

ADDRESSING WATER SCARCITY IN SAUDI ARABIA: POLICY OPTIONS FOR CONTINUED SUCCESS

Water Arabia
February 18, 2015

Jon Freedman

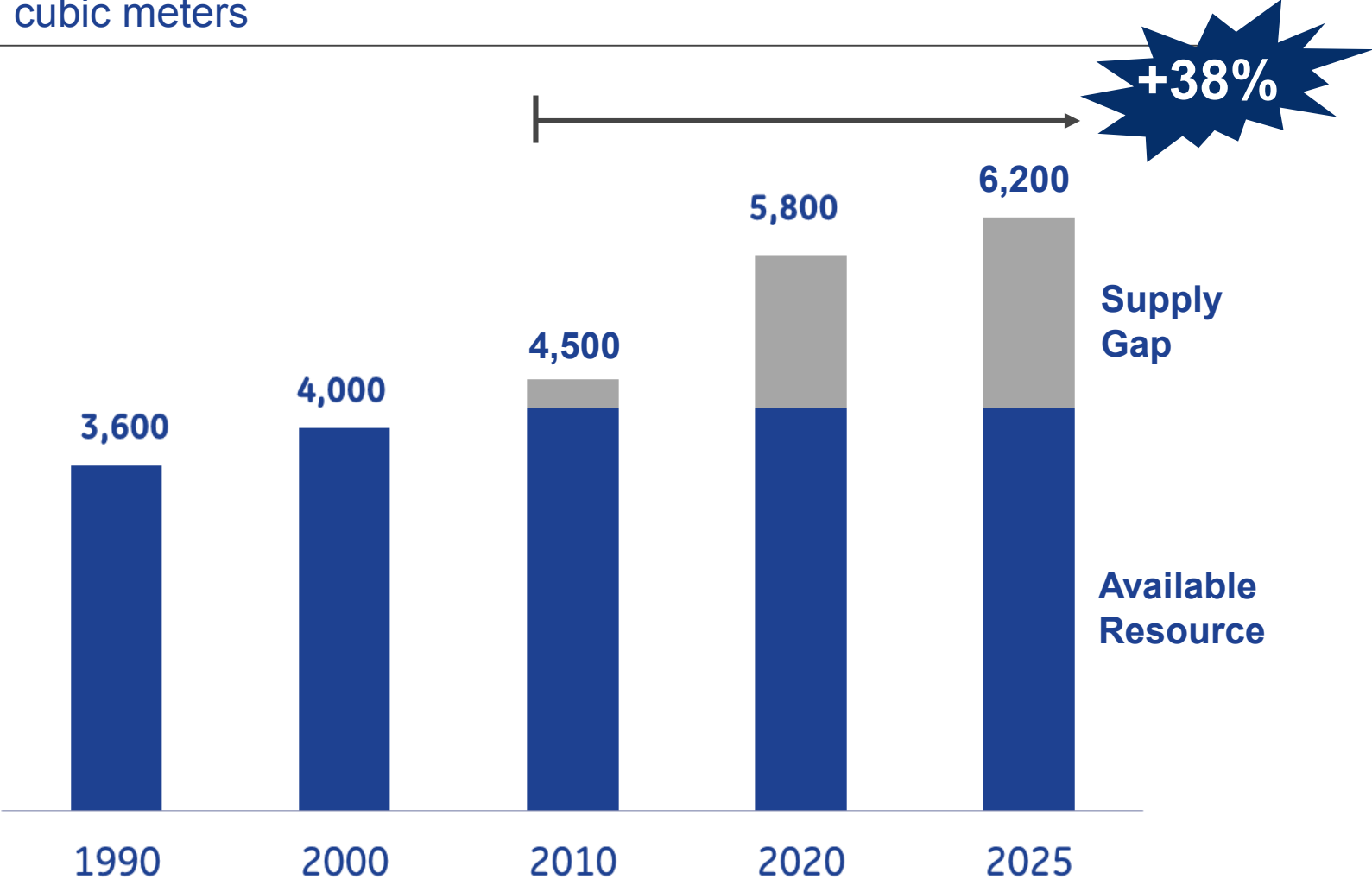


ecomagination

Global freshwater supply gap

Global water withdrawals, 1990-2025*

Billion cubic meters



*Assumes productivity is frozen.

Source: 2030 Water Resources Group, 2009; McKinsey's Resource Revolution, 2011



Recent water headlines

California Drought Outlook Extends at Least Into April
Bloomberg Business
Jan. 15, 2015

Worldpress.org

Fracking and Water Scarcity

Joshua Pringle, April 23, 2014

UN voices serious concerns over looming drought crisis in Syria
2014-04-08

middle east online
میدل ایست اونلاین

arab news

Thursday, 12 February 2015 | 23 Rabi'ul Akhri 1436 AH

Saudi Brothers: Ensuring sustainable water solutions

The New York Times

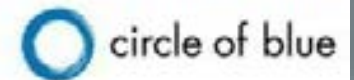
Report Finds Widespread Water Pollution in China

By EDWARD WONG APRIL 24, 2014, 12:43 AM Comment

Brazil Dries Up and Blacks Out
Bloomberg View
FEB 4, 2015

World Economic Forum Ranks Water Crises as Top Global Risk

THURSDAY, 15 JANUARY 2015 04:00

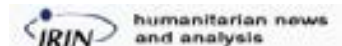


World has not woken up to water crisis

REUTERS Tue Feb 3, 2015 11:23am EST

Africa: Water and Conflict

BY KUALA LUMPUR, 22 APRIL 2014

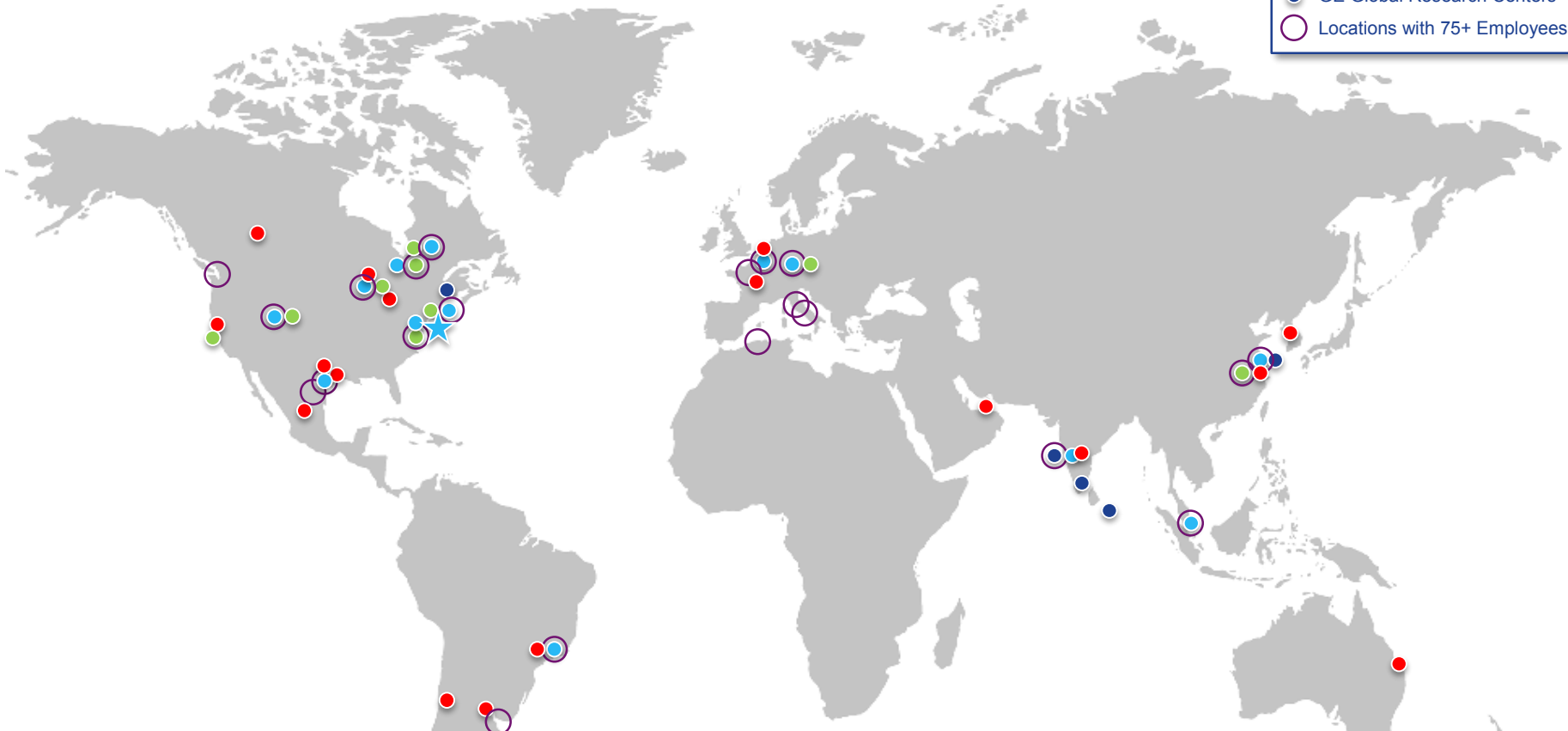


Water issues center stage around the world



GE Water & Process Technologies

Global presence and reach



Leader in equipment, chemical, & monitoring water & process treatment technologies

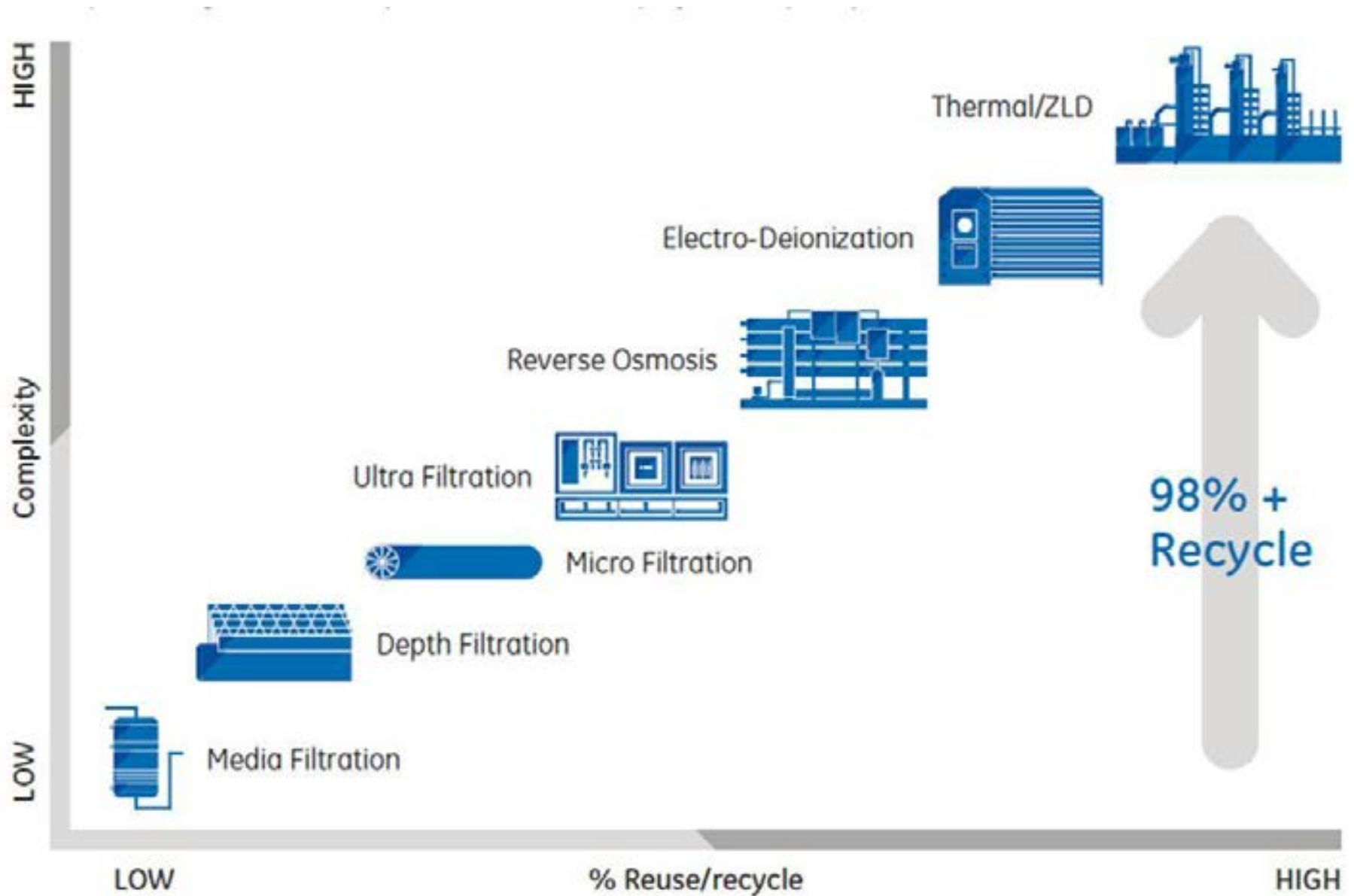
- 50,000 customers in 130 countries
- 45 global manufacturing sites



- Focused on water reuse



Reuse technology spectrum



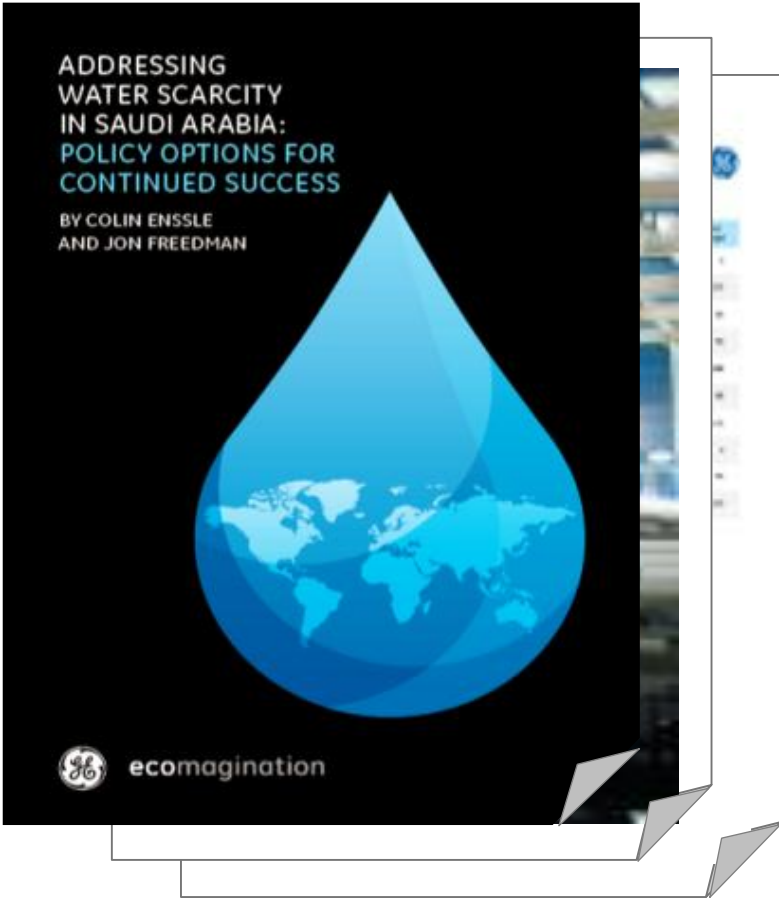
GE White Papers addressing water scarcity

2008



Global

Today



Saudi Arabia

Water reuse policy options



EDUCATION AND OUTREACH

- Recognition awards and certification programs
- Information dissemination and educational outreach efforts
- Reporting of water consumption, discharge, and reuse data



INCENTIVES

- Direct subsidies
- Reductions in payments to the government
- Payments for reintroduction of recovered water
- Pricing mechanisms
- Regulatory relief for recycled water users
- Government procurement of water recycling/reuse equipment
- Structuring of water rights to reduce the use of potable water



REMOVING BARRIERS

- Modifying local regulations to require that all water meet potable standards
- Revising plumbing codes to allow dual piping
- Alleviating stringent permitting and inspection requirements for recycled water

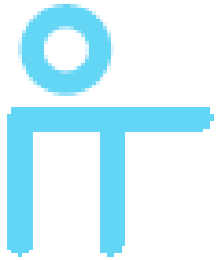


MANDATES AND REGULATION

- Requiring utilities to develop plans for recycled water
- Restricting potable water to human or food-related uses



Water reuse policy options



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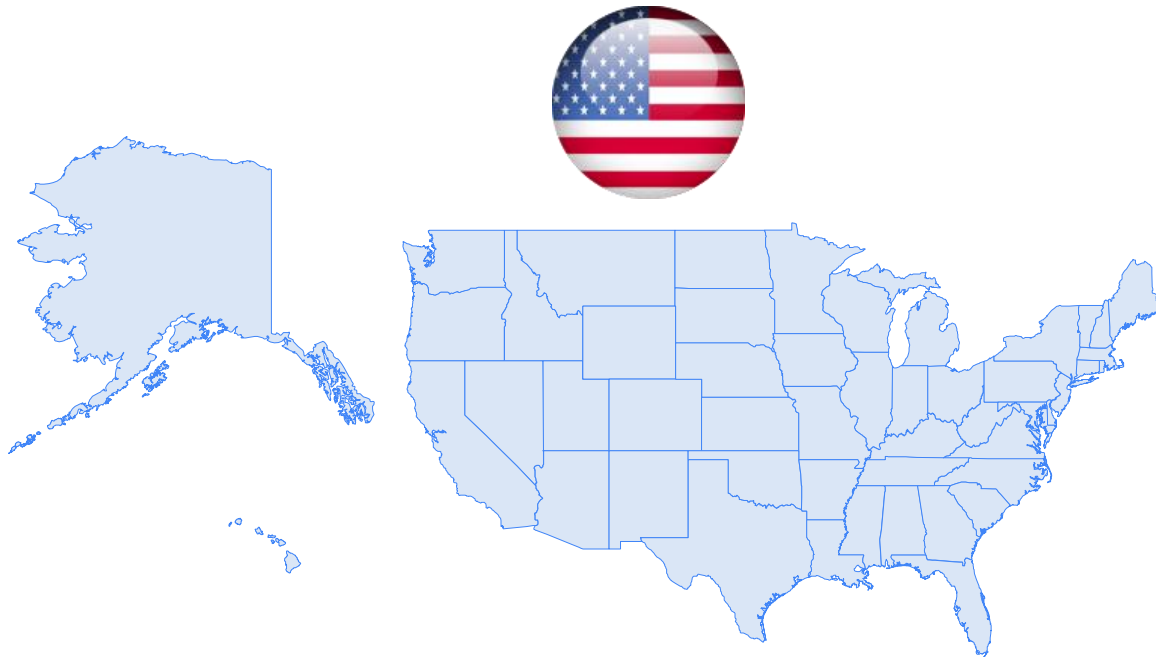


Water reuse policy options

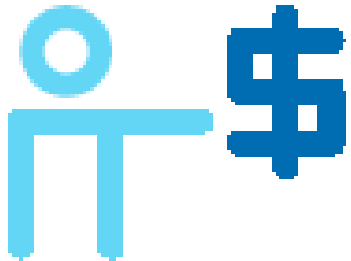


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Water reuse policy options



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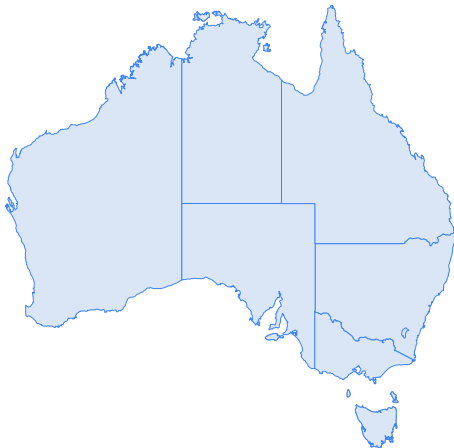


Water reuse policy options



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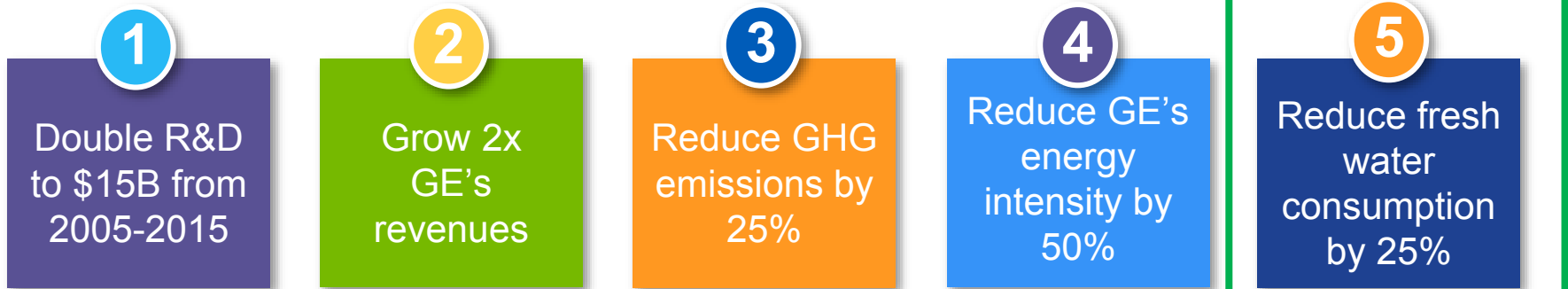


GE's global sustainability initiative

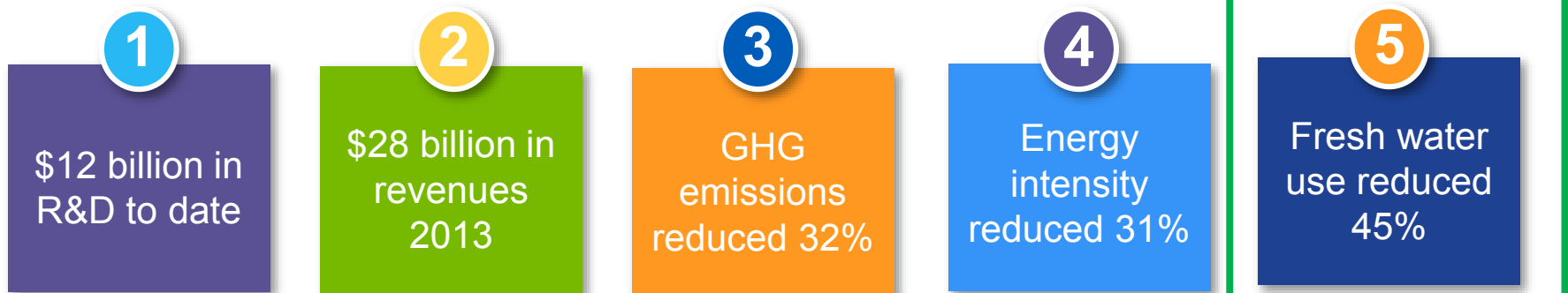
ecomaginationSM



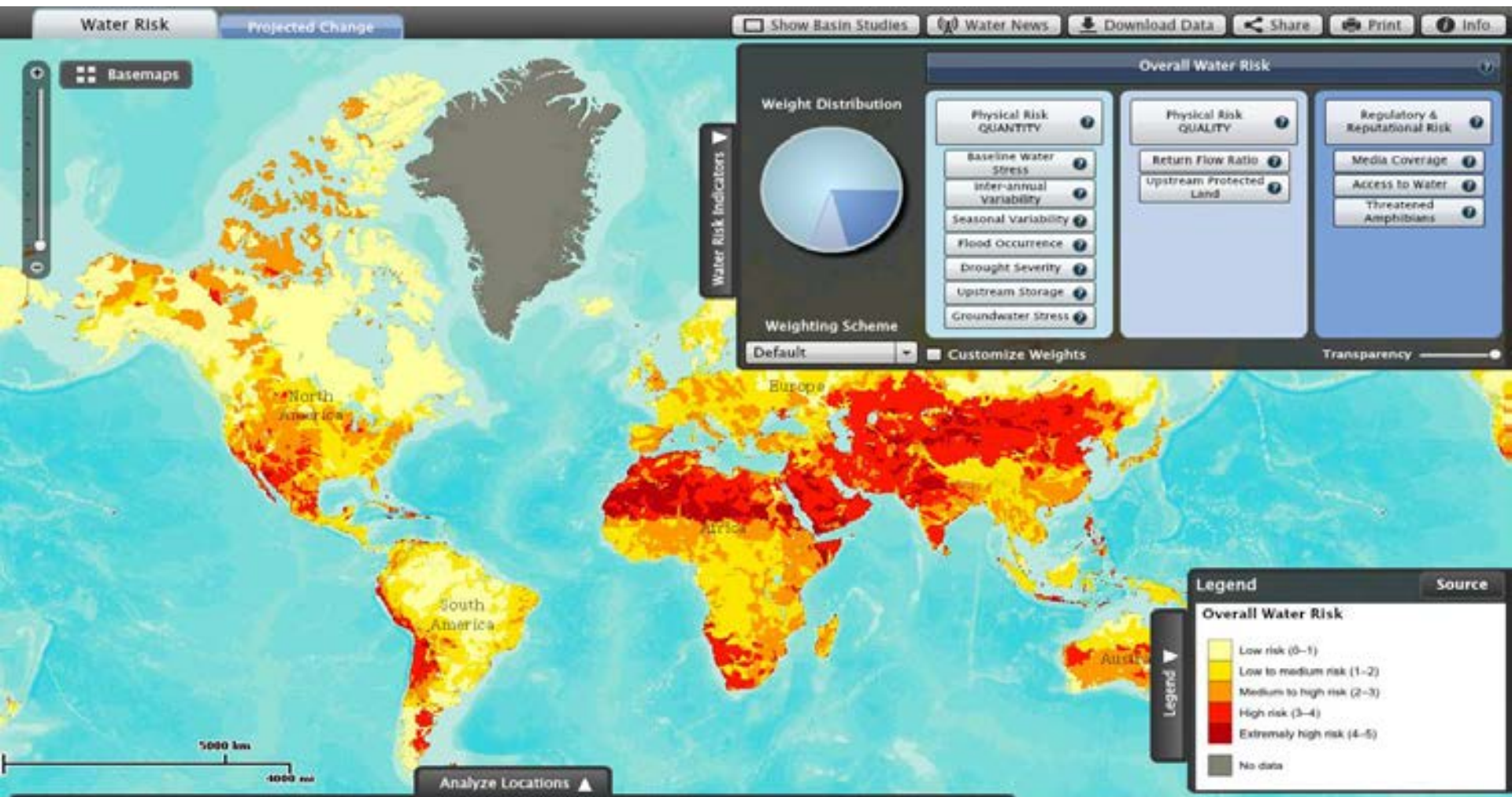
Goals for 2015



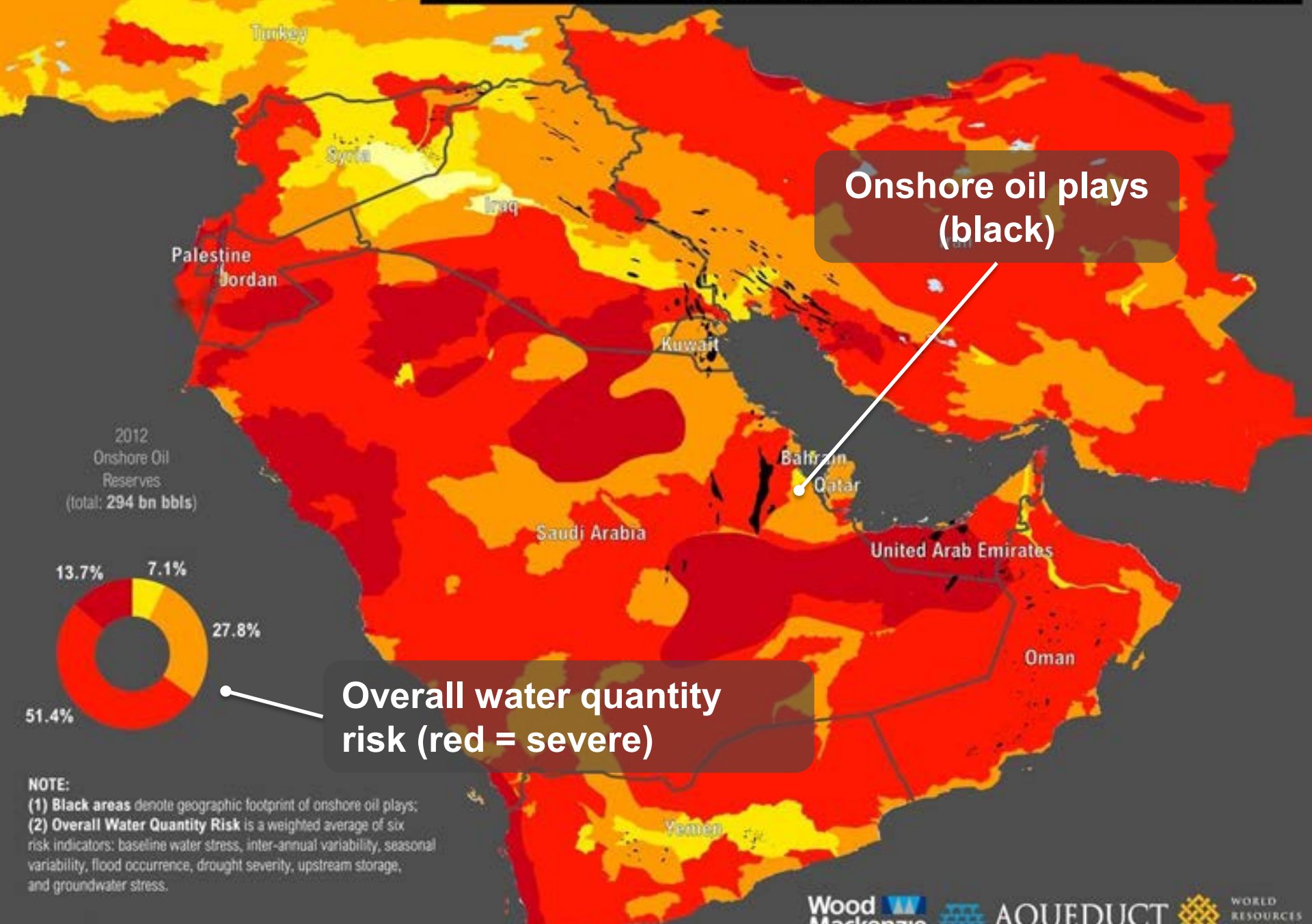
2013 Progress



Global water risk mapping in an open access tool



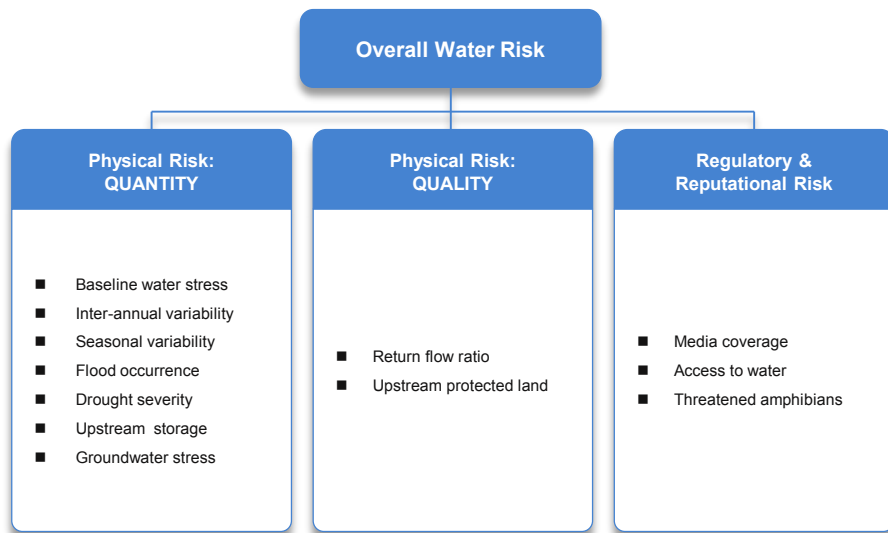
2012 MIDDLE EAST ONSHORE OIL RESERVES VS OVERALL WATER QUANTITY RISK



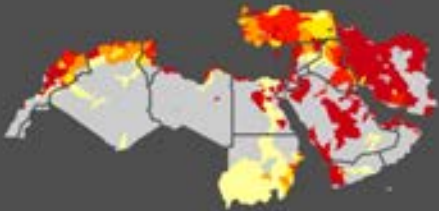
End

Modeling and mapping global, regional, & local water risk

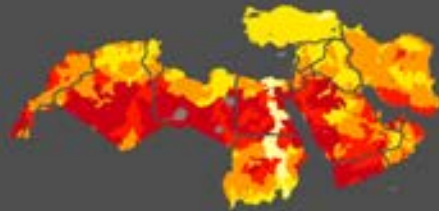
- 12 indicators, grouped by quantity, quality, & regulatory/reputational risk
- Open access tool



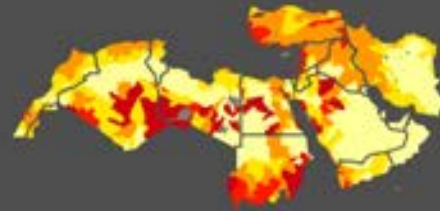
12 water risk indicators



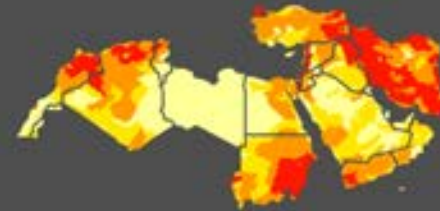
Baseline Water Stress



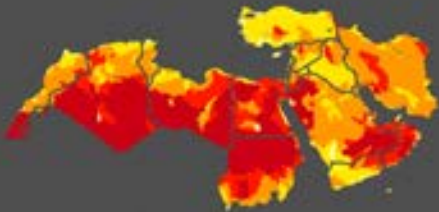
Inter-annual Variability



Seasonal Variability



Flood Occurrence



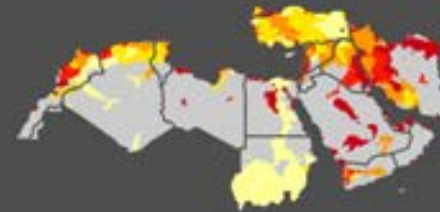
Drought Severity



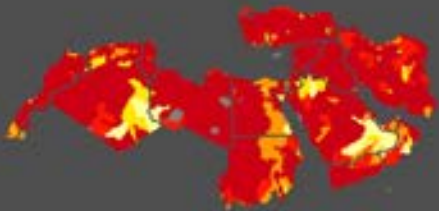
Upstream Storage



Groundwater Stress



Return Flow Ratio



Upstream Protected Land



Media Coverage



Threatened Amphibians



Access to Water

Case study

Water reuse in the Canadian Oil Sands

- 7% of Alberta's surface & groundwater allocations used for extraction
- Directive 74 (2009)
 - Limit & close tailing ponds
 - Driver: environmental protection
- Directive 81 (2012)
 - Mandates H₂O management plan
 - 90%+ produced water recycling rate
 - Encourages pilot projects by exempting disposal limits



**Government & industry
collaboration**