ENGINEERING SOLUTIONS FOR SUSTAINABILITY:
MATERIALS AND RESOURCES 3

Toward a Circular Economy

February 18–19, 2017 | Denver, Colorado

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Session 4: Water

Complexity of Water as a Resource and Innovation

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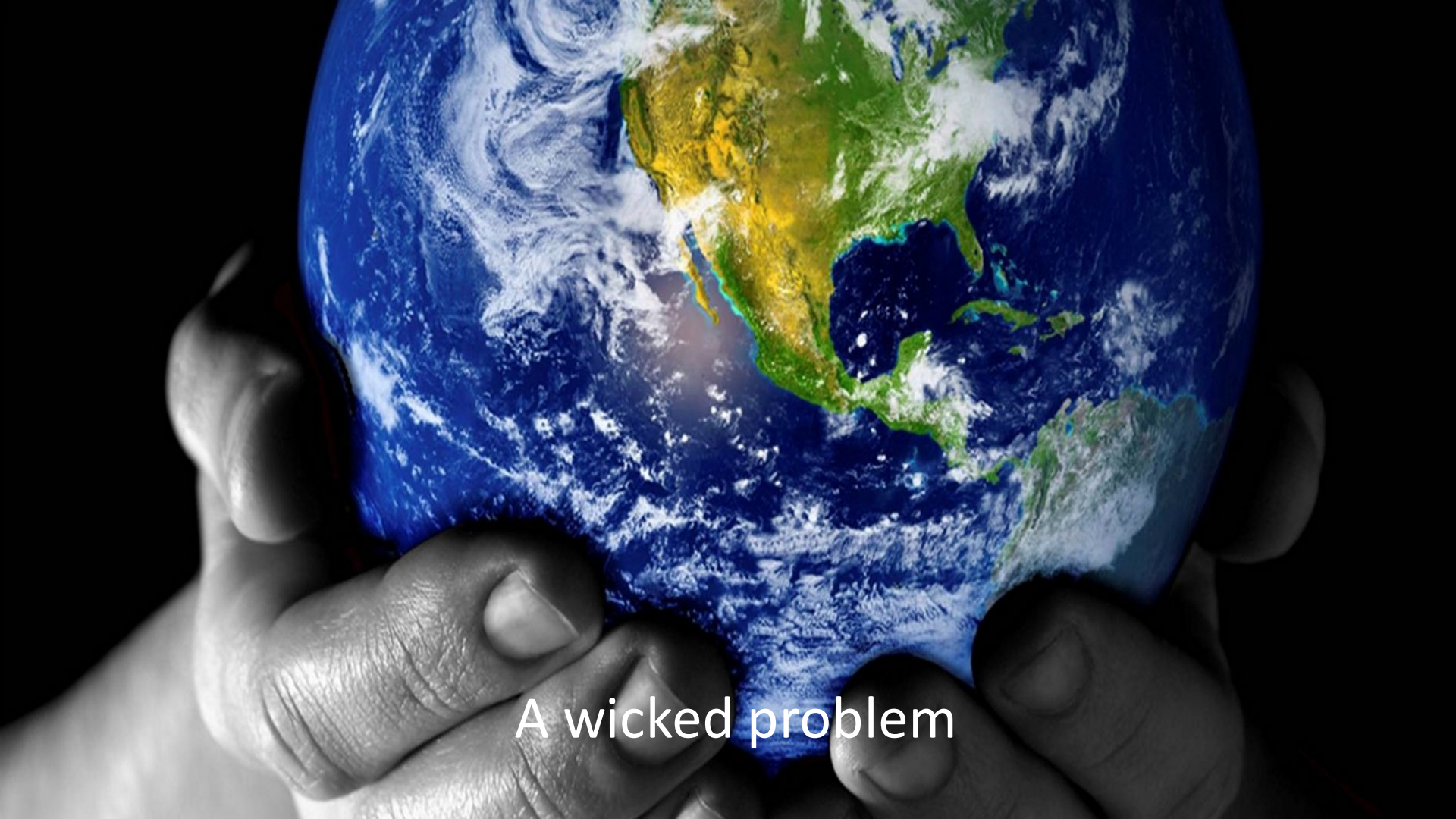

A wicked problem


47%


900 M


850 K


FLINT WATER PLANT


22 M

Why is water different?

- Its availability, management and impacts are ***local*** at a watershed or basin level
- It is typically ***variable*** in space and time, while changes are ***uncertain***
- The availability for use is ***constrained***, but often with complex rights and undeveloped pricing-market systems
- It has a ***social*** and ***economic*** nature, with significant political involvement
- Freshwater ecosystems are vulnerable and are highly ***interconnected*** with human activities

How the private sector views water risk

	Supply Chain	Operations	Product Use
Physical	Water scarcity drives up input prices (~2%-20%)	Increased capital expenditure on water treatment, extraction or alternative technologies raises costs	Non-availability or scarcity of water required for using product or service limits growth
Regulatory	Suspension or withdrawal of supplier's water license or discharge permits disrupts supply chain	Reallocation to more urgent needs during drought disrupts operations	Restrictions on use of particular products or services due to water intensity raises costs or checks growth
Reputational	Responsibility "by association" for suppliers' water pollution damages brand or reputation, hinders growth	Competition with household demands, or pollution incidents, damages brand or reputation, hinders growth	Public outcry regarding water intensity of product damages brand, reputation, hinders growth

Financial Impact

- **Lost revenue**
- **Higher costs from:**
  - **Supply chain**
  - **Changes in production**
  - **Capital expenditure**
  - **Regulatory compliance**
  - **Increasing price of consuming or discharging water**
- **Delayed or suppressed growth**
- **Potential higher cost of capital**

1 – "Watching Water," JP Morgan Chase Global Equity Research, April 2008.

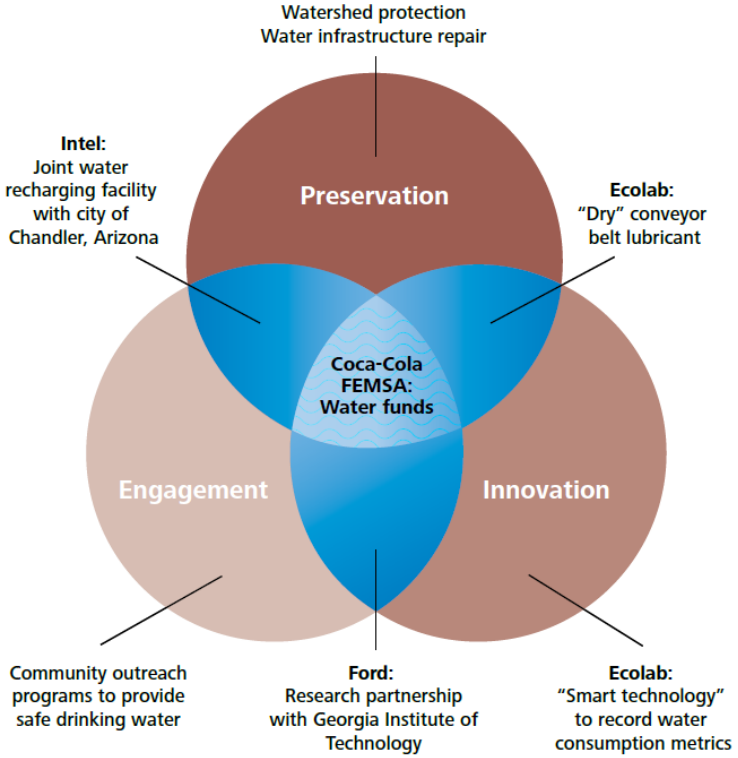
Four lousy arguments

- Water is **cheap**, it doesn't cost much
- Compared to others, we **don't use much**
- **We can get water** when we need it
- Our **impacts are small**

Elements of a water stewardship strategy

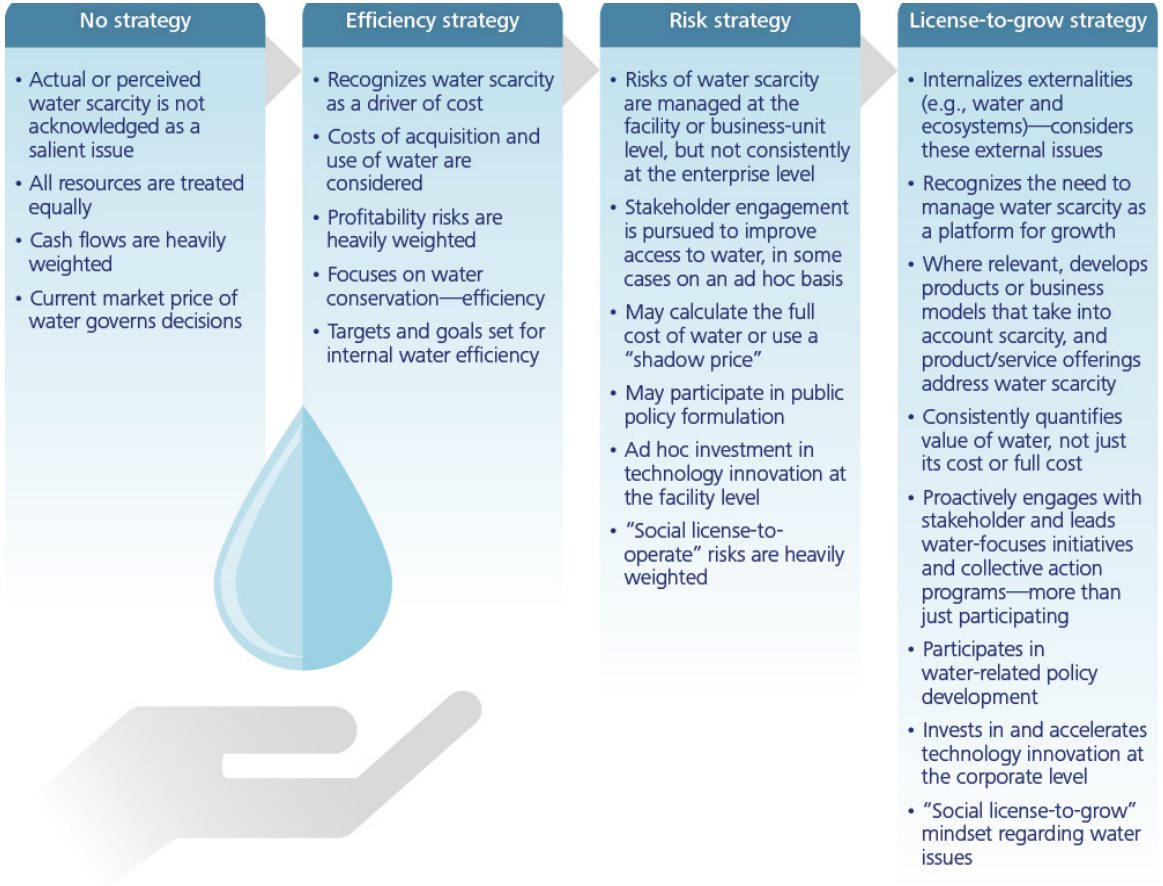
Companies should:

- **Incorporate water risk** into 'traditional' corporate risk management processes
- **Quantify the "real" value** of water to the business
- **Understand the energy-water nexus** and its potential business implications, set targets across the value chain
- **Increase** focus on **engagement and innovation**
- **Look for opportunities** in the overlaps
- **Make a public commitment** to water stewardship
- **Practice "radical transparency"** about water and seek opportunities to collaborate – or clear the (internal) path for collaboration



Getting Ahead of the "Ripple Effect" A Framework for a Water Stewardship Strategy. W. Sarni, Deloitte University Press. 2013

“Fueling growth” – water and business



Fueling Growth: You Can’t Always Buy What You Need. W. Sarni. Deloitte University Press. 2013.


INNOVATION
water

What does "innovation at the nexus" look like?

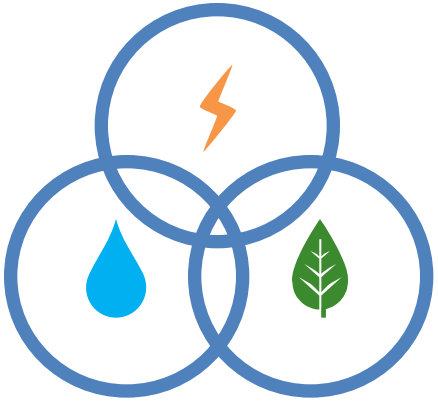
Companies, NGOs, and communities are working together in new ways to find innovative opportunities to address the water, food, and power nexus

IMAGINE H$_2$O

- Promotes nexus technology innovation in agriculture, water efficiency, wastewater reuse, and energy and resource recovery
- Funders include Wells Fargo, Autodesk, Berkeley Energy and Resources Collaborative, and AgTech Silicon Valley

PG&E Pacific Gas and Electric Company® +

- Worked with water agencies to offer a joint high efficiency clothes washer rebate
- 63% increase in PG&E customer participation since water utility partnership
- 30% increase in water utility customer participation



EDF +

- Signed a Water Savings Convention in which irrigators agreed to reduce water usage and EDF agreed to pay irrigators based on water savings
- Led to annual savings of more than 90 million cubic meters of water annually
- 84% of water savings are used to maintain natural ecosystems

The Nature Conservancy Protecting nature. Preserving life.™ + SAB MILLER

- Developed The Water for Life and Sustainability Fund in Cali, Columbia
- Pays farmers, ranchers, community organizations, and environmental groups to implement projects to address water, energy, and food needs
- 7,801 hectares set aside for conservation

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Thank you

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