Industrial water re-use: A step towards circular economy

Arcadis, P&G, IPIECA, Shell, WBCSD

Stockholm, 31 August 2017

Welcome!

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Agenda

Time	Session	Speakers
14.00-14.05	Welcome & Introduction	Tatiana Fedotova, WBCSD
14.05-14.15	Business Guide to Circular Water Management: a focus on reduce, reuse, recycle	Toon Boonekamp, Arcadis
14.15-14.30	Industry focus: consumer goods	Shannon Quinn, P&G
14.30-14.45	Industry focus: oil & gas	Artemis Kostareli, IPIECA Alfio Mianzan, Shell
14.45-15.10 (25mins)	Breakout group discussion around 3 key themes: ➢ Best practice clinic ➢ The business case for circular water management within circular economy ➢ True cost & true value of water	
15.10-15.25	Plenary feedback	Sara Traubel, WBCSD
15.25-15.30	Summary & close	Tatiana Fedotova, WBCSD

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Louis Dreyfus Company
MASISA
más confianza
MICHELIN
A better way forward
Mitsubishi Chemical Holdings
Mitsubishi Corporation
MITSUBISHI HEAVY INDUSTRIES, LTD.
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SNCF
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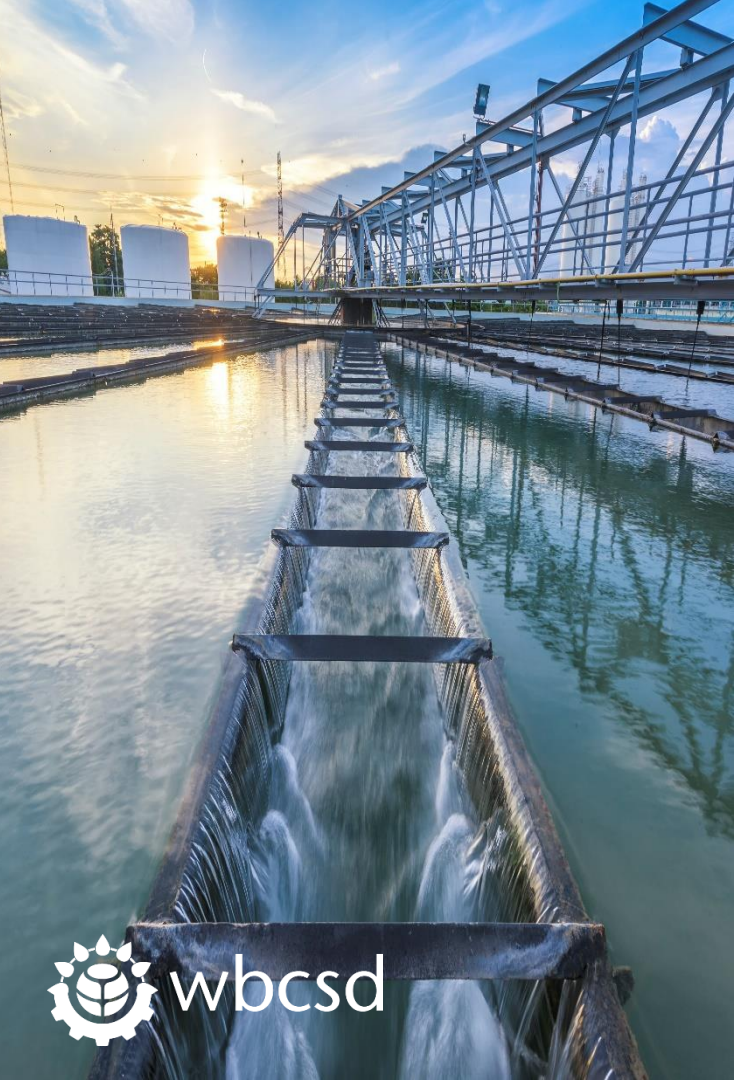

WBCSD Circular Water Management

- **Co-chairs** ARCADIS Design & Consultancy for natural and built assets, EDF
- **Working Group**: Aditya Birla Group, Arcadis, BP, CEBDS, EDF, Engie, Godrej Industry, Heidelberg Cement, Nestlé, P&G, PepsiCo, Shell, Vale, Vedanta Resources
- **Objective**
  - *By 2020, the management of water issues by businesses is value driven and follows the 5Rs approach (reduction, reuse, recovery, recycling and replenishment) in the broader context of a more circular approach to resource management and effective, cross sector watershed collaboration.*
- **Latest developments**
  - Production of "Business Guide to Circular Water Management: spotlight on reduce, reuse, recycle" together with 8 detailed case studies
  - Integration of business solution into WBCSD Circular Economy platform
  - Dedicated Circular Water Management working group in India and customization of the Business Guide to Brazilian context

Launched today: company deep-dive case studies

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Search

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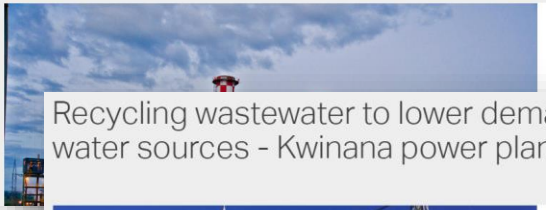
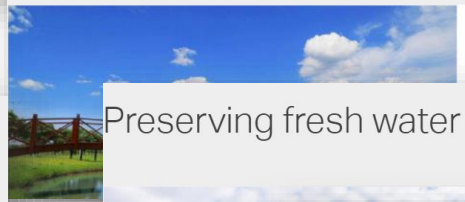
Water Reduction and Recycling in Refining

Recycling and reuse of treated industrial waste water in cosmetics operations

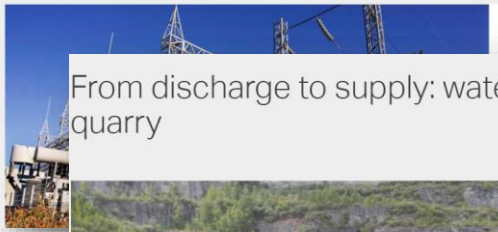
Rainwater harvesting for water reduction



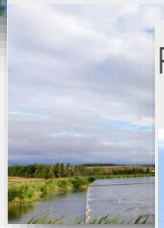
Water reduction and reuse in a P&G Beauty Care manufacturing facility



Recycling wastewater to lower demand on potable water sources - Kwinana power plant



Preserving fresh water through collaboration



From discharge to supply: water reuse at Antoing quarry

Robotic washer for mining equipment

bp

EDF

ENGIE

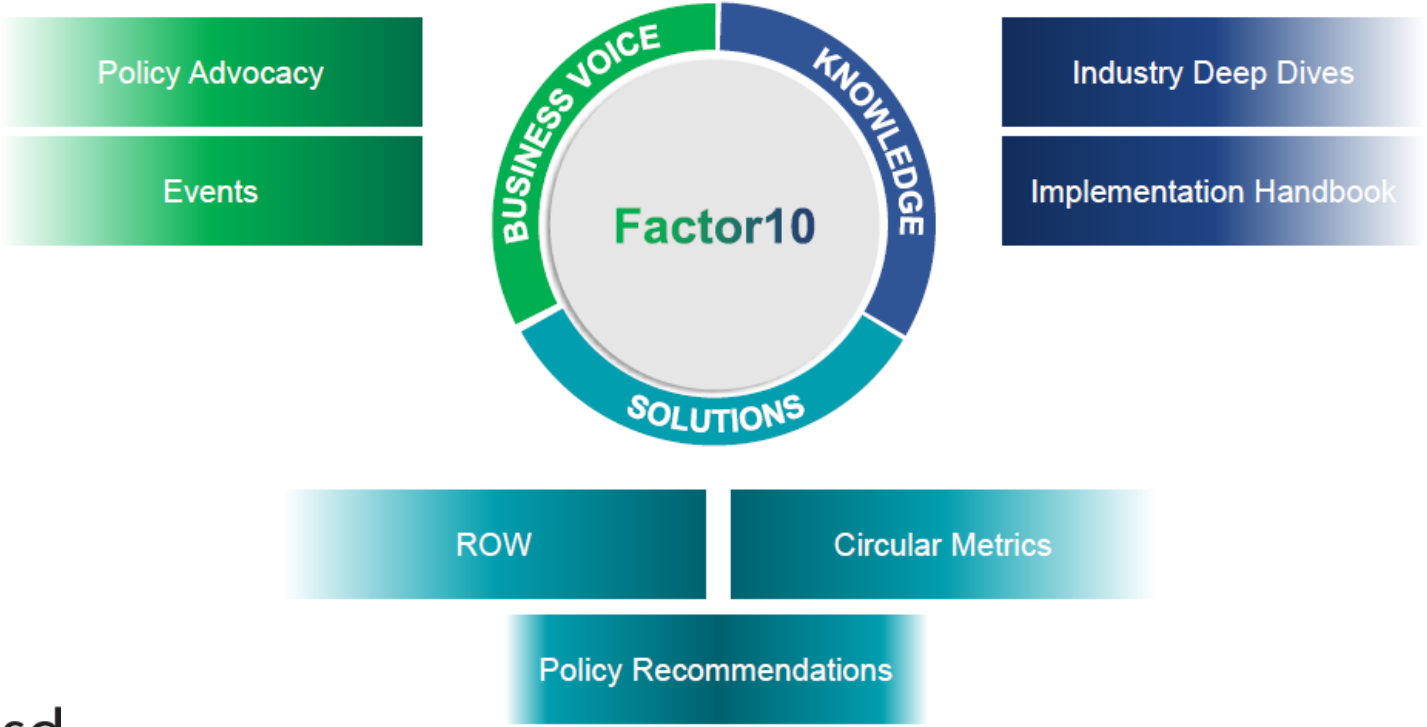
HEIDELBERGCEMENT

L'ORÉAL PARIS

P&G

VALE

Factor10: WBCSD's CE program



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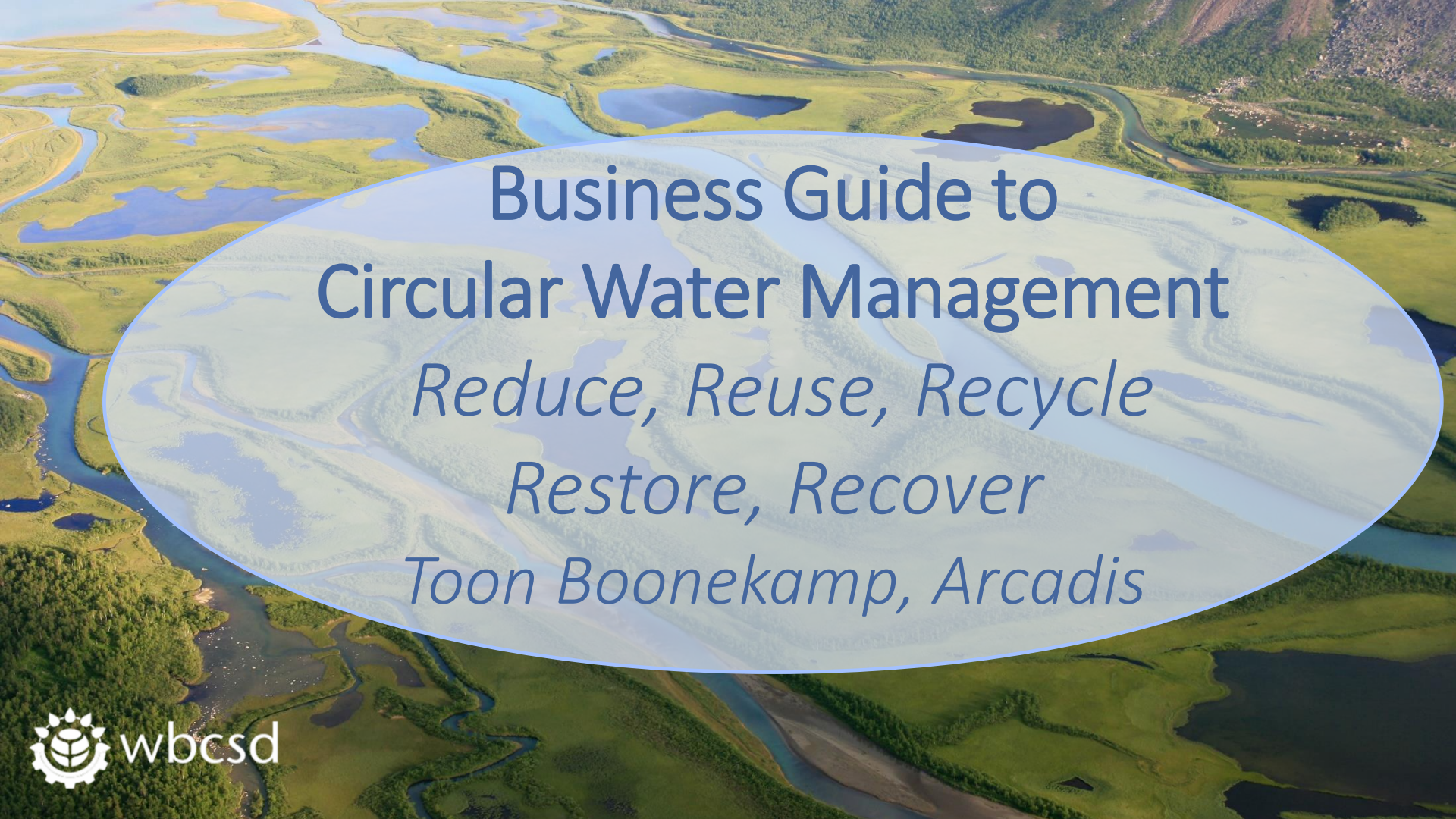
Business Guide to
Circular Water Management
Reduce, Reuse, Recycle
Restore, Recover
Toon Boonekamp, Arcadis
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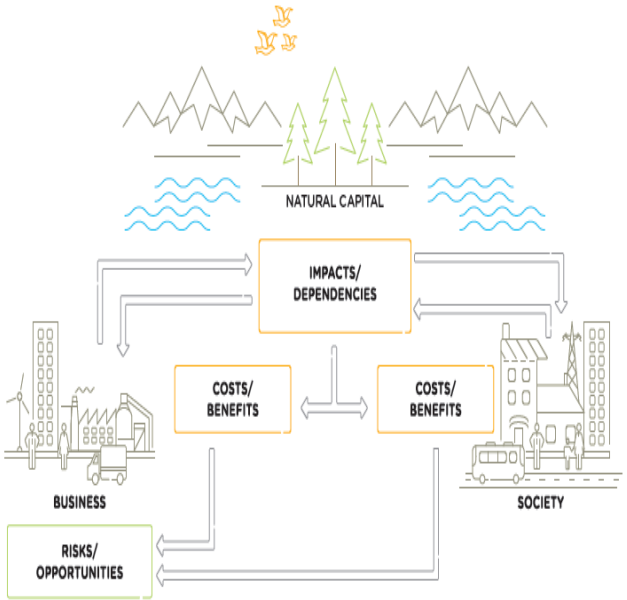
Need for circular water management



- Industry is a major water user
  - In Asia 10%
  - In Europe 57%
- Over 80% of wastewater goes back into the environment untreated
  - Business shares the responsibility for protecting water resources
- Climate change and consumption growth are impairing water scarcity
  - By 2030 demand for water is expected to outstrip supply by 40%
- Business needs to consider other users' objectives

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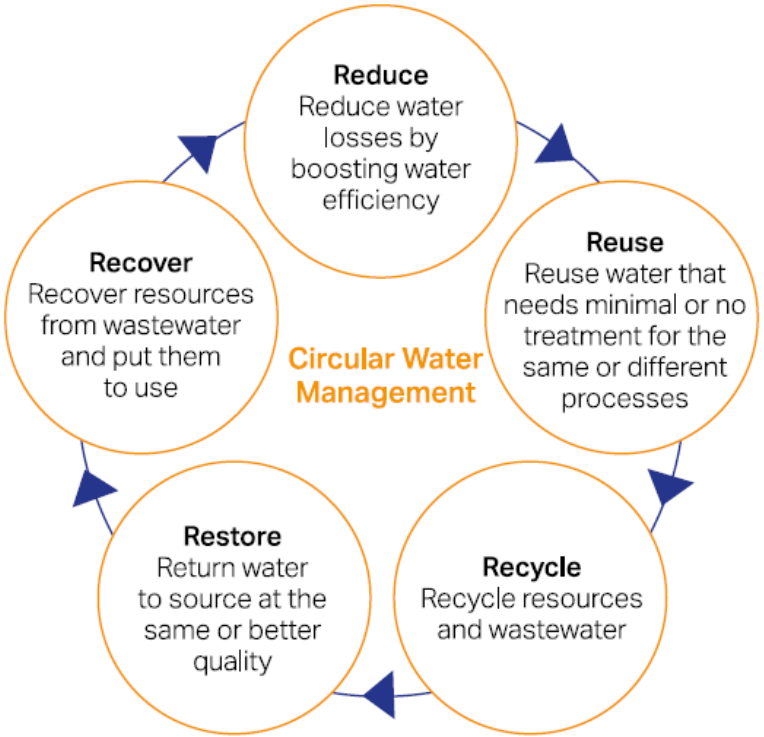
5Rs approach to circular water management



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Drivers of circular water management

- **Emerging regulatory frameworks**
  - Required regulatory **compliance** at site level (e.g. zero liquid discharge)
  - Internal company standards reflecting emerging standards (CSR)
- **Risks to water supplies (now and in the future)**
  - Securing **licenses to operate** at corporate and site levels
  - Less dependencies provides **opportunities for growth**
  - **Reducing operating risks** via operational awareness
- **Costs and resources**
  - Circular water management has significant potential to **reduce costs**
- **Reputation**
  - Circular water management policies helps secure **social license to operate**

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Overcoming barriers of circular water management

- **Regulation and water quality**
  - Identify the **regulations and systems that favor** circular water management
- **Resources**
  - **Integrate** water reuse and recycling into operations and infrastructure
- **Awareness**
  - Collect, evaluate and **present data** on water use and all related resources
- **Dialog**
  - Engage stakeholders **inside and outside the fence**
  - True **Value** of water

Manages risks in the changing business environment

- *Emerging regulations*
- *Competition for water*

Delivers significant benefits

- *Reduces costs*
- *Increases efficiency*
- *Enhances reputation*

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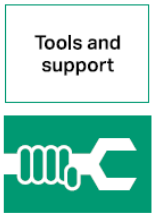
Barriers and Drivers related?



- **Regulation and water quality**
- **Resources**
- **Awareness**
- **Dialog**

- **Emerging regulatory frameworks**
- **Risks to water supplies**
- **Significant savings**
- **Reputation**

Key success factors

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Circular Water management: examples

Case study: **BP Australia**
Collective commitment overcomes financing barrier
Sector: **Oil and gas sector**

Although the BP refinery in Western Australia significantly reduced its demand for water, it still relied to a large extent on potable water. BP worked with the Water Corporation of Western Australia, the potable water supplier of most of the water for the refinery for drinking and industrial use, the local regulator, the Government of Western Australia and a number of companies to develop an alternative source of water for industrial use. The Kwinana Water Reclamation Project (KWRP) treats municipal wastewater for industrial purposes, reducing the demand for potable water from six industries.

Case study: **L'Oréal**
Growing from reduction to recycling
Sector: **Cosmetics**

Barrier: **Water in cosmetic factories is mainly used in cleaning production equipment, which may account for 20%–70% of total consumption. L'Oréal uses mainly potable urban water for utilities. The group set an ambitious target of reducing total water consumption by 60% per finished cosmetic product by 2020 as measured from a 2005 baseline of water withdrawal in factories and distribution centers.**

Case study: **Procter & Gamble (P&G)**
Global approach, locally customized
Sector: **Fine chemicals**

The global Dry Laundry Team at P&G developed a tool for mapping all water use in dry laundry operations globally. The in-house tool can be customized with site-specific data and by activating/deactivating (if nonexistent) water streams unique to a specific site.

Case study: **Grasim Industries Limited, Chemicals Division, Renukoot Chemicals Unit**
Measuring and mapping reveals possibilities for reducing, reusing and recycling water
Sector: **Chemicals**

The Renukoot Chemicals Unit developed a sustainability road map to reduce freshwater consumption by 10% from a 2013–14 baseline and to meet global standards by 2017. The unit began by measuring effluent generated by each plant. Previously, the unit had no meters to measure freshwater consumption in individual process units. Mapping water consumption in terms of effluent quantity and quality showed the potential for saving in each process. The unit created a water-balance tool in Excel to assess water use and the potential for water savings across departments.

Case study: **Electricité de France (EDF) Group**
An open dialogue with neighboring companies creates opportunities
Sector: **Energy production**

Barrier: **Electricité de France (EDF) Group uses hot water generated by a thermal power plant to heat a greenhouse for tropical plants. On one side of a road is Edison Candela's combined cycle gas turbine power station. On the other side are 90 hectares of greenhouses owned by Ciccolella, the world's largest grower of the tropical flower Anthurium. The win-win partnership conserves water, a scarce resource in the Italian region of Puglia.**

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Questions?

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Industry focus: consumer goods

Shannon Quinn, P&G

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Water Reuse in Consumer Products Manufacturing

World Water Week - 31 August 2017

Shannon Quinn
P&G Global Water Stewardship Leader


Citizenship at P&G
Ethics & Corporate Responsibility
Community Impact
Diversity & Inclusion
Gender Equality
Environmental Sustainability

P&G 2020 Water Goals

Reduce water used in P&G manufacturing facilities by 20% per unit of production by 2020 versus 2010 with conservation focused on water-stressed regions.

Provide one billion people with access to water-efficient products by 2020.

Provide 15 billion liters of clean drinking water to those who need it most by 2020.

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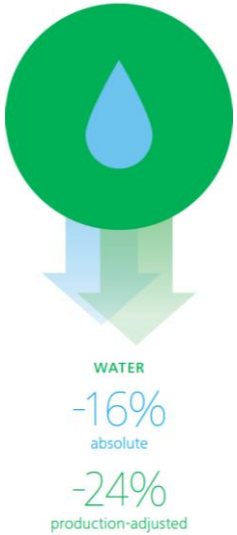
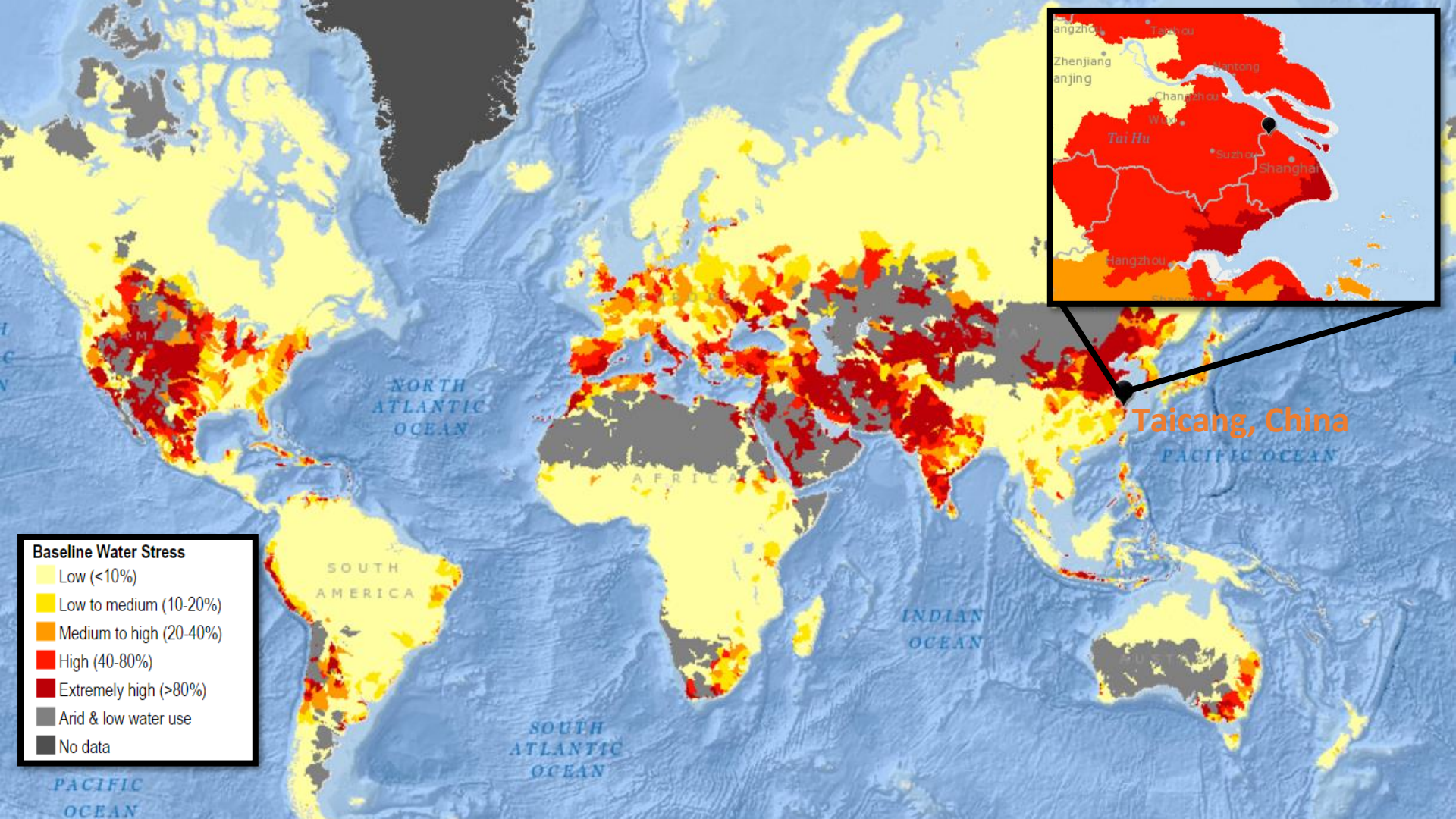
Reduce water used in P&G manufacturing facilities by 20% per unit of production by 2020 versus 2010 with conservation focused on water-stressed regions.



- 2020 goal achieved in 2015
- Committed to reducing water usage across the globe and to strengthen efforts at facilities in high water-stressed regions
- Beauty Care plant in Taicang, China example of what we are doing to achieve our goal


Baseline Water Stress
Low (<10%)
Low to medium (10-20%)
Medium to high (20-40%)
High (40-80%)
Extremely high (>80%)
Arid & low water use
No data
Taicang, China
Zhenjiang
anjing
Changzhou
Wuxi
Tai Hu
Suzhou
Shanghai
Hangzhou
NORTH ATLANTIC OCEAN
SOUTH AMERICA
AFRICA
INDIAN OCEAN
PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
PACIFIC OCEAN

Taicang: Site Profile

A factory inspired by a garden

Located close to Shanghai

Year built: 2012

employees: 170

First Site To:

- Achieve LEED Gold certified administrative building
- Use 100% wind electricity
- Reach lowest water discharge within P&G Beauty
- Achieve zero manufacturing waste to landfill in China

Project Goal

Demonstrate how to create the most sustainable P&G manufacturing facility

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Water as the Project Focus Area

Why?

- Facility located in water-stressed region
- Demanding incoming water and wastewater permit requirements
- Retailer/consumer demands requiring more flexible supply chain

Objectives

- Ensure longevity of operations in a water-stressed region
- Enable compliance with permit requirements
- Exceed P&G sustainability targets

Steps to Achieving Project Objectives

1 Completed detailed water map for the site

2 Reduced the quantity of water used at the site

3 Developed effective way to reuse water back into utilities and core process

Results

60% of C&S water reused in cooling towers

12% reused in core process

Quality and safety requirements ✓

Delivered savings ✓

Key Lessons Learned

1. Essential to have a strong vision and business case along with clear leadership support
2. Sustainability must be a part of the core criteria from the beginning
3. Detailed water map key to drive right decision and design
4. Importance of an integrated project team
5. Need to understand context of the local basin for long term sustainability

Questions?

Shannon Quinn
quinn.se@pg.com

Industry focus: oil & gas

Artemis Kostareli, IPIECA
Alfio Mianzan, Shell

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IPIECA

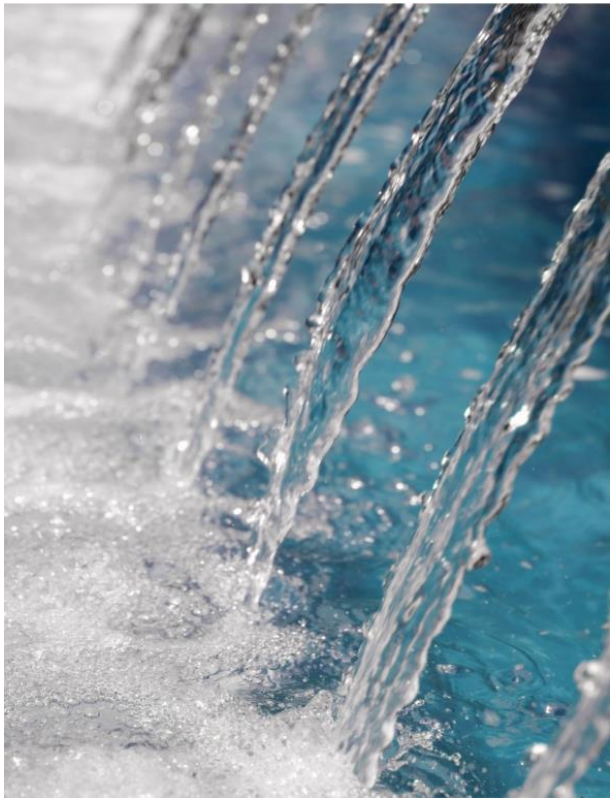
Produced water re-use: Opportunities and constraints

THE GLOBAL OIL AND GAS INDUSTRY ASSOCIATION FOR ENVIRONMENTAL AND SOCIAL ISSUES

www.ipieca.org

Agenda / content

- What is produced water?
- Opportunities
- Constraints
- Overcoming barriers
- Examples / case studies from Shell



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What is produced water?

‘Water that is brought to the surface during the production of hydrocarbons including formation water, flow-back water and condensation water’

- Globally, the produced water : oil ratio is estimated to be 3:1
- Quantity and quality will vary widely
- Constituents – e.g. total dissolved solids, oil and grease, heavy metals, naturally occurring radionuclides, additives etc.

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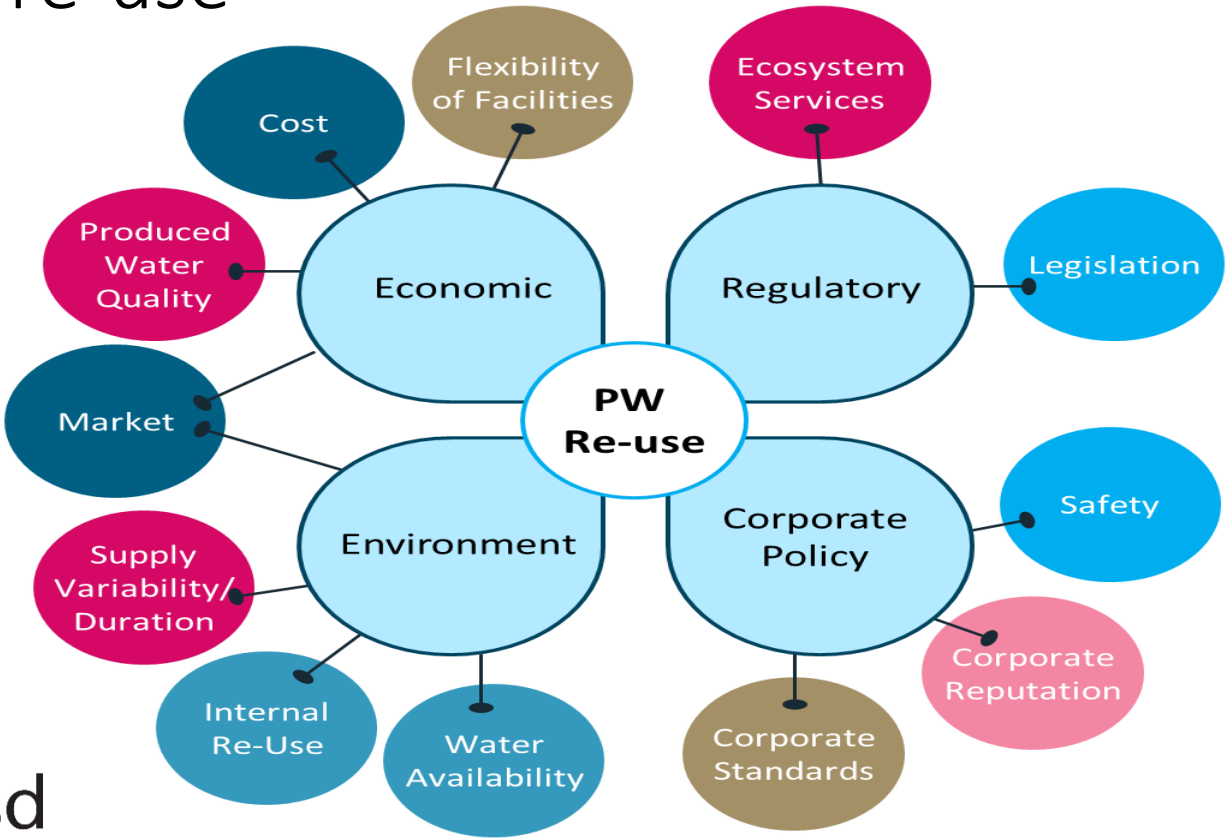
Why re-use



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Constraints

Barriers and risks

- Barriers
  - Cost
  - Perception/mindset
  - Feasibility
  - Regulation
  - Water quality/availability
  - Market/proximity of potential users
- Risks
  - Financial
  - Liability
  - Dependence
  - Reputation

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Overcoming barriers

Willingness

- Understand the value of water
- Site operator coaching
- Incorporate reuse at early stages of the project

Regulation

- Engage with regulators and other basin operators

Feasibility

- Engage with other basin operators/stakeholders
- Understand water quality and end use requirements
- Scale up treatment and storage facilities
- Assess Risk

Cost

- Innovation and technology for PW treatment and brine management
- Plan a resilient investment strategy
- Community engagement
- Apply concept of water valuation

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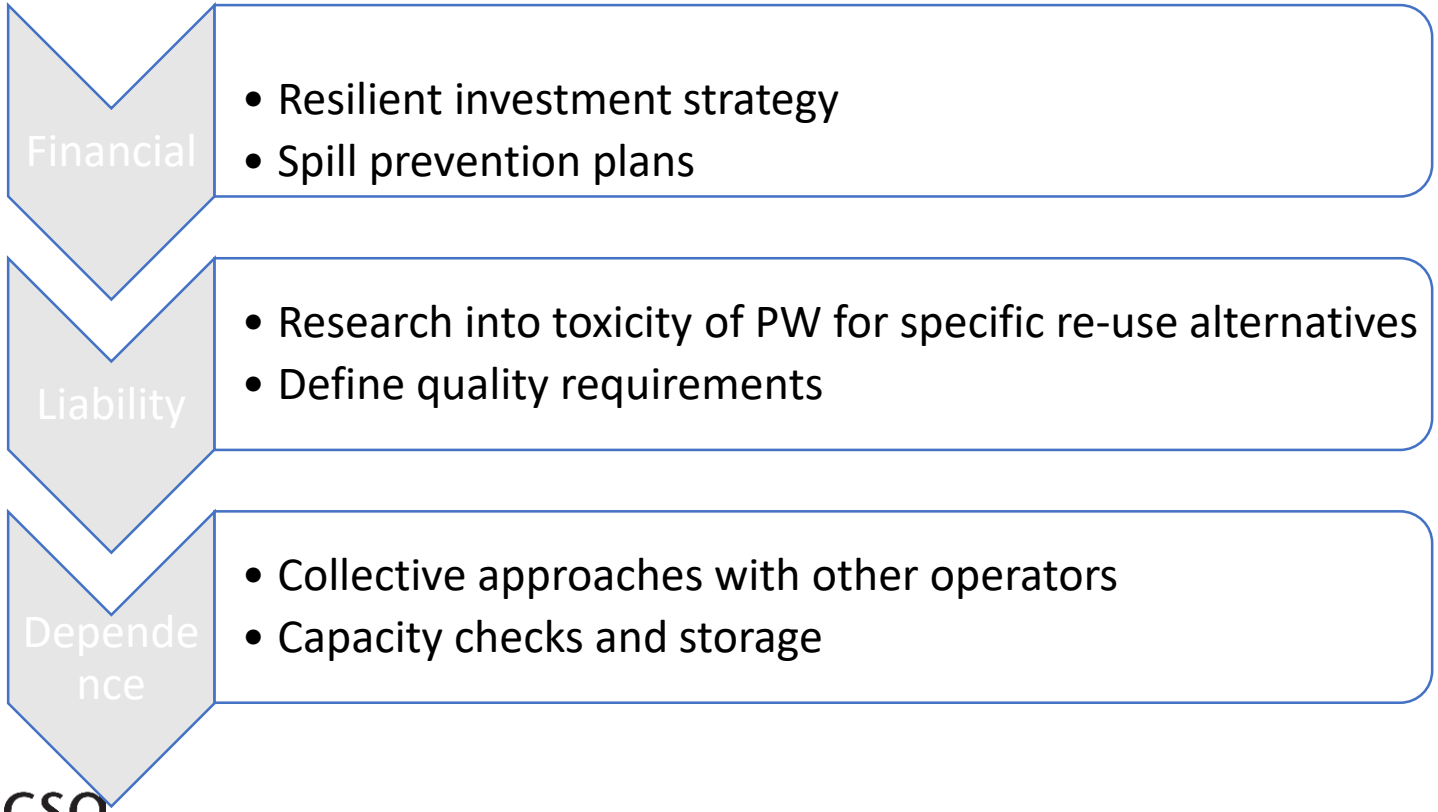
How to mitigate risks



Success factors

Source: WBCSD

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Breakout discussions
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Breakout discussions

Group 1: Best practice clinic

- Shannon Quinn, P&G; , Alfio Mianzan, Shell; Artemis Kostareli, IPIECA

Group 2: Business case for circular water management within circular economy

- Toon Boonekamp, Arcadis

Group 3: True cost & true value of water

- Tatiana Fedotova, WBCSD

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Get engaged!

Check out our resources:

- *Business Guide to Circular Water Management* http://www.wbcsd.org/Clusters/Water/Resources/spotlight-on-reduce-reuse-and-recycle
- *Deep-dive case studies:* https://goo.gl/D49yFt

Share your experience – any circular water management practice to share, let us know!

- Toon Boonekamp, Arcadis - toon.boonekamp@arcadis.com
- Artemis Kostareli, IPIECA - artemis.kostareli@ipieca.org
- Shannon Quinn, P&G - quinn.se@pg.com
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- Sara Traubel, WBCSD – traubel@wbcsd.org

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Thank you