

US EPA ARCHIVE DOCUMENT

Actionable Science for Communities

Durham Light Rail Model – A Transit-Centered, Multi Sector, Systems Approach for Sustainability – SHC 4.61

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Purpose/Utility of Research

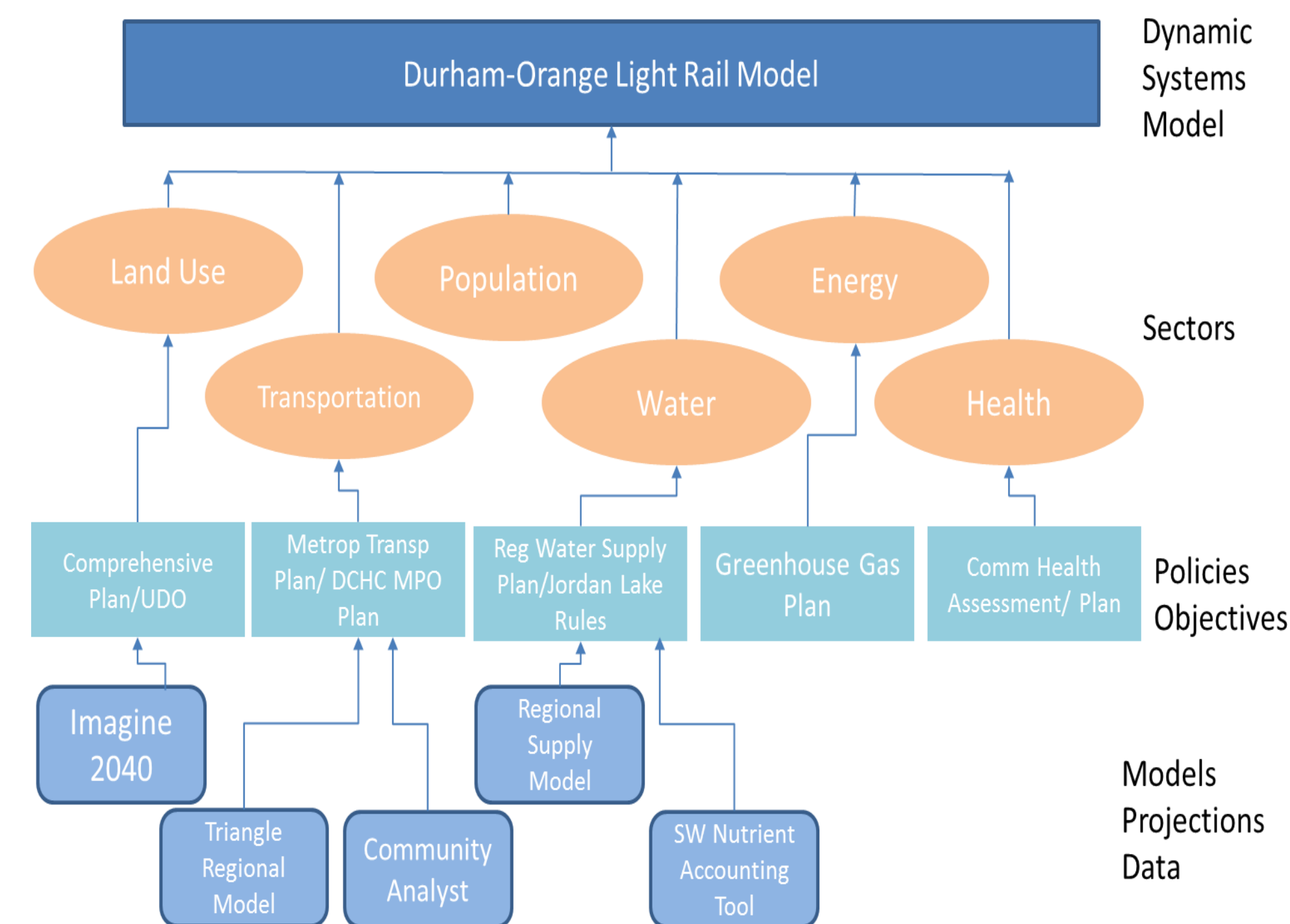
The dynamic systems model (DSM) is a tool that integrates actions and policies from multiple sectors with knowledge about their interactions and feedbacks to achieve greater net benefits. Consistent with the goals of Federal Partnership for Sustainable Communities, the Durham Light Rail seeks to increase mobility, decrease VMT and air emissions, while providing affordable housing, increasing public health and safety, enhancing economic development, improving water quality and resources, reaching vulnerable and underserved populations, and creating an overall improved sense of “place.”

Connection to SHC Portfolio

This project builds on the body of extant knowledge amassed and synthesized in the Decision Sector synthesis documents. The high-resolution spatial data for Durham and the integrated approaches to health, well-being and the built and natural environment as synthesized by the Eco-Health browser were derived from the community components of the EnviroAtlas (SHC 1.62)

Highlights

- Developed a modeling approach that enables stakeholders to explore the dynamic interactions among sectors such as land use planning, energy, water resources, and transportation
- Linked outcomes to social, economic and environmental impacts to enable community to assess and communicate net benefits of a light rail proposal, while identifying and mitigating unintended consequences of their actions.
- Rather than predicting specific outcomes, model uses scenarios to evaluate trade-offs and optimize benefits
- Developed for proposed light rail construction project in Durham – Chapel Hill; will develop guidelines for use by other communities and/or issues
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Intended End users

- Model can be used by public stakeholders (helpful to have experienced model user) to evaluate scenarios, test assumptions
- Can be used by technical policy stakeholders to investigate interactions among policies, forge partnerships for mutually beneficial outcomes
- Within EPA, likely users Regions, OSC

SHC Outcome

Community stakeholders will use a **systems approach that is based on a full accounting of the costs, benefits, and tradeoffs among social (including public health), economic, and environmental outcomes** of alternative decisions, focusing on: waste and materials management, land-use planning, transportation, buildings and infrastructure, and water and energy infrastructure.

Application & Translation

- Model is being used by Triangle Transit, in conjunction with Triangle J Council of Governments, Durham City/County Planning and Engineering Departments.
- Expect to use model in public meetings for environmental impacts in Fall 2015
- Guidance document will outline transferability
- Other locations where DSM being used: Snohomish River Watershed (Region 10); Delmarva (Region 3); Aberdeen Proving Ground (Region 3 & Net Zero program); Narragansett Bay Watershed (with Region 1); Cape Cod (Region 1); Suffolk Co, Long Island (Region 2).



Lessons Learned

- Models can be built largely with readily available foundational data; sensitivity analyses can be used to evaluate uncertainties, including uses of data from other sources/locations
- Model fills niche between spatially-explicit planning tools and regional scale macro(economic) models
- Early and frequent stakeholder participation needed for model formulation, evaluation