

What kind of model is Phoenix for 21st Century Sustainable Cities?



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Characteristics of a fast-growing, arid city



- Phoenix is the fastest-growing and 5th largest “big” city in U.S.
- Typical Sun Belt sprawling growth style (“drive till you qualify”)
- *Relatively* young, modern, and clean infrastructure and industry
- Infill has not made economic sense until recently
- Brownfields caused by electronics leaks begun in the 1970s
- “Real Estate-Industrial Complex” dominates Phoenix business
- Strong correlation between air/water pollution and poverty

Phoenix is dealing with problems today that other global cities will confront in the future



- Water shortages due to consumptive lifestyles and low prices
- Heat island effect caused by hot climate and built environment
- Immigrants fleeing poverty and environmental degradation
- Auto-based economy vulnerable to high fuel costs
- Current lack of renewable energy generation
- Food, fuel, and water supplies transported long distances

Metro Phoenix's planning must integrate across sectors, disciplines and cities



- Lack of regional governance a significant challenge
- Overlapping state, federal, tribal and local jurisdictions
- Local companies have clout in civic planning
- Arizona State University is a major economic and political player

University role in regional planning unusually strong in Phoenix



- Arizona State University (ASU) only research university in region
- ASU a thought leader for “new” and “green” economic reforms
- New publicly-funded campus revitalizing downtown Phoenix
- Major federal grants for studies of rapid urbanization
- Urban focus led to world’s first School of Sustainability and pan-university Global Institute of Sustainability

ASU contributions to “greening” of Phoenix



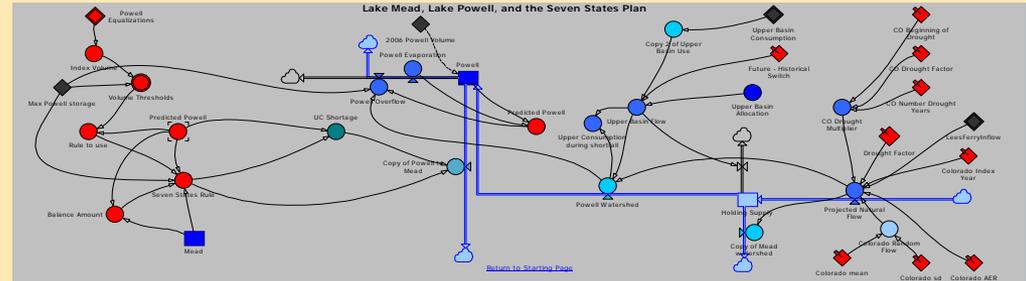
- Decision Theater is policy link between city and university
- ASU prepared \$75M “Green Phoenix” proposal to US DOE
- Sustainable City Network involves managers from all cities
- Customized research for urban sustainability solutions
 - Renewable energy: Solar and algae-based biofuels
 - Energy efficiency: Building and neighborhood redesigns
 - Heat island effect mitigation: New materials and strategies

Decision Theater is policy interface with Phoenix



- Non-experts can explore future policy options
- Applies to environmental, social and economic issues
- State agencies, cities, private sector users
- Major emphasis on improved water decision-making
- Global network being considered: DC, Dubai, Beijing

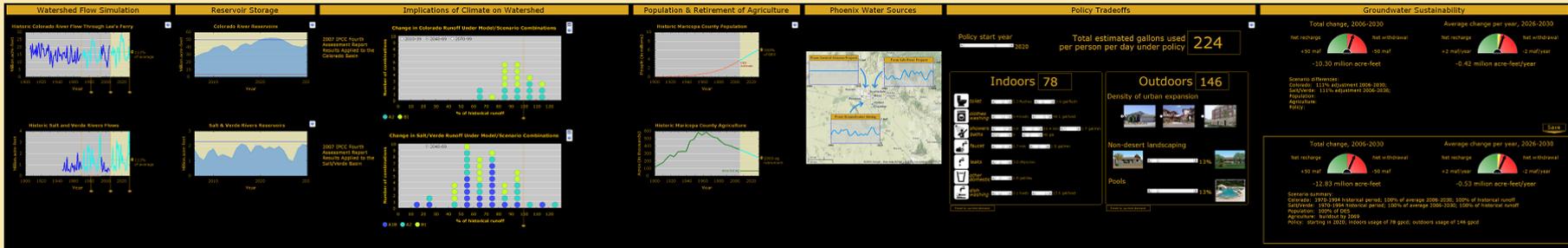
Decision Center for a Desert City



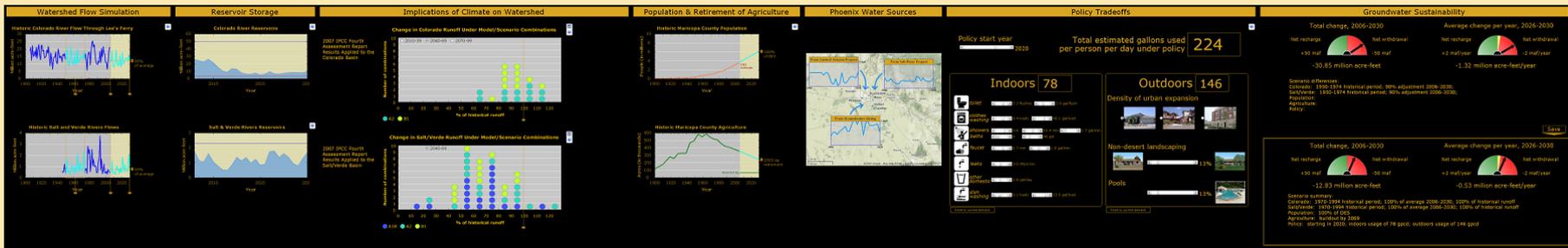
- \$7.5M National Science Foundation grant
- Addresses water decision-making under uncertainty
- Regional stakeholders engaged from start to finish
- Decision Theater helps them assess alternative futures
- Also applies to air pollution, energy, traffic, labor issues
- Can be applied to entire Colorado River Basin
- Same approach used to compare Beijing and Phoenix

Dynamic Water Supply and Demand Model

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Watershed
Simulation

Climate
Change

Land Use &
Population

Policy
Tradeoffs

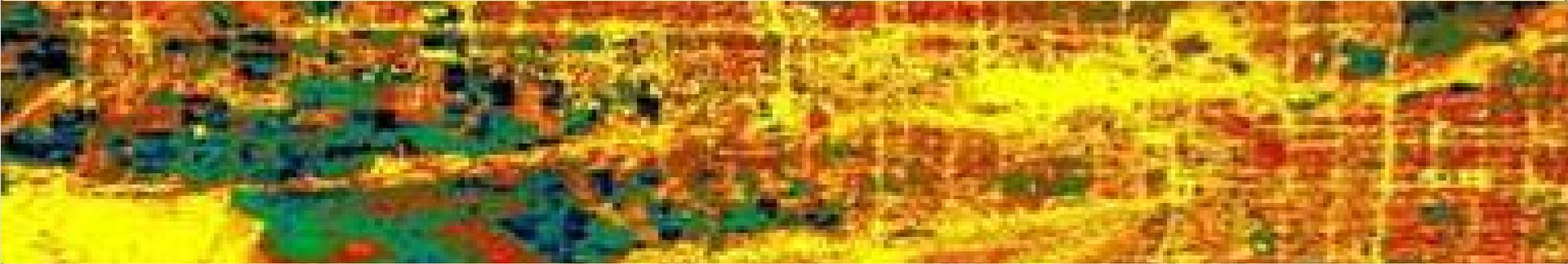
Groundwater
Sustainability

More technical ←————→ Less Technical

Slider bars on graphs let alternate futures be assessed in real time

WaterSim also available online at <http://watersim.asu.edu>

Global Institute of Sustainability and School of Sustainability deal with complex tradeoffs



- Urban heat island example
 - Mitigation requires more vegetation and water
 - Vegetation lowers local temperatures and air conditioning demand
 - Power generation in AZ uses lots of water
 - Planting trees and lawns may actually result in a net saving of water
- Land use example
 - Most agriculture in Metro Phoenix is cotton farming
 - Cotton uses large amounts of water
 - Converting farms to houses results in net increase in available water
 - However, converting desert to houses reduces available water

Phoenix as a 21st Century Sustainable City



- Every city faces sustainability challenges
- Success depends on how adaptive and resilient they are
- Complexity of tradeoffs requires an integrated systems approach
- Phoenix can choose to ignore challenges or embrace them
- Phoenix could be source of policy solutions for cities worldwide
- Energy, water, heat, food, immigration are crucial issues
- Universities are under-utilized policy assets in most cities
- Sustainable cities will be those that learn from each other