Asian Development Bank

3rd Asian Sanitation Dialogue

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Sustainable Urban Development: Examples from Seattle

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Outline

- Background on Seattle
- Sustainable urban development goals and strategies
- Seattle Public Utilities' climate program
- Conclusions

Seattle

- Latitude 47.6
- Population 635,000
- 369 km2 (41% is water)
- Temperate marine climate
  - cool wet winters
  - cry warm summers
- Fastest growing large U.S. city

Waste

Picking Up the Pace Toward Zero Waste

OVER THE PAST 25 YEARS, Seattle residents saved over 3 million metric tons of greenhouse gas emissions by recycling.

3 M metric tons of greenhouse gases = **625,000** cars taken off Seattle's roads for 1 yr OR **EVERY** single-family home in Seattle powered for 1 yr

As households have increased recycling, the amount of waste sent to the landfill has decreased.

1980's HOUSEHOLD GARBAGE:

32-GALLON CANS PER WEEK

TODAY'S HOUSEHOLD GARBAGE:

32-GALLON CAN PER WEEK

OUR STRATEGIES:

Seattle residents and businesses divert more waste than nearly every other city in the nation. We strive to maintain and improve on that level of excellence. Our strategies include:

Waste Prevention

Reducing waste by not creating it in the first place.

Recycling & Composting

Expand recycling and composting through services, incentives, and regulations.

THE BENEFITS:

- Climate Protection
- Economic Benefit
- Less Waste
- Natural Resource Protection
- Healthy People
- Toxics Reduction

THE CHALLENGE AHEAD:

While Seattle continues to be a leader in recycling and composting, approximately half of what we send to the landfill is either food waste or recyclable material. We can do better!

Waste Prevention

1 GOAL INCREASE PRODUCTS WHERE WASTE IS MANAGED BY MANUFACTURERS

PROGRESS

In part because of Seattle's efforts, manufacturers are now responsible for safe handling of these discarded products:

- Electronics (2006)
- Mercury-containing lights (2010)
- Medicines (2013)

Future product stewardship laws for:

- Paint
- Carpet
- Batteries

2 GOAL BAN OR DISCOURAGE PROBLEM MATERIALS

PROGRESS

2011 PHONE BOOK OPT-OUT

Over 20% of Seattle's residents have "opted out" of phone book delivery:

Estimated **1M** fewer delivered in 2011 vs 2010 → **900 tons** of paper saved

2009 POLYSTYRENE CONTAINER BAN

A 2009 polystyrene food container ban requires that all single-use food packaging be either compostable or recyclable:

66% decrease in polystyrene in commercial garbage from 2008 to 2012

2012 PLASTIC BAG BAN

Plastic bag pollution poses serious threats to Puget Sound's wildlife.

292 M plastic bags used annually in Seattle before 2012. Only 13% were recycled.

The 2012 Ban **eliminated** the use of these bags.

Recycling & Composting

3 GOAL REDUCE WASTE SENT TO LANDFILL

PROGRESS

27% decrease in landfill waste over the past 7 years:

438,400 tons in 2006 → 318,600 tons in 2013

360 lbs per resident is sent to the landfill annually in Seattle

4 GOAL RECYCLE 70% BY 2022

PROGRESS

Overall recycling rate:

Average monthly pounds of recycleables collected per household:

Single Family: 63 lbs.

Multi Family: 30 lbs.

SINGLE-FAMILY HOUSEHOLDS

70% of waste recycled in 2012

We achieved our highest ever recycling rate in 2012. Key to this success has been organics collection & disposal bans.

MULTI-FAMILY SECTOR

30% of waste recycled in 2012

While achieving their highest recycling rate yet in 2012, more work is needed to help landlords & tenants recycle more.

COMMERCIAL SECTOR

61% of waste recycled in 2012

2,500 businesses recycled organic waste in 2012 compared to 900 in 2008.

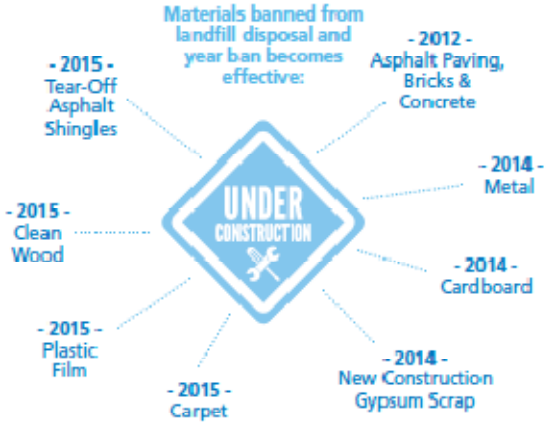
THE LEADING EDGE

CONSTRUCTION & DEMOLITION PROGRAM

As Seattle continues to grow, it's imperative that we look for better ways to manage our waste stream. Waste from construction and development is substantial. Recently, the City took steps to significantly reduce the waste from these activities that goes to our landfills. New requirements have been adopted for new construction, remodeling and demolition activities in Seattle.

SEATTLE CITY COUNCIL HAS ADOPTED A GOAL FOR RECYCLING 70% OF CONSTRUCTION WASTE BY 2020.

70% BY 2020



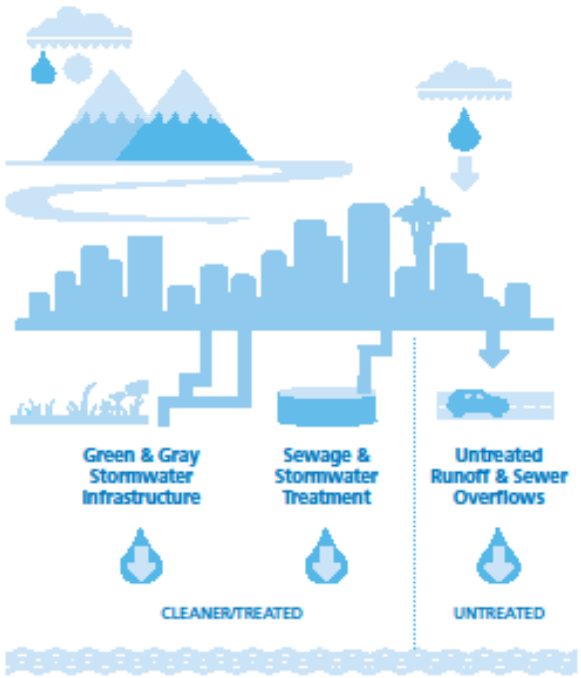
As of January 1, 2014 construction projects file a Waste Diversion Plan before starting a project, and at the end, they file a report on materials delivered to recycling facilities.

Learn more about Seattle's environmental work
WWW.SEATTLE.GOV/ENVIRONMENT

Water

Enhancing quality of life and health through our water system

Seattle is committed to delivering high-quality drinking water and protecting our local waterways.



OUR STRATEGIES:

Seattle will cost-effectively manage the drinking water supply and stormwater runoff while protecting public health and the environment.

Water Conservation

Ensure that saving water continues to be second nature for people by providing excellent education, tools & incentives.

Watershed Protection

Protect water quality & restore habitat in the mountain watersheds that supply our drinking water.

Pollution Prevention

Partner with the community to stop pollution at its source.

Sewage Overflow Prevention

Use system improvements, green stormwater infrastructure, & flow reduction strategies to protect our waterways.

THE BENEFITS:

- Clean Waterways
- Healthy People
- Healthy Fish & Wildlife
- Natural Resource Protection
- Vibrant Neighborhoods
- Climate Preparedness

THE CHALLENGE AHEAD:

For more than 100 years, Seattle has enjoyed plentiful and high-quality drinking water from protected mountain sources. In the future, we will likely see more rain, leading to more sewage overflows and polluted stormwater runoff. Protecting our water supply from the effects of climate change and polluted runoff will preserve our quality of life for future generations.

Water Conservation

1 GOAL USE LESS THAN 105 MILLION GALLONS OF WATER PER DAY*

ACHIEVED!

PROGRESS

In 2013, **93M** gallons per day (mgd) were used by customers of the Saving Water Partnership.

The Saving Water Partnership is a collaboration between Seattle Public Utilities & 18 other water utilities to help our region conserve water.

22% increase in population since 1990.

Even so, there has been a **24%** decrease in regional water consumption since 1990

This is a 38% decrease in water consumption per person!

From **126** gallons/day → To **78** gallons/day

* for the Saving Water Partnership

Pollution Prevention

3 GOAL MANAGE 700 MILLION GALLONS OF RUNOFF ANNUALLY WITH GREEN INFRASTRUCTURE BY 2025

PROGRESS

Annual runoff managed through **Green Stormwater Infrastructure:**

GSI Methods: Bioretention and rain gardens, permeable pavement, green roofs, urban canopy cover, rainwater harvesting, soil building, biofiltration, and depaving.

4 GOAL INCREASE POLLUTANT REMOVAL FROM ROADWAYS

PROGRESS

50% increase in pollutant removal between 2011 & 2013

	Miles Swept:	Pollutants Removed:
2011	6,850 MILES	66 tons
2013	10,328 MILES	99 tons

Street sweeping is an incredibly simple and cost-effective method of preventing pollution from getting into our waterways.

Sewage Overflow Prevention

5 GOAL REDUCE SEWER BACKUPS TO LESS THAN 4 PER 100 PIPE MILES BY 2025

ACHIEVED!

PROGRESS

3.1 sewer backups per 100 miles of pipeline in 2013

Fats, oils, and grease (FOG) (i.e. sauces, cooking oil, food scraps & oil from cooked meats) build up in sewer pipes & cause costly blockages & sewer backups.

Keep your drains fat free: Dispose of FOG in a sealed container in your garbage.

6 GOAL REDUCE COMBINED SEWER OVERFLOWS TO NO MORE THAN 1 OVERFLOW PER OUTFALL PER YEAR BY 2025

PROGRESS

Overflows from **52 outfalls** are controlled

87 Outfalls are owned by the City of Seattle. The outfall is considered controlled when it has no more than one overflow per year.

Watershed Protection

2 GOAL DECOMMISSION 236 MILES OF LOGGING ROADS IN CEDAR RIVER WATERSHED BY 2020

PROGRESS

Decommissioned to date:	Left to go:
152 miles	84 miles

Decommissioning decreases sediment input into adjacent streams and habitat fragmentation, benefiting aquatic animals and water quality.

THE LEADING EDGE

SEATTLE'S RAINWISE PROGRAM

Rain that falls on roofs, roads, driveways and compacted soils collects quickly, then runs off into local waterways. During heavy rain storms this "stormwater" can back up and flood homes, overflow sewers, and erode hillsides. It also carries pollutants from cars, lawn chemicals, cleaners and pet waste into Seattle's creeks and swimming beaches.

The **RainWise program** helps homeowners reduce this polluted runoff by providing rebates for natural drainage solutions on their property.

AS OF JANUARY 2014, SEATTLE residents have installed more than: 350 RAINWISE PROJECTS

This filters 5.4 M GALLONS of stormwater annually

The average project controls the runoff from **1,398 SQ FT** of roof area

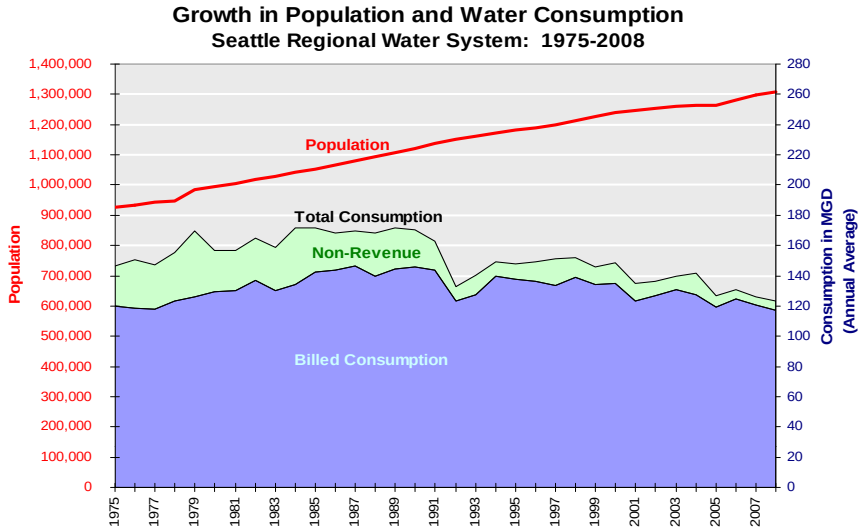
Learn more about Seattle's environmental work
WWW.SEATTLE.GOV/ENVIRONMENT

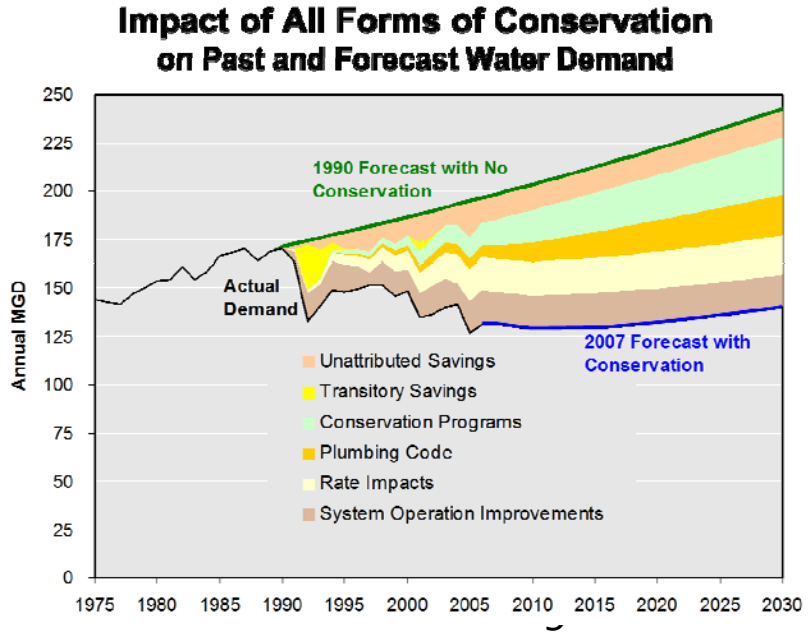
Portfolio approach to achieving goals

- capital improvement programs
- operational strategies
- regulatory (e.g. code)
- financial strategies (e.g. inclining block rates)
- technical assistance
- incentives/behavioral modification
- triple bottom line investment strategy

Water conservation

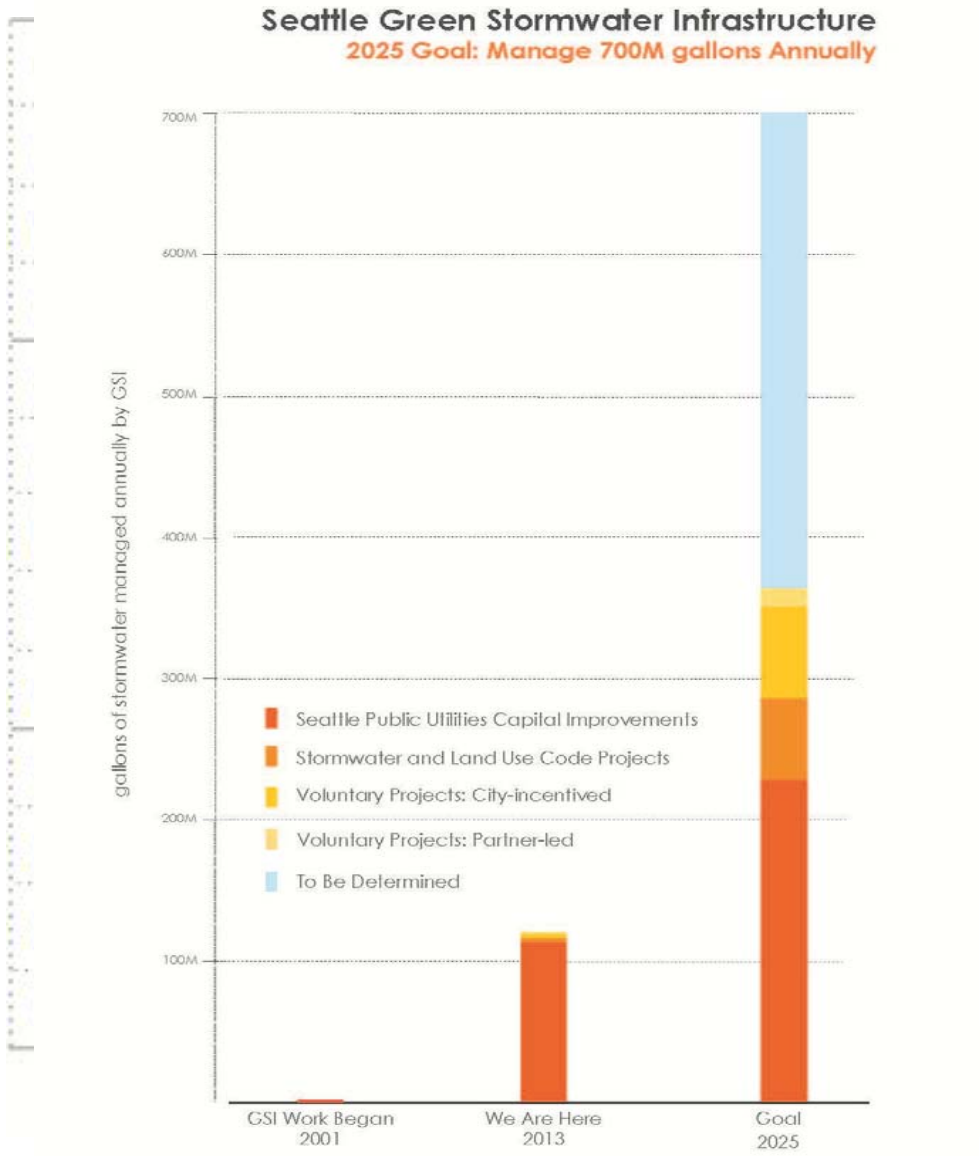
- dramatic reductions in use while population increased
- sustained investment in multiple strategies
  - system operations
  - price signals
  - multi-sectoral technical and financial assistance
  - marketing/behavior change





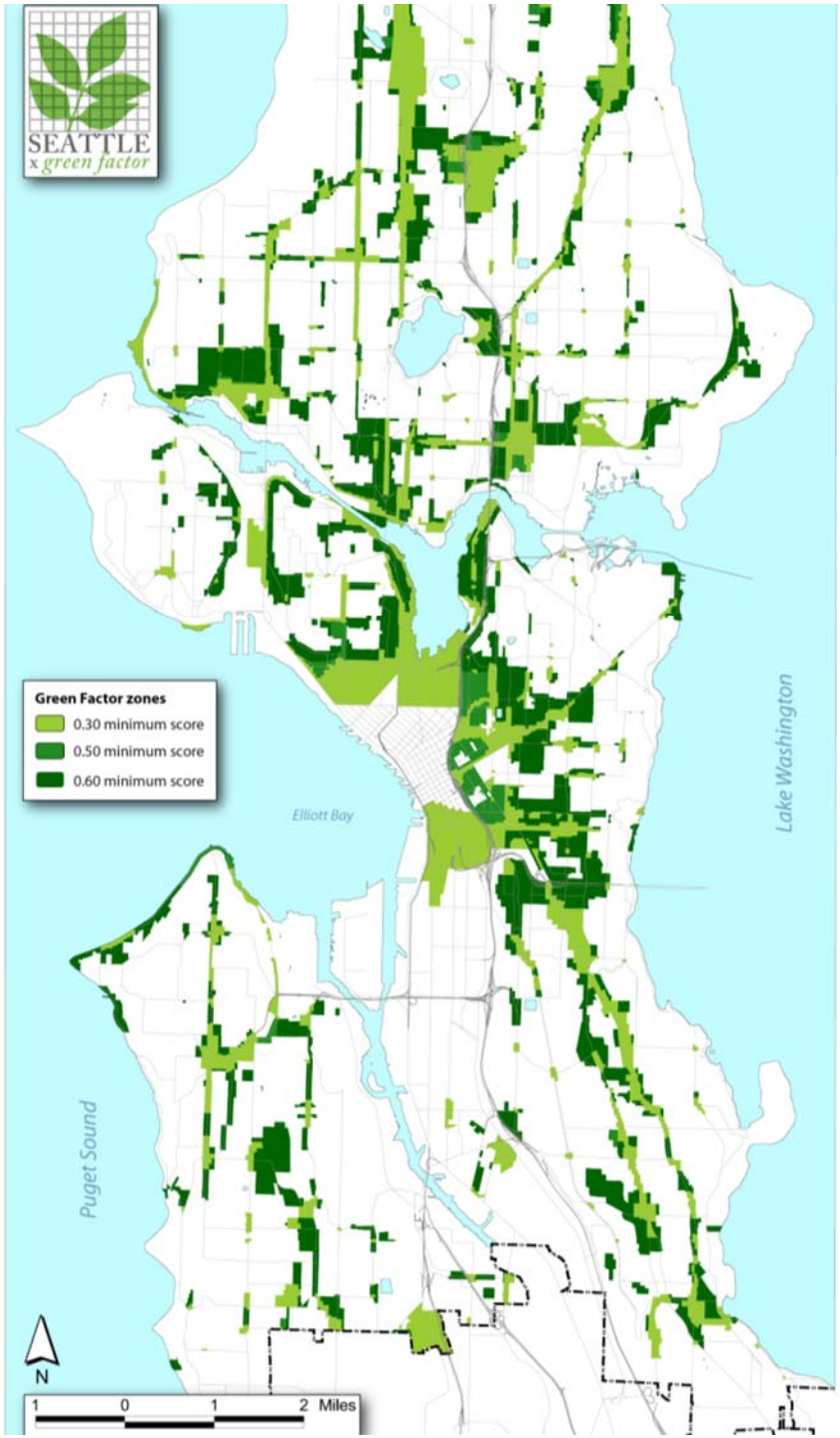
Stormwater and wastewater management

- protect life and property, improve water quality
- reduce
  - combined sewer overflows
  - sewer backups
  - pollutants to waterbodies
- portfolio approach
- expanding use of green stormwater infrastructure (GSI)
  - rain gardens
  - green roofs
  - porous pavement
- active private sector



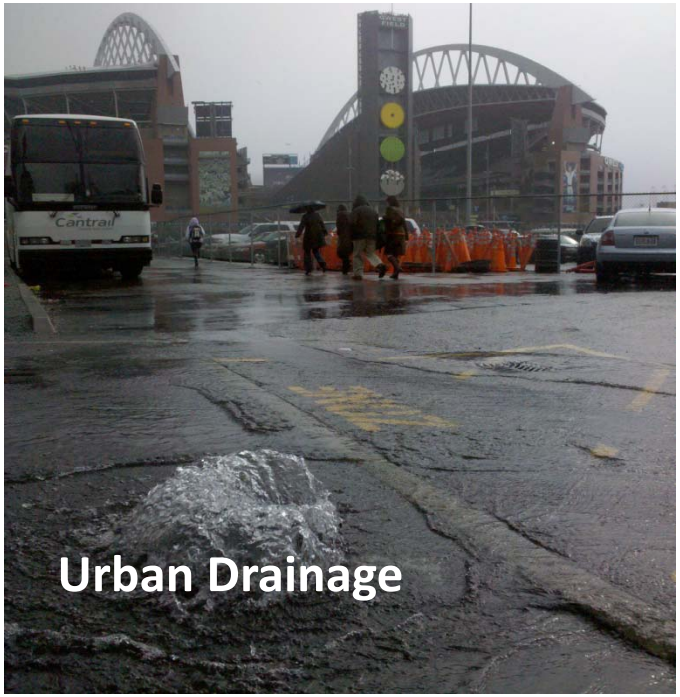
Seattle Green Factor

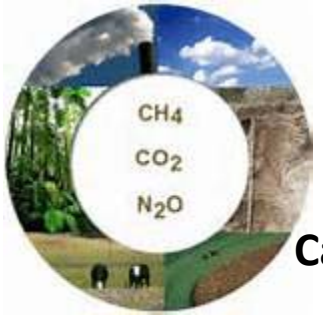
- score-based code requirement
- required in certain parts of Seattle
- increase quantity and improve quality of urban landscaping
  - improves the look and feel of a neighborhood
  - reduces stormwater runoff
  - cools cities during heat waves
  - provides habitat for birds and beneficial insects
  - supports adjacent businesses
  - decreases crime



tinyurl.com/ greenfactor

SPU's climate program





Carbon neutrality

Climate program objective:

- build sustained capacity to manage the risks of climate change by:
  - enhancing knowledge
  - assessing impacts and vulnerabilities
  - building collaborative partnerships
  - strengthening institutions and people
  - pursue a portfolio of approaches
  - mainstreaming adaptation
  - quantifying and neutralizing our emissions

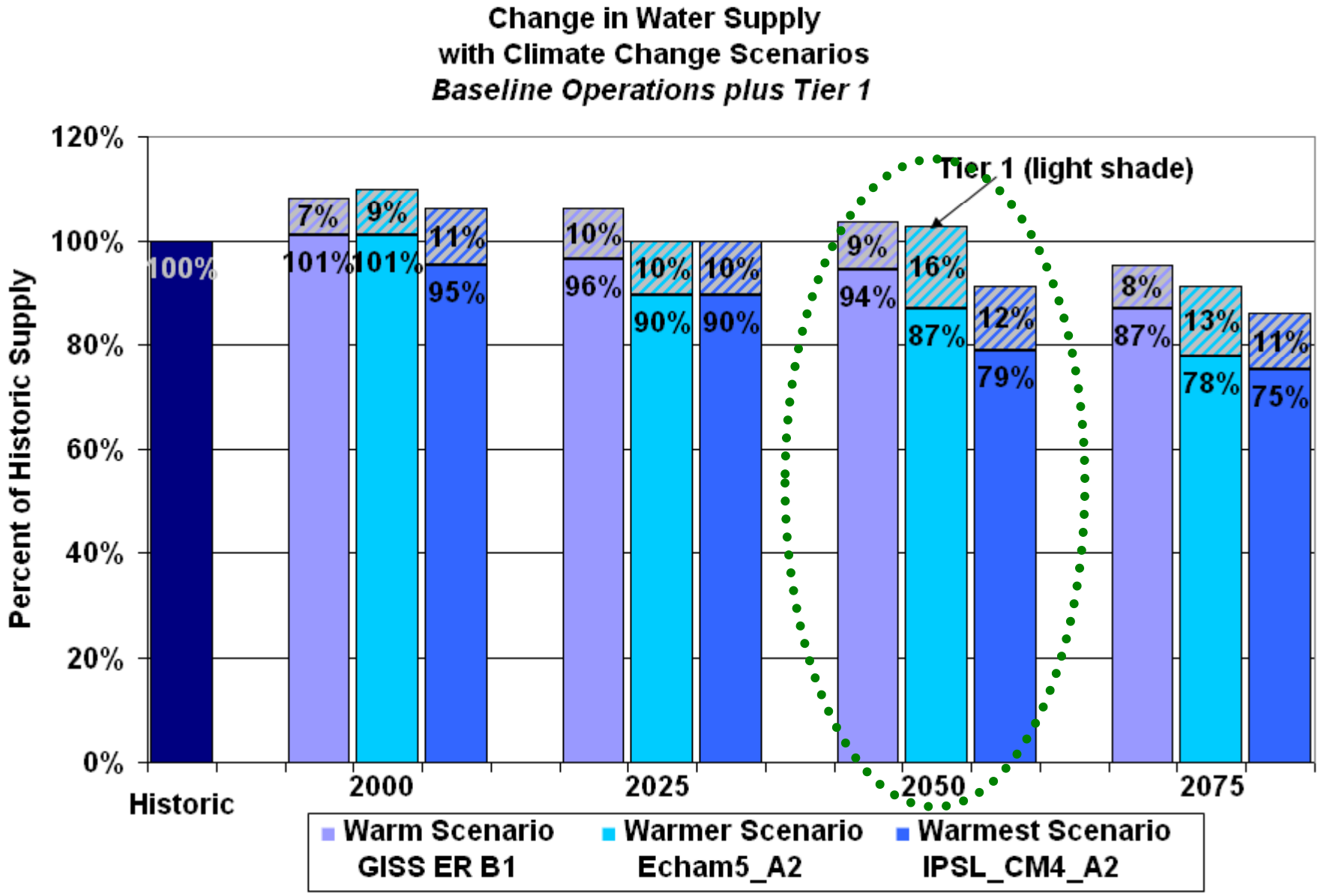
Meteorological and impacts forecasting

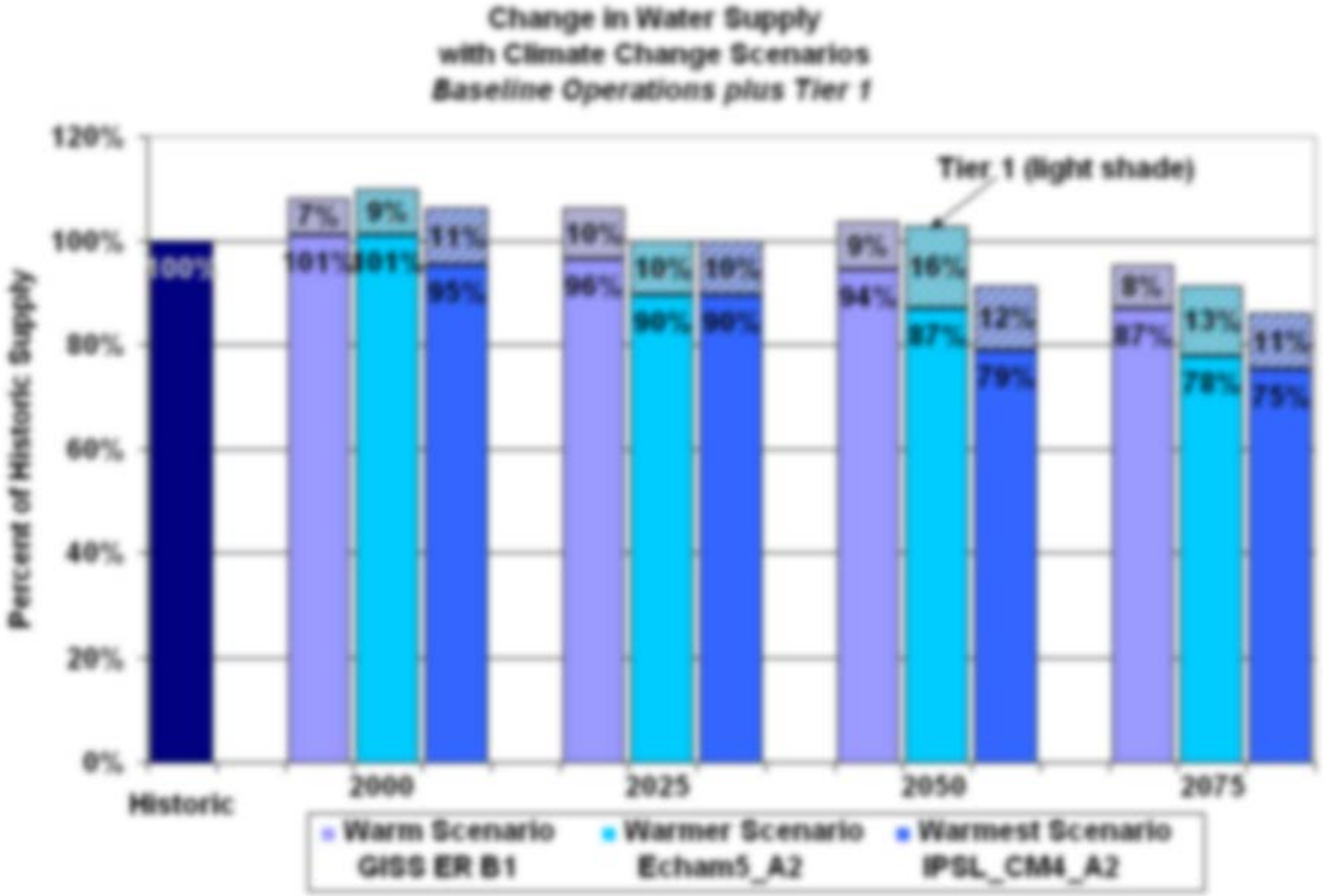
48 Hr. Precip Total (Valid: 2011-06-02 12:30 Local

event	Met desc.	Max precip	duration	USGS landslide threshold	N cso	% 2011 CSO events	CSO volume	% 2011 CSO volume
21 Jan	FROPA	1.60”	6hrs	20%	25	10%	11,178,562	15%
09 Mar	FROPA	0.21”	10min	17%	38	15%	14,051,868	19%
14 Mar	FROPA	0.77”	3hrs	134%	18	7%	18,279,670	25%
23 Nov	AR	3.47”	48hrs	0%	28	11%	12,066,139	17%
4 significant events					109	42%	45,576,239	76%
2011 total					261		73,086,686	

total in

http://www.atmos.washington.edu/SPU/


Change in Water Supply
with Climate Change Scenarios
Baseline Operations plus Tier 1
Percent of Historic Supply
120%
100%
80%
60%
40%
20%
0%
Tier 1 (light shade)
100%
7%
101%
9%
101%
11%
95%
10%
96%
10%
90%
10%
90%
9%
94%
16%
87%
12%
79%
8%
87%
13%
78%
11%
75%
Historic
2000
2025
2050
2075
Warm Scenario
GISS ER B1
Warmer Scenario
Echam5_A2
Warmest Scenario
IPSL_CM4_A2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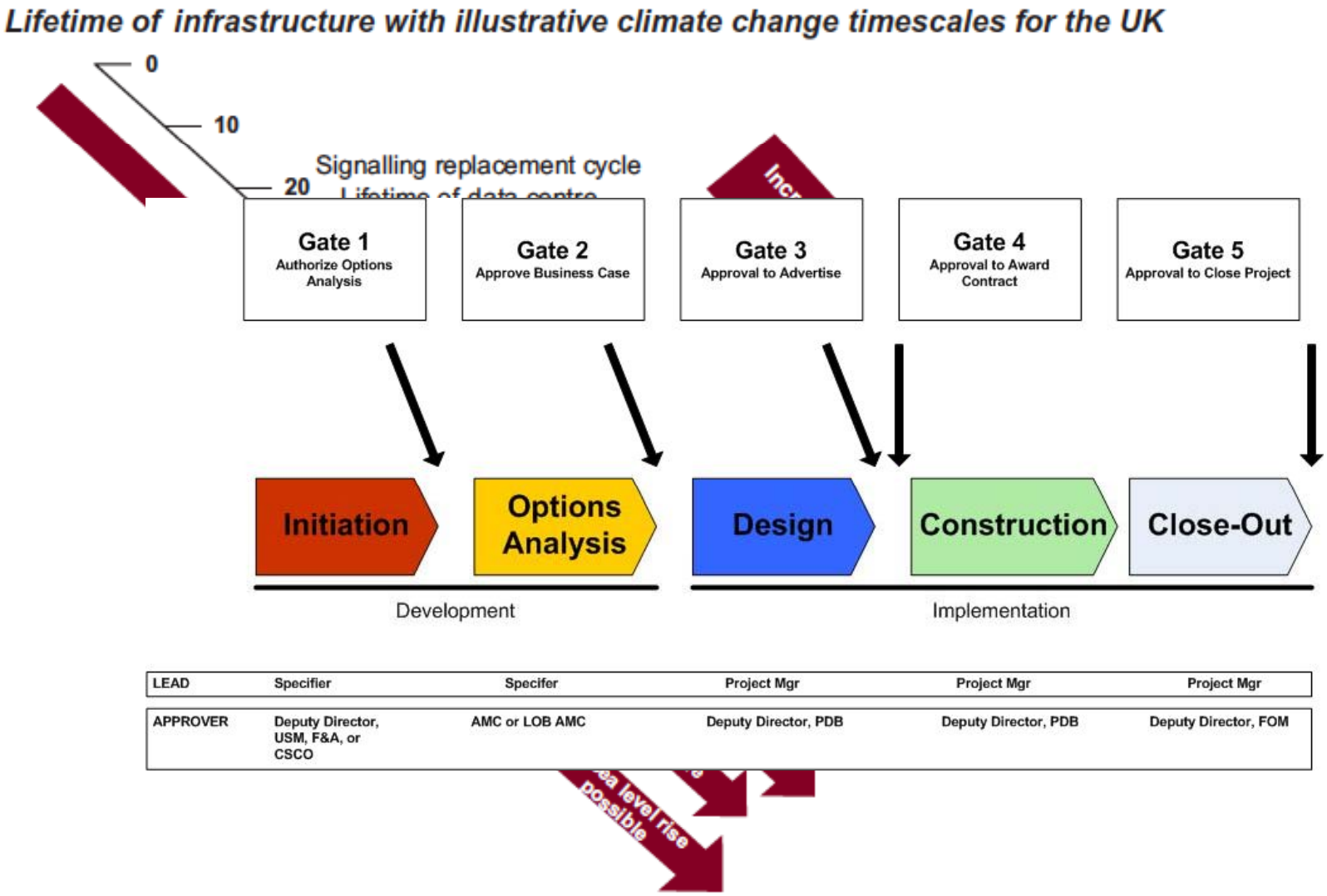
87%
12%
79%
8%
87%
13%
78%
11%
75%
Historic
2000
2025
2050
2075
Warm Scenario
GISS ER B1
Warmer Scenario
Echam5_A2
Warmest Scenario
IPSL_CM4_A2

Climate initiatives going forward

- Updating our impacts assessment
  - use “next generation” of climate data, 40 climate scenarios
  - top down approach:
    - feed hydrology into system and operational models
    - conduct yield analysis
  - bottom up approach:
    - develop system specific metrics/thresholds
    - query climate projections
    - timing of fall rains
- mainstream adaptation into capital planning and asset management

Mainstream adaptation




Thank You