Adaptable, Resilient, Green Infrastructure

Mayors’ Innovation Project 2011

Steve Moddemeyer
Principal
CollinsWoerman, Seattle
Challenges for Cities of the Future

Three new goals

Three examples
800,000

New people last week.
This week.
Next week.
Every week for the next 4 decades.
Planetary boundaries
Reliability

We continue to build infrastructure that is designed for the way the weather used to be
Affordability

We continue to build infrastructure that made sense when energy was cheap and resources were plentiful.
“It is riskier to continue with business as usual than it is to change.”

Glen Daigger, Chief Technology Officer
CH2M Hill
IS THERE A SOLUTION?

Add 3 goals to capital spending:
1. Adaptable
2. Resilient
3. Green
1. Plan for the worst plausible scenarios
2. Make incremental investments that keep options open
3. Do “No Regrets”
Resilient

1. Range of strategies (portfolio of options)
2. Operating at multiple scales
3. Diversity of drivers
Green

1. Clean water
2. Save energy
3. Beautify the city
4. Make streets open space
5. Improve health
Example: Increase urban vegetation

How?

1. Regional scale
   Connect parks and restore river courses
2. Drainage basin/district scale
   Plant trees and rain gardens upstream of pipe
3. Street scale
   Vegetate the Rights of Way
4. Building scale
   Adopt *Green Factor* landscape code
Seattle Green Factor

- Based on Berlin model
- Requires 30% - 60% of lot to function as if landscaped
- Code provides menu of choices
- Results so far:
  - 50% green roofs
  - 50% permeable paving
  - 75% vegetated walls
Modeled benefits:

- A 13% reduction of stormwater runoff
- A 9% reduction of energy demand
- A 12% reduction of greenhouse gases
ANOTHER EXAMPLE: Use waste water collection system for district scale heating and cooling

How?

1. **Regional scale**
   At treatment plans harvest heat for internal operations

2. **District/neighborhood scale**
   Drop in heat exchangers along larger sewer lines to create district energy thermal loops

3. **Building scale**
   Provide 90% of domestic hot water for multi-family apartments with heat exchanger and heat pump in basement
All renewable district loop provides 90+% of all heating and cooling for 4,000 apartments.
A THIRD EXAMPLE: Treat wastewater at district scale.

How?

1. Regional scale
   Reduces flows to regional wastewater plants

1. District scale
   Reduces contributions to combined sewer overflows for $$$ savings

2. Building scale
   Reduces water use 50% and wastewater flows 70% for less money than normal sewer and water rate.
Costs less than normal sewer and water rates

Adaptable
Resilient
Green
Less expensive
Adaptable, Resilient, Green Infrastructure

THANK YOU!

Steve Moddemeyer
206.245.2034
ColinsWoerman, Seattle