

# whatIf?® Urban and Regional Planning

## Powerful Simulation Models for Integrated, Long-Term Urban Sustainability Analysis

Urban and Regional planners today are challenged to consider complex and uncertain issues such as:

- How could our region's current land development strategy affect employment distribution over the next 30 years? How do we effectively evaluate competing strategies?
- What will 4% annual population growth in our region mean for the load on public transportation services? For water, sewage and communications infrastructure?
- Which policies have the greatest impact on our region's atmospheric emissions levels? What about the trade-offs?

whatIf® urban and regional planning models enable a holistic, quantitative approach to exploring these types of planning issues. We deliver models that allow clients to interactively create and analyze scenarios via simulation. The whatIf? approach enables superior group communication and consensus building leading to effective policies and strategies.

At the core of whatIf? urban and regional planning models are customizable modules. Depending on client requirements, the model is constructed from modules that may include (but are not limited to):

- Cohort population growth
- Household formation
- Dwelling units
- Employment
- Buildings stock
- Land use and development
- Energy use and atmospheric emissions
- Transportation, water and wastewater
- Vehicles stock
- Trip generation and modal share
- Human services
- Capital and operating cost
- Revenue generation

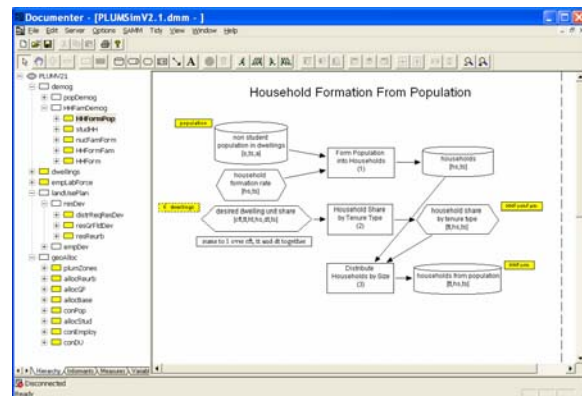
### The whatIf? Approach - Benefits

**Flexible model development.** Each municipal client and their planning needs are unique; hence their model must be unique. However, there are many common themes in urban and regional planning. This commonality is leveraged for efficiency gains in the implementation of a whatIf? urban and regional planning model by drawing upon a large collection of existing modules. These modules are customized to meet client requirements and assembled. Completely new and unique issues can be addressed through development of new modules, as required.

**High utility for stakeholder and analyst consultation.** Innovative features make our urban and regional planning models a highly effective support for group discussion and

for consultation with stakeholder or community groups. These include:

- extensible active views - These are active reports that may be added to the model at any time after its customization. They may be used to create new scenarios, debrief existing scenarios and export data to documents.
- model navigation using diagrams - The diagrams used to represent the model and convey its meaning are also used to facilitate navigation within the model during scenario construction and debriefing.
- white box approach - This allows 'zooming' in or out to any level of model detail to facilitate understanding of the model structure and the meaning of each scenario.
- strong interactive data display - This allows easy understanding of the meaning of data assumptions and scenario outcomes. These include tabular, line graphics and thematic map colouring display tools.



Diagrams are used to represent and navigate models

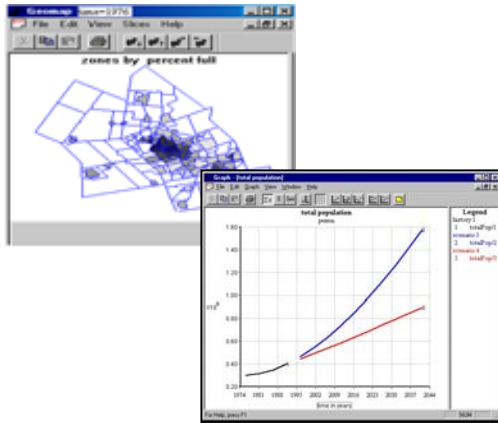
**Built in scenario management.** Users can construct, document, manage and communicate effectively on any number of scenarios. The assumptions upon which each scenario is based are preserved and powerful scenario comparison tools are readily accessible. Scenarios are fully documented and easily retrieved for comparison. This supports effective data and knowledge management – thereby ensuring corporate memory.

**Rapid, low cost development.** The modular approach to whatIf? urban and regional planning models draws upon decades of model-building expertise. This approach lends itself to rapid, low cost development cycles – for both initial model customization and subsequent modification and enhancement.

**Interface to other major tools.** whatIf? urban and regional planning models interface to spreadsheet packages, geographic information systems (GIS) and relational databases.

**High value with long productive life.** Because whatIf? urban and regional planning models are easily maintained and modified, they provide a long productive life and thus have high value for the client. Some clients have had whatIf? models in operation for over ten years thus amortizing model investment over many years. Our models are usually built to explore specific client concerns (e.g. land development strategies). Due to the integrated and extensible nature of the models, they are often expanded or adapted over time to explore a growing set of issues (e.g. transportation and energy infrastructure).

## The whatIf? Project – Life Cycle



Simulation data can be presented on maps or graphs

Customizing a whatIf? urban and regional model includes the following stages:

- 1. Customization workshop.** Here we define the problem set and identify key issues with a team of subject matter experts so that the model modules can be customized to accommodate all scenarios advocated by various stakeholders. Data sets are also identified.
- 2. Model calibration.** Historical data is gathered to calibrate the model – that is, to ensure acceptable tracking in history. This leads to a historical database upon which future scenarios can be built.
- 3. Scenario construction workshop.** Primary planning scenarios are developed in consultation with the client.
- 4. Training.** Depending on client requirements, technology transfer training and user support is provided.
- 5. Integration.** The model is integrated in the client's planning, consultation and communication processes.

A typical whatIf? urban and regional planning model customization takes three to six months, depending on model complexity and data availability. Clients with large-scale models may adopt a multi-phase implementation schedule.

## whatIf? Projects - Profiled

### Population and Land Use Model (PLUM): Regional Municipality of Waterloo, Ontario, Canada

The Region of Waterloo uses their whatIf? Population and Land Use Model (PLUM) to simulate changing population and implications for land use. Also simulated is the distribution of dwelling units, people and employment – spatially, and over time. Re-urbanization, intensification and greenfield development are some of issues that PLUM is currently used to explore.

### Sustainable Cities: Melbourne Region, Australia

The Melbourne Region Urban Metabolism Simulation is part of the State of Victoria's long term urban strategic planning project for the Melbourne watershed. This simulation model supports the regional planning process described in the Melbourne 2030 study, prepared by the state government of Victoria. This project is comprised of three phases:

- Phase 1 simulates population and land use
- Phase 2 simulates transportation, water, wastewater and energy demand and regional supply capacity.
- Phase 3 simulates urban metabolism.

Completion of the third phase will enable in-depth examination of sustainability issues.

## Corporate Profile – whatIf? Technologies

Founded in 1989, whatIf? Technologies Inc. has established a worldwide reputation as a leader in computer-based simulation models for long-term strategic planning and scenario analysis – particularly in the areas of urban and regional planning, transportation and economic sustainability.

whatIf? Technologies is the creator of over fifty simulation models in a wide range of application areas including: urban and regional planning; natural resource management in forestry, fisheries and agriculture; energy analysis including energy end use, emissions and fuel production systems; demography; sustainable development at global and national scales; technology impact assessment; and human resource strategic planning.

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