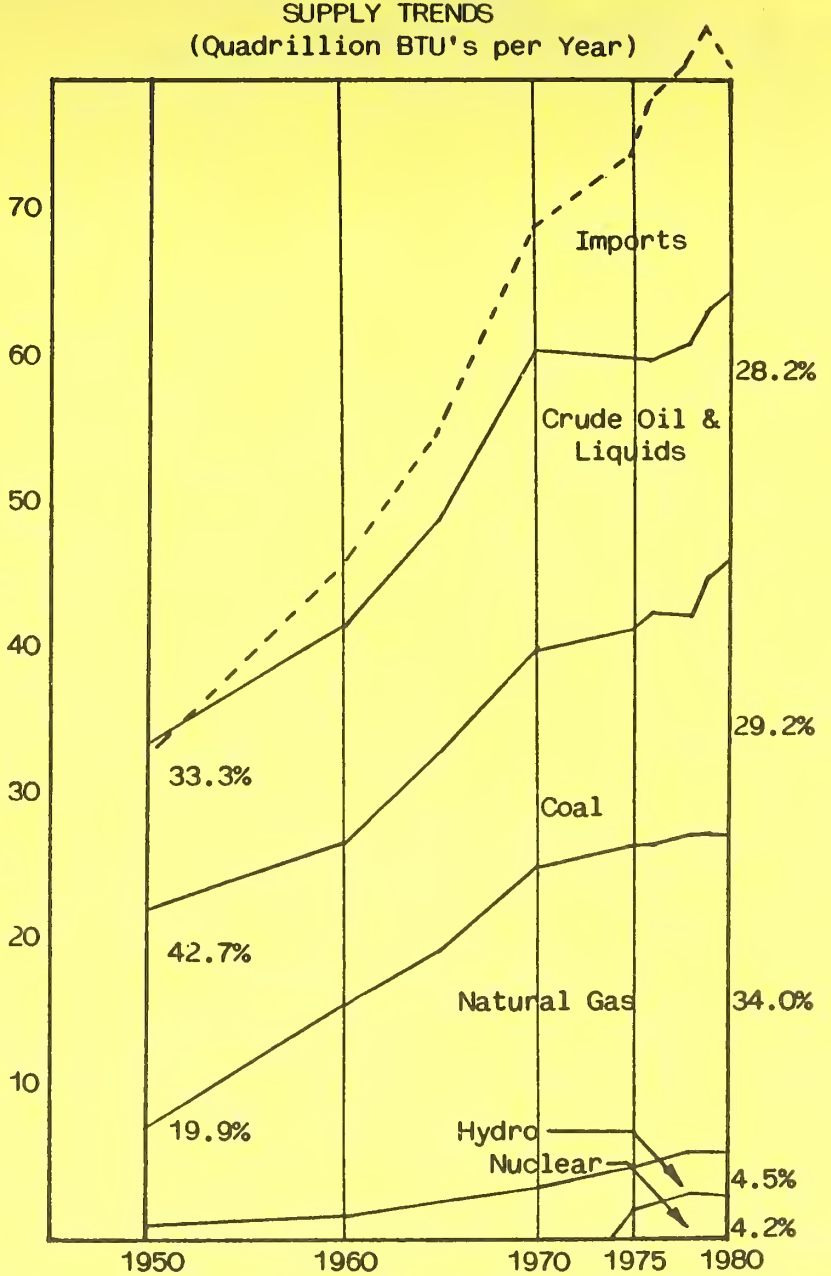
Source: Motor Vehicle Facts & Figures, 1976 Ed., pp. 70, 99; 1980 Ed., p. 57, 80; and EIA Report to Congress, 1980, Vol 2, pp. 2 & 6.

NATIONAL ENERGY
CONSUMPTION TRENDS
(Quadrillion BTU's per Year)



Source: Energy in Focus (1950–1975) and EIA Report to Congress, 1980, p. 3)

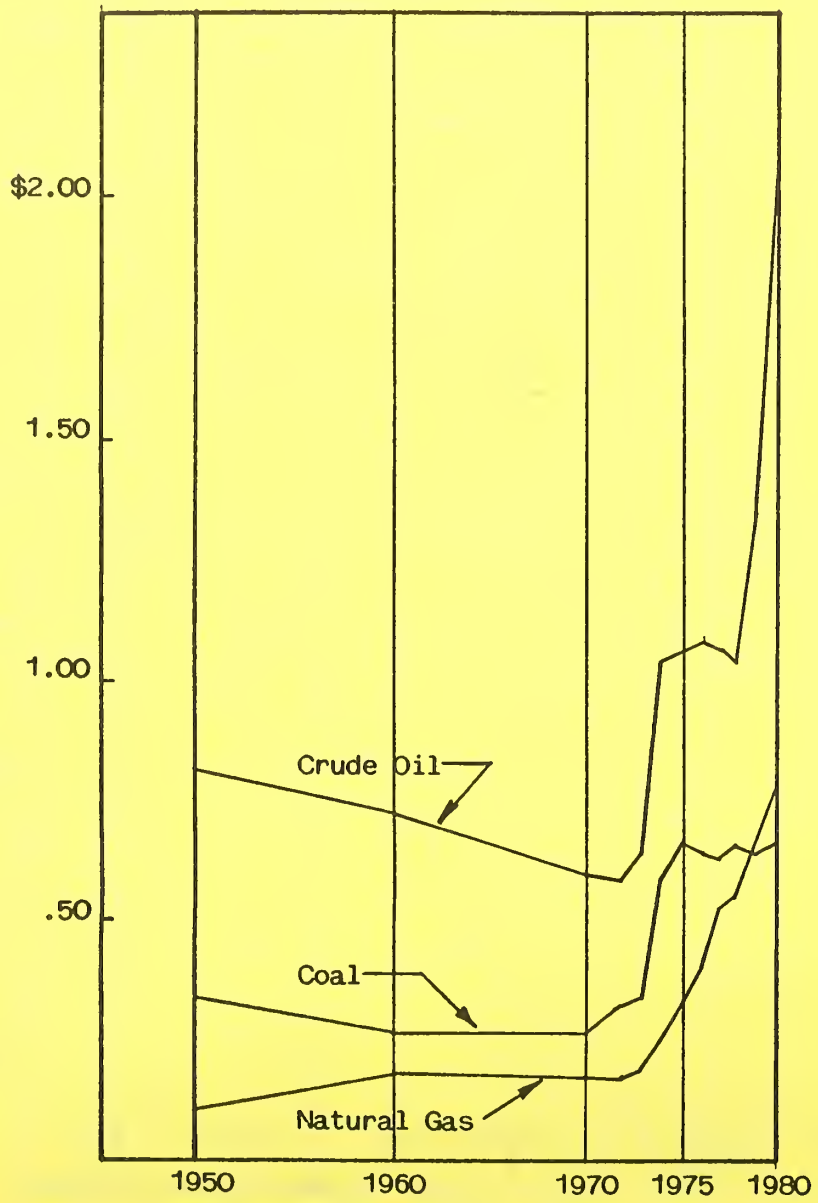
NATIONAL ENERGY
SUPPLY TRENDS
(Quadrillion BTU's per Year)



Source: Energy in Focus (1950–1975) and EIA Report to Congress, 1980, p. 2)

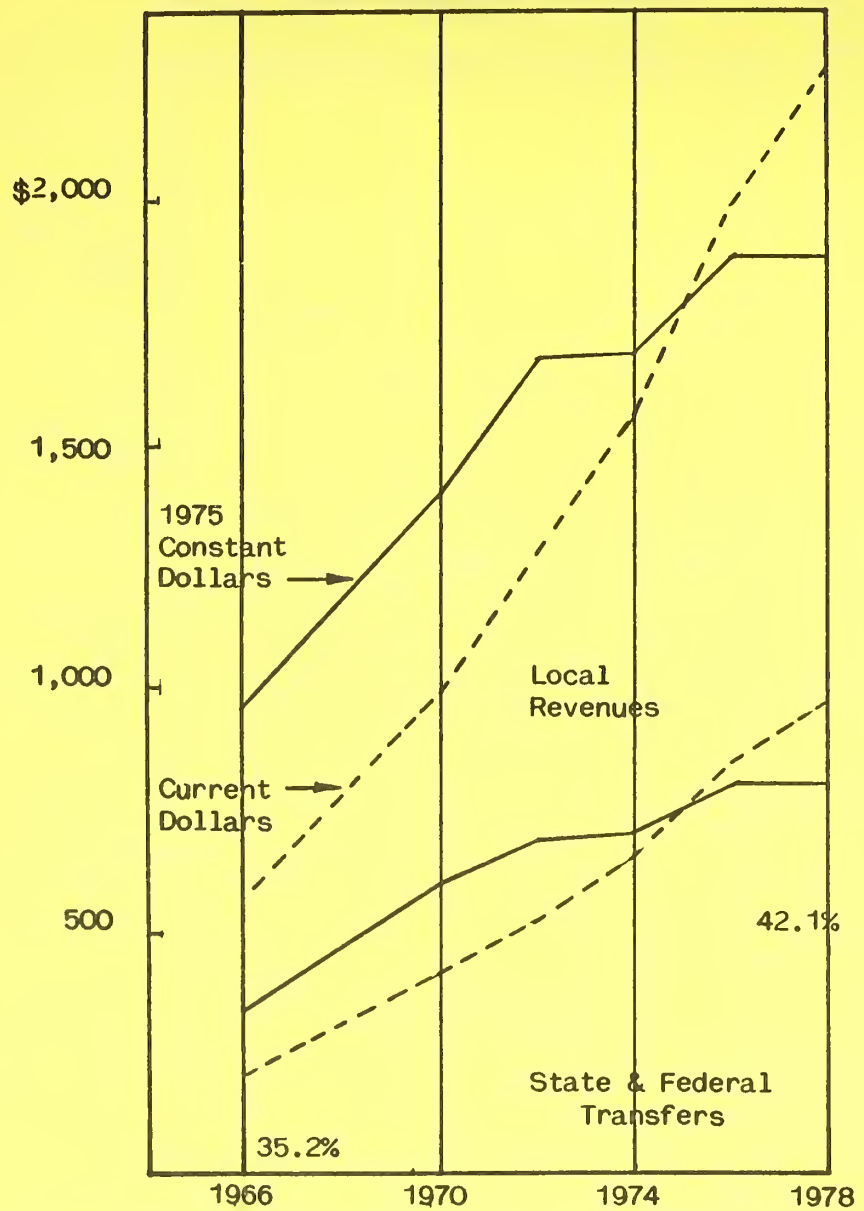
Note: Supply includes exports of coal not reflected in the consumption chart.

NATIONAL DOMESTICALLY PRODUCED
FUEL PRICE TRENDS
(1972 Constant Dollars
per Million BTU's)



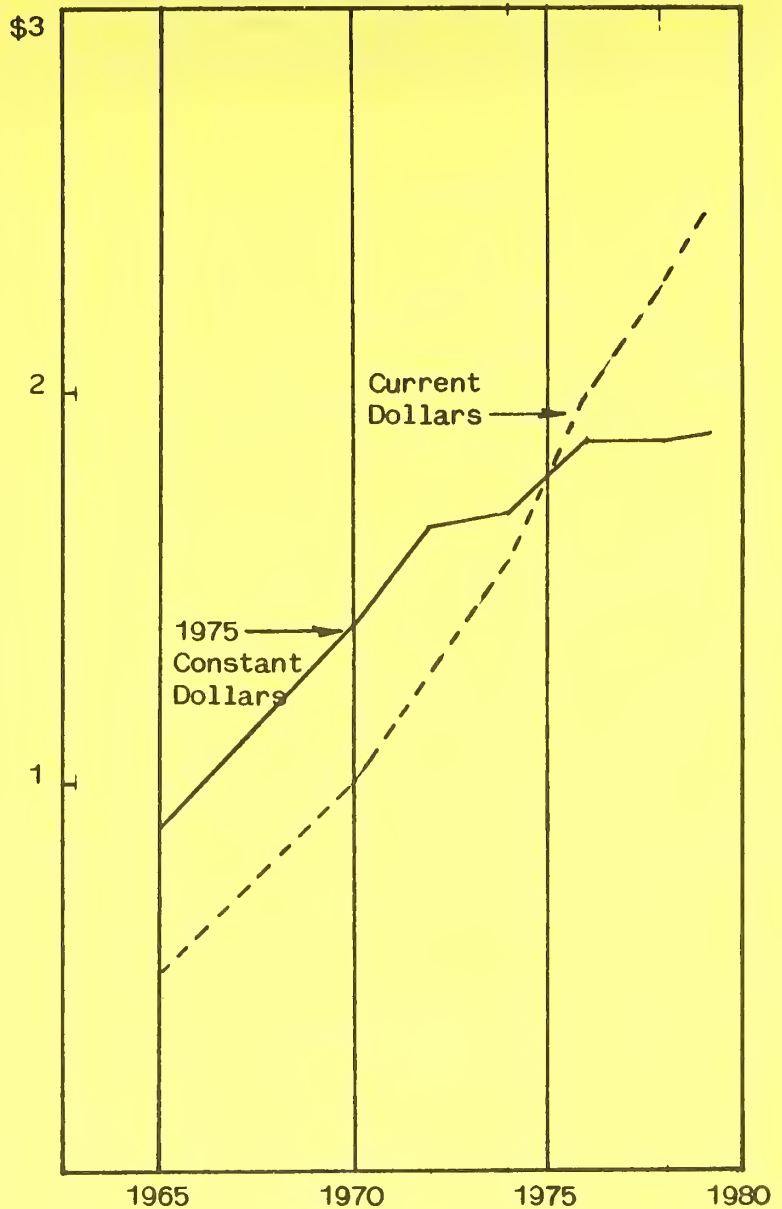
Source: EIA Report to Congress, 1980,
Vol. 2, p. 6

Total Revenues for Local Governments in the Baltimore Region
(Billions of Dollars)



Source: Economic Indicators, RPC, p. c-4 & c-8.

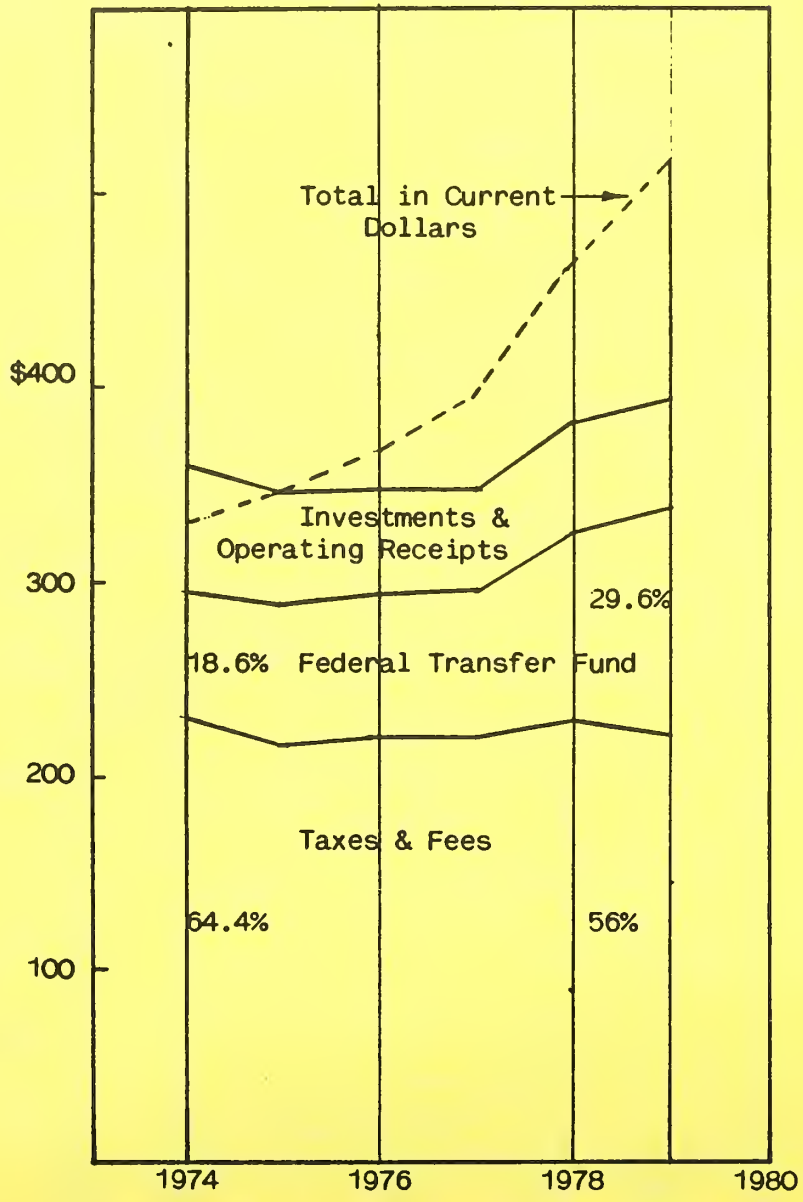
Total Expenditures by Local Governments in the Baltimore Region
(Billions of Dollars)



Source: Local Government Finances in Maryland (Year ending 6/80), Table 3, p. 135 for Capital Spending, Economic Indicators, RPC for Totals.

- - - - - - 1975 Constant Dollars
——— Current Dollars

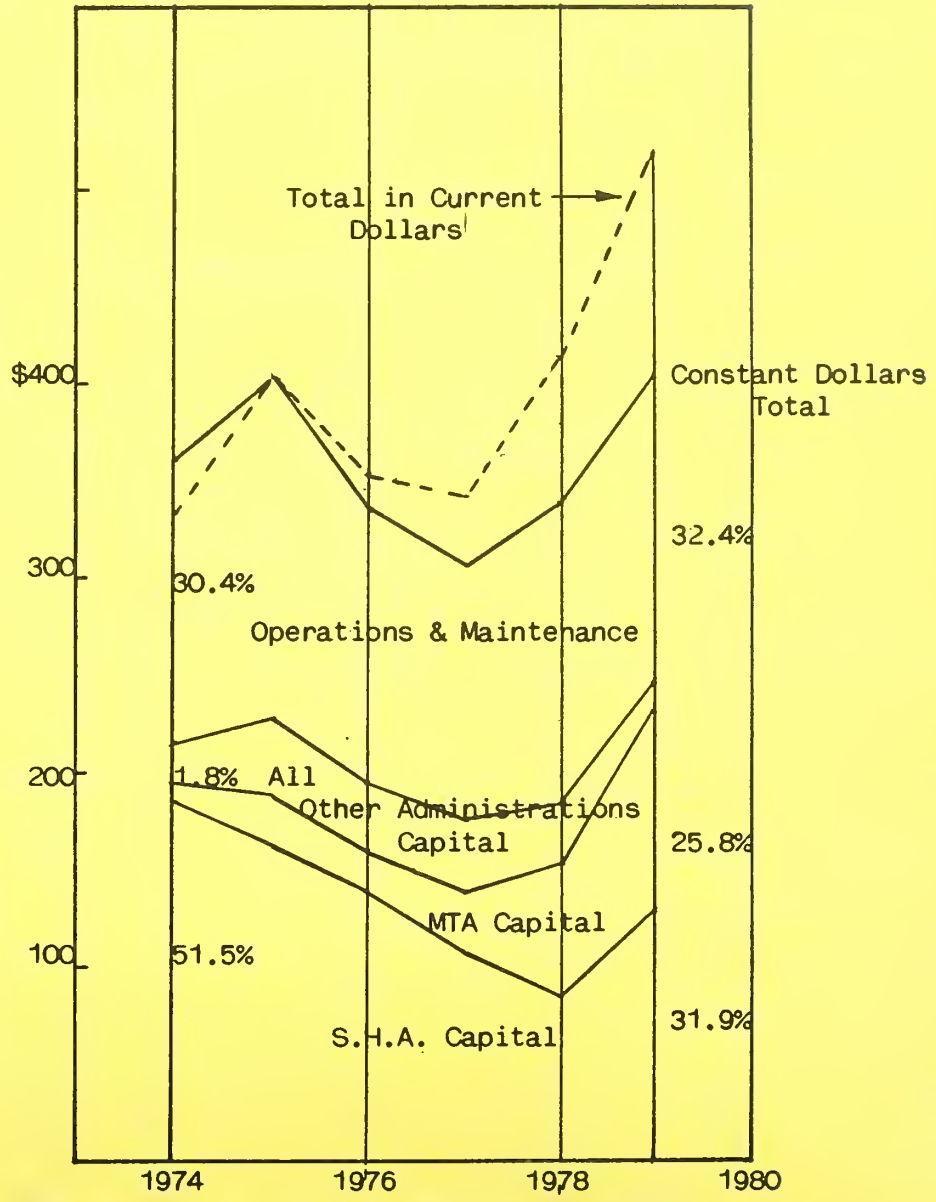
MDOT REVENUES
(Millions of 1975
Constant Dollars)



Source: MDOT Financial Statements 2/78 and 11/79

Note: Bond revenues not included.

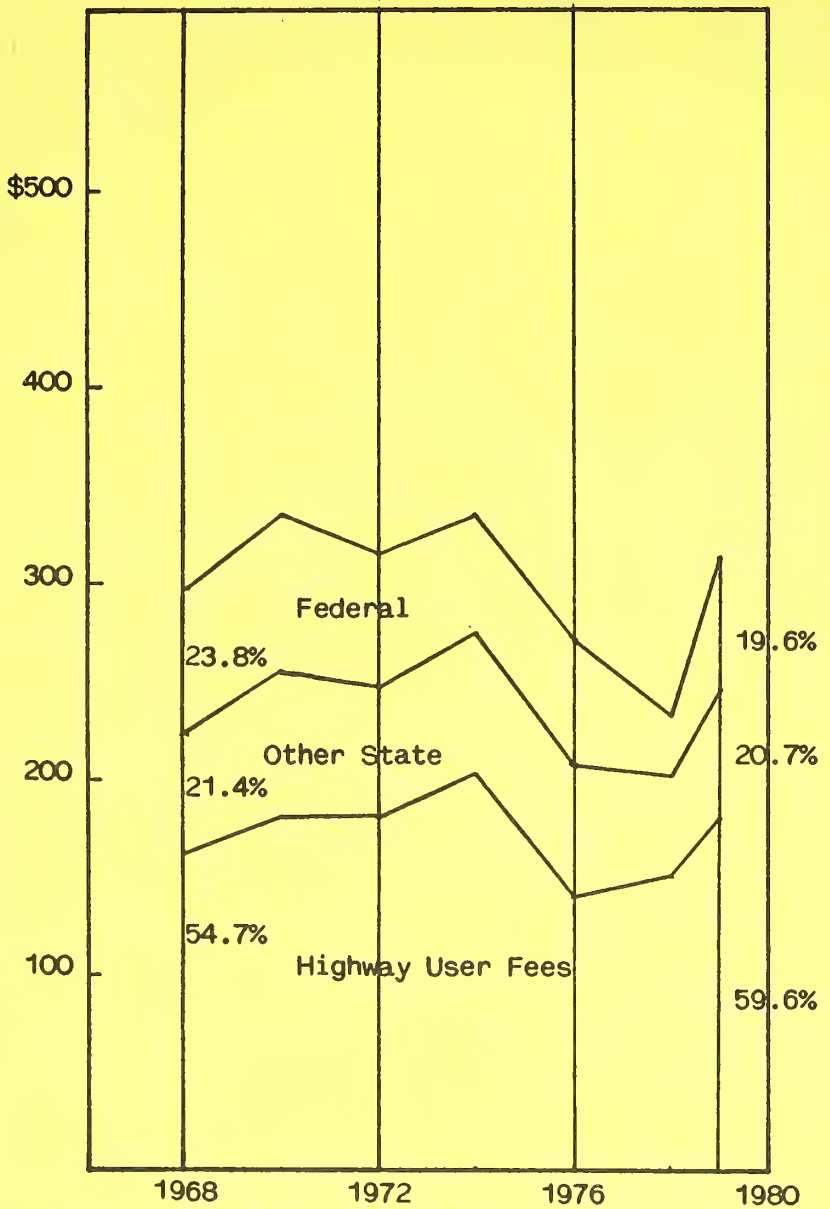
MDOT EXPENDITURES
(Millions of 1975
Constant Dollars)



Source: MDOT Financial Statements, 2/78 and 11/79

Note: Sinking fund not included.

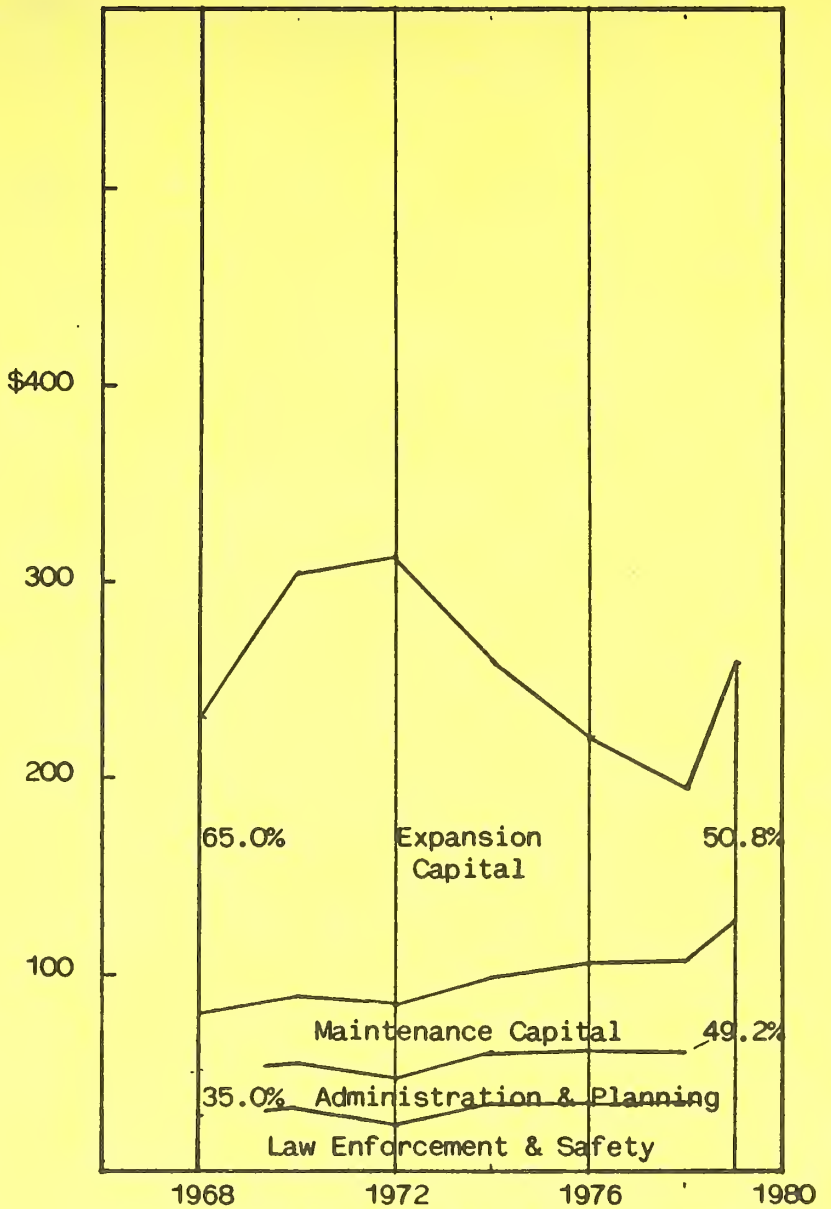
STATE HIGHWAY ADMINISTRATION
REVENUE TRENDS
(Millions of 1975 Constant $)



Source: Highway Statistics, 1968 thru 1979, FHWA

Note: Excludes Bonds.

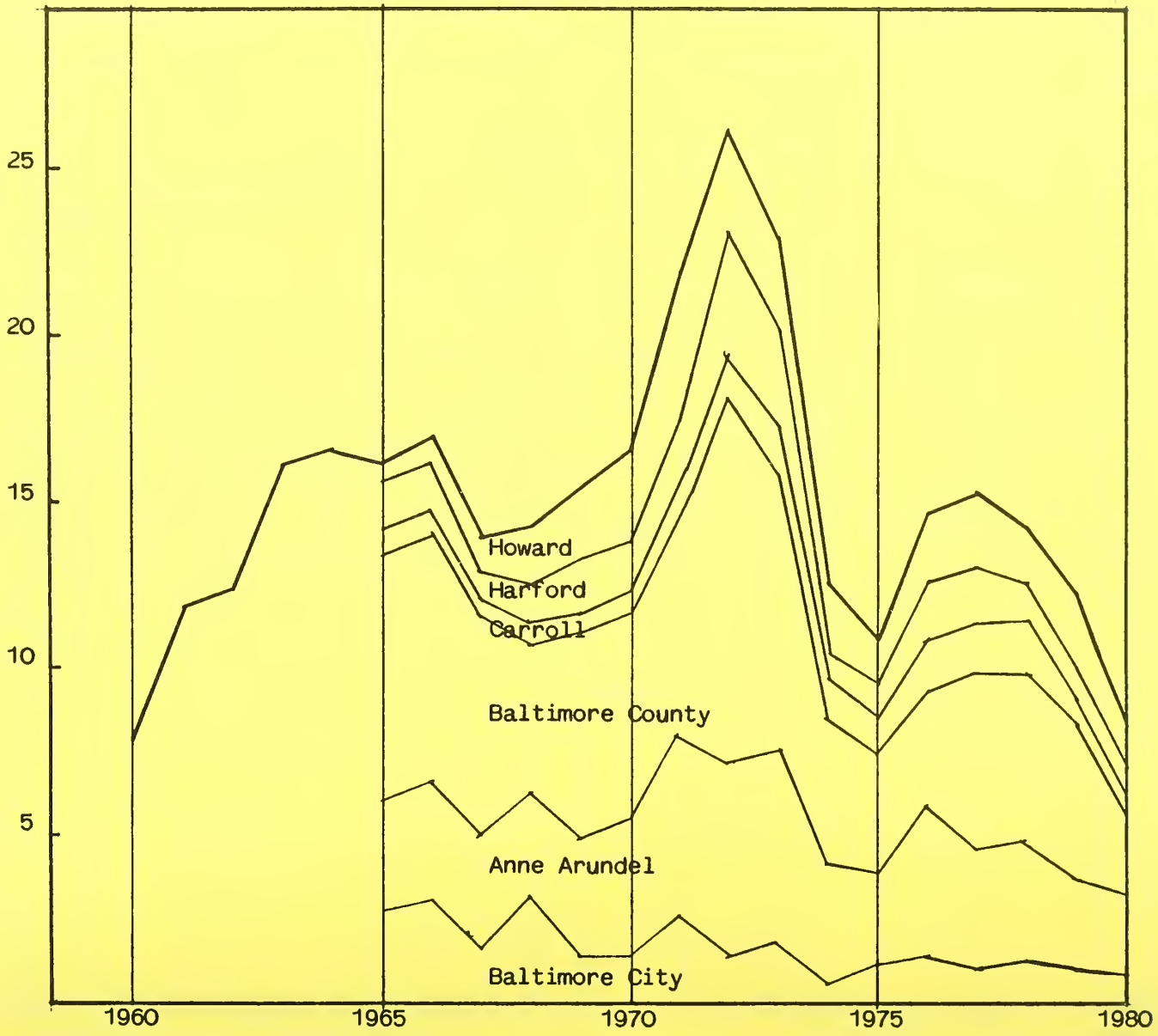
STATE HIGHWAY ADMINISTRATION
EXPENDITURE TRENDS
(Millions of 1975 Constant $)



Source: Highway Statistics, 1968 thru 1979, FHWA

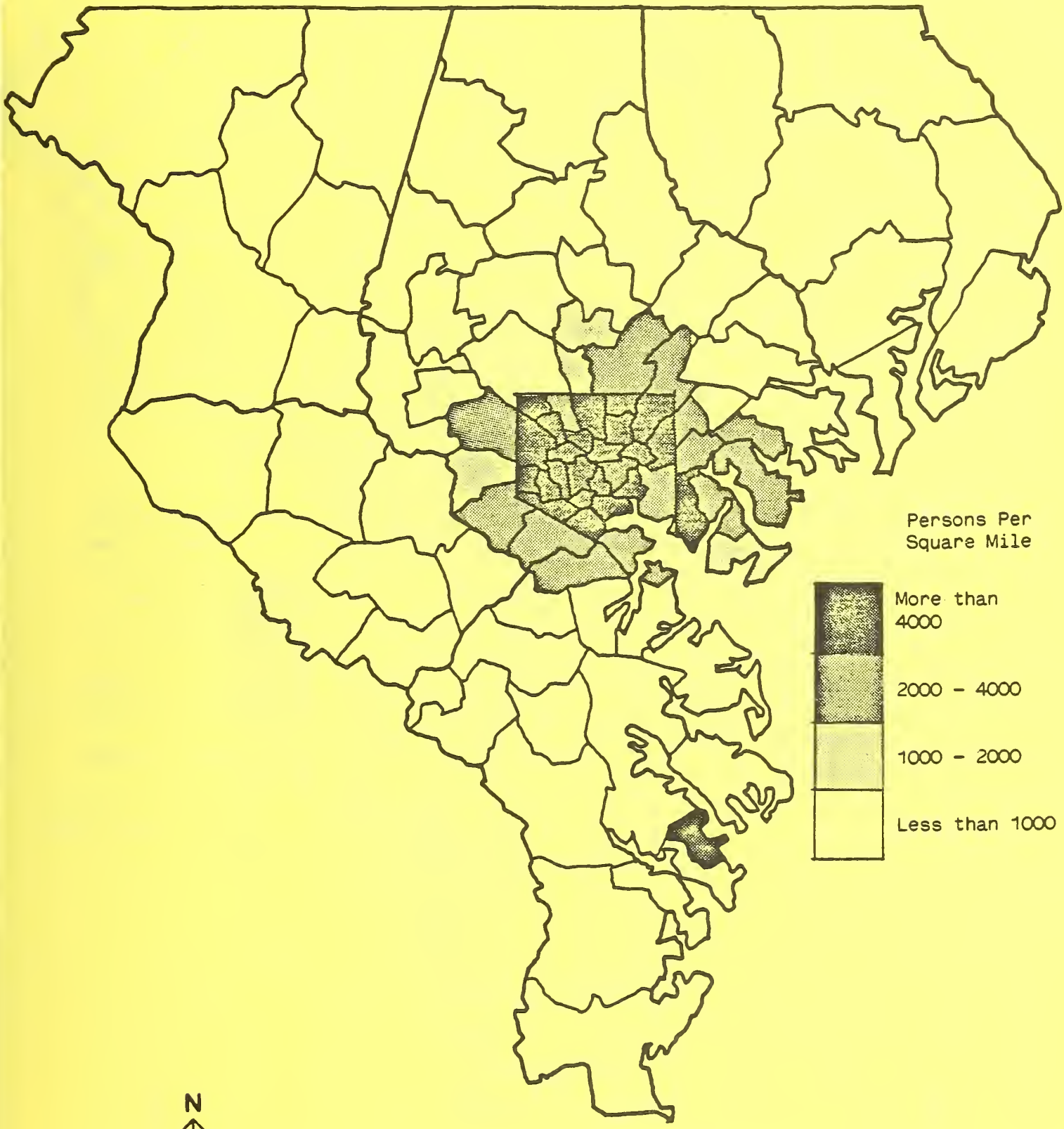
Note: Excludes Sinking Fund.

REGIONAL RESIDENTIAL BUILDING PERMITS
(Thousands of Units)

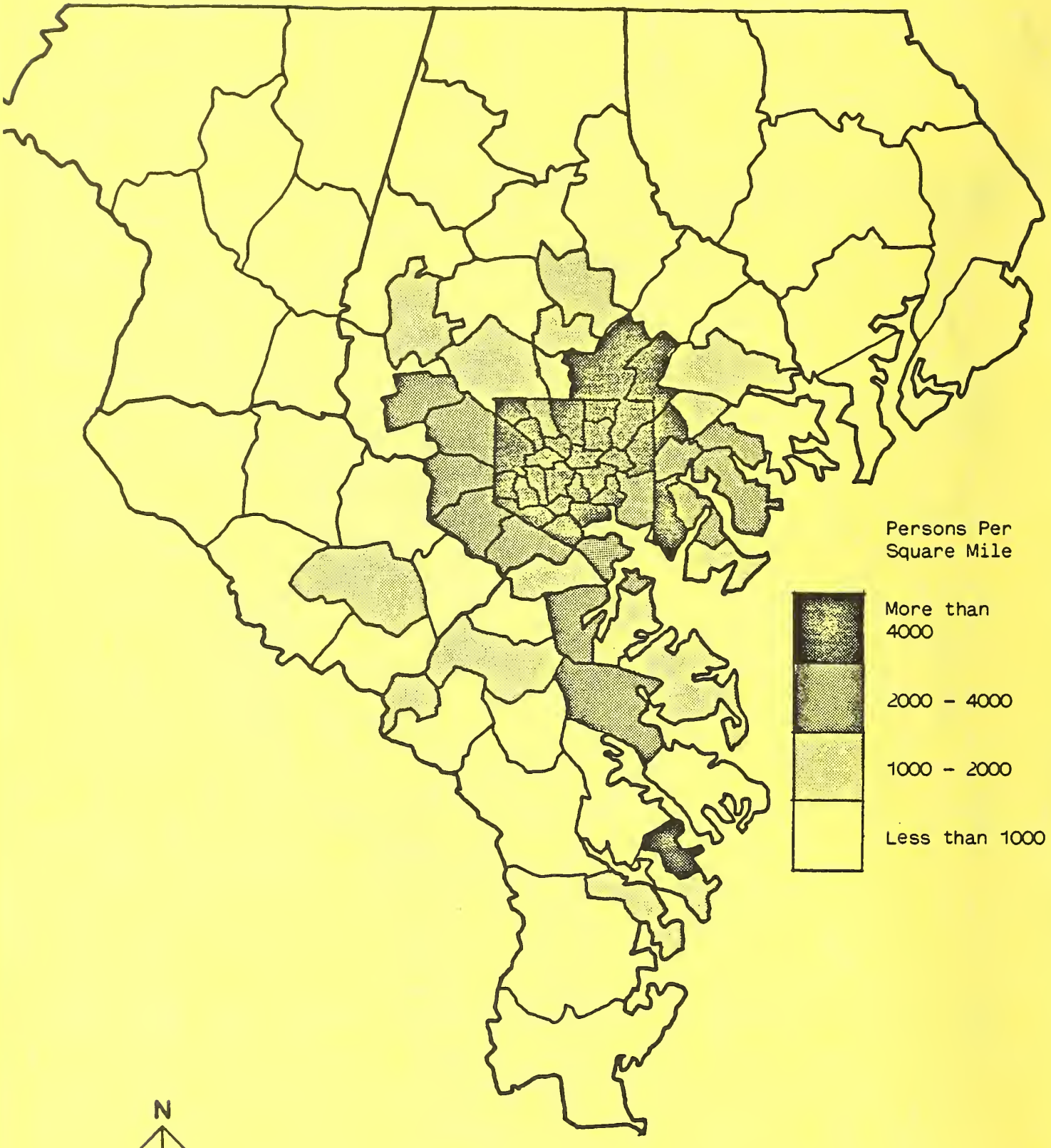


Source: Housing Division, RPC.

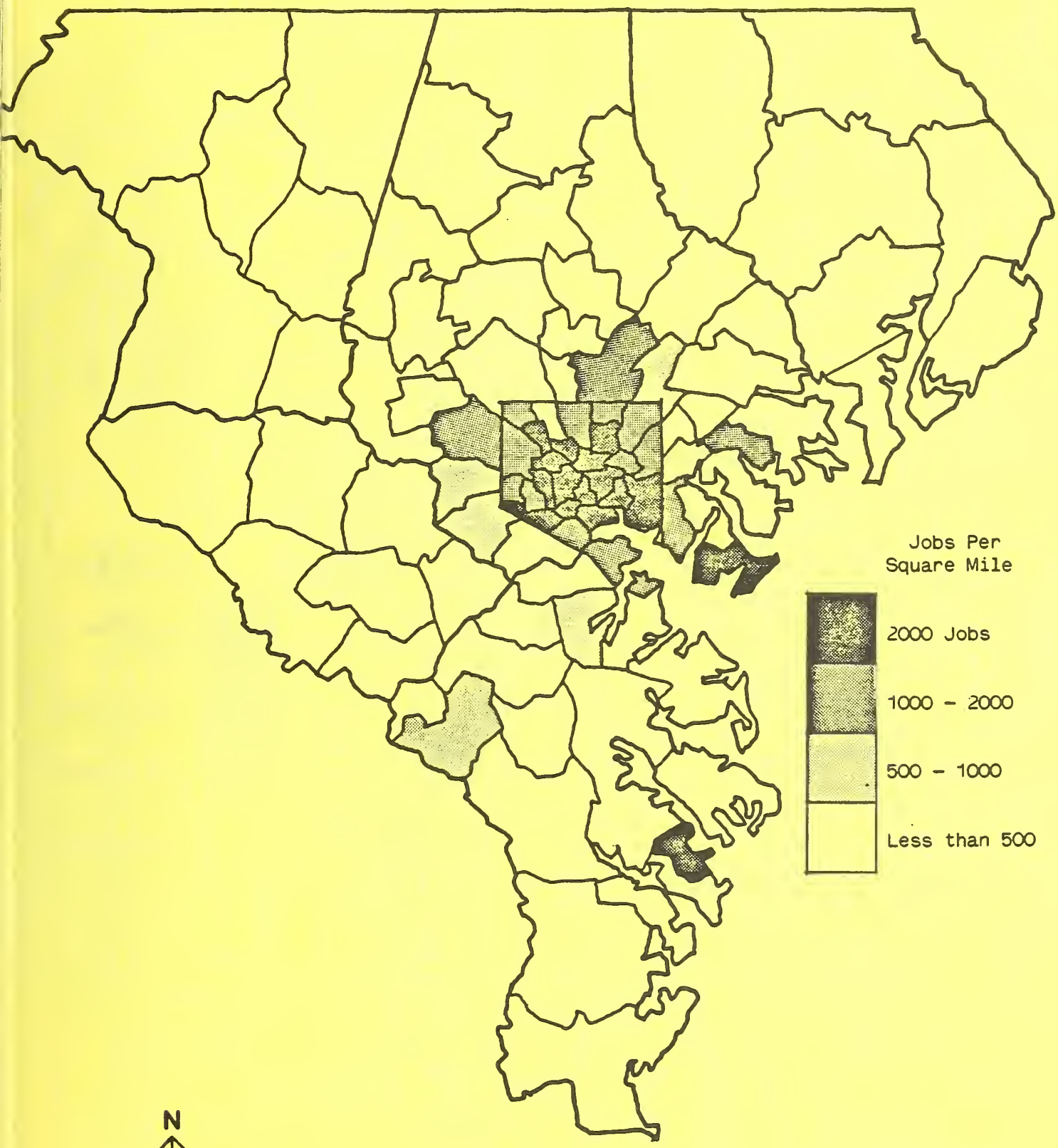
1960 POPULATION DENSITIES
(By Regional Planning District)



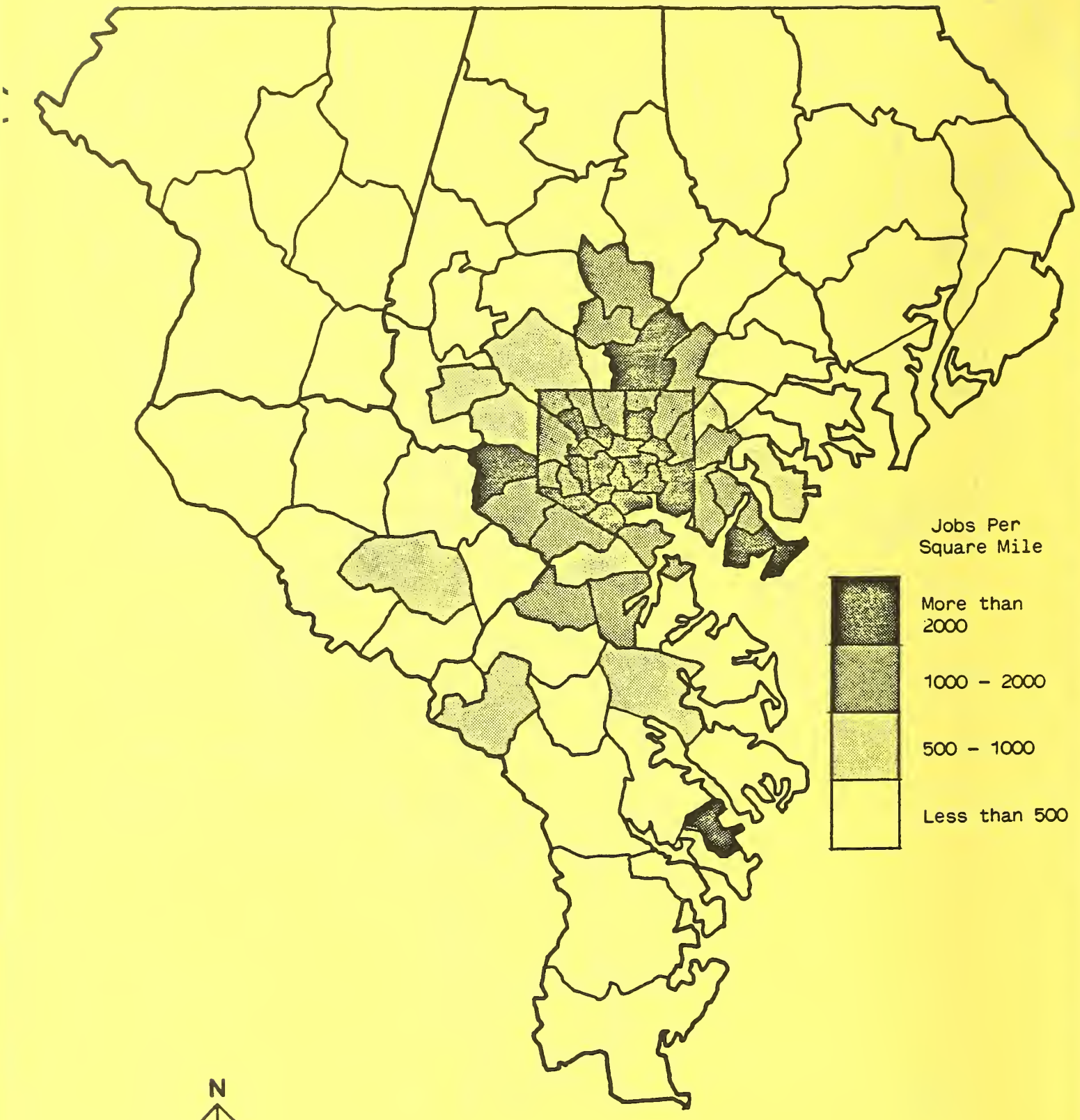
1980 POPULATION DENSITIES
(By Regional Planning District)



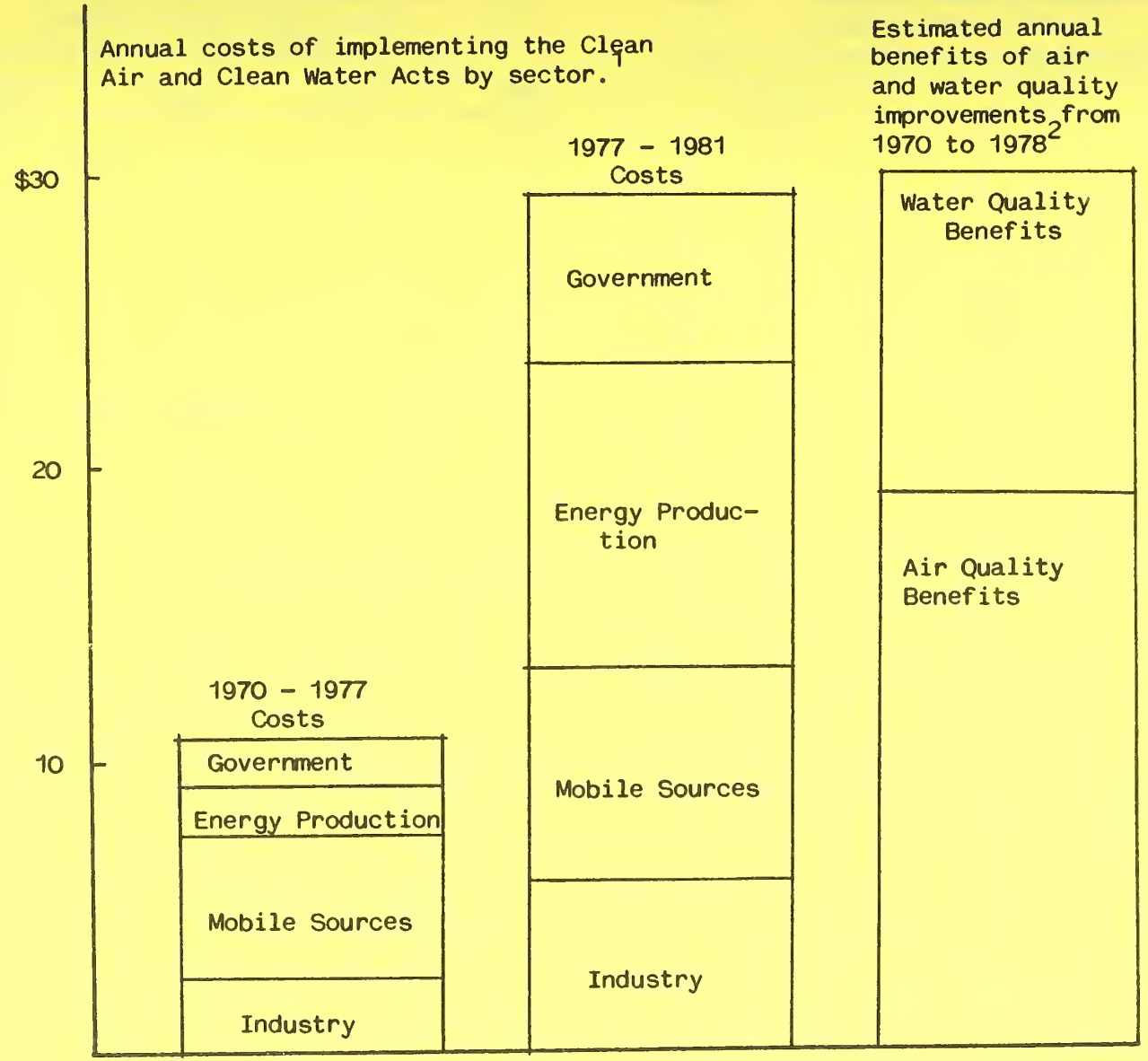
1960 EMPLOYMENT DENSITY
(By Regional Planning District)



1978 EMPLOYMENT DENSITY
(By Regional Planning District)



NATIONAL POLLUTION CONTROL COSTS AND BENEFITS
(Billions of 1975 Constant Dollars)

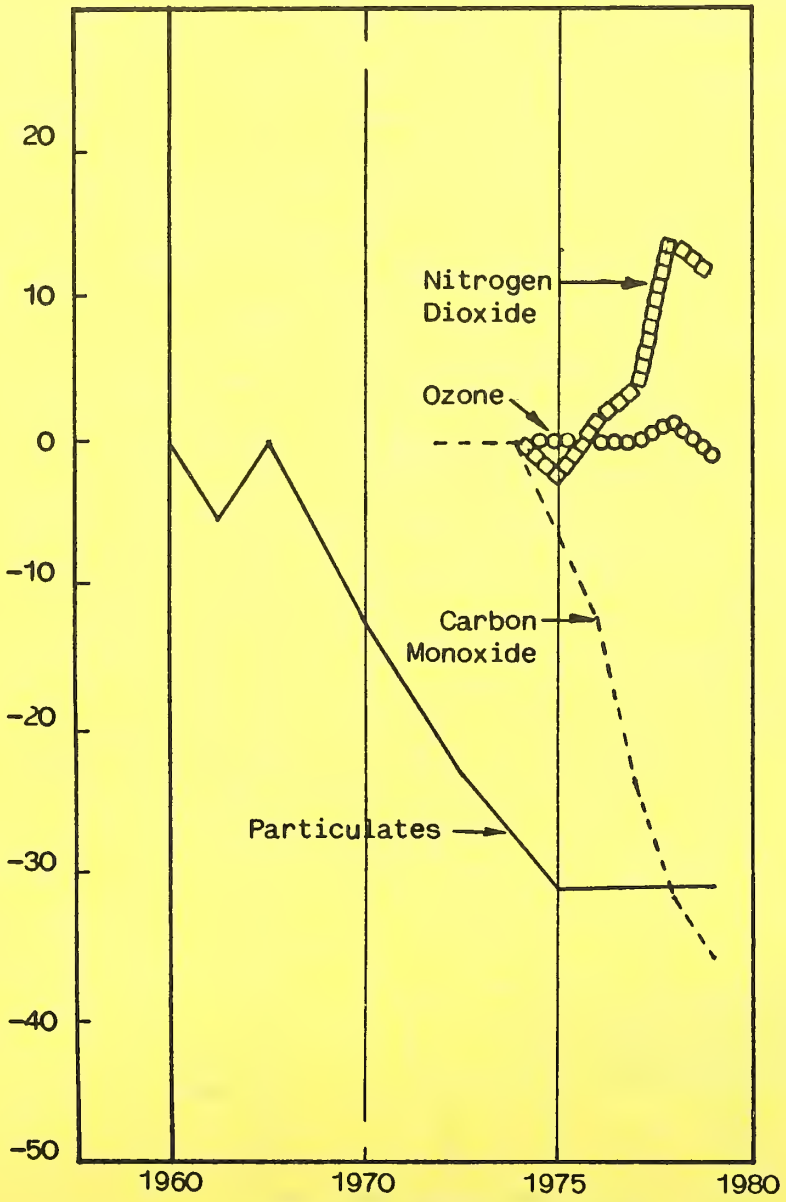


[1] Senate Documents, Vol. 15, numbers 36-38. EPA Report to Congress, 12/79.

[2] "The Benefit of Air and Water Pollution Control," 1979 report prepared for the Council on Environmental Quality.

Note: The increased cost from 1977-1981 are due to revisions of the Clean Air Act and increased funding for the EPA 201 (Sewer Facility Grants)

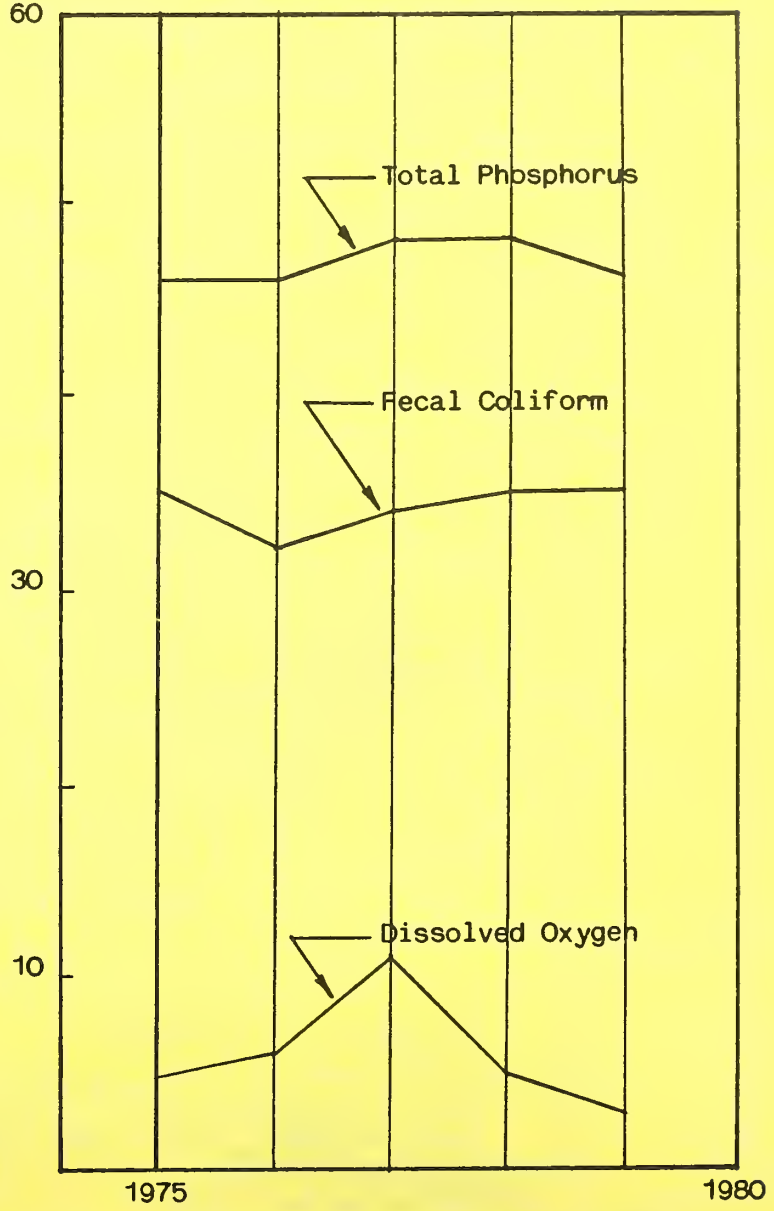
CHANGE IN NATIONAL LEVELS OF
SELECTED AIR POLLUTANTS
(Annual Percentage Change)



Source: Trends in the Quality of the Nation's Air, EPA, 1980.

Note: Based on data from more than 2,000 monitoring stations located in 95 urban areas nationwide.

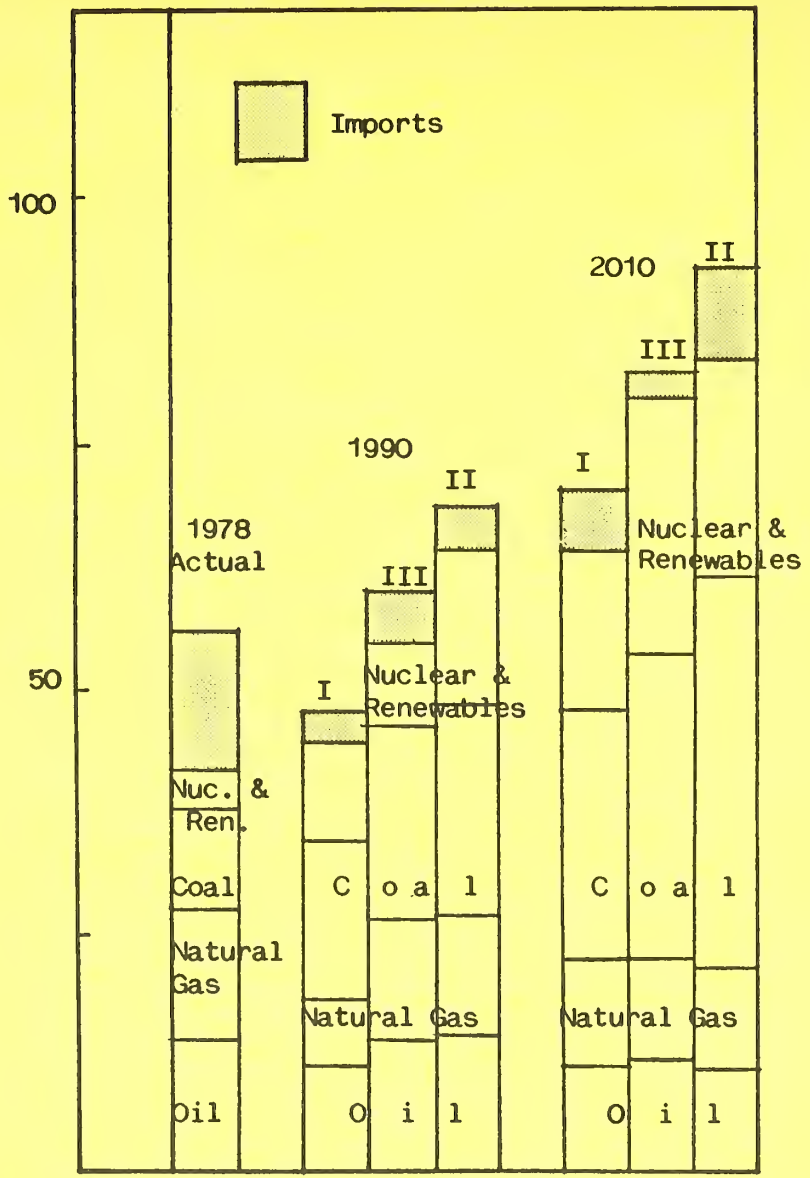
NATIONAL VIOLATION RATES FOR
SELECTED WATER POLLUTANTS
(Percent of Readings in
Excess of EPA Standards)



Source: Council on Environmental Quality, 1980 Report.

Note: Based on data from a nationwide network of 309 monitoring stations.

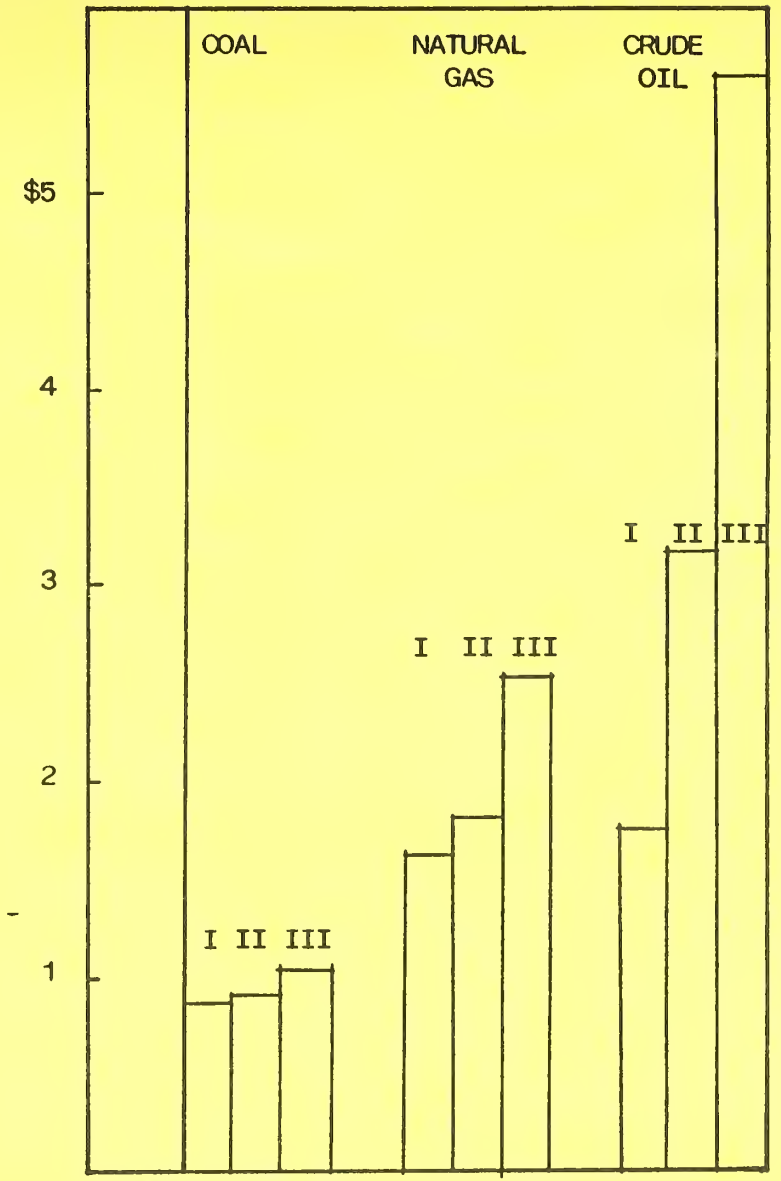
VARIATIONS IN ENERGY
SUPPLY PROJECTIONS
(Quadrillion BTU's/Year)



I National Academy of Science - Low
II National Academy of Science - High
III Energy Information Administration

Source: FEA Report of Congress 1979, pp. 144, 161 and 166.

VARIATIONS IN ENERGY
PRICE PROJECTIONS
(1975 Dollars per Million BTU)



I 1978 Actual
II 1977 EIA Projections
III 1979 EIA Projections

Source: 1979 EIA Report to Congress, p. 143

Appendix B, Part IV

GOALS OF THE REGIONAL PLANNING COUNCIL, THE MARYLAND DEPARTMENT OF TRANSPORTATION, AND LOCAL GOVERNMENTS

LOCAL GOVERNMENT MASTER PLAN GOALS

Subject Areas	Anne Arundel County	Harford County	Howard County	Baltimore County	Baltimore City
Economic Development	A reasonable rate of sustained and diversified growth to provide the jobs, income, and tax base necessary to allow citizens to meet their individual needs and to allow the county to effectively supply public services.	To promote economic growth to ensure a healthy, balanced and diversity of activities including encouragement of agricultural production, ensuring thoughtful location of industrial and commercial uses responses to the market.	Businesses and industries now existing in Howard County should be retained and their expansion and growth should be encouraged and promoted.		Expand opportunities for employment within the region; expand the City's tax revenues from commercial and industrial activity; preserve and enhance existing industrial activity; promote development of the Harbor and related industrial activites; promote development of Metro Center.
Natural Environment	Provide a high level of quality for the whole environment, assure that human uses of the land are compatible with natural conditions and that the county's communities are liveable, efficient, attractive and situated in a countywide pattern of development which promotes efficiency and minimizes public and private costs.	To preserve the quality of the natural environment through achievement of federal and state environmental protection standards, to support productive agricultural activities, as well as to guide land development activities in a manner which will maximize compatibility and minimize conflict between man and the natural environment.	The aesthetic, ecological, natural wilderness and other environmental resources should be protected and maintained. More efficient use of energy should be fostered throughout the county. An economically viable and realistically productive agricultural, horticultural, and sylvicultural resource base should be maintained.	Development should be reduced in areas unsuited for more than very limited development and natural resource areas for agricultural preservation, groundwater resource, stream valleys, floodprone areas, wetlands, and reservoirs be protected.	Develop recreation and park facilities that are highly accessible; relate recreation lands and facilities to schools, multi-service centers, and other appropriate city facilities.
Social/ Housing	Provide the best possible opportunities for all of the people to earn a living, to have a comfortable home, and to enjoy physical and emotional health, personal security and safety, access to new skills and knowledge, and control over their own lives.	To foster a quality living environment through better design and development standards, to encourage rehabilitation and to ensure compatibility among residential, commercial and industrial uses, as well as providing adequate public facilities and services.	Provide a wide variety of housing opportunities with a choice as to location, price and type of tenure within areas which are planned for future urban growth.	Increase the ability of the private market to meet housing needs, improve housing conditions, develop plans to assist lower income households.	Increase the supply of decent and affordable housing available to the city; improve the overall quality of existing housing stock; provide more choice in housing type, tenure and neighborhoods for all segments of the population; improve and stabilize the quality of the neighborhoods.

LOCAL GOVERNMENT MASTER PLAN GOALS (Cont.)

Subject Area	Anne Arundel County	Harford County	Howard County	Baltimore County	Baltimore City
Land Use			Future growth should be in accord with present community scale and character and should not exceed the capacity of the county to provide adequate public services and facilities. Future pattern of land use with respect to distribution and densities, should reduce private transportation needs while promoting development and use of public transportation.	Within Town or Community Centers encourage high density residential development, and development of community service centers. In existing communities limit development where service and public facilities are substantially inadequate; preserve and strengthen their character and identity. In new development areas stage development in relation to staging of major transportation and utilities improvements; direct a substantial portion of new residential growth into areas where major transportation improvements and utility extensions exist or are planned. In fringe development areas the pace of development should not exceed scheduled provision of community services.	

LOCAL GOVERNMENT MASTER PLAN GOALS (Cont.)

Subject Area	Anne Arundel County	Harford County	Howard County	Baltimore County	Baltimore City
Transportation			An efficient and effective highway system should be developed and maintained to support anticipated growth and development. Public transportation should be available to residents wherever and whenever feasible. A network of continuous and direct bike routes should be developed; transportation systems should seek to improve air quality and energy conservation.	Provision of transportation facilities should precede and guide land development; transportation facilities should be planned and designed to be in harmony with the environment; transportation-related energy consumption should be reduced by discouraging inefficient trip making and reducing VMT. The county should assume adequate and rational transit services. Designated growth areas and town centers should be served by fixed guideway transit service. Utilization of non-motorized transportation modes should be encouraged. Land use elements and the zoning map process must be tied very closely to the transportation element.	Support and expand development of Baltimore's economy through selective transportation improvements; promote rebuilding of obsolete and inadequate sections of the city through selective transportation improvements; provide a balanced system of transportation facilities to meet anticipated needs for the movement of people and goods, and storage of vehicles.
Source:	General Development Plan, Office of Planning and Zoning, 1978.	Comprehensive Zoning Plan, Draft Outline, Department of Planning and Zoning, June, 1981.	Draft Howard County Master Plan, Office of Planning and Zoning, August, 1981.	Baltimore County Master Plan 1979-1990, November, 1979.	Baltimore's Development Program, Baltimore City Planning Commission, January, 1976.

RPC GENERAL DEVELOPMENT PLAN GOALS

Subject Area	1967	1972	1977
Economic Development	Suitable industrial land should be reserved for economic development.	Adequate and rewarding employment for everyone able to work, opportunity for securing goods and services necessary for satisfactory life in today's society; economical and effective delivery of public assistance to those who cannot otherwise provide; sound governmental fiscal bases and balanced economic development in the region.	Promote the attainment of an economy with the fullest possible employment by stimulating economic development to produce the jobs, private income, and public revenues necessary for every citizen to achieve economic well-being and to provide the goods and services necessary for a satisfactory life in today's society.
Transportation	Provide a balanced transportation system.	A high level of service for the movement of people and goods and the efficient transmission of energy, consistent with enhancement of the aesthetic, physical, economic and social environment.	Provide transportation services needed to support and enhance the economy consistent with the preservation and improvement of the social, physical, and natural environments.
Community Development	Town centers should serve as focal points for service, commercial, and institutional activities. There should be continued redevelopment and revitalization of central Baltimore; a variety of residential development, planned in relation to physical characteristics, open space, good transportation facilities, and convenient shopping areas.	Improve the quality of development, create image and character, protect and enhance the cultural historical, visual, and ecological assets of the region's manmade environment.	Improve and stimulate development and redevelopment by protecting and enhancing communities; by promoting balance in physical, psychological, financial, and social concerns in community development; and by maintaining and recreating communities with character and stability.

Subject Area	1967	1972	1977
Natural Environment	Retention of open space in the region should be promoted.	Preservation and enhancement of sunlight, air, water, and land resources and wildlife and vegetation of the region in order to support and enrich human life.	Preserve and enhance the natural environment to increase the benefits derived from sunlight, air, water, land, wildlife, and vegetation.
Housing	Order and variety in residential growth.	Adequate choice from a sufficient supply of decent homes in suitable environments within economic reach of all citizens of the region.	Promote adequate choice and sufficient supply of decent homes in suitable environments within economic reach of all citizens.

MARYLAND DOT: MISSION, ROLE, GOALS

Mission

MDOT will do whatever is possible and necessary within the limitations of competing demands on available resources to obtain for the people of Maryland the transportation services and facilities which they need and to meet the responsibilities and commitments of the State for the achievement of local, state, and national objectives.

Role

1. Give more emphasis and attention to management of existing facilities, improved performance, monitoring trends, and interjurisdictional coordination.

2. Become more actively involved in shaping the amount, location, and types of transportation demand.

3. Assure that transportation investments help to meet multiple objectives - economic, social, and environmental, as well as transportation.

4. Give priority to the preservation of transportation lands and rights-of-way.

Goals

1. Economy - Assure the provision of transportation facilities and services which will enhance the economy, strengthen fiscal integrity, and meet the needs of state, national, and international commerce.

2. Institutions - Strengthen the capability of governmental and private institutions to achieve sound land use/transportation relationships and provide needed transportation facilities and services with maximum effectiveness, safety, and efficiency.

3. Existing Population and Environment - Through transportation, better serve the existing population and improve, preserve and make more effective use of existing resources - both natural and manmade.

4. Expansion and/or Change - Assist in providing transportation services and facilities needed to support planned growth and redevelopment and/or to enhance mobility.

Source: 1978 Maryland Transportation Plan

Appendix C

Part I. Minutes of the Second Panel Meeting

Part II. Data Requested by the Panel during the First Meeting

Appendix C, Part I
MINUTES OF THE SECOND PANEL MEETING

The second Energy/Transportation Futures Study Panel meeting was held on December 10, 1981 at The Johns Hopkins University. The meeting was called to order at 9:30 a.m. The first item on the agenda was a review of the overall scenario process. The objectives and step-by-step flow of the process were discussed. Specific objectives for the second meeting were also explained.

Select Cells (Skeleton Scenarios) from Matrix

The first item on the agenda was a discussion of the independent variables selected during the first panel meeting. It was recommended by the staff that Energy Availability be changed to Availability of Oil and that a third value, Plentiful Supply, be added for this variable. It was also suggested that Technological Innovation be changed to Commercialization of Technology with two values, rapid commercialization and slow commercialization, to be considered. These changes are accepted by the panel.

Definitions for the values of each independent variable were discussed next. The definitions suggested were those included in the mailout package and were accepted by the panel. It was also agreed that these definitions represent the scenario end point conditions.

A matrix of all possible skeleton scenarios resulting from the selection of independent variables was then presented to

the panel. In order to provide the panel with some insight as to the meaning of the individual scenarios, a correspondence between conditions represented by scenarios and selected historical periods was discussed for many of the 18 scenarios.

The panel was then asked to select three or four of the skeleton scenarios for detailed development. The selection process was begun by taking a straw vote. Each panel member was asked to select four scenarios which they felt were likely to occur or were less probable but would have a strong impact on the region. The results from the straw vote are shown in Attachment A.

The discussion that followed resulted in the selection of four scenarios for further development. Scenario 5 (refer to Attachment A) was selected as the most likely scenario. A transition scenario represented by the combination of Scenarios 16 and 10 was chosen to represent a worst case type condition with regard to a transportation energy shortage. Scenario 3 was selected to represent a condition of economic decline and low oil availability. Scenario 7 was selected as the fourth scenario representative of a period of high growth.

Selection of Goals for Inclusion in the Study

The next topic for panel discussion was the selection of study goals and evaluation criteria. The panel was asked to comment on a set of goals and accompanying evaluation criteria prepared by the staff and included in the pre-meeting mailout package. The ensuing discussion resulted in the recommendation of several changes and additions to the list of goals and criteria. These recommendations are indicated on the Revised Goals

and Evaluation Criteria Table (Attachment B). Principal topics discussed in the development of these recommendations included:

- development of commercial and industrial sites to be competitive with other regions;
- meaning of "balanced economic development;"
- location of housing near employment;
- focusing of energy conservation on petroleum;
- GRP and unemployment rate as measures of economic growth.

Select Dependent Variables for Inclusion in Study; Discuss Impact of Scenario Conditions on Dependent Variables and Study Goals

Goal selection was followed by discussion of dependent variables. A set of dependent variables prepared by the staff was presented to the panel as a starting point for the discussion. The panel was then asked to describe what they believed would be the impacts of the four scenarios on each dependent variable. The dependent variable impacts projected by the panel are indicated in the table of Attachment C. Time did not permit a complete discussion of all variables on the table.

Many topics were addressed by the panel during the dependent variable discussion. Among them were:

i. off-setting impacts on personal travel (technology, oil availability, economy);

ii. truck versus rail for goods movement: rail bottlenecks at tunnels, reduced bulk and weight of freight due to changing technology, impacts of increased coal export;

iii. higher portion of low bulk, high value cargo;

iv. road system improvements: maintenance versus expansion, implications of new automotive technology;

v. future roles of transit and paratransit modes;

vi. impact on housing development of a shortage of funds for water and sewerage system expansions;

vii. employment base and labor force training;

viii. government (especially transportation) revenues.

Discussion of Policy Options to Address Scenario Conditions

The panel was next asked to consider what policies would be appropriate in order to solve the transportation/energy/land use problems arising in each of the four scenarios. A list of example policies pertaining to transportation, land use, economic development, and institutional operations was handed out to the panel and a brief explanation given.* The panel then discussed several types of policies that they would like to have considered in the development of the four scenarios. The policies discussed were:

* The handout has been included as Attachment D.

i. staggered work hours, flex time arrangements;

ii. parking management strategies;

iii. extension of paratransit;

iv. airport development;

v. promotion of alternate fuels;

vi. labor force training;

vii. support of energy contingency plans; and

viii. location decisions for public facilities.

Because of time limitations, a discussion of the applicability of the policies under each scenario was not possible. It was agreed that the staff would prepare a policy table and mail the table to the panel to solicit further comments and recommendations.

Project Administration

The meeting was concluded with a discussion of the schedule for the remainder of the project. It was anticipated that draft scenarios, prepared by the staff, would be sent to the panel in early February. The panel will be asked to review the draft scenarios and return their comments to the staff. Final scenarios will then be written and used as a basis for developing policy recommendations at the third panel meeting to be held in early March.

Appendix C, Part I

ATTACHMENT A
SCENARIO MATRIX

Rapid Commercialization of New Technology

Oil Availability	ECONOMIC GROWTH: Vigorous	Slow, Stable	Decline
Shortage	1 (2)	2 (2)	3 (3)
Stable	4 (7)	5 (6)	6 (0)
Plentiful	7 (3)	8 (3)	9 (1)

Slow Commercialization of New Technology

Oil Availability	Vigorous	Slow, Stable	Decline
Shortage	10 (1)	11 (2)	12 (3)
Stable	13 (1)	14 (5)	15 (1)
Plentiful	16 (1)	17 (0)	18 (0)

( ) - Number of votes

Attachment B

STUDY GOALS AND EVALUATION CRITERIA

Goals	Scenario Policy Evaluation Criteria
TRANSPORTATION	
Provide for adequate movement of people to promote land development goals.	o GRP lost due to inadequate transportation facilities.
Provide for adequate movement of goods and services to promote economic development goals.	o Amount of fuel used per ton mile.
Respect social and natural environments.	o Roads with E or F service levels and rail shipping times.
Maintain mobility for all segments of the population in face of severely increasing transportation costs plus uncertainty of fuel supplies.	o Amount of land taken for transportation facilities.
LAND DEVELOPMENT	
Promote a centralized development pattern.	o Distribution of new building permits in/outside development areas.
Foster growth in planned urban areas, for all uses. Maintain and revitalize existing communities.	o Relative economic and social strength of city. - % of public school children passing national exams. - differential in crime rates between city and suburbs.
Provide appropriate public services, facilities and land use designs for planned growth areas which will be competitive with other regions.	o Average trip length. o Amount of inadequate capacity of sewerage and highway facilities.
Preserve prime agricultural land for farming.	o Amount of agricultural land lost to urban development.

Attachment B

Goals	Scenario Policy Evaluation Criteria
ECONOMIC DEVELOPMENT	
Promote economic development through retention and expansion of existing enterprises and the attraction of new activities.	o GRP/per capita. o Unemployment rate.
Promote fullest and diversified employment.	o Growth in disposable income.
Opportunity for every citizen to achieve economic wellbeing.	o State and local taxes as a proportion of per capita income.
Generate public revenues to provide necessary services.	
Promote a diversity of economic enterprises which meet present and future needs, that is a distribution of jobs in industrial, commercial, service, governmental and agricultural activities.	
NATURAL ENVIRONMENT	
Preserve the natural environment.	o Change in air and water quality levels amount contributed by transportation sector.
Increase benefits of the natural environment to the public.	o Average travel time to a major park facility.
HOUSING	
Promote adequate choice of decent homes.	o Percent of homes in area served by transit (for non-auto households). o Vacancy rate. o % of household budget spent on housing. o % substandard stock.

Attachment B

Goals	Scenario Policy Evaluation Criteria
ENERGY	
Increase efficient use of energy resources.	o BTUs used in transportation sector.
	o BTUs used per capita.
Increase utilization of indigenous resources.	o % of energy produced in region.
Increase conservation of petroleum.	o Passenger miles/gallon.
GOVERNMENT DECISION MAKING	
Improve government capability to respond to changing conditions.	o Time required to plan and implement transportation and land use development projects.
Reduce implementation time of public projects.	o Number of separate regulatory reviews required.
Target employment programs to meet specific economic development objectives.	
Clarify government's role in provision of housing in region.	
Improve government capabilities to measure preservation of the environment.	
Improve government capacity to mediate conflicts between environmental preservation and economic development.	

Matrix Cell # (from Attach. B) DEPENDENT VARIABLES	3 Decline Econ ↓ Oil ↓ Tech ↑	5 Trend Econ – Oil – Tech ↑	7 High Growth Econ ↑ Oil ↑ Tech ↑	16→10 Transition Econ ↑ Oil ↑ – ↓ Tech ↓
Personal Travel	↓	–	↑	↷
Goods Movement	↓		↓tonage ↑$	–
Road System	–	–	↑	–
Public Transit (MTA)	↑		↓	
Regional Jobs	↓	↓	↓	
Unemployment				
Housing				
Energy Consumption				
Institutional				
Obsolete Infrastructure	↑			
Development Density				
Paratransit	↑	↑		

↑ Impact of scenario is to increase dependent variable relative to present conditions.

↓ Impact of scenario is to decrease dependent variable relative to present conditions.

– Impact of scenario is no change to dependent variable relative to present conditions.

Appendix C, Part I
Attachment D

POLICY AREAS

TRANSPORTATION

1. Investment policies:
   highways-maintenance, capacity expansion
   transit-subway expansion, bus service expansion.
2. Policies resulting in incentives for ridesharing.
3. Parking management policies.
4. Policies related to provision of facilities for goods movement--rail, truck, port.
5. Contingency planning.

LAND USE

1. Policies impacting location of new residential units and employment.
2. Policies impacting expansion of sewer, water facilities.
3. Policies placing constraints/shifting public costs on developers.

ECONOMIC DEVELOPMENT

1. Policies to provide facilities to develop markets competitive with other areas.

ENERGY

1. Policies to improve the efficient use of petroleum products.
2. Encourage alternative fuels.

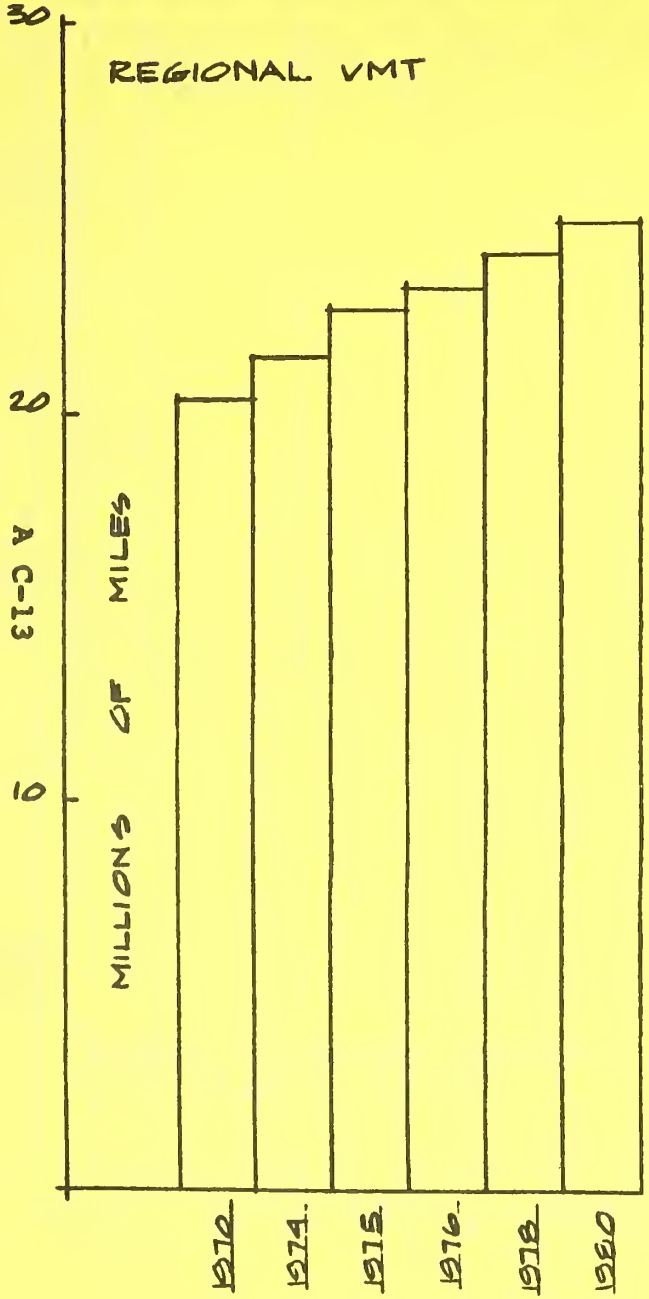
GOVERNMENT DECISION MAKING

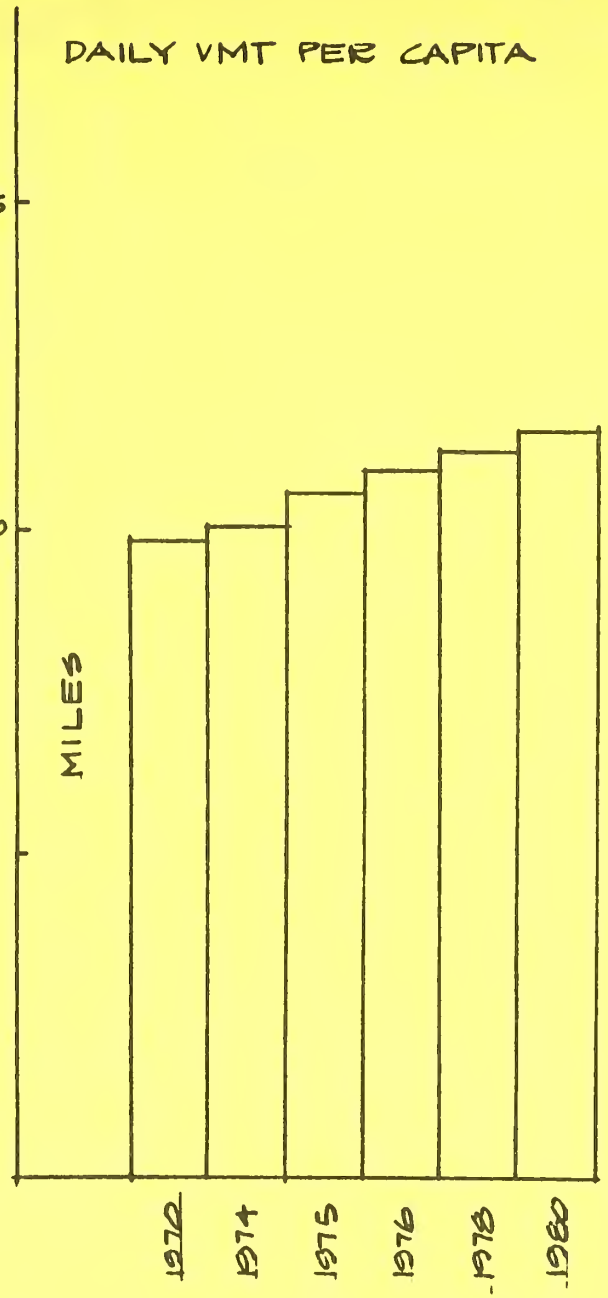
1. Location of sewer, roads.

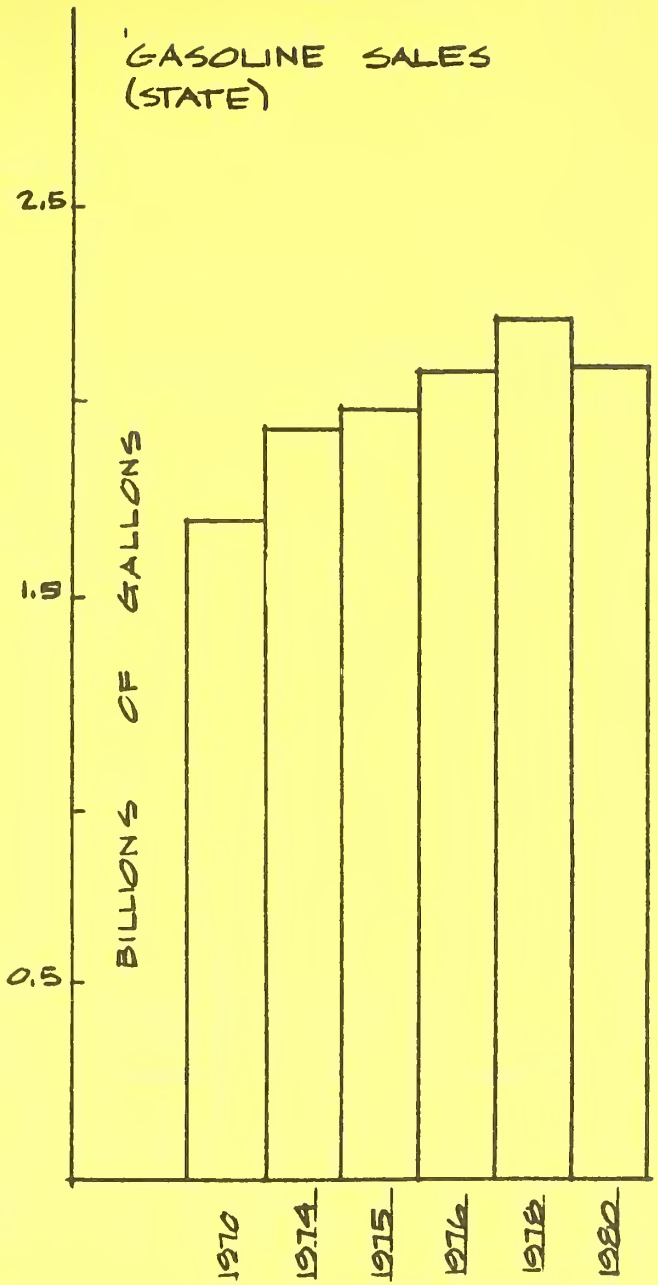
Appendix C, Part II

DATA REQUESTED BY THE PANEL DURING THE FIRST MEETING

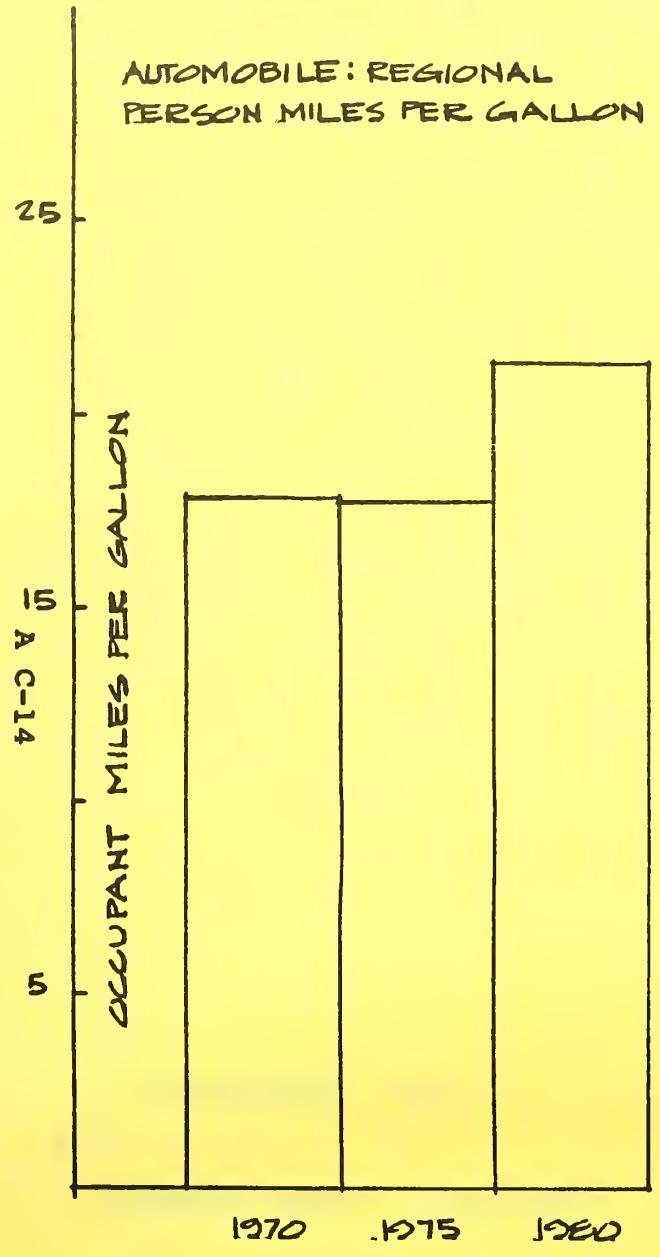
REGIONAL TRAVEL TRENDS

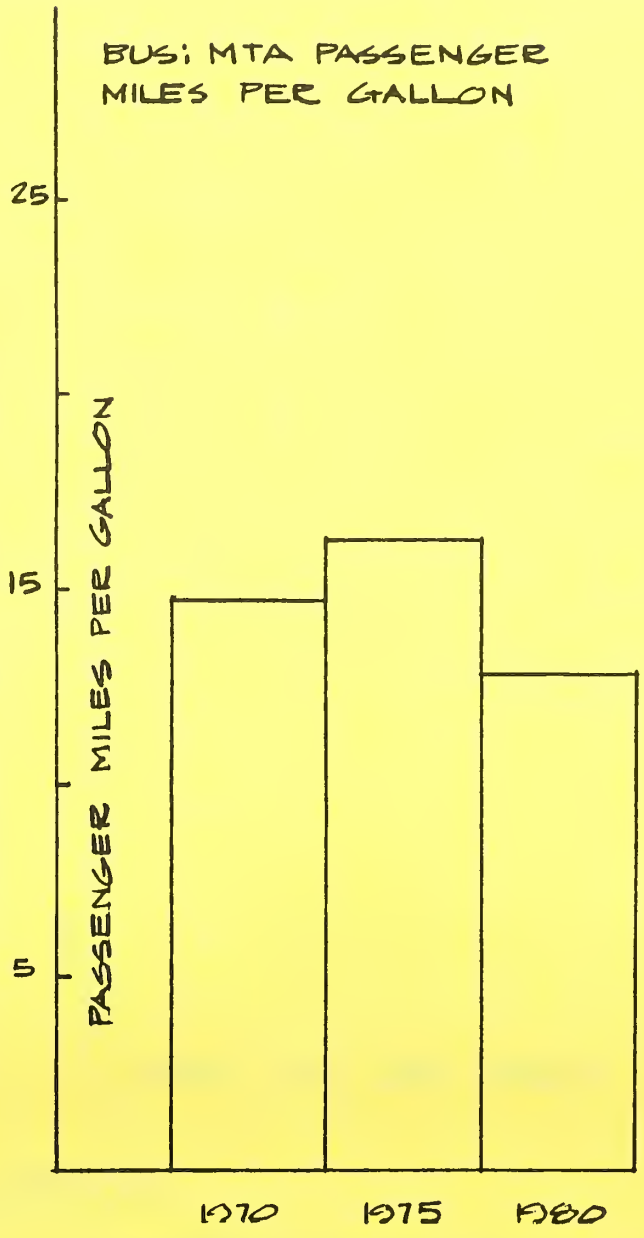


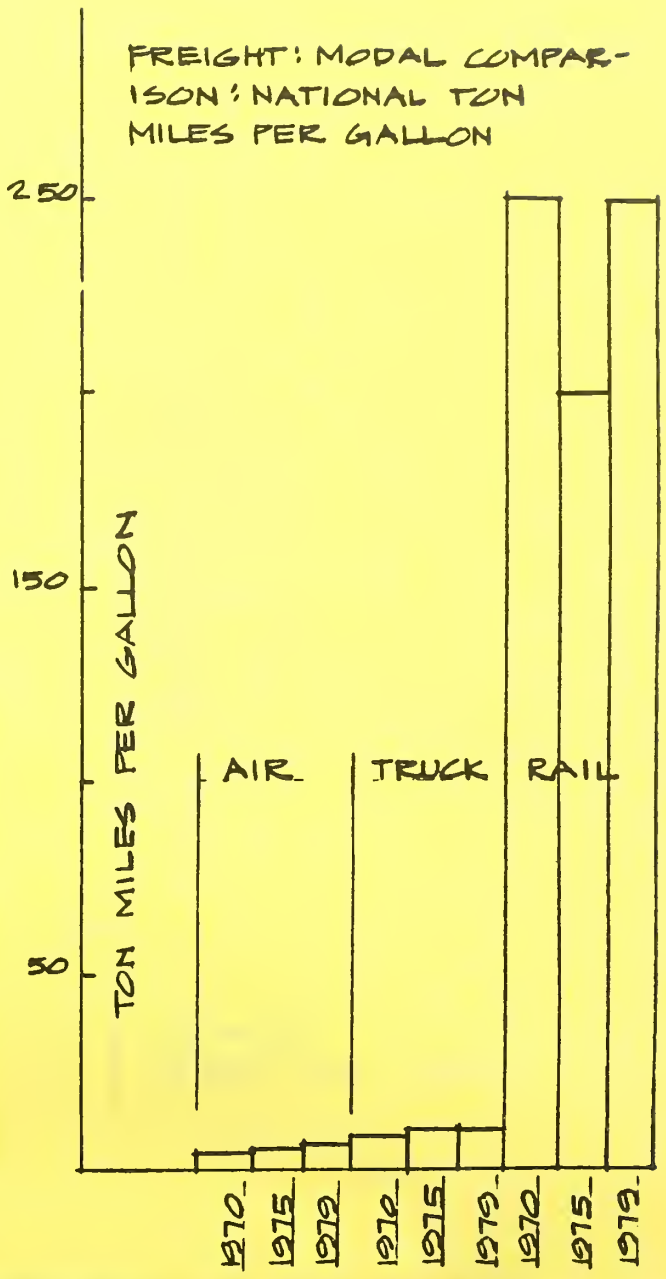




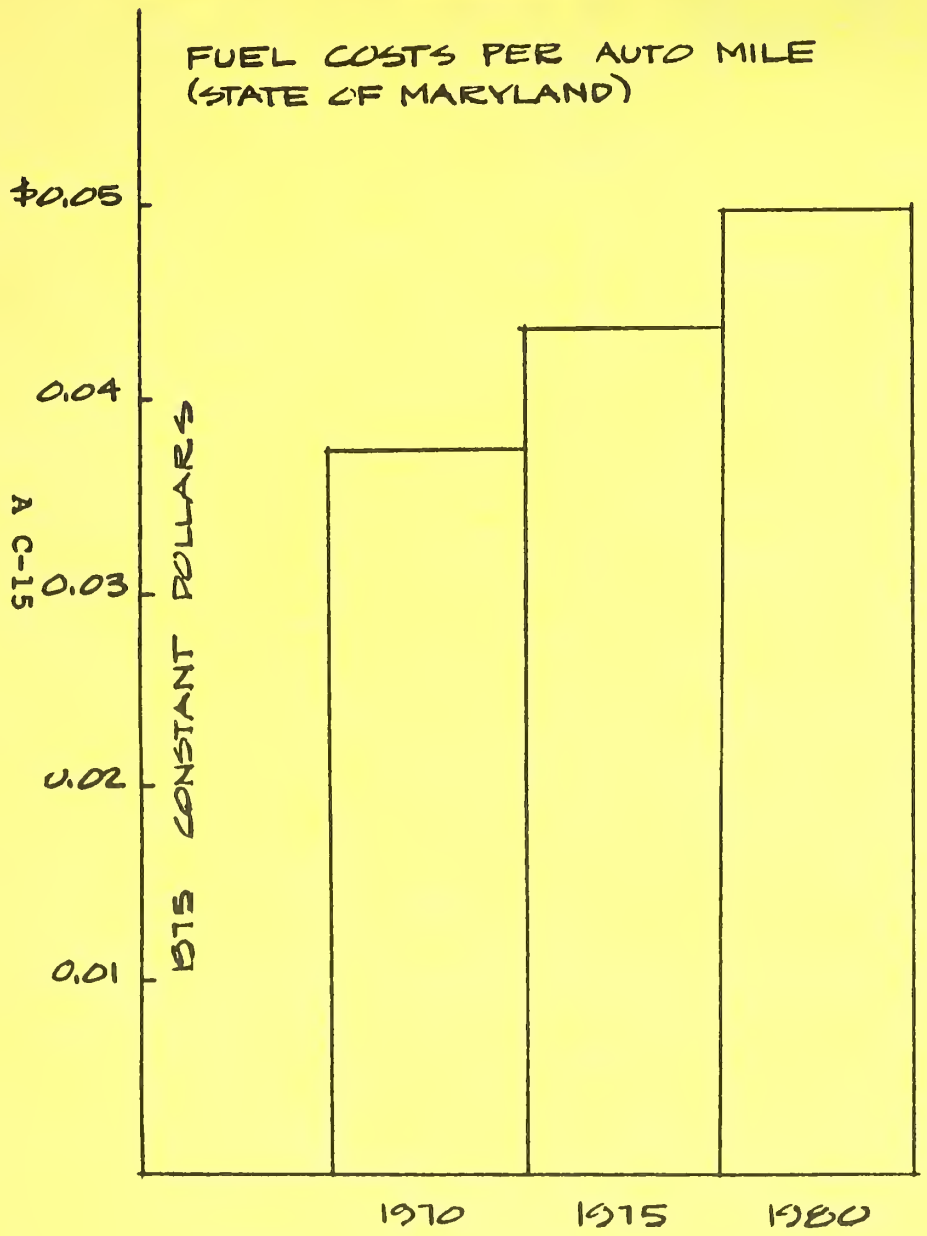
FUEL EFFICIENCY TRENDS

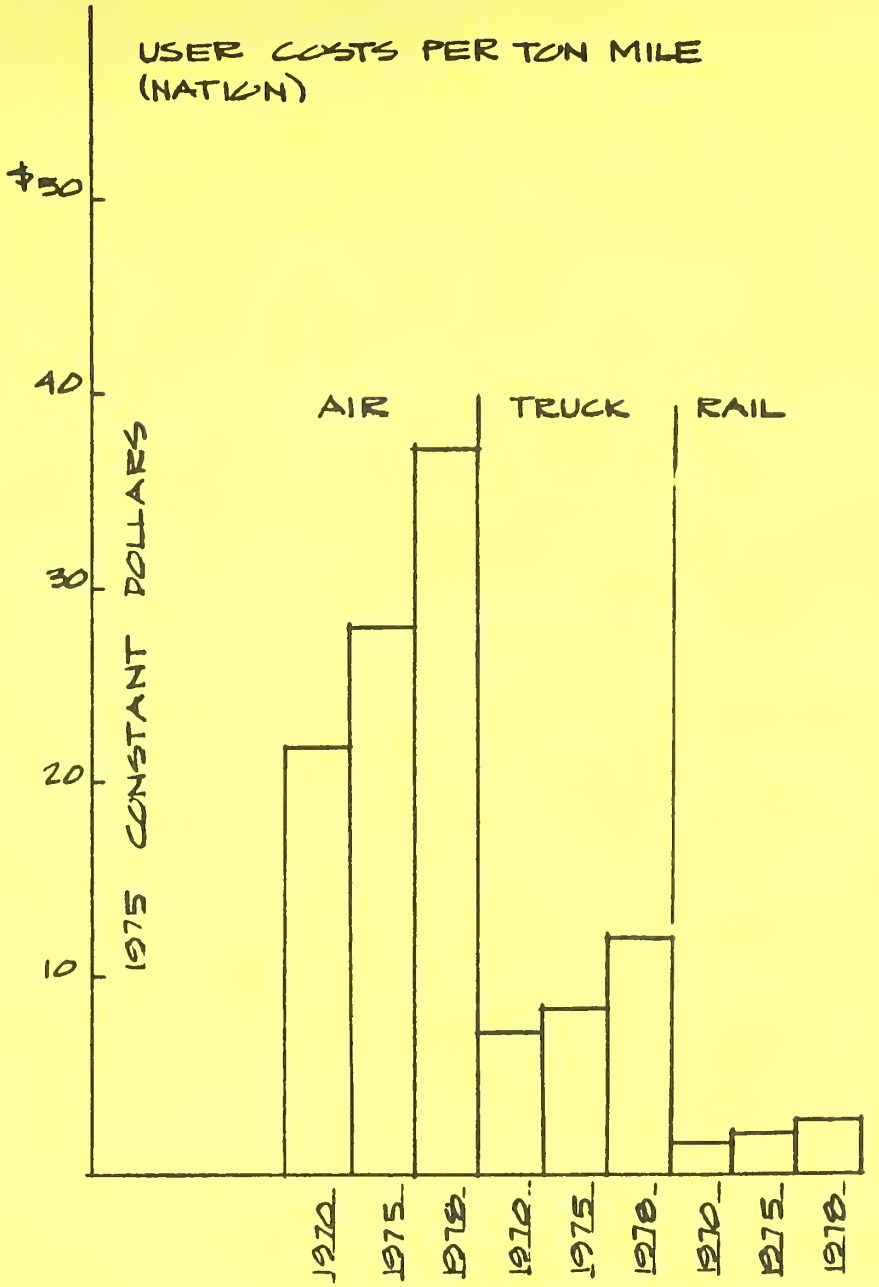




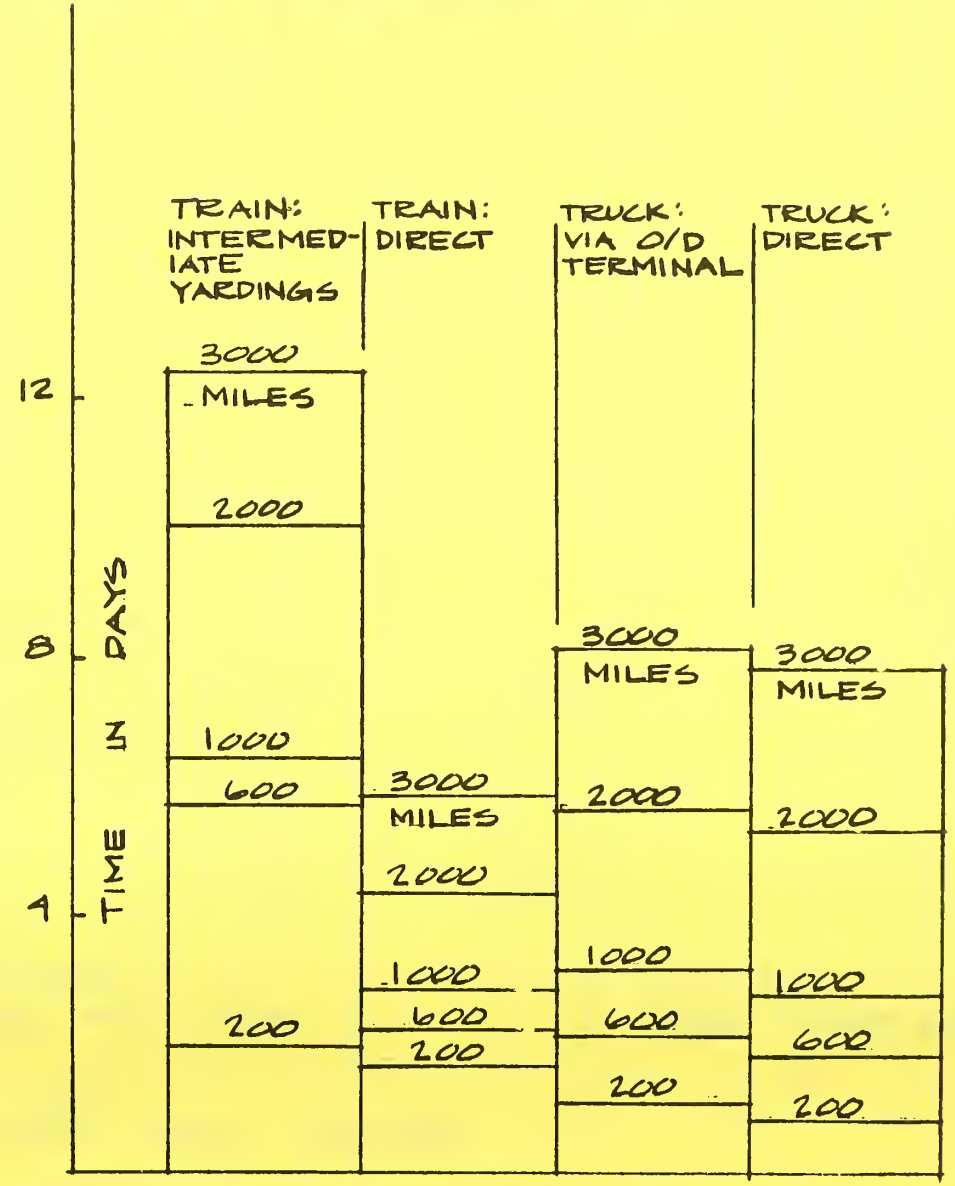


TRANSPORTATION COST TRENDS

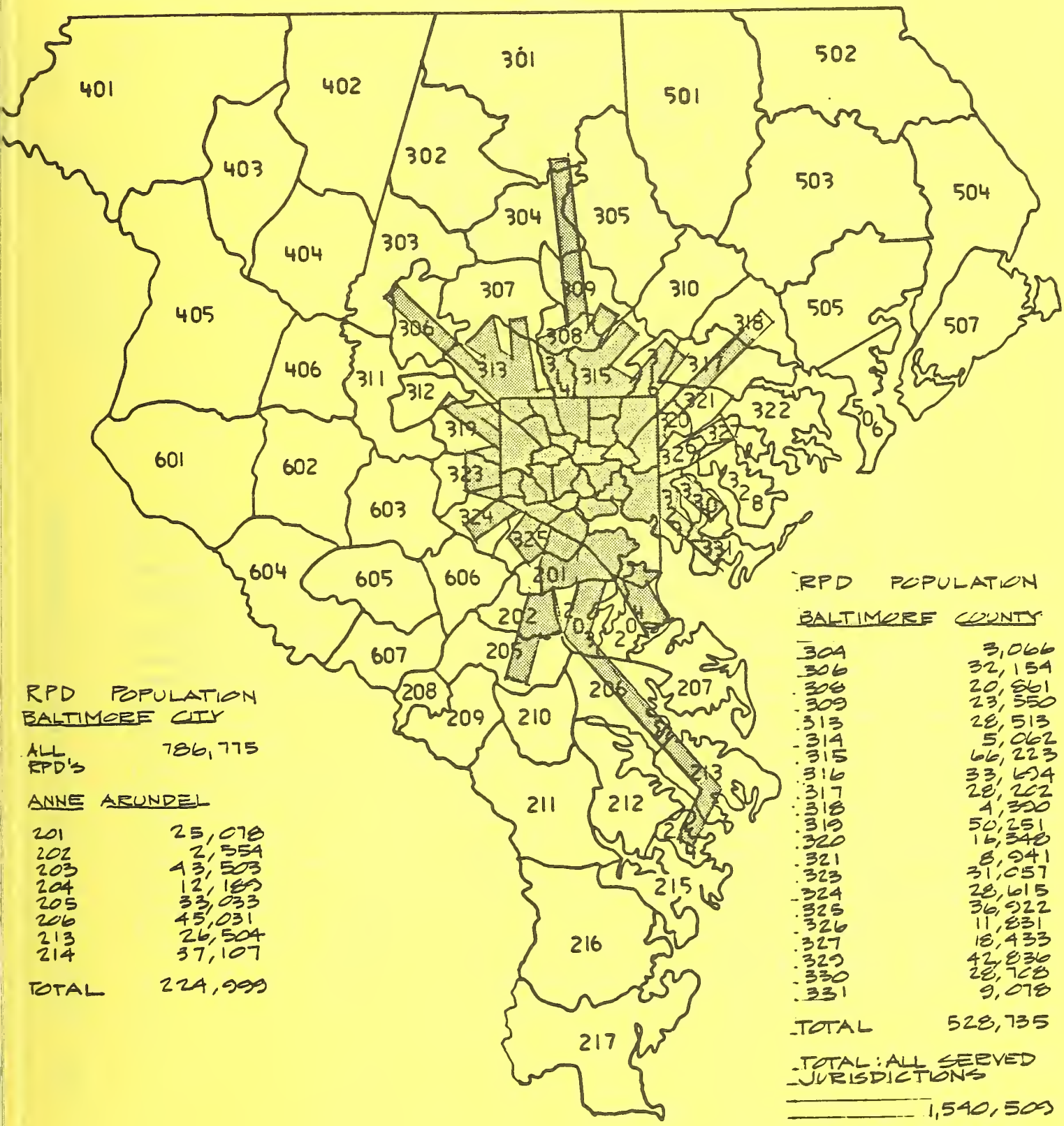




FREIGHT DELIVERY TIMES



MTA SERVICE AREA; 1980 POPULATION SERVED



RPD POPULATION
BALTIMORE CITY

ALL RPD's	786,775

ANNE ARUNDEL

201	25,078
202	2,554
203	43,503
204	12,185
205	33,033
206	45,031
213	26,504
214	37,107
TOTAL	224,995

RPD POPULATION
BALTIMORE COUNTY

304	3,066
306	32,154
308	20,861
309	23,550
313	28,513
314	5,062
315	66,223
316	33,604
317	28,202
318	4,350
319	50,251
320	16,348
321	8,941
323	31,057
324	28,615
325	36,922
326	11,831
327	18,433
329	42,836
330	28,768
331	9,078
TOTAL	528,735

TOTAL: ALL SERVED JURISDICTIONS

1,540,509

PER CENT OF REGIONAL POPULATION: 70.8%

INTER JURISDICTION TRIP TABLE

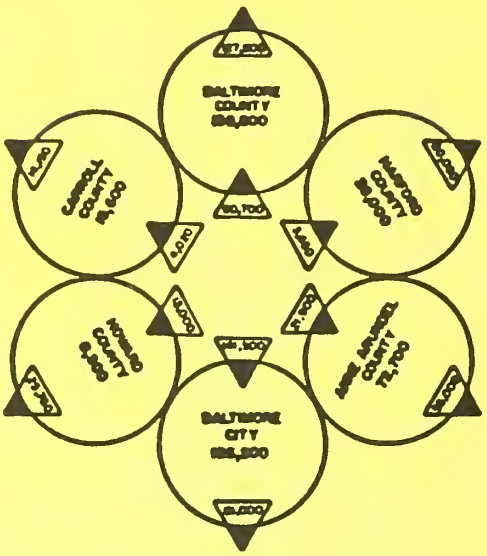


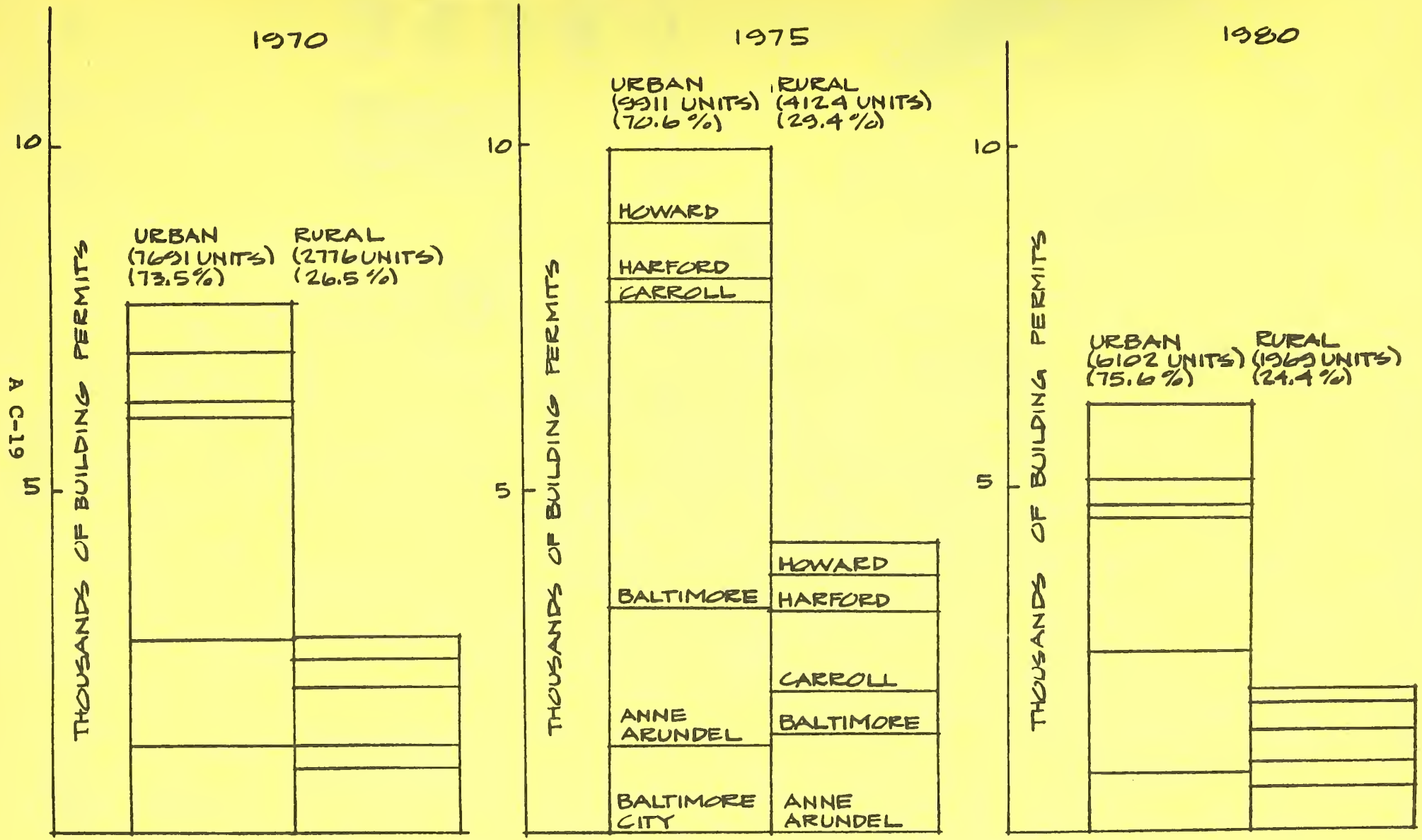
TABLE A-6. JOURNEYS TO WORK, 1976

coming from / going to	TOTAL	BALTIMORE CITY	ANNE ARUNDEL COUNTY	BALTIMORE COUNTY	CARROLL COUNTY	HARFORD COUNTY	HOWARD COUNTY	OUTSIDE REGION
TOTAL	774,070	327,700	94,600	229,500	19,620	31,650	21,500	49,500
BALTIMORE CITY	267,600	186,200	8,900	63,100	500	1,300	2,300	5,300
ANNE ARUNDEL CO.	127,700	19,600	72,700	8,300	-	-	3,400	23,700
BALTIMORE COUNTY	266,700	103,900	8,600	138,800	3,200	2,200	6,500	3,500
CARROLL COUNTY	29,750	2,500	500	6,500	15,600	150	500	4,000
HARFORD COUNTY	48,060	9,900	-	8,200	160	28,000	300	1,500
HOWARD COUNTY	34,260	5,600	3,900	4,600	160	-	8,500	11,500

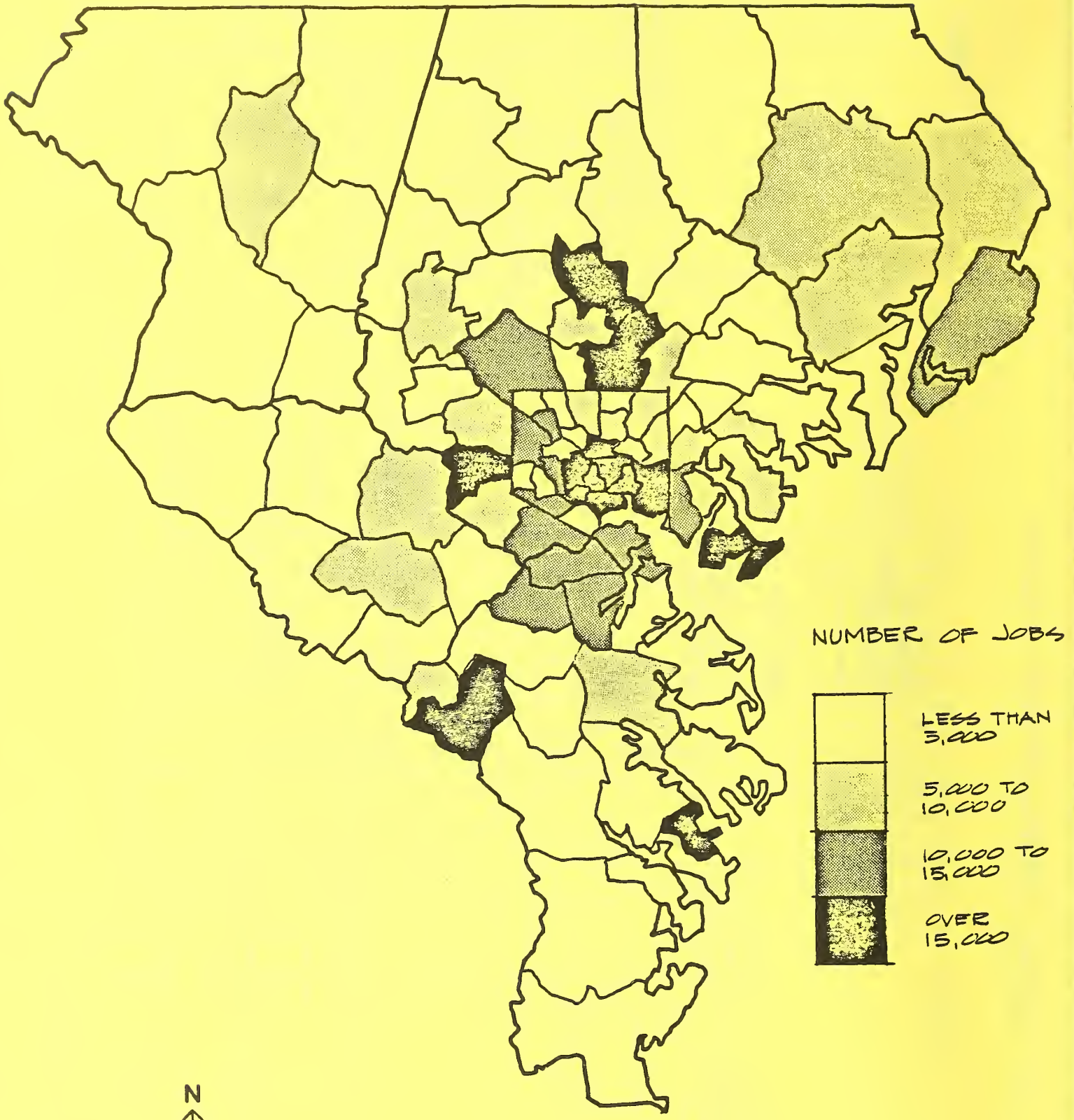
SOURCE: U. S. Census Bureau, Annual Housing Survey: 1976

Regional Planning Council
October, 1981

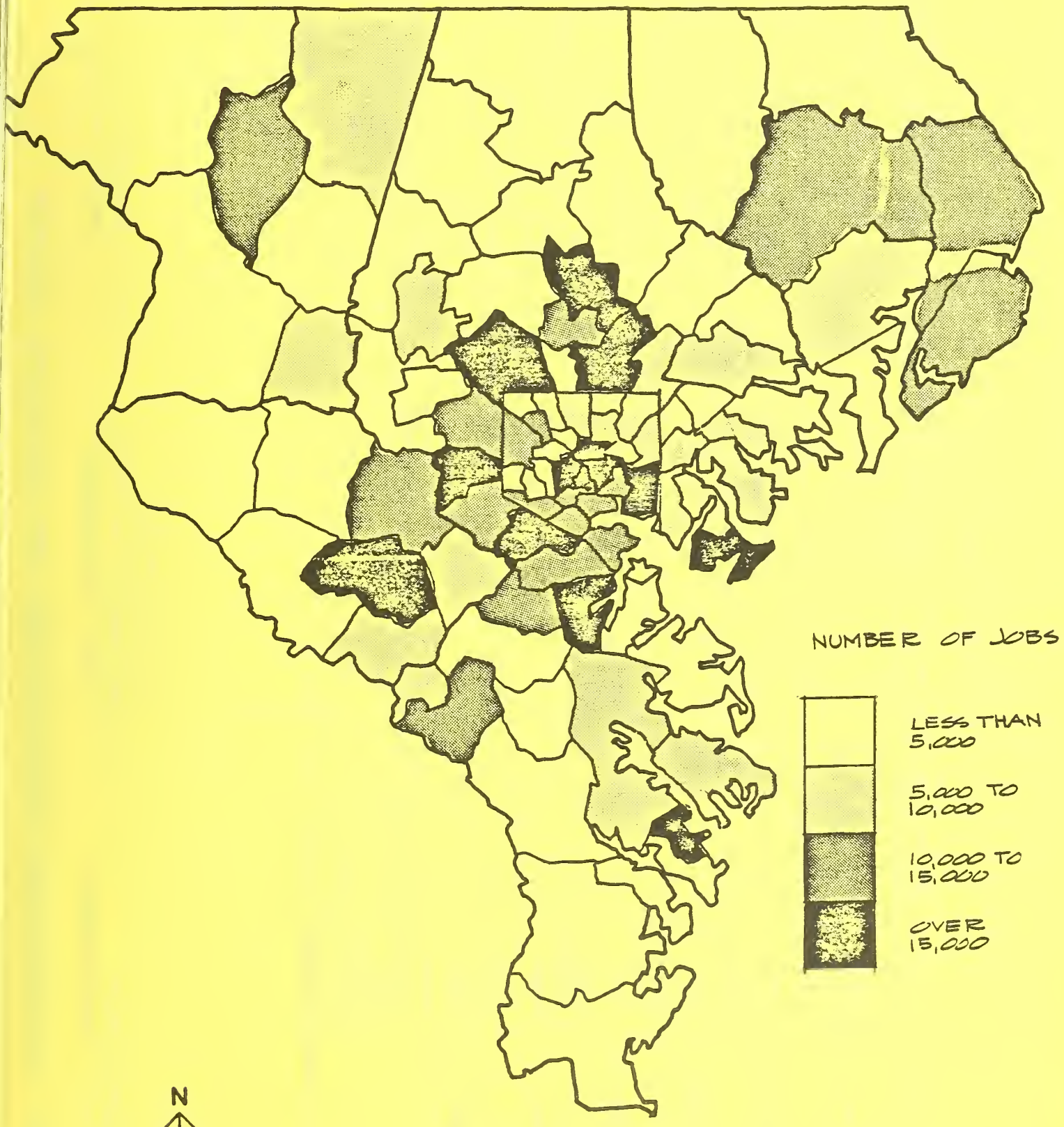
RURAL AND URBAN DEVELOPMENT TRENDS



REGIONAL EMPLOYMENT, 1970



REGIONAL EMPLOYMENT, 1978

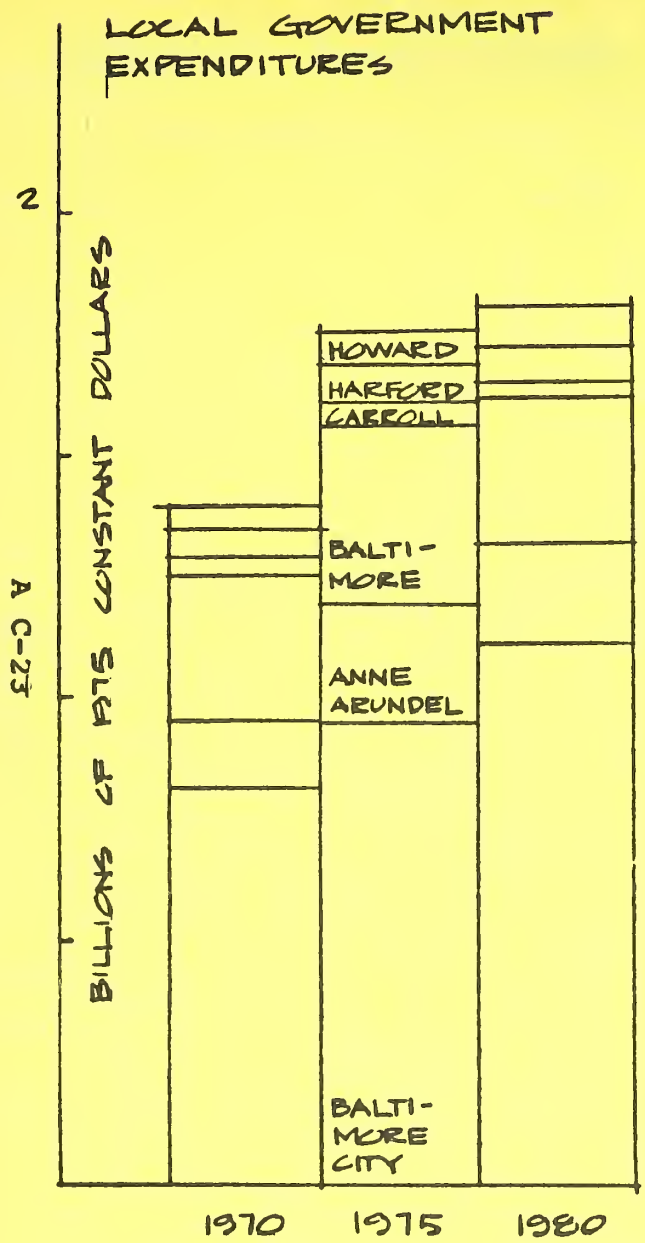


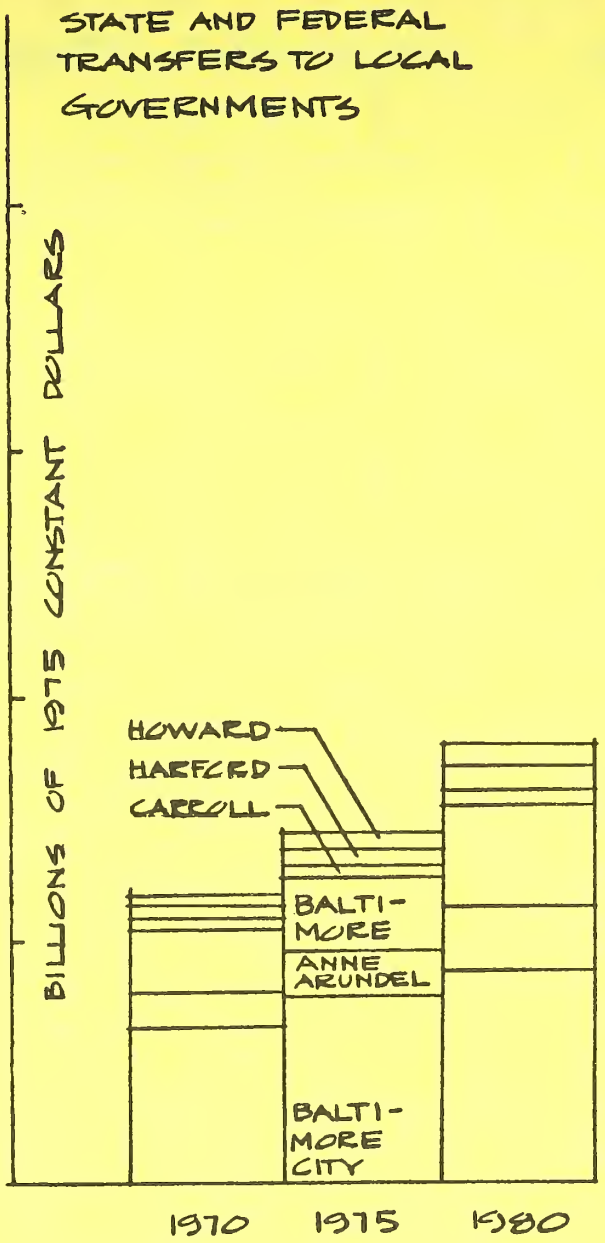
REGIONAL UNEMPLOYMENT RATES: 1960-1980

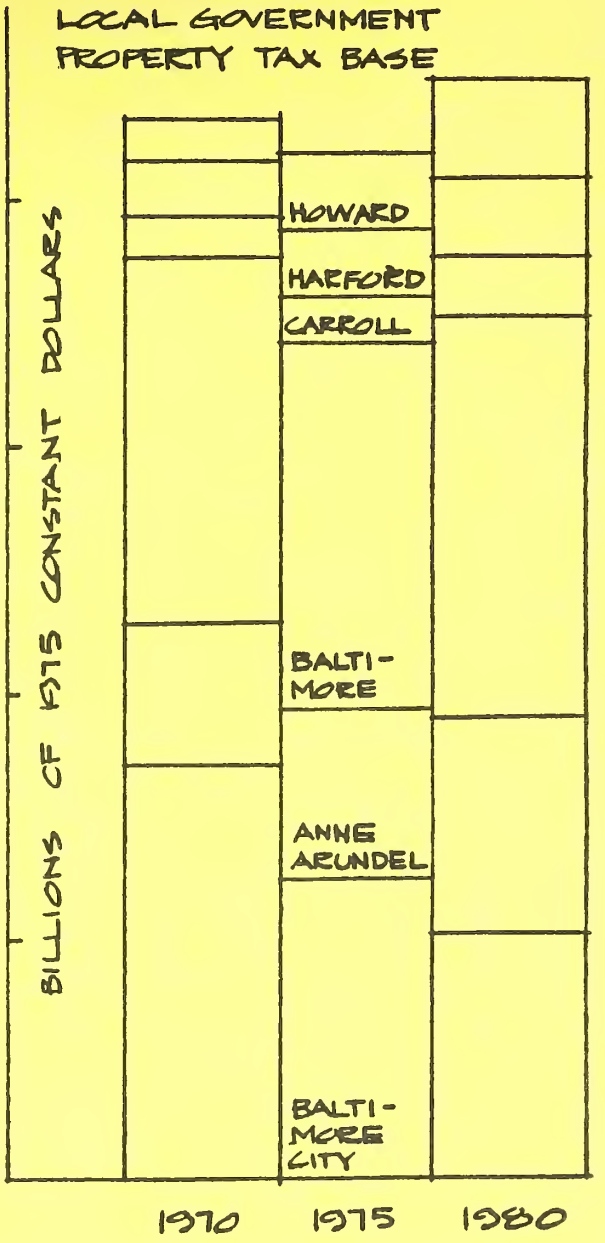
		1960 (PERSONS 14 YEARS AND OLDER)			1970 (PERSONS 16 YEARS AND OLDER)			1980 (PERSONS 16 YEARS AND OLDER)		
		TOTAL	WHITE	NON-WHITE	TOTAL	WHITE	NON-WHITE	TOTAL	WHITE	NON-WHITE
BALTIMORE CITY	TOTAL	6.4	4.9	9.7	4.6	3.4	6.2	9.1	6.8	12.0
	FEMALE	5.9	4.2	9.1	5.1	3.7	6.7	10.1	7.4	12.9
ANNE ARUNDEL COUNTY	TOTAL	4.1	3.8	6.2	2.7	2.6	4.0	5.0	4.7	7.3
	FEMALE	4.2	3.9	6.1	3.5	3.3	5.4	6.5	6.0	9.7
BALTIMORE COUNTY	TOTAL	3.6	3.5	7.2	2.6	2.6	3.0	7.7	7.7	9.0
	FEMALE	4.2	4.1	6.4	3.4	3.4	3.3	10.2	10.2	9.9
CARROLL COUNTY	TOTAL	4.0	3.7	11.9	2.3	2.3	3.3	6.1	6.0	8.4
	FEMALE	4.5	4.2	9.2	3.2	3.3	1.2	8.2	8.4	3.3
HARFORD COUNTY	TOTAL	4.4	4.0	8.4	3.3	3.1	5.8	5.8	5.4	9.9
	FEMALE	5.0	4.3	10.5	5.5	5.1	9.0	9.3	8.7	14.9
HOWARD COUNTY	TOTAL	3.4	2.9	6.7	1.9	1.8	2.9	3.0	2.9	4.6
	FEMALE	3.2	2.9	4.8	2.3	2.1	4.2	3.7	3.3	6.6
REGION	TOTAL	5.3	4.2	9.4	3.5	2.8	5.8	7.4	6.4	11.2
		5.2	4.1	8.8	4.3	3.6	6.4	9.1	8.1	12.3

SOURCE: U.S. Census and Maryland Department of Human Resources for 1980 data.

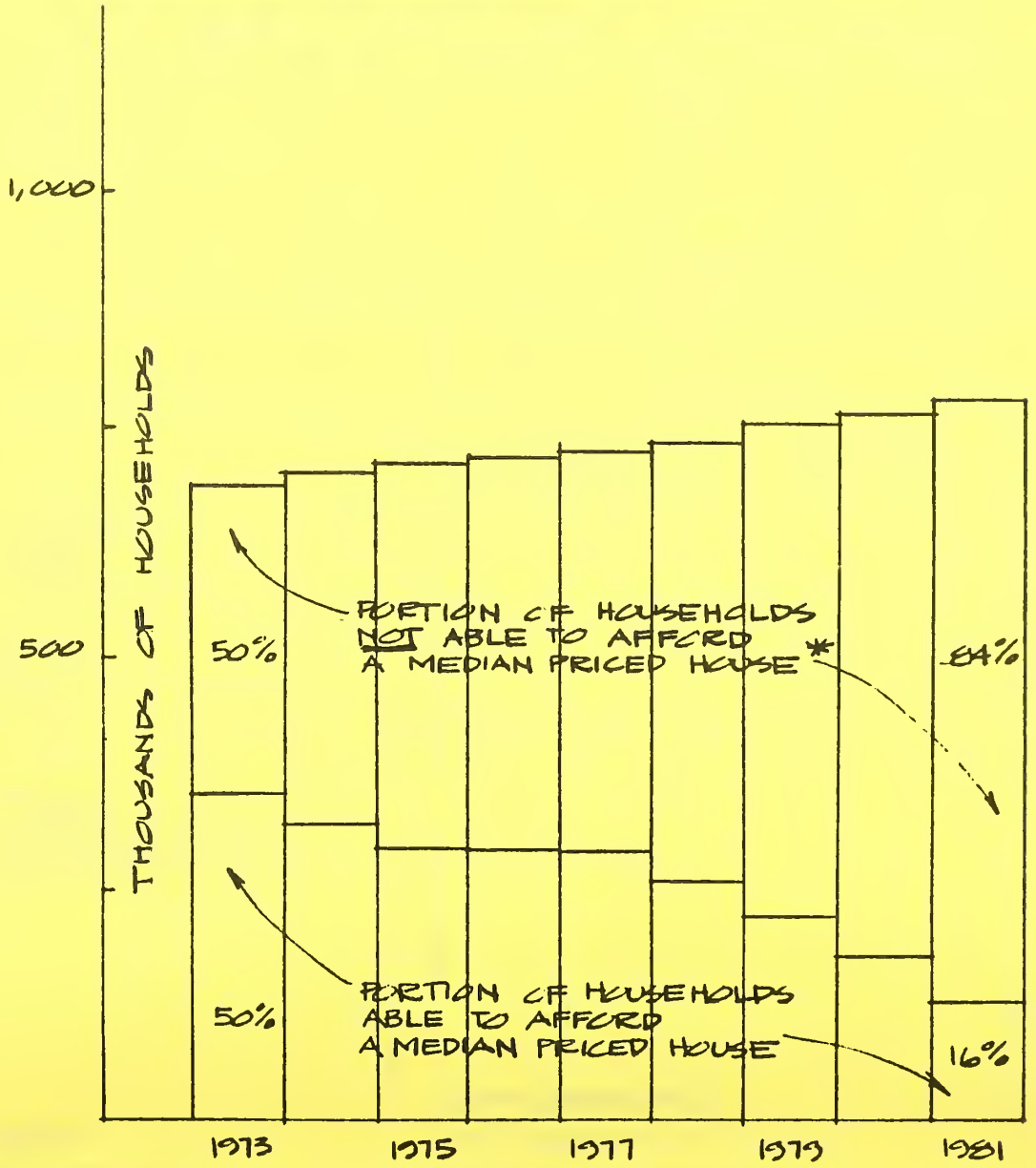
LOCAL GOVERNMENT EXPENDITURE AND REVENUE TRENDS





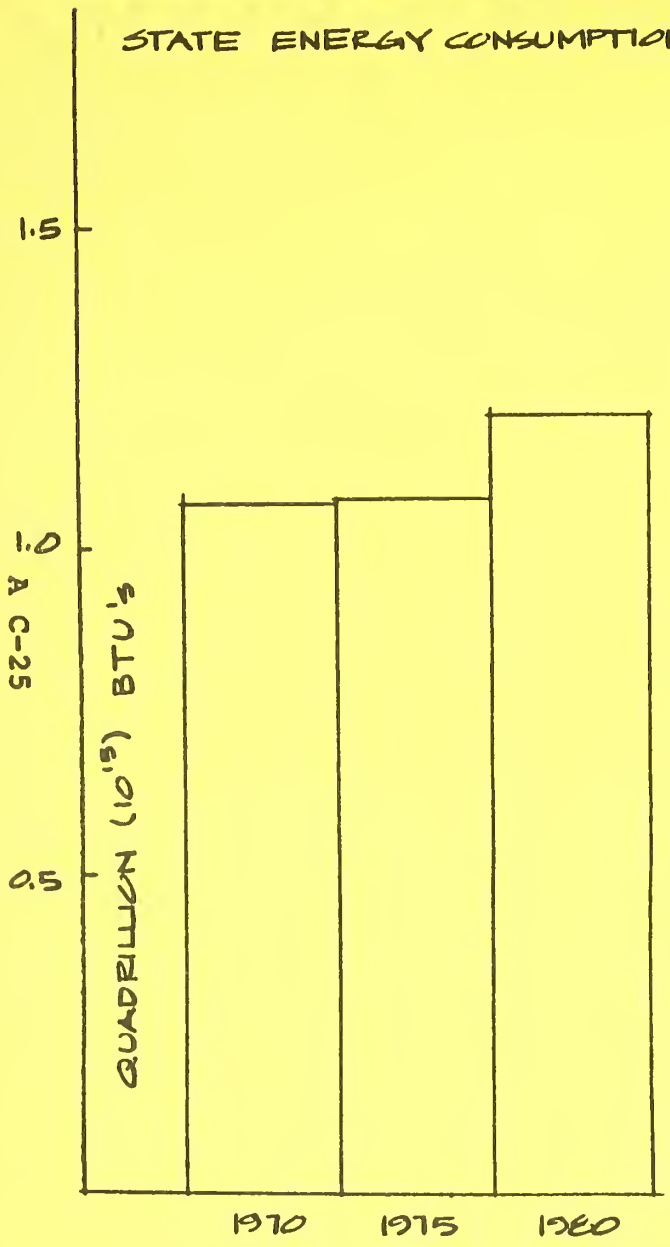


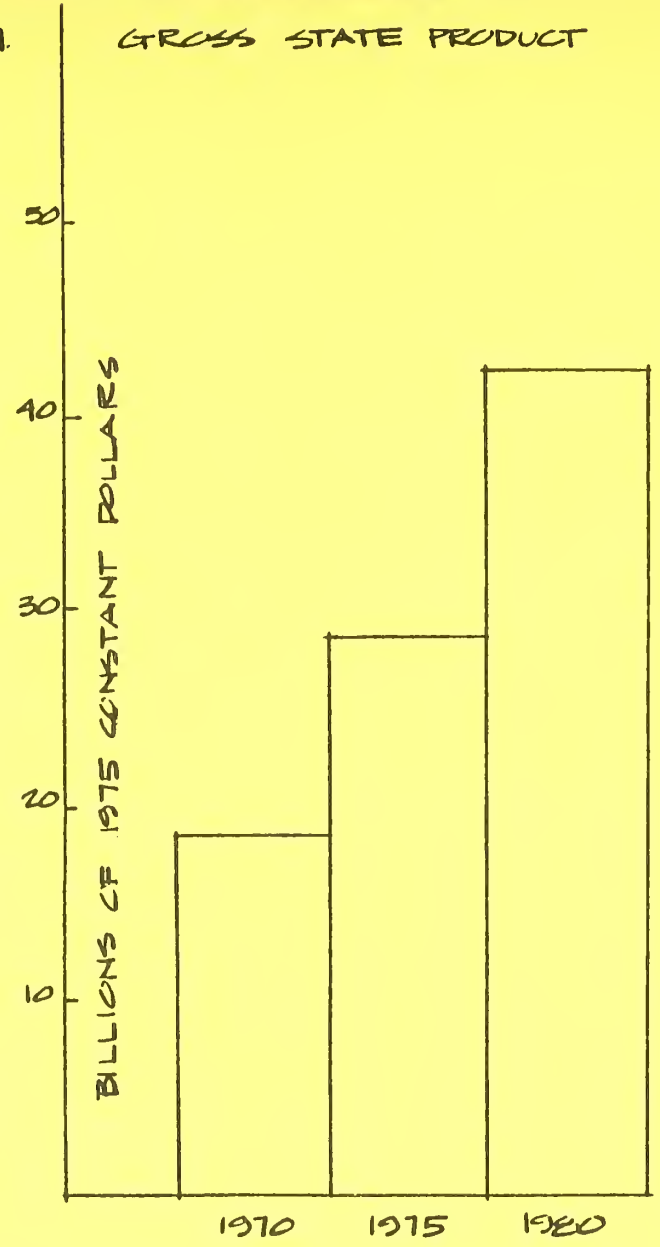
HOUSING AFFORDABILITY, BALTIMORE REGION

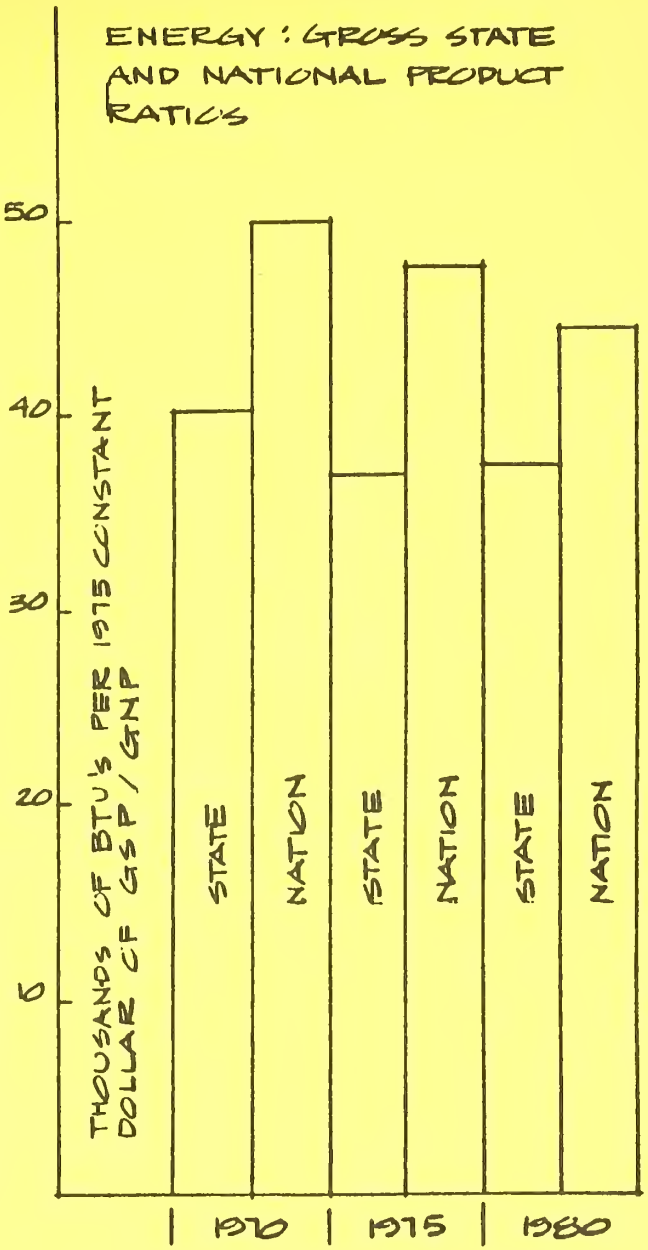


* ASSUMES 28% OF GROSS INCOME FOR HOUSING.

ENERGY CONSUMPTION AND THE ECONOMY







A C-25

Appendix D

Part I. Minutes of the Third Panel Meeting

Appendix D, Part I
MINUTES OF THE THIRD PANEL MEETING

The third Energy/Transportation Futures Study panel meeting was held on March 25, 1982 at The Johns Hopkins University. The meeting was called to order at 9:45 a.m. by panel member Florence B. Kurdle who served as moderator. The first item on the agenda was a brief review of the step-by-step flow of the scenario process, followed by an explanation of the objectives of the third meeting.

Discuss Effect of Policies in Achieving Goals in Differing Scenario Conditions

A review of the four regional scenarios (representing futures characterized as economic Decline, continuation of current Trends, strong economic Growth, and economic growth with a Transition from high energy availability to an oil shortfall) was then presented. The basic scenario assumptions, independent variable values, and dependent variable projections were highlighted. This was followed by a presentation summarizing the policies recommended in each scenario and the projected impacts of those policies (refer to Attachments B, C).* Panel discussion of the policies was then initiated.

Transportation Policies: Principal topics addressed during the discussion included:

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* The attachments were the chief working documents. The panel also had access to fully developed scenarios. Final revisions of the full scenarios are in Appendix E.

- Should the policies identify a specific source for new transportation revenues (e.g., regional sales tax) or recommend that additional sources be investigated? Concensus was to recommend the sales tax option to ensure that the policy will receive attention.

- Considerations of transit operations should be broadened to include MTA, private services, and paratransit operations. These considerations can be satisfied in most cases by combining several separate policies.

- Development and evaluation of policies must not ignore heterogenity of the Baltimore Region.

- In Decline and Trend Scenarios, transporation expenditures for maintenance and operating needs must be weighed against benefits of new facilities.

- More attention should be given to the landside impacts on the region's transportation infrastructure when evaluating capital investments for port/airport expansion.

- Is there a need for a regional transportation authority and how would it be structured?

The discussion of transportation policies was concluded with the panel directing the staff to incorporate the following items in developing revised set of policy statements.

1. Decisions impacting transit service should encompass private operators, paratransit modes as well as MTA operations.

2. In the Decline Scenario, "planned disinvestment" should be replaced by "selective reduction in the levels of maintenance and operations."

3. A balanced allocation of funds between maintenance needs and new construction is desirable in all scenarios.

4. The effects of port/airport expansion on the landside transportation infrastructure needs to be examined when allocating port funding relative to other transportation needs.

5. Baltimore regional water/sewer system maintenance costs will place constraints on location of future growth.

6. Prioritization of regional goals is a function of the scenario under consideration.

7. Heterogenity of the region must be recognized.

Energy Policies: It was recommended that a policy encouraging the study of energy use and conservation methods is in the long-term interest of the region for all scenarios. Specific ideas expressed included the following:

- regional energy input/output study;

- use of time-of-day electrical energy pricing;

- B G & E rebates to homeowners for household investments that would reduce peak demand loads;

- location of new industry near population growth areas;

- better utilization of public facilities during evening and night hours.

Land Development and Housing Policies: The general concensus of the panel was that housing related policies should stress the need to focus new growth and discourage sprawl. New housing should be encouraged in existing areas in order to reduce the need for expansion of the existing infrastructure. Other factors discussed included:

- relative importance of quality of school system, proximity to work, crime, and race in residential location decisions;

- desirability of rezoning to allow the subdivision of existing housing for rental to the elderly.

Economic Development Policies: This discussion focused on a policy included in several scenarios that recommended the formation of a regional agency that would set up a "common market" type situation to promote economic development. Advantages cited for such an agency were: better regional planning capability, resource sharing, presentation of a unified, more attractive

package to potential new businesses. The panel expressed concerns that if such a policy was not implemented correctly, some jurisdictions might not be treated fairly and that the resulting agency would represent a duplication of effort now handled at the county level. Panel concensus was to retain the policy but with the following points emphasized: the agency would be at the regional level and would supplant all such local agencies; its role would be one of coordination (land purchase is not a primary function); and tax base sharing should be indicated as a potential means of pooling resources and sharing benefits. Under the topic of economic development, the panel also emphasized the importance of the unskilled labor and youth unemployment problems contained in all four scenarios. It was recommended that a policy to link community colleges and private industry in job training programs for the region's unemployed youth be added to all scenarios.

Reach Agreement on Policy Options to Recommend for Inclusion in the General Development Plan

Because the discussion of policy options did not conclude until near the end of the afternoon session, it was necessary to postpone the panel selection of policies for recommendation to RPC committees. It was agreed that the staff would prepare a revised set of policies incorporating changes and additions recommended by the panel and mail it to the panel during the first week of April. Panel members will be requested to indicate which policies should be recommended to the GDP and other RPC committees and which should be the subject of further analysis. The panel agreed to reply within one week so that the staff could tabulate the vote and attempt to resolve any policy issues over which there was not strong panel agreement in time for the recommendations to be incorporated into the GDP process.

Project Administration

The staff agreed to mail the tabulated responses to the panel. The panel was asked to complete a post-project questionnaire (identical to the one completed before the project) which would measure how panelists' attitudes had changed during the course of the study.

ATTACHMENT A

COMPARISON OF KEY SCENARIO CONDITIONS
1983 - 1992

Variable	Decline	Trend	Growth	Transition*
	SCENARIO			
Gross National Product	-1/2/year	+1%/year	+3%/year	+3%/year
Gross Regional Product	-1%/year	+1%	+4%/year	+4%/year
Inflation	10-15%/year	8-9%	6-8%	6-8%
Interest	15-20%/year	12-15%	9-12%	9-12%
Oil Availability	Tight	Available	Plentiful	Tight after supply disruption
Oil Price Change[1]	+1%/year	+2%/year	0%/year	0%/year; +65% in disruption year
Fleet Miles per Gallon	Increase most	Increase	Increase	Increase
Non-Traditional Auto as % of Total Fleet	5%	2%	1%	2%
Population Change	0 - (-1/2%/year)	0 - 1/2%/year	1%/year	1%/year
Population Location	Slow but Concentrated for New Growth	Slow but Concentrated for New Growth	Dispersion continues but Slower	After disruption experience concentrated Growth
Household Affordability	15%	25%	50%	50%
Unemployment				
Region	10%	7%	5%	5%
City	15%	12%	8%	8%
Vehicle Miles of Travel (VMT)	1/2%/year	+1 1/2%/year	+3-5%/year	3% after disruption
Transit Service	Ridership ↑ Service ↓ Operating Revenue ↓	↓ ↓ ↓		↑ ↑
Paratransit Use	Strong Increse	Some Increase↑	Little Change	Strong after supply disruption

* Scenario similar to Growth Scenario until 1989 when there is a petroleum supply disruption.

[1] Relative to rate of inflation.

ATTACHMENT B

SUMMARY of POLICY RECOMMENDATIONS

SCENARIO

3/11/82

Policy Recommendation	Decline	Trend	Growth	Transition
TRANSPORTATION Budget Allocation Priorities: Capital Improvement	Planned disinvestment in highway network and transit service on a regional basis. Develop regional maintenance priority scheme to support land development policies. Plan transit service cutbacks on individual basis considering cost, travel, land use, social objectives.	Top priority on programs to maintain existing facilities and enhance capacity where congestion severely restricts traffic flow.	→	→
Low Volume Highways:		Defer maintenance on low volume highways.		
Paratransit:	Promote paratransit through tax incentives to firms; create framework for and relaxation of regulations on private jitney services.	Increase programs to encourage use of paratransit and alternative work schedules to reduce peak traffic loads; parking management, ridesharing, peak period transit use, jitney and ridesharing collection lots. Create framework and relax regulations for private jitney and vanpool operations.	→	→
Mini-Car Use:	Encourage mini-car use by providing preferred parking treatment, local government purchase of vehicles; government share lease and purchase for large vehicles when needed.	→		→

→ Indicates applicability of policy in adjacent scenario.

Attachment B

SCENARIO

Policy Recommendation	Decline	Trend	Growth	Transition
TRANSPORTATION CONT'D. Funding Transit Operations:		Revise public funding of transit operating deficits by recovering expenditures among jurisdictions according to benefits received from transit; bring transit labor costs in line with comparable municipal labor skills.		
Contingency Plans:				Develop and update contingency plans. Plans should include: organizational structure for implementing and coordinating plans; set aside funds for costs incurred during emergency and stockpiling fuel; monitor supply and conservation levels to determine time to use purchase restrictions; variable work hour programs to maximize transit and paratransit use, and reduce VMT; use school bus fleets; supplement MTA service, jitney service outside MTA service areas; set fuel allocation procedures, maximize efficiency of government vehicle fleets.

Attachment B

SCENARIO

Policy Recommendation	Decline	Trend	Growth	Transition
DEVELOPMENT Economic and Land: Regional Development	Analyze region's economic strengths and weaknesses; priority to retain existing industry, recruit expanding industries that enhance region's strengths.	Create and provide funding sources (% of property tax) for a regional development agency to: identify new employers compatible with regional goals, select appropriate land parcels and supply parcels with public facilities to attract those industries.	→	→
Regional Growth Centers	Direct industrial, commercial, and residential development to areas that maximize use of existing infrastructure and minimize its extension.		Stimulate residential development in designated areas by focusing funds for public facilities in these areas. Discourage sprawl through zoning policies, charge cost of public facility expansion to developers, set developer fees in proportion to additional traffic generated, strengthen agricultural land preservation programs.	→ →
Development Control			In designated areas control pace and density of new development so growth is consistent with land use plans, and capacity of public services are not exceeded.	→

→ Indicates applicability of policy in adjacent scenario.

Attachment B

SCENARIO

Policy Recommendation	Decline	Trend	Growth	Transition
DEVELOPMENT CONT'D. Job Training	Establish job training programs with tax incentives to upgrade indigenous unskilled labor force.	→	→	→
ENERGY Alternate Energy Sources		Encourage energy use accountability procedures in government and business.		
Mini-Cars			See Transportation Mini-Car policy.	
Government Organization and Decision Making: Regional Transportation Service Area		Impose a 1% regional sales tax to preserve and improve transportation services; % of funds for regional projects, % of funds to local governments. →	Amount from 1% sales tax is $100 million in 1983, increasing at 10-11%/year.	→ →

→ Indicates applicability of policy in adjacent scenario.

Attachment B
SCENARIO

Policy Recommendation	Decline	Trend	Growth	Transition
Regional Public Facilities Service Area			Collect and pool a portion of local property taxes to allocate by a regional body to extend public facilities or services in support of regional land use and economic development objectives and policies.	

 Indicates applicability of policy in adjacent scenario.

ATTACHMENT C

3/24/82

POLICY IMPACTS ON SCENARIOS
(___) Denotes Policy Recommendation

GOAL	Decline Scenario	Trend Scenario	Growth Scenario	Transition Scenario
TRANSPORTATION Adequate movement of people to promote land development goals. Adequate movement of goods and services to promote economic development goals. Mobility of all segments of population with increasing transportation costs and fuel supply uncertainty.	Planned disinvestment in transportation facilities made feasible by reduced travel demand. Result is sharpened differential in level of service for MTA, and highway facilities. Paratransit systems develop where MTA cannot provide service.	Revenues from regional sales tax for transportation services reduces need for disinvestment; only a few low use facilities and MTA routes are written off; few new facilities are provided. TSM, alternative work schedules, and paratransit are used to alleviate peak period demand and crowded facilities. Middle income group spends higher proportion of income than before on transportation.	Transportation CIP focuses on goods movement for port, rail, and trucks. Revenues from regional sales tax for transportation programs needed to support MTA, and relieve overcrowded roads. TSM, alternative work schedules, and paratransit used heavily to accommodate increase movement as urban growth in suburban areas is not easily served by transit.	TSM, alternative work schedules, and paratransit programs are expanded and receive strong support after fuel shortage.
LAND DEVELOPMENT Promote centralized development. Foster growth in planned urban areas. Maintain and revitalize existing communities. Provide public services, facilities, and land use designs for planned growth areas. Preserve agricultural land.	New urban development is focused in areas where public facilities have capacity and are maintained. Urban rehabilitation is focused in areas of good infrastructure.	Slow growth in urban development is funneled into areas with existing public facility capacity.	Local growth management programs not able to funnel as much development into urban areas as desired as reduced federal funds limit rapid expansion of public facilities. Coordination of land use policies and economic development encourages opportunities to reduce length of work trips.	After fuel supply shortage there is an increase in rehab programs and population in Baltimore City.

Underlining denotes policy statement.

→ Indicates similar policy impact in adjacent scenario.

Attachment C

GOAL	Decline Scenario	Trend Scenario	Growth Scenario	Transition Scenario
ECONOMIC DEVELOPMENT Retain and expand existing business and attract new activities. Full and diversified employment. Opportunity for all citizens to achieve economic well being. Generate public revenues to provide necessary services. Diversity of employers with jobs in diversity of sectors.	Level of cooperative efforts at economic development and transportation services barely averts a regional economic disaster, but cannot greatly improve economic conditions.	Economic development reflects level of regional cooperation.	Economic growth focused in planned urban areas to attract workers, and difficulty of providing public services in rural areas. →	
NATURAL ENVIRONMENT Preserve natural environment. Increase benefits of environment to the public.	Conflict between economic development and environmental regulations.		Slow improvement of natural environment as new employment is based less on heavy manufacturing, is made to conform to environmental regulations, and industries find more efficient use of their waste products. →	

Underlining denotes policy statement.

→ Indicates similar policy impact in adjacent scenario.

Attachment C

GOAL	Decline Scenario	Trend Scenario	Growth Scenario	Transition Scenario
ENERGY				
Increase efficient use of energy resources. Increase use of indigenous resources. Increase conservation of petroleum.	Greatest use of fuel efficient autos, mini-cars, non-traditional autos, bicycles, mopeds, and motorcycles. Low and middle income groups have inadequate funds for energy, transportation, and housing needs.	Private use of mini-cars and use by local governments of alternative fueled vehicles saves energy and money, but regional energy impact in scenario time frame is small. →	→	Low income groups suffer most from sudden increase in fuel prices and shock to economy.
GOVERNMENT DECISION-MAKING				
Government capability to respond to changing conditions. Reduce implementation time of public projects. Target employment programs to meet specific economic development objectives. Imrpove government capability to mediate conflicts between environmental and economic development.	Intra-regional cooperation made necessary by continued economic decline of frostbelt.		Sustained economic growth and reduced federal transportation revenues make cooperative economic development and sales tax for transportation program easier to implement than in other scenarios.	Experience of cooperative regional economic development along with long-term level effort at contingency planning among state and local agencies pays off in government responses to fuel shortage.

Underlining denotes policy statement.

→ Indicates similar policy impact in adjacent scenario.

Appendix E

Part I. Decline Scenario

Part II. Trend Scenario

Part III. Growth Scenario

Part IV. Transition Scenario

Appendix E, Part I

DECLINE SCENARIO

Decline Scenario

Independent Variables and Assumptions

Of the four scenarios analyzed, the decline scenario incorporates the most pessimistic assumptions concerning general economic conditions in the region and availability of oil. The assumptions concerning the commercialization of technology are generally favorable. Their impacts are not as important as those occurring in the trend and high growth scenarios, however, because of the overall poor economic conditions in this scenario.

Economy -

It is assumed that the gross national product is declining about 1/2% per year over the 10 year period and that the gross regional product is declining a little more rapidly, at approximately 1% per year. Inflation rates will be in the 10 to 15% range throughout the study period, fueling yearly interest rates in the 15 to 20% range. Increased unemployment will further reduce the supply of capital and increase deficits at all levels of government, thereby greatly increasing the demand for capital by the public sector.

Oil Availability -

Oil availability will remain relatively steady during the first years because of a steady decline in demand brought about by the decline in the GNP and the increased substitution of other fuels, especially coal, encouraged by fear of mideast political instability. Political events in the mideast eventually lead to a real reduction of oil imports to the United States from that region. This oil shortfall is made up from non-Arab sources, but the increased demand on these sources from the other industrial nations results in higher worldwide prices. These oil price increases will average about 1% per year over the general inflation rate.

Commercialization of New Technology -

The impact of technological change is greatly limited by the general economic conditions. New cars and new housing are more energy efficient but the high interest rates and economic uncertainty retard the growth of these markets. In housing, most energy efficient gains continue to be in the addition of conservation efforts in the existing housing stock. In the automobile market, new cars continue to become more energy efficient, and older, less efficient cars are abandoned or driven less as the real income of marginal car owners continues to decline.

Continued improvement in communications and computers, along with the general economic decline, reduce the demand for person to person business meetings. This reduction, compounded by the reduction in the size and scope of the federal government's role in business and the reduction of pleasure trips, greatly decreases air passenger service through Baltimore-Washington International.

Brief Description of Horizon Year and Interim Period

The primary feature of the decline scenario from a policy viewpoint is the tremendous reduction in government revenues and the concomitant increase in the demand for social welfare benefits and subsidies for the private sector that will occur. Regional population will decline as unemployment increases.

Baltimore City will suffer the most of any jurisdiction in the region during the period. Its population will decline about 10%. The city's remaining population will face the highest unemployment in the region as minorities and semi-skilled are the most affected by the economic decline. Faced with greatly declining revenues, the City will be forced to reduce services, which will further hamper its ability to attract new employment and to retain middle class residents.

State and regional revenues will also decline in real terms. As a result of reduced revenues and increased social service demands by the unemployed, it will be impossible for the region to maintain the existing infrastructure, especially the highway network. Transit will suffer as funding declines. Fare increases will be attempted in the face of public opposition and non-productive routes will be dropped.

High unemployment and declining public services and a deteriorating infrastructure will reduce the region's ability to compete with other regions of the nation (especially those in the Sun Belt) for new employment. Not only will new industries locate in other regions, but those already located here will invest elsewhere as local conditions deteriorate.

Item	Description	Panel Comments
I. Demographics		
Population	. A net out-migration results in an overall decline in regional population.	
Population Distribution	. Total regional population declines with intra-regional population changes as follows: -Baltimore City decreases 10% (-13%) -Baltimore County increases 0% (+6%) -Howard County increases 10% (+90%) -Harford County increases 1% (+27%) -Carroll County increases 1% (+39%) -Anne Arundel County increases 5% (+24%) ( ) 1970 - Growth Rate	
Disposable Income	. decreases for all economic classes, but most sharply for lower-middle and lower socio-economic groups.	
Household Size	. household size stabilizes as families stay together longer except for Baltimore City, where it decreases as most in-migration consists of singles and childless couples and most out-migration consists of larger families with school age children.	
2. Industrial/Commercial Base		
Industry	. most industries decline, especially auto, steel and housing . defense, space, medical, rail and coal industries grow slightly . except for railroad and coal industries, which grow in Baltimore City, most growth is located in suburban growth areas . declining industries are primarily in older manufacturing areas of Baltimore City and Baltimore County	
Port	. port activity continues to increase, especially in coal and grain exports . value to weight ratio declines as auto and luxury imports drop	

Item	Description	Panel Comments
Retail/Commercial	. retail and commercial activity declines reflecting overall decline in the economy . older, smaller suburban shopping centers close as people make fewer shopping trips . no more regional malls are built . commercial growth slows, major office projects decline, current major centers attract what new office space that is developed	
Service	. repair services prosper as people delay new purchases of goods . proportion of budget spent on energy increases because of higher fuel costs	
3. Employment		
Employment By Sector	. government employment at all levels decreases, Baltimore City employment has sharpest decline: 10-15%, Baltimore and Howard Counties increase government employment some, state employment decreases . industrial employment decreases overall, reflecting the changes in industrial base . service employment increases, especially among self-employed . commercial and retail employment decrease slightly and moderately, respectively . underground economy grows reducing further revenue to state and local governments	
Character of Employment	. employment of highly skilled and educated (especially in technical and medical fields) increases	
Unemployment Levels	. increase to 12 to 15% overall for region	

Item	Description	Panel Comments
Character of Unemployment	. unemployment among unskilled and semi-skilled increases sharply . unemployment among the young, especially blacks, increases to even higher levels	
4. Housing and Land Use		
Form	. new housing is more energy efficient and more dense (e.g. town houses, quadraminiums, condominiums)	
Location	. new housing remains at very low levels and occurs primarily in designated growth areas in the counties . renovation of substandard housing continues at present levels in Baltimore City	
Affordability	. high interest rates (15-20%) continue to keep new housing out of the financial reach of the great majority of regional residents	
5. Institutional		
Federal	. revenue levels decline but high housing costs and extremely high levels of unemployment force some Federal involvement in these areas in terms of mortgage subsidies and for private sector employment training programs	
State	. revenue levels decline	
Regional		
Local	. revenue levels decline significantly for Baltimore City; Baltimore, Anne Arundel, Harford, and Carroll Counties' revenues increase slightly, Howard County's increase relative to expenditures	
Private Sector	. a general concentration of industries as many small firms collapse or are bought up by larger firms . increase in government cooperation, especially in paratransit planning	

Item	Description	Panel Comments
6. Transportation		
1. Revenue Levels	. declining MDOT revenues from gasoline sales tax reversed in 1983 with an increase of 2 cents per gallon; in real terms, this source of revenue continues to decline throughout period due to decreasing volume of gasoline sales and high inflation rates.	
	. Federal operating assistance and highway construction aid declines during period.	
	. All other MDOT revenue sources suffer a decline (in real terms) throughout the period.	
	. MTA periodically adjusts transit fares to maintain a yield of 50% of operating costs.	
Demand Side People Movement		
	. total vehicle miles traveled decreases	
	. air travel will decline at faster rate than economic decline	
Goods Movement		
	. total goods movement in region increases due to increased coal and grain movement through port	
	. value to weight ratio of goods moved through region declines	
Supply Side		
Highway	. inadequate funds to maintain roads	
	. substantial decrease in capacity requirements	
Transit	. some increase in demand	
	. inadequate funds force fare increases in face of public opposition significant number of less productive routes dropped. Age of fleet increases substantially	
Paratransit	. employers will take more initiative in paratransit activities	
	. legal and illegal paratransit activities grow rapidly	

Item	Description	Panel Comments
Freight	. will decline at levels reflecting economic decline of region . increase in coal exportation . rail movement of goods increases relative to truck movement; air freight drops substantially	
7. Transportation/ Energy Impacts		
Conservation	. automobile fleet efficiency will improve as older cars are abandoned by marginal owners and new cars become more efficient . economic conditions greatly reduce non essential trips and increase the number of multipurpose trips	
New Energy Sources	. no major technology changes because of poor economic conditions	
Energy Use Distribution	. private auto use declines in absolute and relative terms . transit use increases slightly in absolute and relative terms . paratransit use increases significantly . increased use of alternate fueled vehicles	
8. Environmental Considerations	. increasing pressure to reduce standards to save jobs and reduce costs . no further gains in water or air quality will occur, some degradation will occur	

Item	Description	Panel Comments
9. Significant Regional Trends	. residential densities increase, most growth occurs in designated areas . port tonnage increases . automobile fleet efficiency increases and interest in paratransit increases . insufficient transportation revenues to maintain existing level of roadway and transit service, and to undertake needed capital projects . economic burdens unequally distributed among economic classes and political jurisdictions with semi-skilled and unskilled blue collar workers and Baltimore City suffering the most severe hardships . industrial, retail and commercial activity decrease, thereby reducing governmental revenues and its ability to supply services	

POLICY ASSESSMENT

Policy Option	Impact Assessment	Panel Comments
A. Transportation		
1. Budget Allocation Priorities:		
a. Highway:		
Since insufficient funds will be available to properly maintain the entire existing highway network the disinvestment in the network must be planned on a regional basis to guarantee that the remaining network is as efficient as circumstances will allow. A regional maintenance priority scheme must be developed which supports regional land development policies and considers maintenance costs as well as benefits. Vehicle volume, trip type, alternate routes and modes are just a few of the factors which must be analyzed.	- This policy will promote the most efficient allocation of dwindling highway maintenance expenditure and mitigate the negative effects of an undermaintained highway network.	
b. Transit:		
Decreased funds for operating subsidies will require service cutbacks. Service cutbacks should be made on a route by route basis. Routes which operate in the black should be maintained at profitable service levels. Those routes which require significant operating subsidies should be continued only if their operation can be justified by some other objective.	- Total service levels will still decrease, but in a more orderly fashion. Those routes which remain will generally be those which require the least subsidy. Some unprofitable lines will remain in service because some other objective justifies them. For example, an unprofitable line may be heavily subsidized because it provides an alternate for private auto transport along a highway route whose capacity has been greatly decreased because of maintenance cutbacks.	

Policy Option	Impact Assessment	Panel Comments
c. Paratransit		
The policy includes measures such as tax incentives for firms which establish extensive car and van pool operations, the coordination of multi-firm operations, the creation of a framework and the relaxation of regulation on private jitney services.	- Paratransit services should be provided primarily by the private sector. Regional efforts should center on encouraging these services in areas which are adversely affected by mass transit cutbacks or highway maintenance cutbacks.	
3. Mini-car Use		
Policy - The purchase and use of low performance mini-cars using a variety of energy sources is encouraged by the removal of institutional constraints, provision of preferred parking spaces, and designation of areas such vehicles are permitted to operate. Purchase of such vehicles by local jurisdictions should also be encouraged for municipal fleets. Local and state governments should encouage shared lease or purchase arrangements for large vehicle use.	- By the end of the period, these cars represent about 2% of the regional vehicle fleet with that % increasing each year. These cars are used primarily for trips in suburban and urban regions where speeds are 40 mph or less. They are particularly suited for the home to work or home to park-n-ride lot trips of commuters. The occasional need for larger vehicles is partially satisfied by shared lease or purchase agreements.	
B. Development		
1. Economic Regional Development		
An analysis of the region's economic strengths and weaknesses should be conducted. Priority should be given to retaining existing industries and recruiting new industries which enhance the region's strengths and are least affected by its weaknesses. Priority should also be given to the industries with the brightest economic outlooks.	- Regional strengths such as water availability, coal handling facilities, university and military resource facilities will lead to efforts to attract industries such as coal conversion industries or bio-medical research. By concentrating limited government resources on attracting industries which can most benefit from the region's strengths only those industries with a high probability for success will be recruited to the region.	

Policy Option	Impact Assessment	Panel Comments
2. Regional Growth Centers - All industrial, commercial and residential development should be directed into areas of the region in such a way as to maximize the use of the existing infrastructure and minimize its extension.	- This policy will focus growth in areas of the region which are already developed. This policy will reduce the need for new infrastructure development and reduce new energy demand by concentrating growth.	
3. Job Training Private job training programs should be established with tax incentives so that local residents' job skills can be upgraded to allow them to work in the new industries.	- Upgrading the skills of those presently unemployed in the region will reduce pressure for social welfare benefits and will make the region more attractive to new industries	

Discussion of Policy Impacts on Scenario:

It is unlikely that policy options available to regional decision makers in this decline scenario will be sufficient to greatly improve the overall economic conditions of the region. The options available, however, do seem sufficient to avert a regional economic disaster, if meaningful intra-regional cooperation can be attained.

Decreased demand for and planned, controlled disinvestment in the transportation network, accompanied by integrated mass transit and paratransit operations can result in a regional transportation system as efficient as the present one. An integrated regional economic development plan with intra-regional cooperation and subsidies could actually increase the region's competitive position vis-a-vis other regions in retaining and attracting employment. The quantity and quality of intraregional cooperation necessary is great, however, and the history of intra-regional cooperation is not encouraging.

The continued economic decline may well lead to increased intra-regional competition rather than cooperation if the research and analysis required for the above mentioned policies is not carried out. First, as the economic decline gradually worsens, local, fragmented decisions may be made which will later preclude efficient regional actions. Secondly, if the less obvious local benefits of regional cooperation are not known in advance, jurisdictions can be expected to make shortsighted decisions based on immediate local gains rather than more efficient regional decisions. As a consequence, the sooner intra-regional planning and cooperation begins, the more effective it will be in mitigating the negative economic effects of the decline scenario.

Appendix E, Part II

TREND SCENARIO

Trend Scenario

Independent Variables and Assumptions

In this scenario, the 10-year period can be characterized as a continuation of the trends visible in the past five years. The economic growth is on the average slow, oil is adequate to meet demand but not sufficient to force significant price decreases, and, although considerable new technology is available for exploitation, the slow economy has reduced the capital available to take advantage of these new products. The period is also one of a continuing redefinition of the roles of Federal, State, and local governments in the carrying out of social, economic, and urban development programs.

Economy - The Gross Regional Product and the Gross National Product increase at a moderately slow pace of 1.5 percent per annum after accounting for inflation. The regional and national growth rates tend to mirror each other.

Energy (Oil Availability) - Supplies are adequate to meet demand in such a way that the market is comparatively elastic. After discounting for inflation, gasoline prices increase at a moderate rate of approximately two percent a year. Petroleum-derived fuel continues to provide well over 90 percent of energy used in the transportation sector.

Commercialization of New Technology - Technical innovations existing in the base year (1982) are commercialized as quickly as could be expected, given a moderately slow-level of economic growth. Cable TV and small computers for home and office use are widespread. However, these innovations have less impact than expected.

Brief Description of Horizon Year and Interim Period

This scenario provides few surprises with life styles and travel evolving slowly from similar activities in 1982. While the increased oil prices are of concern, especially to low-income groups, the growth in disposable income among the majority of the public is sufficient to accommodate these price increases. As a result, the dispersion to the suburban rings continues and local travel by automobile is essentially unaffected. The increased fuel prices do continue to promote conservation and the new housing, mostly suburban, tends to be smaller and focused on designated growth areas.

Unemployment among unskilled and blue collar workers remains high, especially in the city. The recovery of existing industry is slowed by a shortage of capital and higher fuel costs. New businesses, especially high technology, continue to locate in the suburbs and require skilled labor. The foreign demand for coal and the completion of new coal-loading facilities does increase port activity and employment.

As a result of the slow economy and reduced Federal assistance, the available government funding is inadequate to meet the needs to preserve existing facilities and services. This lack of resources leads to sharp conflicts between State and local agencies in selecting priorities for both maintenance and capital projects. The Mass Transit Administration is particularly affected and is forced to increase fares to maintain revenue at 50 percent of operating costs and to drop the least productive routes.

Trend Scenario

Item	Description	Panel Comments
1. Demographics Population	. population increases at approximately .5% per year primarily due to birth rate; in-migration balanced by out-migration; differences between in-migration and out-migration socio-economic characteristics is negligible.	
Population Distribution	. suburbanization continues, but at a slower rate. Projected changes (compared to 1970-1980 rate): City -6%(-13%) Carroll +19%(+39%) AA +14%(+24%) Harford +13%(+27%) Balto. Co. +2%(+6%) Howard +36%(+90%)	
Disposable Income	. increases just under 1 percent per annum after accounting for inflation; approximately 12 percent of income spent on energy, except for low income household.	
Income Distribution	. disposable income increases more slowly for low income household than for other groups.	
Household Size	. decreases slightly from 2.8 to 2.6 due to women in work force and weakening family structure.	
2. Industrial-Commercial Base		
Industry	. moderate comeback for steel, automobiles and other heavy manufacturing. However, more jobs develop in high technology industries such as computers, medical, and cable TV. . suburban location favored by new industries.	
Port	. increased port facilities especially for coal reflect economic growth.	
Retail/ Commercial	. no new regional shopping malls except in Owings Mills and Glen Burnie.	

Item	Description	Panel Comments
	. decline of small and medium shopping malls due to competition of existing regional malls and the development of new neighborhood retail facilities.	
Industrial Services	. labor: because of large supply and few positions calling for unskilled labor, wages for such jobs remain low, thus permitting a slight increase in the economic attractiveness of unskilled labor.	
	. energy: improvements in the efficient use of energy resources due mainly to the rapid price rises in the 1970's still having impacts.	
	. transportation: the proportion of budget spent on energy increases due to fuel price increase and relocation to suburbs.	
3. Employment		
By Sector	. percent of total heavy industry stabilizes, percent of light industry increases moderately and percent of services decreases slightly.	
Character of Employment	. job opportunities increase in the high technology area. The high growth in the professional service areas ends. New low paying jobs develop in basic services (semi-skilled).	
Unemployment Levels	. mostly among unskilled and blue collar; 7 percent region wide, 12 percent city with levels as high as 30 percent for minority youth.	
4. Housing and Land Use		
Form	. new housing is smaller and closer together, due to increased costs for conventional housing.	
	. increased conversion of apartments to condominiums and of existing single family to multi-family units.	

Item	Description	Panel Comments
Location	. density continues to decrease in city. . most growth occurs in areas with existing facilities rather than random sprawl, but not well served by conventional transit. . general shift closer to work location as small-medium sized malls close.	
Affordability of Housing	. due to declining interest rates and smaller units, steady rise in the percent of households able to afford a medium priced house increased by about 50%.	
5. Institutional		
Federal	. decreased role in transit and social programs, however highway aid remains about equal to 1982 level.	
State	. except for transit, state role increases because of the income tax and corporate tax funding structure.	
Regional/Local	. the coordination role is strengthened, however the regional organization is still not given authority to raise funding on their own. . greater share in state transportation decision-making.	
Private	. project specific support for such things as local roads and commuter transit.	
6. Transportation		
Revenue Sources	. declining MDOT revenues from gasoline sales tax reversed in 1983 with an increase of 2¢ per gallon; in real terms, this source of revenue continues to decline throughout period due to decreasing volume of gasoline sales. . Federal operating assistance and highway construction aid declines during period. . only title tax, corporate income tax, and port revenue sources increase at rates greater than inflation.	

Item	Description	Panel Comments
	. MTA periodically adjusts transit fares to maintain a yield of 50% of operating costs.	
Demand		
People Movement	. 12-14 percent of household income continues to be spent on transportation.	
	. fixed costs involved in auto ownership increase while operating costs remain about constant.	
	. proportion of non-work trips increase.	
	. VMT increased by approximately 15 percent over period, most growth occurring in suburban areas.	
	. work trip length decrease slightly as both people and jobs move closer together.	
Goods Movement	. fuel and labor costs put significant pressure on business operations to reduce transportation costs.	
	. Baltimore remains highly competitive with other ports in both volume and value of goods shipped with continued increases in coal movement.	
Supply Side		
Highway	. maintenance needs of bridges and roads place severe demands on state and local budgets.	
	. decreased new construction even in growth area where demand is high.	
	. TSM/traffic flow measures are depended upon to keep up with demand.	
Transit	. Metro segments A and B completed.	
	. fixed route MTA service has been increased only on certain high demand runs, these being areas with low auto ownership and high density.	

Item	Description	Panel Comments
	. periodic fare increases take place to hold revenues at 50 percent of operating cost. In addition, non-productive routes are dropped.	
	. local governments provide partial support for operating deficits.	
	. bus fuel costs run 12 percent of MTA operating budget.	
Paratransit	. slow increases continue in specific ridesharing programs with little impact on vehicle occupancy rates.	
Freight	. essentially all intra-regional goods continue to be transported by motor vehicles.	
	. highway - access to major road facilities and TSM measures to improve efficiency.	
	. rail - improvement of tracks and road crossing to improve freight transport without impacting highway travel.	
	. air - high energy costs slowed down growth in air travel. However, because of crowding at Washington airports, BWI does quite well.	
	. water - channel deepening proceeds slowly and has marginal impacts on increasing volume of goods shipped. Improved support facilities have greater impact in keeping business.	
7. Transportation Energy Impacts		
Conservation	. public concern for energy conservation remains fairly high throughout scenario.	
	. demand for small, fuel efficient vehicles remains high.	
	. fuel consumption declines slightly despite increased VMT due to greater efficiency.	

Item	Description	Panel Comments
New Energy Sources	. after new coal electric power facilities came on line, petroleum demand declined slightly. . low performance, alternate fuel autos reach market in mid-1980's but have negligible impact on consumption.	
Energy Use Distribution	. industry moves faster than public or government to conserve energy.	
8. Environmental Considerations	. due to economic cost of additional pollution abatement, no new controls imposed on automobiles after 1987. . noise and particulate pollution controls on trucks are mandated. These costs marginally increase already high trucking costs.	
9. Significant Regional Trends	. road system receiving insufficient maintenance. . continued suburbanization. . lack of new facilities in high growth areas. . conventional transit system a poor alternative to autos, except for downtown work trips. . dedication of transportation funds causes inflexibility which limits responses. . continued perception on violent crimes negatively effects transit use and housing location. . the economy grows too slowly to meet political and public expectations. . high unemployment, especially among unskilled and blue collar workers. . decreasing density in the city and scattered areas threatens fiscal capacity to provide infrastructure support. . energy costs remain a substantial burden on businesses, government, and households.	

POLICY ASSESSMENT

Policy Option	Impact Assessment	Panel Comments
A. Transportation		
1. Budget Allocation Priorities:		
Policy - With the phasing out of Federal aid for transportation, local budgets are insufficient to support significant expansion of the road or transit systems. Priority will be placed on programs directed toward maintaining quality service with existing facilities. Specific policies are:	- low density areas and low volume roads suffer further deterioration. - high volume roads and roads in specific designated areas are maintained at minimal acceptable level.	
a. Paratransit:	- ridesharing and jitney operations increase but with small overall impact on vehicular traffic.	
Increase the priority of programs to encourage use of paratransit and alternative work schedules in order to reduce peak traffic loads on road system, particularly around growth areas. Such programs include: parking management policies to promote ridesharing or use of transit for travel to/from congested areas during peak periods (differential pricing, transit/jitney/or ridesharing collection lots along major arteries), removal of institutional constraints and availablity of assistance for private development of jitney and vanpool operations.	- staggered work schedule arrangements are most effective of TSM measures adopted.	

Policy Option	Impact Assessment	Panel Comments
b. Capital Improvements Top priority in capital improvement programs is given to maintenance of existing facilities and to capacity enhancement of facilities in areas where congestion is severely restricting flow of traffic.		
2. Defer maintenance on low volume highways	- this becomes a defacto policy, due to lack of funds; as a result low density areas have increasingly poorer roads and restoration becomes impractical.	
3. Mini-car Use Policy - The purchase and use of low performance mini-cars using a variety of new energy sources is encouraged by the removal of institutional constraints, provision of preferred parking spaces, and designation of areas such vehicles are permitted to operate. Purchase of such vehicles by local jurisdictions should also be encouraged for municipal fleets. Local and State Governments should encourage shared lease or purchase arrangements for large vehicle use.	- incentives to use of mini-cars encourage shift to these cars to the level of about 1 percent of the fleet.	
4. Funding of Transit Operations Revise public funding of transit operating deficits by: a. Recovering expenditures among all jurisdictions in the region according to the amount of benefits realized by each; and	- each jurisdiction is forced to review individual transit needs leading to dropping of some routes and revising of others. - because labor costs were such a large proportion of operating	

Policy Option	Impact Assessment	Panel Comments
b. Bringing transit labor costs in line with comparable labor skills providing other municipal services.	costs (73% to 84%), a decrease in labor costs (to approximately 56% of costs) enables improvement and expansion of transit service.	
B. Development		
Economic		
1. Regional Development Agency		
Policy - Create and provide appropriate funding sources (% of property tax) for a regional agency whose functions are: 1) to identify new commercial, high technology, light industry, etc., employers whose labor, transportation, and energy requirements are compatible with regional goals, 2) to select land parcels appropriate for the location of these employers, and 3) to supply these parcels with public facilities tailored to attract the identified industries.	- regional cooperation and pooling attracts some new high technology industry to designated sites such as BWI.	
2. Job-Training		
Policy - Establish a job-training program through a coordinated effort by local governments, colleges, and businesses to upgrade skills of unemployed to match needs of new industry.	- labor requirements of new industries can be drawn from local labor pool.	

Policy Option	Impact Assessment	Panel Comments
C. Energy		
1. Alternate Energy Sources		
Policy - Encourage and when possible implement energy use accountability procedures in government and business operations.	- potential unfavorable publicity and reaction forces local jurisdictions to undertake considerable measures.	
D. Government Organization, Decision Making, Financing		
1. Regional Sales Tax		
Policy - Impose a 1% regional sales tax whose revenues are dedicated to the preservation/improvement of transportation services throughout the region - distribution: 50% to a regional pool, 50% returned to local jurisdictions.	- improved maintenance of local road system. - expansion of roads, construction of access links in designated regional development areas. - planning and financial assistance for private paratransit service. - construction of parking lots to serve as pickup locations for transit/paratransit service to regional centers or City.	

Summary of Policies and Scenario Impacts

While the slowly growing economy and the reduction of Federal assistance places a severe burden on Government revenues, the income from additional taxes and the changes in operational procedures permit maintenance and some expansion of high volume facilities although at the expense of lower volume facilities. To a limited extent, the integration and dereglation of paratransit modes does pick up some of the slack from the reduced transit service but a substantial number of the transit-dependent are further immobilized.

The increasing energy costs are felt most strongly by the lower-income groups both in housing and transportation costs. However, even the middle income groups are forced to spend a higher percentage of their disposable income on energy, so that the trend toward more fuel-efficient cars will continue.

Since unemployment remains high, transportation will compete with other human services for scarce government funding. The result will be a greater reliance on TSM activities.

Appendix E, Part III

GROWTH SCENARIO

GROWTH SCENARIO

Independent Variables and Assumptions

In this scenario, the period is characterized as one of sustained economic growth, redefinition of the federal role in providing assistance to local and state governments, and rapid commercialization of new technologies. Oil availability is plentiful and, while higher priced, is not a major issue.

Economy - The economic climate in Baltimore is reflected in an annual growth rate of 4% in the GRP when measured in real dollars. The region fares slightly better than the nation during this period; however, the GNP also grows an average of 3.5% per year. As the national economy began to show signs of recovery and ultimately of growth, the Port of Baltimore receives much attention as a means to revitalize the regional economy, and port modernization efforts commence. The economic impact of port development has provided the marginal advantage to the Baltimore region relative to the nation. Meanwhile, the inflation rate has fallen to 6 - 8% throughout the ten year timeframe. Personal savings increase and capital is available for investment and housing.

Oil Availability - Even though oil availability is plentiful with respect to demand, the crises of the 1970s produced lasting effects, such as a consistently lower demand for oil. Similarly, fuel prices stabilize by 1984 and thereafter experience an average increase of 1% per year in real dollars.

Rapid Commercialization of Technology - The most rapid commercialization of technology has been evidenced in the communications industry. The home computer has become commonplace; translating into some reduction in trips although its impact is not directly realized in VMT. The growing economy stimulates growth in medical technology, communications, and information industry which locates in the suburbs.

Brief Description of Horizon Year and Period

In the 1982-1992 period, the Baltimore region successfully rejuvenates its economy as private and public sectors combine efforts to modernize the Port and develop the harbor area as well as the airport in accordance with great demands for goods movement. Moreover, as the biomedical, defense, and communications industries expand in the region, job opportunities draw new workers into the city and suburbs alike. The commercial and industrial development in the city and residential growth in the counties are accompanied by increased retail and service facilities around the growth areas. Regarding travel behavior, transit and paratransit services remain in the periphery of concern, as the personal automobile continues to dominate the travel in the region and the nation.

In the national context, Baltimore's reputation as a commercial center is greatly enhanced; however, problems of unemployment and crime continue to plague the city. Generally, the regional and city populations are much more diverse than in 1980, and the Port and harbor area continue to attract business and vacationing visitors from the rest of the country and the world.

High Growth Scenario

Item	Description	Panel Comments
1. Demographics: Population	. Increases at 1% per year; 30–40% of growth due to net in-migration of white collar and skilled labor households.	
Distribution Population	. City population continues to decline, pressures mount for dispersed growth in outer suburban rings; estimated increases for the 10 year period are: City - 5%(-13%); Carroll +27%(+39%); A.A. +22%(+24%); Harford +30%(+27%); Balto. Co. +7%(+6%); Howard +50% (90%). ( ) = 1970–1980 growth	
Disposable Income	. Increases at rate of GRP (about 4% per year above inflation).	
Income Distribution	. Disposable income for middle as well as upper portions of income spectrum increases faster than inflation; however, with reduction of federal aid to entitlement programs and soft market for unskilled, blue collar labor, those at bottom of income ladder experience little improvement.	
Household Size	. Average household size stabilizes at 2.7 due to echo baby boom effect, leveling off of % of women in work force.	
2. Industrial-Commercial Base		
Industry	. GNP growth, stabilized inflation, lower interest rates produce strong recovery early in period for auto, steel, appliance, construction industries; defense related industries grow at a strong pace throughout the period; export coal shipments increase gradually.	

Item	Description	Panel Comments
	. Significant growth of new light industry (e.g., computer, bio-technology, communications) and commercial sources of employment.	
	. Suburban location preferred by most new industry.	
Port	. Sustained growth in GNP and economic growth worldwide result in increased port activity.	
	. Although growth in export coal market has slowed, Baltimore's share of the market continues to increase with operation of new loading facilities.	
Industrial Services	. Labor: modernization and automation of existing industrial base plus nature of new industry leads to little growth in demand for unskilled, blue collar labor other than port.	
	. Energy: existing and new industries become less energy intensive, requiring less energy per unit of GRP growth than in 70s.	
	. Transportation: suburban locations and nature of new industry generates additional truck and commuter traffic on suburban road network; goods moved by truck increase more sharply than for rail (excluding coal).	
3. Employment		
By Sector	. % of total employment in heavy industry declines; % light industry and service sectors increase.	
	. Public sector employment increases.	
Character of Employment	. Unskilled, blue collar labor demand shows little growth; new sources of employment require white collar professionals and skilled blue collar.	

Item	Description	Panel Comments
	. Growth of coal export and other port activities offsets declining needs of existing industry (auto, steel) for blue collar labor; total number of blue collar jobs does not increase significantly.	
Unemployment Levels	. Overall regional unemployment is held to a 6-7% level ; however, unemployment among City's large unskilled labor force remains high, leaving the City with a 10%+ unemployment rate.	
4. Housing and Land Use		
Form	. Economic and population growth plus lower interest rates revitalize housing market, new units are constructed at '76-'77 rates (13,000 - 15,000/yr.).	
	. With declining auto operating costs, available and affordable financing, market pressures again build for single family, low density housing.	
	. New units tend to be smaller, more energy efficient than those constructed in early 70s.	
Location	. Demand is high for housing in outer suburbs and semi-rural areas as well as around growth areas (e.g., Columbia, Whitemarsh, Owings Mills).	
Affordability of Housing	. Lower interest rates, increasing incomes, and stabilized inflation lead to a reversal of trend during late 70s and % of households able to afford a median priced house (i.e., 28% of gross income equals or exceeds amount necessary for median priced housing) increases to the 50% level of early 70s.	

Item	Description	Panel Comments
5. Institutional		
Federal	. Redefinition of role of federal government during 80s leads to diminishing transfer of funds for transportation (transit and highway aid), water/sewer projects, redevelopment programs, and numerous entitlement programs.	
State	. States bear burden of taking over and establishing funding sources for programs phased out by federal government.	
Regional/Local	. Decreasing federal aid, backlog of road and bridge maintenance, plus demands for new/expanded public facilities to attract and support employment and residential growth, constrain budgets and require prioritization of programs.	
	. New funding sources are required to preserve quality of public services and facilities.	
Private	. Developer charges, increased user fees as additional sources of revenue to state and local governments receive increased consideration; loss of new industry or business volumes to other regions are potential negative impacts.	
6. Transportation		
Revenue Sources	. Declining MDOT revenues from gasoline sales tax reversed in 1983 with an increase of 2¢ per gallon; in real terms, this source of revenue continues to decline throughout period due to stable and then declining volume of gasoline sales.	
	. Federal operating assistance and highway construction aid are phased out during period.	

Item	Description	Panel Comments
	. Only title tax, corporate income tax, port, and airport revenue sources increase at rates above inflation. . MTA periodically adjusts transit fares to maintain a yield of 50% of operating costs.	
Demand		
People Movement	. Population growth, increased sub-urbanization, and declining auto operating costs/mile (real $) cause VMT to grow at 6% per year (approximate rate of mid-70s). . VMT in city remains about constant, with most growth in travel occurring in outer suburban or regional center areas. . Low density residential development plus new suburban employment centers result in travel patterns that are more dispersed, less amenable to service by conventional line haul transit. . Work trip lengths continue to increase and % of VMT due to discretionary travel grows.	
Goods Movement	. GNP, GRP growth result in increased goods shipments by truck, rail, air and water. . Shift from heavy to light industry produces highest growth in demand for goods movement by truck.	
Supply Side		
Highway	. Maintenance needs of bridges and road systems place severe demands on state and local transportation budgets.	

Item	Description	Panel Comments
	. As region grows, suburban area congestion increases and pressures build for new roads and capacity enhancement of existing system.	
Transit	. Segments A and B of subway are completed and go into revenue operation.	
	. Tight budgets require cutback in bus service, with low ridership routes eliminated early during period.	
	. Scarce funds and reduced coverage result in a declining bus fleet and hence decreasing available capacity.	
	. Periodic fare increases are required to hold operating subsidies at 50% of operating costs.	
Paratransit	. With declining auto operating costs, use of paratransit shows no growth; average auto occupancy declines slightly.	
Freight	. Dredging of a channel to 50' depth is undertaken during period and completed by 1989.	
	. Two new coal loading facilities begin operation, increasing Baltimore Port capacity to 40 million tons/year (14 million tons handled in 1981).	
	. Volume of coal trains supplying port increases throughout period leading to disruptions of local traffic where at-grade crossings are used.	
	. Volume of truck traffic on road system shows rapid growth as result of economic growth, new industry.	

Item	Description	Panel Comments
7. Transportation Energy Impacts		
Conservation	. Public concern for energy conservation declines during period due to plentiful supply, and costs that show little or no increase in real terms.	
	. Demand for small, high efficiency autos weakens.	
	. Regionally, gasoline consumption (by volume) remains constant with VMT growth offset by efficiency gains.	
New Energy Sources	. Low performance, alternate fueled autos reach market in mid-1980s; however, demand and sales are not significant until after oil shortage.	
Energy Use Distribution	. % of regional electrical energy generated from oil sources continues to decline (about 15% in 1981).	
	. Industrial sector becomes increasingly less energy intensive.	
8. Environmental Considerations	. After relaxation in standards, environmental concerns increase as economy improves.	
	. Increased regulation for coal handling to reduce dust and spillage.	
9. Significant Regional Trends	. Economic growth plus energy availability renew pressures for dispersed, low density residential and employment growth.	
	. Traffic volumes increase on suburban road system creating budgetary conflicts between maintenance needs and new construction.	

Item	Description	Panel Comments
	. Declining public concern for energy conservation. . Continued tight state and local government budgets due to diminished federal aid for transportation, water/sewer projects, entitlement programs. . Increasing potential for attraction of new industry because of sustained GNP growth. . Persistent high unemployment in Baltimore City among unskilled, blue collar labor groups.	

Policy Option	Impact Assessment	Panel Comments
A. Transportation		
1. Budget Allocation Priorities:		
Policy - With the phasing out of Federal aid for transportation, local budgets are insufficient to support significant expansion of the road or transit systems. Priority will be placed on programs directed toward maintaining high quality service with existing facilities. Specific policies are:	- Road/bridge maintenance efforts are accelerated and trend of a slowly deteriorating system is reversed. - Localized staggered work schedule arrangements were most effective of the TSM programs initiated.	
a. Paratransit: Increase the priority of programs to encourage use of paratransit and alternative work schedules in order to reduce peak traffic loads on road system, particularly around growth areas. Such programs include: parking management policies to promote ridesharing or use of transit for travel to/from congested areas during peak periods (differential pricing, transit/jitney/or ridesharing collection lots along major arteries), removal of institutional constraints and availability of assistance for private development of jitney and vanpool operations.	- Ridesharing and jitney operations increase as a result of promotional efforts, but overall impact on vehicular traffic is small with the exception of locations where long term parking is limited.	
b. Capital Improvements Capital improvement programs give top priority to maintenance of existing facilities and to capacity enhancement of facilities in areas where congestion is severely restricting flow of traffic.		

POLICY ASSESSMENT

Policy Option	Impact Assessment	Panel Comments
B. Development		
1. Regional Development Agency:		
Policy - Create and provide appropriate funding sources (% of property tax) for a regional agency whose functions are: (i) to identify new commercial, high technology, light industry, etc., employers whose labor, transportation, and energy requirements are compatible with regional goals; (ii) to select land parcels appropriate for the location of these employers; and (iii) to supply these parcels with public facilities tailored to attract the identified industries.	- Regional cooperation and pooling of resources successful in attracting a mix of light industry (biotech, computer, communications, defense) and commercial firms to designated growth regions (Columbia - BW Corridor, Whitemarsh, Owings Mills), inner suburban regional centers, and in City locations. - By focusing development in desired areas, new employment centers are diverted from rural or outer suburban areas thus reducing tendencies toward a dispersed regional growth pattern. - Selected locations chosen to: provide opportunity for employees to reside relatively close to jobs, increase potential for transit/paratransit modes to provide cost effective means of transportation for work trips, provide opportunity for shared freight facilities.	
2. Regional Growth Centers:		
Policy - Stimulate residential development in designated areas (near major employment and commercial centers as identified in economic development actions) by focusing limited availability	- Although economic and public pressures for dispersed, low density development exist, the limited availability of public funds for new facilities plus a firm regional commitment to implement	

Policy Option	Impact Assessment	Panel Comments
of capital funds for sewer/water and transportation facilities in these areas. Discourage sprawl type development through zoning policies, charging costs of any public facilities expansion to developers, allocating developer fees in proportion to additional traffic generated, plus agricultural land preservation programs.	centralized growth policies results in the focusing of 85-90% of new housing within the designated regional growth areas. - Regional cooperation, fostered through establishment of a shared pool of funds for transportation and water/sewer projects, has guided development distributed over all regional growth areas without the saturation of any specific area. Exception to success of distributing growth is the City where new residential developments were not quickly filled.	
3. Development Control: Policy - Within designated areas, control pace and density of new development so that the growth is compatible with existing land use plans and so that capacities of public facilities and services are not exceeded.		
4. Job Training: Policy - Establish a job training program through a coordinated effort by local governments, colleges, and businesses to upgrade skills of unemployed to match needs of new industry.	- Labor requirements of new industries can be satisfied to a greater degree from local labor pool; unemployment in Baltimore City is reduced.	
C. Energy Mini-Car Use Policy - The purchase and use of low performance mini-cars using a variety of		

Policy Option	Impact Assessment	Panel Comments
energy sources is encouraged by the removal of institutional constraints, provision of preferred parking spaces, and designation of areas such vehicles are permitted to operate. Purchase of such vehicles by local jurisdictions should also be encouraged for municipal fleets. Local and state governments should encourage shared lease or purchase arrangements for large vehicle use.		
D. Government Organization, Decision Making, Financing		
1. Policy - Impose a 1% regional sales tax whose revenues are dedicated to the preservation/improvement of transportation services throughout the region -- distribution: 50% to a regional pool, 50% returned to local jurisdictions.	- Improved maintenance of local road system.	
	- Expansion of roads, construction of access links in designated regional development areas.	
Amount: $100 M 1983, increasing @ 10-11%/yr.	- Planning and financial assistance for private paratransit service.	
[$250 M by horizon year]	- Construction of parking lots to serve as pickup locations for transit/paratransit service to regional centers or city.	
2. Policy - Collect and pool a portion of local property taxes to be allocated under the direction of a regional body for the extension of public facilities or services (water, sewer, transportaion)	- With the gradual elimination of federal aid for transportation and water and sewer facilities during this period, this pooling of regional capital represents an effective and efficient means	

Policy Option	Impact Assessment	Panel Comments
in support of regional land use and economic development objectives and policies.	of providing the required facilities to attract new industry and to support regional population growth.	

Summary of Policies and Scenario Impacts

A firm regional commitment to policies encouraging centralized development was recognized as a necessity to counter private sector pressures for dispersed growth. Policies that encouraged both residential and industrial development in designated growth areas while discouraging development in other areas were successful in containing growth and limiting the need for expansions of transportation, water and sewer, and other public facilities throughout the region. Furthermore, the coordination of land use policies and economic development plans for attracting new businesses provided a potential for reduced commuting distances by fostering development of regional centers containing both residential developments and new employment centers.

The pooling of a portion of property taxes provided a regional source of funds for financing the capital improvements necessary to attract new industry and to support development in growth areas. Intra-regional cooperation rather than competition enabled the region to achieve the greatest overall benefit per dollar during a period when local and state budgets were strained to meet the operating and maintenance requirements of the existing infrastructure.

Key to sustaining economic growth within the region was the need to maintain a high quality transportation system. With an anticipated decline in federal aid for transportation, increasing maintenance and operating costs, and a projected growth in vehicular travel, the region perceived early on during the period a need to enhance transportation revenues and to minimize the expenditures required to preserve service levels and support expansion where necessary. Policies were, therefore, adopted which generated additional revenues through a regional sales tax and which placed high priority on programs directed toward reducing peak period traffic loads while concentrating capital improvement funds on maintenance and on capacity enhancement in growth areas. The combination of centralized development plus strong promotion of ridesharing, complimentary parking management policies including designated collection lots, and alternative working schedules was effective in retarding the growth of peak traffic volumes. The necessity for new road construction and expansion of capacity, sufficient funds were available such that road and bridge maintenance needs were gradually brought under control. These measures reduced the need for new road construction and/or capacity expansion in many areas, thus freeing more funds for bringing the problems of road and bridge maintenance under control.

Appendix E, Part IV

TRANSITION SCENARIO

Transition Scenario

Independent Variables and Assumptions

In this scenario, the 10-year period of interest can be characterized as one of sustained economic growth, redefinition of the federal government's role in providing assistance to state and local governments, slow commercialization of new technologies that could have a dramatic impact on transportation, and plentiful energy availability until foreign oil supplies are disrupted for a period of six months. Scenario assumptions pertaining to each of the independent variables are given below:

Economy - After recovery from the recession of 1981-1982, the economy experienced an 80 month period of growth (real GNP increasing at 3-4% per year), halted only by an oil supply shortfall in mid '89. The sustained growth was accompanied by a stabilization of both inflation (6-8%) and interest rates (10-12%). These conditions lead to an increase in personal savings and an increasing availability of funds for capital investment by business and for residential construction. This combination of available capital and economic growth fostered a period of increasing business expansion.

Efforts to redefine the role of the federal government, transferring programs and funding burdens to state and local governments, were initiated in 1982 and carried out on a gradual basis throughout the 80's. This transfer of responsibility required local governments to impose new taxes and find new sources of revenue to replace lost federal aid for transportation, water and sewer projects, and numerous entitlement programs.

Energy (Oil Availability) - Prior to the 1989 disruption in the flow of Middle East oil, supplies were plentiful throughout the 80's with no increases (after adjustment for inflation) in prices for gasoline or fuel oil. The loss of normal supply from the Middle East in mid 1989 lead to an overall 15% shortfall of oil in the U.S. that lasted for 6 months. The impact of the shortfall was a rapid escalation in oil prices (40% increase) during the 6 month period, with price stabilization occurring at the end of another 6 months at levels 65% above the pre-shortage prices. The impact of the shortfall on the economy was a 12 month period of no growth and double digit inflation. The economy gradually returned to its pre-crisis state of growth during the remainder of the period, oil supplies were again plentiful, but prices remained high.

Commercialization of New Technology - Prior to the oil crisis of '89, public concern for energy conservation was declining and as a consequence the market for small, high efficiency automobiles had softened. Nevertheless, with the continued improvement in new car efficiency and the more rapid fleet turnover rate that accompanied economy prosperity, the average auto fleet efficiency reached a level of 29 mpg by 1989. Small, low performance cars using a variety of propulsion systems (electric, propane, bottled natural gas), introduced to the public in the mid '80's, had captured less than 1% of the new car market by 1989 due to the declining operating costs of conventional cars. The oil shortage and accompanying jump in gasoline prices lead to a shift in public demand toward small, fuel efficient and alternate fuel automobiles that lasted through the end of the period.

Communications and personal computer industries experienced rapid growth during the period. Information services, electronic mail, and electronic transaction capabilities (funds transfers, purchase orders, etc.) became available to individual households via cable TV/telephone communication lines. However, because of regulatory issues and early operational problems, such services had penetrated only 10-20% of limited distribution plus declining auto operating costs, these services had little impact on reducing personal travel.

Brief Description of Horizon Year and Interim Period

During the 1982-92 period the Baltimore region experienced a population growth rate similar to that of the early 70's. A significant portion of this growth was a result of in-migration of professional and skilled labor from the Northeast and Midwest, attracted to the new high technology industries that located in the region, as well as, to existing and prospering defense related industries. Economically, the region experienced continued growth throughout the period (excluding a 12 month period of no-growth following the oil shortage), with GRP increases matching or exceeding the GNP. Regional unemployment was reduced to 6-7%, although for Baltimore City high unemployment among unskilled, blue collar workers persisted. Other significant problems faced by the region during the period included: loss of federal aid and transfer of program responsibility to state/local governments, tight budgets and resulting conflicts between needs to preserve existing public facilities and needs for expansion to support growth, and the oil shortage and its impacts on transportation and energy costs.

Regional efforts to attract new sources of employment were highly successful. Both high technology (computer, communications, biotechnology) and commercial businesses found the region's educational, cultural, and environmental resources, as well as its proximity to Washington, very desirable for the location of new facilities. Most of these new businesses did not require rail or port facilities for receiving or shipping large quantities of bulk goods and most preferred suburban sites. The location of new employment centers in suburban regions coupled with lower interest rates, readily available financing for residential construction, and declining real automobile operating costs renewed public tendencies toward low density, dispersed growth. The net effect was increased pressure from the private sector for development in the 2nd and 3rd tier suburban rings and a continuing decline of City population.

Because of reduced federal assistance, conflicts between new capital projects and the preservation of existing facilities and services remained a problem to be resolved in allocating state and local funds. Forces for dispersed growth lead to demands for the expansion of regional water and sewer systems. With regional VMT again growing at the rate of the mid 70's ($\sim$ 6% per year), congestion on the suburban area road network became a problem creating pressures for new roads and the expansion of existing road capacities. However, the deteriorated state of existing roads and bridges, continued high transit operating deficits, and the additional burden of taking over entitlement programs previously funded by the federal government allowed little room in state and local budgets for new capital projects. Competition developed among regional jurisdictions to acquire funds for facilities to stimulate growth in some cases and to maintain existing facilities and services in other cases.

Although the region as a whole was prospering, the City faced a persistent problem of double digit unemployment due largely to little growth in the demand for unskilled labor. Modernization and automation of the local auto and steel industry facilities as well as in the port and other heavy industry reduced the amount of unskilled labor required

per unit of output below that characteristic of the 70's. The addition of two new coal loading facilities, the dredging of a 50' channel, and the oil shortage resulted in a tripling of volume of export coal shipped through the port. However, the major impact for the region was not an increase in jobs (2000-3000) but the disruption of vehicular traffic created by the large number of coal trains required to supply the loading facilities.

Stable gasoline prices and improving operating efficiency of automobiles lead to a decline in concern for energy conservation and consequently little interest in ridesharing by commuters. Because growth in personal travel occurred primarily in the suburban areas outside the beltway, transit ridership did not grow (prior to the oil shortage) and hence operating deficits climbed. This forced the MTA to reduce route coverage, dropping low demand bus routes, and to periodically increase fares.

Because of the nature of new industry that located in the region, the volume and value of goods shipped by truck increased at a greater rate than did shipments by rail. An increase in the volume of truck traffic was particularly evident on the suburban highway system, compounding the congestion and maintenance problems.

The direct effects of the oil shortage on the region were a peak shortfall of 18% in gasoline supplies, a 65% price increase in gasoline and fuel oil (occurring over 12 months), and oneyear of high inflation and a stagnant economy. The seven years of economic prosperity, plentiful oil supplies, reduced transit coverage, and dispersed, low density growth left the region in a very vulnerable position when the shortfall occurred. The impacts on regional transportation included a necessary reduction of VMT such that gasoline consumption was lowered by 18%, increased costs of goods movement by truck with some transfer to rail, and an increase in the volume of export coal shipped through the port. Because of the increased cost and limited availability of gasoline, personal travel of a discretionary nature declined dramatically during the shortage. Commuters destined to the City shifted to transit to the extent system capacity permitted. In suburban areas the only option available to commuters for reducing VMT was to locate neighbors or co-workers willing to form car-pools.

As supplies gradually built up and oil prices again stabilized, the region recovered economically and once again experienced a steady rate of growth through the end of the period. The oil shortfall did, however, have important long-term effects on the region. The public had renewed its concern for energy conservation. The shock of the sudden price increase of gasoline and fuel oil on household budgets did not disappear as quickly as supplies had built up. Demand for new housing shifted toward higher density areas, use of transit services remained high, and demand for smaller, more fuel efficient autos as well as alternate fueled cars remained strong. Low income groups who must allocate a large percentage of their household income to energy expenditures were particularly hard hit by the inflated energy costs.

Item	Transition Scenario Description	Panel Comments
1. Demographics Population	• increases at 1% per year; 30-40% of growth due to net in-migration of white collar and skilled labor households.	
Population Distribution	• City population continues to decline, pressures mount for dispersed growth in outer suburban rings; estimated increases for the 10 year period are: City - 5% (-13%), Carroll + 27% (+39%), AA + 22% (+24%), Harford + 30% (+27%), Balt. Co. + 7% (+6%), Howard + 50% (90%). ( ) = 1970-1980 growth	
Disposable Income	• increases at rate of GRP (about 4% per year above inflation).	
Income Distribution	• disposable income for middle as well as upper portions of income spectrum increases faster than inflation; however, with reduction of federal aid to entitlement programs and soft market for unskilled, blue collar labor, those at bottom of income ladder experience little improvement.	
Household Size	• avg. hh size stabilizes at 2.7 due to echo baby boom effect, leveling off of % of women in work force.	
2. Industrial-Commercial Base		
Industry	• GNP growth, stabilized inflation, lower interest rates produce strong recovery early in period for auto, steel, appliance, construction industries; defense related industries grow at a strong pace throughout the period, export coal shipments increase gradually. • significant growth of new light industry (e.g., computer, biotechnology, communications) and commercial sources of employment. • suburban location preferred by most new industry.	

Item	Description	Panel Comments
Port	• sustained growth in GNP and economic growth world wide result in increased port activity. • although growth in export coal market has slowed, Baltimore's share of the market continues to increase with operation of new loading facilities.	
Industrial Services	• labor: modernization and automation of existing industrial base plus nature of new industry leads to little growth in demand for unskilled, blue collar labor other than port. • energy: existing and new industries become less energy intensive, requiring less energy per unit of GRP growth than in 70's. • transportation: suburban locations and nature of new industry generates additional truck and commuter traffic on suburban road network; goods moved by truck increase more sharply than for rail (excluding coal).	
3. Employment		
By Sector	• % of total employment in heavy industry declines, % of light industry and service sectors increase. • Public Sector employment increases.	
Character of Employment	• unskilled, blue collar labor demand shows little growth; new sources of employment require white collar professionals and skilled blue collar. • growth of coal export and other port activities offsets declining needs of existing industry (auto, steel) for blue collar labor; total number of blue collar jobs does not increase significantly.	
Unemployment Levels	• overall regional unemployment is held to a 6-7% level (with exception of 12-15 months following oil crisis); however, unemployment among City's large unskilled labor force remains high, leaving the City with a 10% + unemployment rate.	

Item	Description	Panel Comments
4. Housing and Land Use		
Form	• economic and population growth plus lower interest rates revitalize housing market, new units are constructed at '76-'77 rates (~13,000-15,000/yr.)	
	• with declining auto operating costs, available and affordable financing, market pressures again build for single family, low density housing.	
	• new units tend to be smaller, more energy efficient than those constructed in early 70's.	
Location	• demand is high for housing in outer suburbs and semi-rural areas as well as around growth areas (e.g., Columbia, White Marsh, Owings Mill).	
	• impact of oil price rises is a shift in demand toward higher density, smaller housing units that continues through end of period.	
Affordability of Housing	• lower interest rates, increasing incomes, and stabilized inflation lead to a reversal of trend during late 70's and % of households able to afford a median priced house (i.e., 28% of gross income equals or exceeds amount necessary for median priced housing) increases to the 50% level of early 70's.	
5. Institutional		
Federal	• redefinition of role of federal government during 80's leads to diminishing transfer of funds for transportation (transit and highway aid), water/sewer projects, redevelopment programs, and numerous entitlement programs.	
	• response to oil crisis includes national allocations to states and regions on basis of a uniform percentage reduction relative to previous year's usage.	

Item	Description	Panel Comments
State	• states bear burden of taking over and establishing funding sources for programs phased out by federal government.	
Regional/Local	• decreasing federal aid, backlog of road and bridge maintenance, plus demands for new/expanded public facilities to attract and support employment and residential growth constrain budgets and require prioritization of programs. • new funding sources are required to preserve quality of public services and facilities.	
Private	• developer charges, increased user fees as additional sources of revenue to state and local governments receive increased consideration; loss of new industry or business volumes to other regiona are potential negative impacts.	
6. Transportation		
Revenue Sources	• declining MDOT revenues from gasoline sales tax reversed in 1983 with an increase of 2¢ per gallon; in real terms, this source of revenue continues to decline throughout period due to stable and then declining volume of gasoline sales. • Federal operating assistance and highway construction aid are phased out during period. • only title tax, corporate income tax, port, and airport revenue sources increase at rates above inflation. • MTA periodically adjusts transit fares to maintain a yield of 50% of operating costs.	
Demand		
People Movement	• population growth, increased suburbanization, and declining auto operating costs/mile (real $) cause VMT to grow at 6% per year(approximate rate of mid 70's).	

Item	Description	Panel Comments
	• VMT in-City remains about constant, with most growth in travel occurring in outer suburban or regional center areas. • low density residential development plus new suburban employment centers result in travel patterns that are more dispersed, less amenable to service by conventional line haul transit. • work trip lengths continue to increase and % of VMT due to discretionary travel grows. • disruption of oil supply requires 15-18% reduction in regional VMT during the 6 month crisis period. • shock of increased energy costs resulting from oil crisis is reflected in less discretionary travel with VMT not exceeding pre-crisis levels until end of the period. • Inflated energy and hence transportation costs result in substitution of communications for business travel in the form of teleconferences.	
Goods Movement	• GNP, GRP growth result in increased goods shipments by truck, rail, air and water. • shift from heavy to light industry produces highest growth in demand for goods movement by truck. • impact of oil shortfall is a reduction in shipments by both rail and truck, with some transfer of intermediate distance shipments from air and truck to rail. • export coal market grows rapidly as result of world-wide oil shortage and remains strong through end of the period.	
Supply Side		
Highway	• maintenance needs of bridges and road systems place severe demands on state and local transportation budgets.	

Item	Description	Panel Comments
	• as region grows, suburban area congestion increases and pressures build for new roads and capacity enhancement of existing system.	
Transit	• segments A and B of subway are completed and go into revenue operation.	
	• scarce funds and reduced coverage result in a declining bus fleet and hence decreasing available capacity for energy crisis situation.	
	• periodic fare increases are required to hold operating subsidies at 50% of operating costs.	
	• ridership remains stagnant during period prior to oil shortage; population and travel growth occurs in low density suburban areas not well served by conventional transit modes.	
	• overall ridership increases by 30% during shortage and remains above preshortage levels although declines gradually through end of period.	
Paràtransit	• with declining auto operating costs, use of paratransit shows no growth; average auto occupancy declines slightly.	
	• sudden jump in gasoline prices during oil shortage (65% by end of shortage) provides strong incentive for travelers to use paratransit modes.	
	• although gasoline prices resume low rate of increase after shortage, household incomes do not catch up with initial increase by end of period; as a result, average vehicle occupancy remains higher than pre-crisis level.	
Freight	• dredging of a channel to 50' depth is undertaken during period and completed by '89.	
	• 2 new coal loading facilities begin operation, increasing Baltimore port capacity to 40 million tons/year (14 million tons handled in 1981).	

Item	Description	Panel Comments
	• volume of coal trains supplying port increases throughout period leading to disruptions of local traffic where at-grade crossings are used. • volume of truck traffic on road system shows rapid growth as result of economic growth, new industry. • increased energy costs resulting from oil shortfall cause a significant increase in costs of freight moved by truck.	
7. Transportation Energy Impacts		
Conservation	• public concern for energy conservation declines during period (prior to oil shortage) due to plentiful supply, and costs that show little or no increase in real terms. • demand for small, high efficiency autos weakens. • regionally, gasoline consumption (by volume) remains constant with VMT growth offset by efficiency gains. • impacts of shortage: renewed energy consciousness of public, high demand for small, high efficiency autos, reduced gasoline consumption through end of period, increased use of communication services to replace travel (business teleconferences, shopping-at-home, work-at-home where feasible), increased % of household income allocated to energy purchases (low income groups impacted most heavily).	
New Energy Sources	• low performance, alternate fueled autos reach market in mid '80's; however, demand and sales are not significant until after oil shortage.	
Energy Use Distribution	• % of regional electrical energy generated from oil sources continues to decline (about 15% in 1981). • industrial sector becomes increasingly less energy intensive.	

Item	Description	Panel Comments
8. Environmental Considerations	• after some relaxation in standards, environmental concerns increase as economy improves. • increased regulation for coal handling to reducing dust and spillage.	
9. Significant Regional Trends	a. economic growth plus energy availability renew pressures for dispersed, low density residential and employment growth. b. traffic volumes increase on suburban road system creating budgetary conflicts between maintenance needs and new construction. c. declining public concern for energy conservation during initial 7 yrs. of period followed by a 15% oil supply shortfall that causes a 65% increase in oil prices over a 12 month period. d. continued tight state and local government budgets due to diminished federal aid for transportation, water/sewer projects, entitlement programs. e. increasing potential for attraction of new industry because of sustained GNP growth. f. persistent high unemployment in Baltimore City among unskilled, blue collar labor groups. g. economic growth and oil availability reduce energy conservation activities so that region is unprepared for embargo when it occurs.	

Policy Option	Impact Assessment	Panel Comments
A. Transportation		
1. Budget Allocation Priorities:		
Policy - With the phasing out of Federal aid for transportation, local budgets are insufficient to support significant expansion of the road or transit systems. Priority will be placed on programs directed toward maintaining quality service with existing facilities. Specific policies are:	- road/bridge maintenance efforts are accelerated and trend of a slowly deteriorating system is reversed. - prior to oil shortage, localized staggered work schedule arrangements were most effective of the TSM programs initiated.	
a. Paratransit: Increase the priority of programs to encourage use of paratransit and alternative work schedules in order to reduce peak traffic loads on road system, particularly around growth areas. Such programs include: parking management policies to promote ridesharing or use of transit for travel to/from congested areas during peak periods (differential pricing, transit/jitney/or ride-sharing collection lots along major arteries), removal of institutional constraints and availability of assistance for private development of jitney and van-pool operations.	- ridesharing and jitney operations increase as a result of promotional efforts, but overall impact on vehicular traffic (prior to oil shortage) is small with the exception of locations where long term parking is limited. - oil shortage and increased gasoline prices causes ridesharing via individual car/van-pools as well as employer pools and jitney services to increase dramatically, with designated collection lots being fully utilized throughout the region. - 18% reduction of VMT during shortage is absorbed by increased ridesharing (10%), increased transit ridership (including jitney services) (3%), and reduced travel (5%).	
b. Capital Improvements: Top priority in capital improvement programs is given to maintenance of existing facilities and to capacity enhancement of facilities in areas where congestion is severely restricting flow of traffic.	- jitney operations expand, and ridesharing remains strong after shortage due to higher gasoline prices.	

Policy Option	Impact Assessment	Panel Comments
2. Contingency Plans Policy - A set of transportation contingency plans to cope with an energy shortfall of up to 20% reduction in motor fuel for a period of 90 days is to be developed as part of the UTPP. These plans are to be updated on a periodic basis and should included: i) the establishment of an organizational structure outlining specific responsibilities for implementing and coordinating contingency plans during a fuel shortage. ii) budgeting of funds to be set aside for use during a fuel emergency to pay the increased operating expenses incurred and to finance the stockpiling of fuel for public vehicle fleets. iii) gasoline sales purchase requirement plans as well as use- and conservation-monitoring systems to provide basis for timely implementation of purchase restrictions. iv) variable work hour programs structured to maximize potential of transit, paratransit, and use of school bus fleets to reduce auto VMT [to permit timely introduction of variable schedules, institutional or legal restraints to imposing work schedule changes must be modified to permit flexibility under emergency conditions.] v) procedures for using school bus fleet to supplement MTA service or as a jitney service in suburban areas without MTA service should be developed; institutional and legal constraints to be resolved prior to a shortage.	- timely implementation of gasoline sales restrictions when suppliers are first observed to be lagging demand trend prevents long lines and tank topping behavior of shortages in the 70's. - with encouragement from public information diseminated by the regional emergency coordination office plus cooperation of employers in establishing variable work schedules and ridesharing services, regional VMT began to decline prior to actual drop in gasoline supply. - monitoring of gasoline sales and supplies indicated that VMT reduction due to increased transit/paratransit usage (particularly ridesharing) and reduction in discretionary travel reduces need to use school bus fleet or travel restriction measures.	

Policy Option	Impact Assessment	Panel Comments
vi) procedures for allocating fuel and for maximizing the operational efficiency of municipal vehicle fleets during fuel emergencies.		
3. Mini-car Use Policy - The purchase and use of low performance mini-cars using a variety of energy sources is encouraged by the removal of institutional constraints, provision of preferred parking spaces, and designation of areas such vehicles are permitted to operate. Purchase of such vehicles by local jurisdictions should also be encouraged for muncipal fleets. Local and State Governments should encourage shared lease or purchase arrangements for large vehicle use.	- with the gasoline price shock caused by the oil supply shortfall, the demand for mini-cars increases dramatically. By the end of the period, these cars represent about 2% of the regional vehicle fleet with that % increasing each year. These cars are used primarily for trips in suburban and urban regions where speeds are 40 mph or less. They are particularly suited for the home to work or home to park-n-ride lot trips of commuters. The occasional need for larger vehicles is partially satisfied by shared lease or purchase agreements.	
B. Development Economic		
1. Regional Development Agency Policy - Create and provide appropriate funding sources (% of property tax) for a regional agency whose functions are: i) to identify new commercial, high technology, light industry, etc., employers whose labor, transportation, and energy requirements are compatible with regional goals, ii) to select land parcels appropriate for the location of these employers, and iii) to supply these parcels with public facilities tailored to attract the identified industries.	- regional cooperation and pooling of resources successful in attracting a mix of light industry (biotech, computer, communications, defense) and commercial firms to designated growth regions (Columbia - BW Corridor, White Marsh, Owings Mill), inner suburban regional centers, and in-City locations. - by focusing development in desired areas, new employment centers are diverted from rural or outer suburban areas thus reducing tendencies toward a dispersed regional growth pattern.	

Policy Option	Impact Assessment	Panel Comments
	- selected locations chosen to: provide opportunity for employees to reside relatively close to jobs, increase potential for transit/paratransit modes to provide cost effective means of transportation for work trips, provide opportunity for shared freight facilities.	
2. Regional Growth Centers Policy - Stimulate residential development in designated areas (near major employment and commercial centers as identified in economic development actions) by focusing limited availability of capital funds for sewer/water and transportation facilities in these areas. Discourage sprawl type development through zoning policies, charging costs of any public facilities expansion to developers, allocating developer fees in proportion to additional traffic generated, and agricultural land preservation programs.	- although economic and public pressures for dispersed, low density development exist, the limited availability of public funds for new facilities plus a firm regional commitment to implement centralized growth policies results in the focusing of 85-90% of new housing within the designated regional growth areas. - regional cooperation, fostered through establishment of a shared pool of funds for transportation and water/sewer projects, has guided development distributed over all regional growth areas without the saturation of any specific area. Exception to success of distributing growth - prior to oil shortage - is the City where new residential developments were not quickly filled.	
3. Development Control Policy - Within designated areas, control pace and density of new development so that the growth is compatible with existing land use plans and so that capacities of public facilities and services are not exceeded.		

Policy Option	Impact Assessment	Panel Comments
4. Job-Training Policy - Establish a job-training program through a coordinated effort by local governments, colleges, and businesses to upgrade skills of unemployed to match needs of new industry.	- labor requirements of new industries can be satisfied to a greater degree from local labor pool; unemployment in Baltimore City is reduced.	
C. Energy (Also refer to A.2-Transportation Contingency Plans)		
1. Alternate Energy Sources Policy - Encourage local governments, industry, and large residential complexes to explore the use of alternate energy sources, e.g. methanol, small-scale hydroelectric power, distributed heating systems, etc., in new facilities as prime or secondary energy sources. Develop contingency plans to exploit appropriate local sources in case of short- and long-term oil shortfalls.	- with oil prices stable, little consideration is given to alternate energy sources except for some district heating applications that prove economically beneficial. - during oil shortfall, alternate source use increases in vehicle fleet with increased use of methanol and some conversion to propane and natural gas. Less than 5% of the fleet is affected. This conversion continues after the end of the shortfall but at a slower rate.	
D. Government Organization, Decision Making, Financing		
1. Regional Sales Tax Policy - Impose a 1% regional sales tax whose revenues are dedicated to the preservation/improvement of transportation services throughout the region - distribution: 50% to a regional pool, 50% returned to local jurisdictions. Amount: $100 M 1983, increasing @ 10-11%/yr. [~ $250 M by horizon year]	- improved maintenance of local road system. - expansion of roads, construction of access links in designated regional development areas. - planning and financial assistance for private paratransit service. - construction of parking lots to serve as pickup locations for transit/paratransit service to regional centers or City.	

Policy Option	Impact Assessment	Panel Comments
2. Property Tax Pooling Policy - Collect and pool a portion of local property taxes to be allocated under the direction of a regional body for the extension of public facilities or services (water, sewer, transportation) in support of regional land use and economic development objectives and policies.	- with the gradual elimination of federal aid for transportation and water and sewer facilities during this period, this pooling of regional capital represents an effective and efficient means of providing the required facilities to attract new industry and to support regional population growth.	

Summary of Policies and Scenario Impacts

A firm regional commitment to policies encouraging centralized development was recognized as a necessity to counter private sector pressures for dispersed growth. Policies that encouraged both redidential and industrial development in designated growth areas while discouraging development in other areas were successful in containing growth and limiting the need for expansions of transportation, water and sewer, and other public facilities throughout the region. Furthermore, the coordination of land use policies and economic development plans for attracting new businesses provided a potential for reduced commuting distances by fostering development of regional centers containing both residential developments and new employment centers.

The pooling of a portion of property taxes provided a regional source of funds for financing the capital improvements necessary to attract new industry and to support development in growth areas. Intra regional cooperation rather than competition enabled the region to achieve the greatest overall benefit per dollar during a period when local and state budgets were strained to meet the operating and maintenance requirements of the existing infrastructure.

Key to sustaining economic growth within the region was the need to maintain a high quality transportation system. With an anticipated decline in federal aid for transportation, increasing maintenance and operating costs, and a projected growth in vehicular travel, the region perceived early on during the period a need to enhance transportation revenues and to minimize the expenditures required to preserve service levels and support expansion where necessary. Policies were therefore adopted which generated additional revenues through a regional sales tax and which placed high priority on programs directed toward reducing peak period traffic loads while concentrating capital improvement funds on maintenance and on capacity enhancement in growth areas. The combination of centralized development plus strong promotion of ridesharing, complimentary parking management policies including designated collection lots, and alternative working shcedules was effective in retarding the growth of peak traffic volumes. The necessity for new road construction and expansion of capacity, sufficient funds were available such that road and bridge maintenance needs were gradually brought under control. These measures reduced the need for new road construction and/or capacity expansion in many areas thus freeing more funds for bringing the problems of road and bridge maintenance under control.

In contrast to the declining public interest in energy conservation, regional transportation energy contingency plans were developed during the mid 80's. These plans included: gasoline purchase requirement plans, a sales versus supply monitoring system, variable work hour programs, and plans for the emergency use of school bus fleets. Because of the availability of these plans coupled with the high priority given to paratransit and other TSM activities as well as a commitment to achieve centralized growth, the impact of the oil shortfall in 1989 was much less severe than would otherwise have been the case. The timely implementation of gasoline purchase requirements successfully avoided the panic buying and resultant long lines characteristic of shortages in the 70's. The necessary reduction in VMT was achieved primarily through ridesharing, jitney services, and

increased use of transit rather than a severe reduction in personal travel. By coordination of staggered work hour schedules, overloading of transit and jitney services requiring use of school buses to augment capacity was avoided. The availability and continued growth of paratransit services lessened the impact of high fuel costs on household budgets both during and after the shortage. Ridesharing and jitney services were particularly beneficial to low income households whose budget were hardest hit by the surge in energy costs for both housing and transportation.

Appendix F

FINAL PANEL POLICY RECOMMENDATIONS

Appendix F

FINAL PANEL POLICY RECOMMENDATIONS

April 22, 1982

ENERGY/TRANSPORTATION FUTURES PANEL
INTRODUCTION TO POLICY RECOMMENDATIONS

The following is a list of comments resulting from the third panel meeting. Although not expressed as formal policy statements, it is the feeling of the panel that these items are important in the development of regional policies and their impacts should be considered as you review the recommended policies.

A. General concerns pertaining to the development and evaluation of regional policies.

The region is heterogenous in many of its characteristics, and these differences must be taken into consideration in developing policies and programs for the entire metropolitan area.

In the matching of policies to scenarios, it must be recognized that goal prioritization changes as a function of the scenario.

B. Regional concerns of the future.

In response to an expected long term supply shortage of fossil fuels and to reduce energy costs to the region, energy conservation should be promoted in all sectors.

The near-term costs for maintenance and modernization of the Baltimore regional water and sewer system may not leave adequate funds available for expansion of these systems. An assessment of the long term requirements and funds for existing facilities should be conducted.

Unemployment in the region is at unacceptable levels for the teenage population which has no or little work history. Job opportunities for this unskilled, non-experienced group is not expected to improve.

In addition to the specific policies listed below, panel members identified a number of problems facing the region where additional policies should be developed. Because there was not adequate time at the meeting to explore these issues and develop proposed policies, they are listed here as stated by the panel. Regional Planning Council committees are invited to develop these concepts further into specific policies or suggestions for further analysis.

C. Areas where policies in addition to those recommended by the panel should be developed.

Housing policies are needed which promote maximum use of existing housing stock and development of areas served by existing infrastructure, opportunity to live close to work, development of affordable housing, reduced cost for energy needed to maintain each house.

Provide public services to extend use of public and private sector facilities as multi-purpose centers beyond normal operating hours.

Ways to provide closer home to work relationships should be studied, including differences in public education programs and crime rates among neighborhoods.

The relative responsibilities of the public and private sectors in providing the supporting infrastructure for economic and land development should be defined and made explicit.

Examine feasibility of currently underutilized railroad ROWs in suburban jurisdictions for commuter services.

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS
A. Policies Common to all Scenarios	
Transportation	
1. Budget Allocation Priorities:	
Policy - With the phasing out of federal aid for transportation, local budgets are insufficient to support significant expansion of the road or transit system. Priority will be placed on programs directed toward maintaining quality service with existing facilities. Specific policies are:	
a. Paratransit:	
Increase the priority of programs to encourage use of paratransit and alternative work schedules in order to reduce peak traffic loads on road system, particularly around growth areas. Such programs include: parking management policies to promote ridership or use of transit for travel to/from congested areas during peak periods (differential pricing, transit/jitney/or ride-sharing collection lots along major arteries); the removal of institutional constraints and the availability of assistance for private development of jitney and van-pool operations, coordination of multi-firm operations, tax incentives for firms with extensive car and van-pooling operations.	Recommended for General Development Plan with further analysis
Coordinate paratransit programs with MTA so that paratransit supplements MTA service where MTA cannot provide cost effective service to an area or clientele.	Recommended for General Development Plan with further analysis

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS
b. Capital Improvements:	
Integrate Goods Movement in Transportation Planning Process. Identify port and airport impacts on land side facilities and integrate needed improvements to these facilities in the transportation planning process and in the Consolidated Transportation Program.	Recommended for General Development Plan with further analysis
2. Funding of Transit Operations:	
a. Reorganize transit labor and operating procedures in line with comparable labor skills	Recommended for General Development Plan with further analysis
3. Mini-Car Use:	
a. The purchase and use of low performance mini-cars using a variety of energy sources is encouraged by the removal of insititutional constraints, provision of preferred parking spaces, and designation of areas where such vehicles are permitted to operate. Purchase of such vehicles by local jurisdictions should also be encouraged for municipal fleets. Local and State Governments should encourage shared lease or purchase arrangements to make larger vehicles available to mini-car owners for special trips requiring them.	Recommended for General Development Plan

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS
Land Development Policies	
1. Centralized Development:	
Concentrate new residential development in designated areas (near major employment and commercial centers as identified in economic development actions) by focusing limited availability of capital funds for sewer/water and transportation facilities in these areas. Discourage sprawl type development through zoning policies, charging costs of any public facilities expansion beyond the designated urban envelope to developer fees in proportion to additional services used, and through agricultural land preservation programs. Encourage development by infilling of existing neighborhoods.	Recommended for General Development Plan
2. Zoning Change:	
Reduce the housing costs of elderly and low income households by permitting subdivision of existing housing stock through modifying zoning ordinance and other means.	Recommended for General Development Plan

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS
Economic Development Policies	
1. Regional Economic Development Agency:	
Create and provide funding for a regional agency whose purpose is to coordinate economic development on a regionwide basis. This agency would supplant existing local economic development agencies and would assume the following types of activities: (1) identify new employers whose labor, transportation, and energy requirements are compatible with regional goals; (2) identify land parcels appropriate for the location of these new employers and compatible with regional development plans; and, (3) coordinate and expedite the supply of public services and facilities required to attract the identified industries. The primary objective of the agency would be to provide a structure for regional cooperation and pooling of resources for the purpose of attracting new sources of employment (actual land purchase and development would remain predominately a private sector function.) Tax base sharing among the local jurisdictions of the region would provide the means for pooling resources as well as for the distribution of development benefits.	Recommended for General Development Plan with further analysis
2. Job-Training:	
Establish a job-training program through a coordinated effort by local governments, colleges, and businesses to project the number of jobs by skill needed in the region, and upgrade skills of unemployed to match projected needs of new industry. Of particular concern is the training of unemployed youth for entry level jobs.	Recommended for General Development Plan

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS
Private job training programs should be established with tax incentives so that local residents' job skills can be upgraded to allow them to work in the new industries.	Recommended for General Development Plan

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS
Energy Policies	
1. Transportation Energy Contingency Plans:	
A set of transportation contingency plans to cope with an energy shortfall of up to 20% reduction in motor fuel for a period of 90 days is to be developed as part of the UTPP. These plans are to be updated on a periodic basis and should include:	
i) the establishment of an organizational structure outlining specific responsibilities for implementing and coordinating contingency plans during a fuel shortage.	Recommended for General Development Plan
ii) budgeting of funds to be set aside for use during a fuel emergency to pay the increased operating expenses incurred and to finance the stockpiling of fuel for public vehicle fleets.	Recommended for General Development Plan with further analysis
iii) gasoline sales purchase requirement plans as well as use- and conservation-monitoring systems to provide basis for timely implementation of purchase restructions.	Recommended for General Development Plan with further analysis
iv) variable work hour programs structured to maximize potential of transit, paratransit, and use of school bus fleets to reduce auto VMT (to permit timely introduction of variable schedules, institutional or legal restraints to imposing work schedule changes must be modified to permit flexibility under emergency conditions.)	Recommended for General Development Plan
v) procedures for using school bus fleet to supplement MTA service or as a jitney service in suburban areas without MTA service should be developed; institutional and legal constraints to be resolved prior to a shortage.	Recommended for General Development Plan with further analysis

POLICY STATEMENT	PANEL RECOMMENDATIONS
vi) procedures for allocating fuel and for maximizing the operational efficiency of municipal vehicle fleets during fuel emergencies.	Recommended for General Development Plan
2. Alternate Energy Sources:	
Encourage local governments, industry, and large residential complexes to examine the use of alternate energy sources, e. g., methanol, propane, and alcohol fueled vehicles, impact of time of day cost differential for use of electric cars in urban fleets with recharging during off peak hours.	Recommended for General Development Plan
Develop contingency plans to exploit appropriate alternative and local sources in case of short- and long-term oil shortfalls.	
3. Conservation	
Continue the support of studies of energy use and methods of conservation (e. g., detailed regional study of energy use by transportation sector, analysis of energy costs for new housing by construction type).	Recommended for General Development Plan

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS	SCENARIO APPLICABILITY Decline	Trend	Growth	Transition
B. Policies applicable to individual scenarios					
Transportation					
1. Budget Allocation Priorities:					
a. Capital Improvements:					
Top priority in capital improvement programs is given to maintenance of existing facilities and to capacity enhancement of facilities in areas where congestion is severely restricting flow of traffic. A continual weighing of costs and benefits will be required in order to achieve a proper balance between maintenance and new construction. New construction including interchanges and realignments of existing state roads that facilitate use of existing public faciliites is a recognized priority.	Recommended for General Development Plan with further analysis	X	X		
2. Budget Allocation Priorities:					
a. Highway:					
Since insufficient funds will be available to properly maintain the entire existing highway network, selective reduction in levels of maintenance and operations must be initiated in order to guarantee that the remaining network is as efficient	Recommended for General Development Plan	X			

POLICY STATEMENT	PANEL RECOMMENDATIONS	SCENARIO APPLICABILITY			
		Decline	Trend	Growth	Transition
as circumstances will allow. A regional maintenance priority scheme must be developed which supports regional land development policies and considers maintenance costs, safety, as well as benefits. Vehicle volume, trip type, alternate routes and modes are just a few of the factors which must be analyzed.					
3. Transit Service Cutbacks:					
Decreased availability of funds for operating subsidies will require service cutbacks on a route by route basis. Routes which operate in the black should be maintained at profitable service levels. Those routes which require significant operating subsidies should be continued only if their operation can be justified by some other objective, such as service to special transit dependent population (e. g., elderly, handicapped).	Recommended for General Development Plan	X			
4. Funding of Transit Operations:					
a. Revise public funding of transit operating deficits by recovering expenditures among all jurisdictions in the region according to the amount of benefits realized by each.	Recommended for General Development Plan with further analysis		X		

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS	SCENAIRO APPLICABILITY Decline	Trend	Growth	Transition
5. Regional Transportation Funding Source:					
Impose an inflation sensitive revenue source, e. g., regional sales tax whose revenues are dedicated to the preservation/improvement of transportation services throughout the region - distribution: 50% to a regional pool, 50% returned to local jurisdiction. Revenue generated by this tax would be allocated among transportation projects and programs at the discretion of the region and local jurisdiction.	Recommended for further analysis		X	X	X

ENERGY/TRANSPORTATION FUTURES
PANEL RECOMMENDATIONS

POLICY STATEMENT	PANEL RECOMMENDATIONS	SCENARIO APPLICABILITY Decline	Trend	Growth	Transition
Land Development Policies					
1. Development Control:					
Within designated growth areas, control pace and density of new development so that the growth of new development is compatible with existing land use plans, and capacities of public facilities and services are not exceeded.	Recommended for General Development Plan		X	X	X

GLOSSARY

DEPENDENT VARIABLES

Key factors chosen by the panel which (1) will vary from scenario to scenario; (2) figure in the realization of goals; and (3) can be controlled by the organization.

EVALUATION CRITERIA

Measures of the attainment of goals, preferably quantifiable.

FULL SCENARIOS

The panel discusses the interactions among the independent and dependent variables and assesses their effect on attainment of goals. These discussions provide more detailed pictures of the future. The staff contributes by assuring consistency between scenarios, quantifying interaction and providing written documentation of the panel discussions. These are full scenarios.

FUTURES PANEL

Group charged with developing scenarios and policies to address scenario conditions. It is the intention that these individuals should be influential members of government and private organizations since they will form a link between the scenario study and the ongoing decision making process. Their work is supported by a staff.

GOALS

The panel chooses study goals. These may be the existing goals of the organization or a subset or restatement. The process traces the influence scenario conditions on the attainment of the goals. For this reason, it is preferable to use a limited number of specific goals.

INDEPENDENT VARIABLES

Key factors selected by the panel which are (1) largely beyond the control of the organization, and (2) will greatly affect its future. They are normally assigned a limited set of values. For example, an independent variable might be the national economy with values of rapid expansion, stable or slow growth and decline.

POLICIES

Are general statements of action to be taken by the organization which make it possible to attain stated goals under the conditions posed by the scenarios. Policies may be appropriate for one, several, or all of the scenarios selected by the panel.

SCENARIO MATRIX

Matrix showing all possible combinations of the independent variables and their values. The cells of the matrix outline hypothetical futures for the organization. If the panel selects three independent variables and assigns three values to each, the scenario matrix would have 27 cells.

SCENARIO SKELETONS

Each cell of the scenario matrix is a scenario skeleton in that it defines the future of the organization in the broad terms of the independent variables. The panel selects a limited number (four in this study) to develop in greater detail. Usually skeletons are chosen which are (1) most likely to occur, or (2) are unlikely but would require strong response by the organization if they should occur.

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Notice

DOT-I-83-20

TECHNOLOGY SHARING

PROGRAM OF THE U.S. DEPARTMENT OF TRANSPORTATION