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To: **Working Committees**

Date: **February 29, 2008**

From: **Bob Dean, Principal Regional Planner**

Re: **Scenario Construction**

The *GO TO 2040* plan (the new name of the Regional Comprehensive Plan) will include a scenario evaluation process as one of its central pieces. Scenarios are combinations of actions (policies, strategies, and investments) that represent alternative paths that the region could take toward reaching its desired future, as expressed in the regional vision. The timeline for using scenario evaluation to make recommendations for *GO TO 2040* is as follows:

- March-July 2008: construct approximately four alternative scenarios, identifying policy and investment features in each
- March-July 2008: identify indicators which will be used to evaluate the effectiveness of each scenario at meeting our regional vision
- July-August 2008: public comment on scenario construction and indicator identification
- September-October 2008: approval from CMAP Board and MPO concerning scenario construction and indicator identification
- November 2008-April 2009: conduct technical evaluation to measure the impact of each scenario on the identified indicators
- May-September 2009: conduct major public involvement process to gather community feedback to identify preferred scenario, which will likely be combinations of strategies from different scenarios, rather than one that is selected as presented
- October 2009: approval from CMAP Board and MPO concerning preferred scenario
- The preferred scenario then forms the basis for the recommendations of *GO TO 2040*

CMAP's working committees and other stakeholders will be highly involved in the construction of scenarios and identification of indicators in spring 2008, and will be asked to assist with the technical evaluation process in late 2008 and spring 2009. Committee assistance in preparing for the public involvement process in summer 2009 will also be critical. Committees will review the results of the public involvement process as it occurs, and will contribute to the identification of a preferred scenario in fall 2009.

The remainder of this memo will provide more description of the scenario construction process and provide some examples of what alternative scenarios might look like. Scenario evaluation case studies are presented in the next several pages, with discussion beginning on page 7.

Scenario evaluation case studies

Scenario evaluation is a common way for organizations like CMAP to address long-range plans that seek to integrate land use and transportation. An excellent summary of scenario planning projects nationwide that describes the value of this approach is available online at: http://www.arch.utah.edu/bartholomew/SP_SummaryRpt_Web.pdf

Staff have reviewed a number of the nation's scenario planning projects to gain a better understanding of how CMAP's scenarios could be constructed. The guiding principles behind scenario construction vary considerably, and will be described below through the use of case studies.

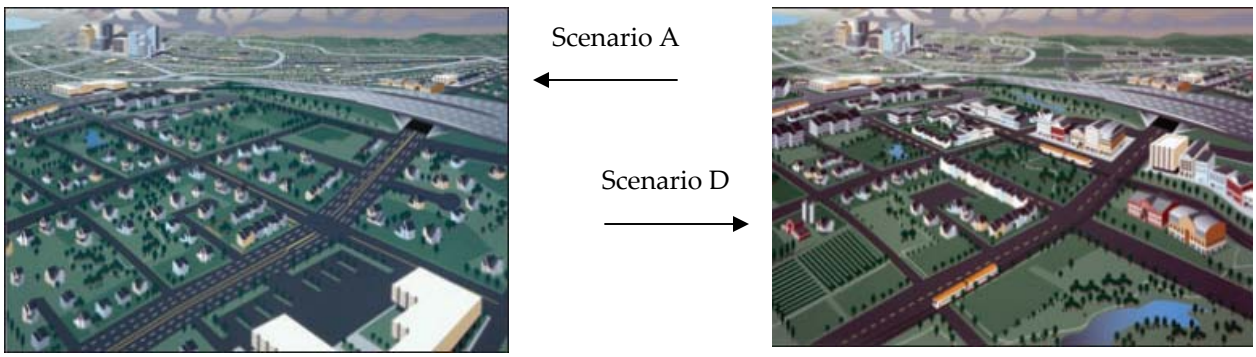
Envision Utah

The Envision Utah project, focusing on the Salt Lake City metropolitan region, has already been described to working committees in some depth. This project led to the identification of four scenarios:

- Scenario A - Pattern of development dispersed, taking the form of single-family homes on larger, suburban lots. Most development would focus on the convenience for auto users, and transportation investments would support auto use.
- Scenario B - Development would not be as dispersed as scenario A, but would remain primarily single-family homes on larger lots. Limited transportation investments would be made for transit.
- Scenario C -The focus of new development and growth on unused land would be walkable and transit-oriented development. There would be more infill and redevelopment and investments would be made to extend public transit systems and alternatives to the automobile.
- Scenario D - The most dense of all the scenarios, the D pattern has significant increases in densities, infill and redevelopment, and an extensive transit system.

(downloaded on February 15, 2008 from "Envision Utah Scenario Development," http://www.envisionutah.org/process-scenario.phtml)

As the above descriptions show, the scenarios used in the Envision Utah process vary primarily in **intensity**. Scenario A and D are extremes, with B and C in between.

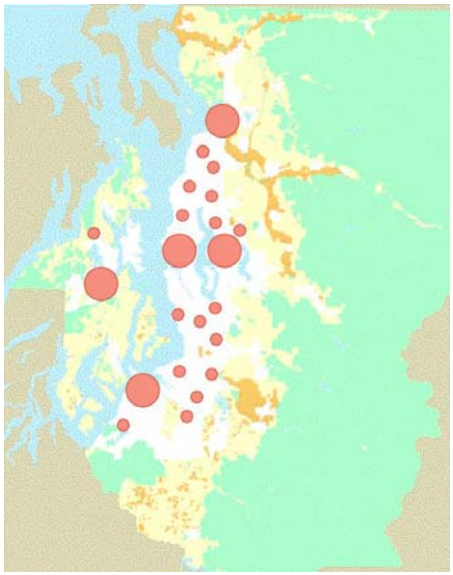


Puget Sound Regional Council – Vision 2020 Update

The Puget Sound Regional Council (PSRC) is CMAP's equivalent in the Seattle region. For their Vision 2020 Update project, four scenarios were identified:

- "Continued as planned." The first alternative continues the growth patterns anticipated in current local land use plans out to the year 2040. Since these plans represent adopted public policy, this is the "no action" alternative. Cities and counties would continue to encourage growth to focus in urban centers, as well as some growth in unincorporated urban areas and rural areas. New jobs would locate in the large and medium size cities. New housing would locate inside cities as well as in the unincorporated urban and rural areas.
- "Metropolitan Cities." This alternative has the most focused growth. Most of the growth would occur in the metropolitan or core suburban cities. This would mean considerable redevelopment, with new housing and jobs in centers near high capacity transit. Significantly less growth would occur in the region's rural and unincorporated urban areas.
- "Larger Cities." This alternative assumes the bulk of the growth would occur in suburban cities with regional growth centers. Considerable redevelopment would occur as town centers became major population and employment centers. Less growth would occur in the downtown areas of the region's largest cities, unincorporated urban areas, and rural areas.
- "Smaller Cities." This alternative has the most dispersed growth pattern. The region's smaller suburban cities and unincorporated urban growth areas would accommodate a sizable amount of the population and employment growth, resulting in new commercial and residential development in currently undeveloped areas.

(downloaded on February 15, 2008 from "Vision 2020 Update: Draft Environmental Impact Statement," http://www.psrc.org/projects/vision/alternatives.htm)



Sample map – "Larger Cities" scenario

PSRC's scenarios vary primarily in the **location of growth**, in terms of the size of cities that receive the most growth in each scenario. The first scenario is simply the continuation of current trends, which is a common theme among scenario processes. The other three assign growth to different parts of the region. However, it should be noted that each part of the region (i.e. north, south, etc) receives growth in each scenario; the difference is whether the growth occurs in larger or smaller cities.

Wilmington Area Planning Council – 2030 Regional Transportation Plan

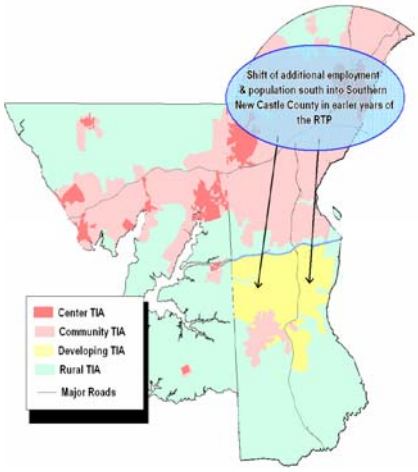
The Wilmington Area Planning Council (WILMAPCO) is CMAP's equivalent for northern Delaware and northeastern Maryland. In their 2030 Regional Transportation Plan, adopted in 2007, six alternative scenarios were used, three of which are described below (others are similar in concept):

- Accelerated southern buildout: allocates 60% of all expected new household growth and 50% of all expected new employment growth to south of the canal. Assumes infrastructure constraints in northern part of the county. Assumes no changes to the future land use plan
- Northern redevelopment: allocates 75% of all expected new growth to the northern part of the county. Assumes a possible increase in demand for housing closer to major employment destinations due to energy, congestion and other factors affecting housing choice. Reduces proposed land use density in the eastern and western portions of the southern county growth area from low to very low density residential.
- Slower growth: shifts 25% of all expected household growth out of New Castle County to other nearby counties by year 2030. Scenario is based on a possibility that the recent decline in building permit activity continues into the future, thus reducing the rate of household growth over time. Development in the surrounding counties continues, making it a more likely destination. Assumes no changes to the future land use plan.

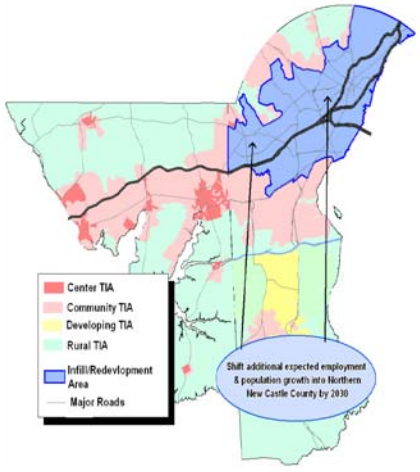
(downloaded on February 15, 2008 from "Scenario Development for the WILMAPCO RTP," http://www.wilmapco.org/RTP/Scenarios_WILMAPCO.pdf)

Similar to the PSRC process, WILMAPCO's scenarios varied by **location of growth**, but this was done by sub-region, instead of by types of urban areas. Scenarios were used to contrast the impacts of more development in the high-growth southern part of the region, compared to the more developed northern part.

Accelerated southern build-out



Northern redevelopment



Chicago Area Transportation Study – 2030 RTP

The Chicago Area Transportation Study (CATS), one of CMAP's predecessors, used scenario evaluation in the 2030 RTP. Four scenarios were created, including the following:

- The *service-intensive scenario* focused on transportation strategies that improve user benefits under existing management, operations and capacity conditions. Service improvements for any mode are typically accomplished in the course of reconstruction or capital maintenance, but may also be pursued as "stand-alone" regional strategies. These strategies have the added benefit of allowing quick adjustments to service in response to changes in the needs or composition of users. This alternative was intended to illustrate the benefits of non-capital intensive strategies to improve the transportation system.
- The *system-intensive scenario* introduced limited capital improvements and operational changes on the existing system. System improvements for any mode are typically made in response to the need to make strategic changes in facility operations. These may be in response to changes in technology or demand patterns. This alternative was intended to illustrate the benefits of low-capital-intensive strategies to improve the transportation system.
- With the *system additions scenario*, capacity additions to existing major highways and rail facilities were introduced. These may result in net new capacity or in existing capacity retrofitted for another function. Capital additions oriented toward improving hub circulation in the Chicago Central Area were included. Completion of existing expressway connections and extensions of existing radial transit lines were also included. System additions are made in response to capacity deficiencies that result from established growth patterns or changing demand patterns. This alternative was intended to illustrate the benefits of capital-intensive strategies to improve the existing transportation system.
- The *system expansion scenario* introduced significant new segments to the region's major highway and passenger rail system, with the intent of accommodating or managing projected growth. These proposals are the most expensive, they fundamentally change the way travelers use the transportation system, and they have the potential to induce significant land use changes. Because of their large scale, they are subject to elaborate financing, design, engineering and environmental reviews. This alternative was intended to illustrate the benefits of capital-intensive approaches to improving the transportation system by adding new major capital facilities.

(downloaded on February 15, 2008 from "2030 Regional Transportation Plan," http://www.sp2030.com/RTP_compiled_20070914.pdf)

The CATS scenario evaluation process was organized by **transportation investment theme**. The scenarios ranged from "service-intensive," which improved transportation operations without the use of major capital projects, to "system expansion," which relied heavily on major capital projects.

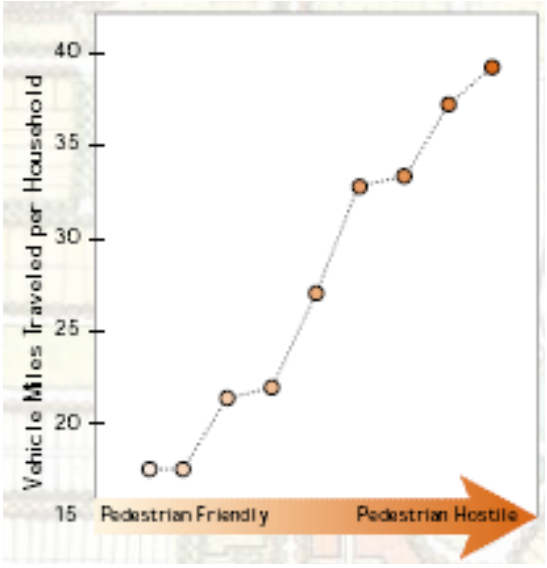
1000 Friends of Oregon – Land Use, Transportation and Air Quality

One of the earliest examples of scenario modeling for regional transportation planning was the Land Use, Transportation, and Air Quality (LUTRAQ) project in the Portland, Oregon region, initiated in 1991. The project was initially meant to demonstrate that there were alternatives to a highway project proposed in that region, but later became part of the MPO planning process.

Because of its focus on a single highway project, the scenarios in the LUTRAQ project are somewhat different than the other projects profiled, but are as follows:

- No build. Includes present conditions and committed transportation projects.
- Highways only alternative. The subject highway facility would be constructed, other nearby highways would be improved, and some new transit facilities would also be added.
- Highways/parking pricing alternative. In addition to the above, new policies concerning parking pricing, transit fares, and demand-responsive transit would be implemented.
- LUTRAQ alternative. New development would occur primarily in transit oriented developments, additional transit improvements would occur (primarily operational), and pedestrian and bicycle facilities would be improved.
- LUTRAQ/congestion pricing alternative. In addition to the above, peak period congestion pricing would be implemented, plus additional sidewalk and bicycle facilities.

(1000 Friends of Oregon, 1996, "Making the Land Use, Transportation and Air Quality Connection: Analysis of Alternatives: Volume 5.")



One of the major innovations of the LUTRAQ project was its linking of urban design, including pedestrian and bicycling facilities, to travel behavior. The chart to the left shows the relationship between "pedestrian friendliness" and vehicle miles traveled (VMT). As it shows, pedestrian-friendly neighborhoods generate significantly less VMT per capita than pedestrian-hostile neighborhoods.

The scenarios in the LUTRAQ project vary in terms of **investments and policies**. In each scenario, different transportation investments, land use characteristics, and transportation policies were assumed.

Options for scenario construction

As the above case studies show, scenarios can be organized in a number of ways. A description of each and a brief discussion of its benefits and problems, follow:

- Intensity: two bookend scenarios are created in terms of the application of planning strategies, and other scenarios fall in between. Organizing scenarios in this way can be effective at demonstrating the benefits of good planning, and in particular, of linking land use and transportation planning. However, it does necessarily lead to prioritization of the most effective strategies.
- Location: growth, in terms of population and jobs, is directed to certain parts of the region. This organizing theme can show how the impacts of growth, in terms of environment, congestion, and other factors, can vary depending on where this growth occurs. On the other hand, "assigning" growth to some areas rather than others does not help to analyze the different policies and investments that the plan could recommend.
- Investments and policies: different transportation investments, land use policies, or other variables make up each scenario. This allows the impact of different planning strategies to be tested, leading to a more complete understanding of the effect of each. However, the construction of scenarios is much more difficult, because a nearly infinite number of scenarios could be created by arranging the strategies in different ways, and because strategies must be researched before scenario evaluation occurs to determine their potential effects.

As past presentations to the working committees have stated, CMAP intends to use the third option, constructing scenarios that are made up of discrete investments, strategies, and policies. We believe that this is appropriate for our agency and region for a number of reasons:

- The work done on the 2040 Regional Framework Plan and 2030 RTP means that we are not starting from scratch. These plans established a solid framework for the benefits of good planning in this region. CMAP does not want the *GO TO 2040* plan to simply re-state assertions that were already made in previous plans.
- The formation of CMAP reflected a regional consensus that planning for land use and transportation should be done together, so we do not need to go through a scenario planning exercise to prove that this is the case.
- Explicitly varying growth by geography would be immediately divisive in this region. While there will be differential impacts of various investments and policies, this should not be the primary point of discussion. Also, "assigning" growth to different areas does not lead to an understanding of how policies and investments can affect the region's growth.
- Because the *GO TO 2040* plan will have a focus on implementation, a scenario evaluation process that helps us to understand the benefits and limitations of different potential strategies helps identify implementation actions. It also helps to understand the trade-offs involved between a range of potential actions and goals.

- The preparation of this plan is one of CMAP's most important projects, so considerable resources have been devoted to it. Constructing scenarios based on investment and policy variables is more rigorous and difficult than other methods, but we believe that it is possible because of our level of committed resources, the additional expertise found on the working committees, and CMAP's partnerships with other organizations,.

Another important aspect of CMAP's scenario planning process is the breadth of policy and investment areas that will be evaluated. According to the report cited on the first page (online at http://www.arch.utah.edu/bartholomew/SP_SummaryRpt_Web.pdf), many studies vary the amount and location of growth between scenarios, but few address its design characteristics, transportation pricing, or additional policy elements. The scenario evaluation for the *GO TO 2040* plan will include the variables listed above, as well as some related to economic development, environment, housing, and human services, in addition to land use and transportation.

Recommendations and standards for scenario construction

As stated above, CMAP will approach scenario construction by identifying investment and policy variables, which we have termed strategies in our process. Scenarios will each feature a combination of strategies, or actions that the region could take, so that each scenario is a potential course of action. CMAP proposes several standards for how scenarios will be constructed, listed below. (Please note that a baseline or trend scenario will be prepared, mainly to illustrate the costs of inaction. The standards below do not apply to this baseline scenario.)

- Each scenario should be a reasonable view of how the future could turn out, not "straw men" scenarios that have no chance of actually occurring.
- No scenario should lead to an overall regional decrease in environmental quality, economic performance, or equity. While some scenarios might have more beneficial environmental impacts than others, for example, in no case should we construct a scenario that we expect will lead to worse environmental quality than already exists.
- Scenarios should be "thematic;" strategies should be grouped into scenarios based on logical themes, not randomly.
- The differences between scenarios should be able to be communicated to the public through written descriptions, maps, and other visualizations. Scenarios should be distinct from each other to provide the public with clear alternatives.

Staff is currently exploring other scenario planning efforts around the nation in more depth. At the April meeting of each working committee, staff will present initial thoughts and recommendations concerning the composition of scenarios.

ACTION REQUESTED: Discussion and comments.