



Presentation from
**2015 World Water
Week in Stockholm**

www.worldwaterweek.org

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Oil and gas sector water management:

From now to 2030

August 2015



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

www.ipieca.org



■ What is IPIECA?

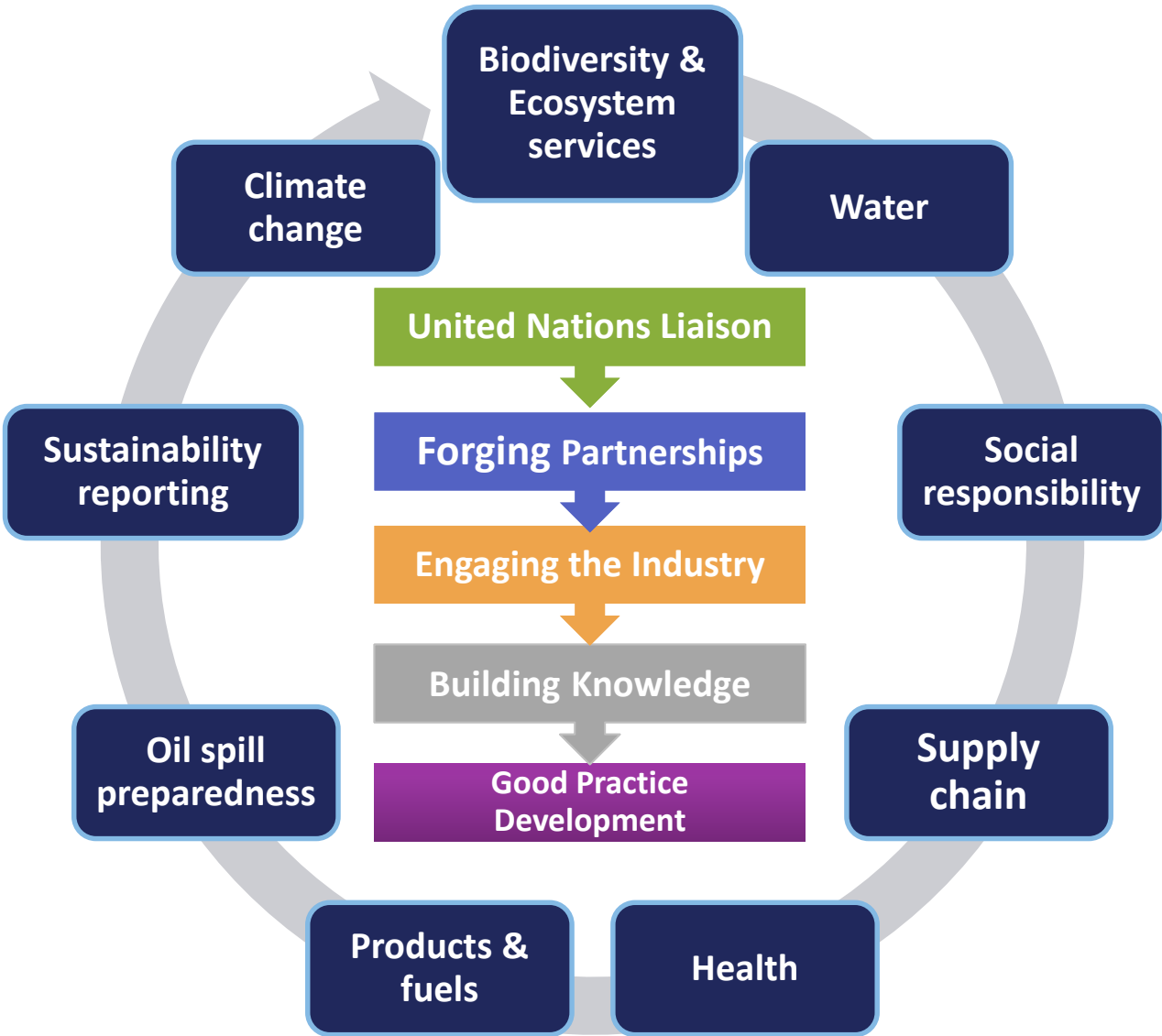
- Global oil and gas association for environmental and social issues
- Formed in 1974 following the launch of UNEP
- The only global association involving both the upstream and downstream oil and gas industry
- Membership covers over half of the world's oil production



■ IPIECA members



■ Scope of Activity



■ Water Visioning - Objective

To build a long term vision (to 2030) for water management in the oil and gas sector

The vision will consider:

- Physical quantity and quality trends and constraints
- Future demand and supply
- Policy and regulatory trends
- SDGs
- Societal expectations
- Technological innovation



■ Overview

PRESENTATIONS

Future Water Challenges: Understanding Future Water Supply and Demand

- Paul Reig, World Resources Institute

American Energy: New Perspectives on the Shale Energy-Water Nexus

- Amy Emmert, American Petroleum Institute

Future Direction of the Oil and Gas Sector in Management Water Resources: NGO Perspective

- Marielle Canter Weikel, Conservation International

Water Management at Shell: Global issues – Local solutions

- Alfio Mianzan, Shell Corporate Environment

DISCUSSION PANEL

Future Challenges: Panel Session

- All Panellists

Summary and wrap up

- Alistair Wyness, IPIECA Water Working Group Chair



WORLD
RESOURCES
INSTITUTE

An aerial photograph of a river delta, likely the Nile Delta, showing the intricate patterns of water channels and sediment. A teal-colored overlay highlights a specific section of the river and its branches. Two thin black lines are drawn across the image, one near the top and one near the bottom, possibly indicating specific areas of interest or data points.

FUTURE WATER CHALLENGES: UNDERSTANDING FUTURE WATER SUPPLY & DEMAND

Paul Reig, WRI
2015 World Water Week

FUTURE WATER CHALLENGES:

UNDERSTANDING FUTURE WATER SUPPLY & DEMAND

1. Data limitations
2. Estimating future water supply and demand
3. Water quantity risks and impacts
4. Water policy & governance



1. DATA LIMITATIONS

- Gaps in regional-scale hydrological data
- Certain types of water data are not collected or reliable
- Water quality data is especially limited or unreliable,
- Some countries or regions still restrict access to water data.
- Some water users and needs are unquantified or unquantifiable



2. ESTIMATING FUTURE WATER SUPPLY & DEMAND

Scenarios of future water supply:

- Impacts from GHG emissions
- Precipitation (Runoff)
- Temperature (ET and PET)
- 4 Representative Concentration Pathways (RCPs)

Scenarios of future water demand:

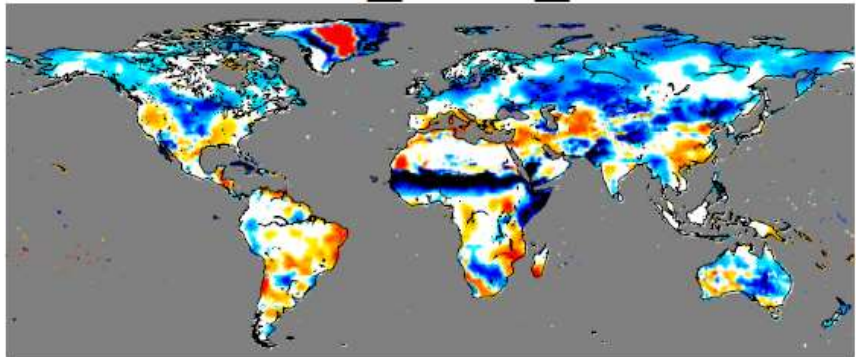
- Impacts from changing population, GDP and urbanization
- Industrial, agricultural, and domestic water demands
- 5 Shared Socioeconomic Pathways (SSPs)



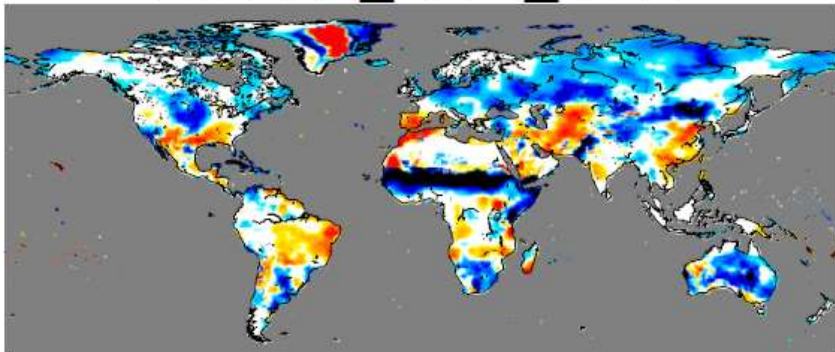
3. WATER QUANTITY RISKS & IMPACTS

Global pattern of change (ratio) in the mean annual runoff from the baseline period (1971–2000) to 2040. Hanasaki et. al (2013)

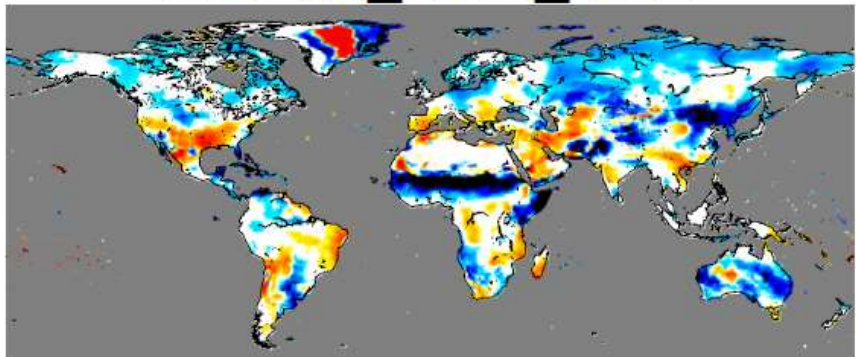
RCP2.6_2011_2040



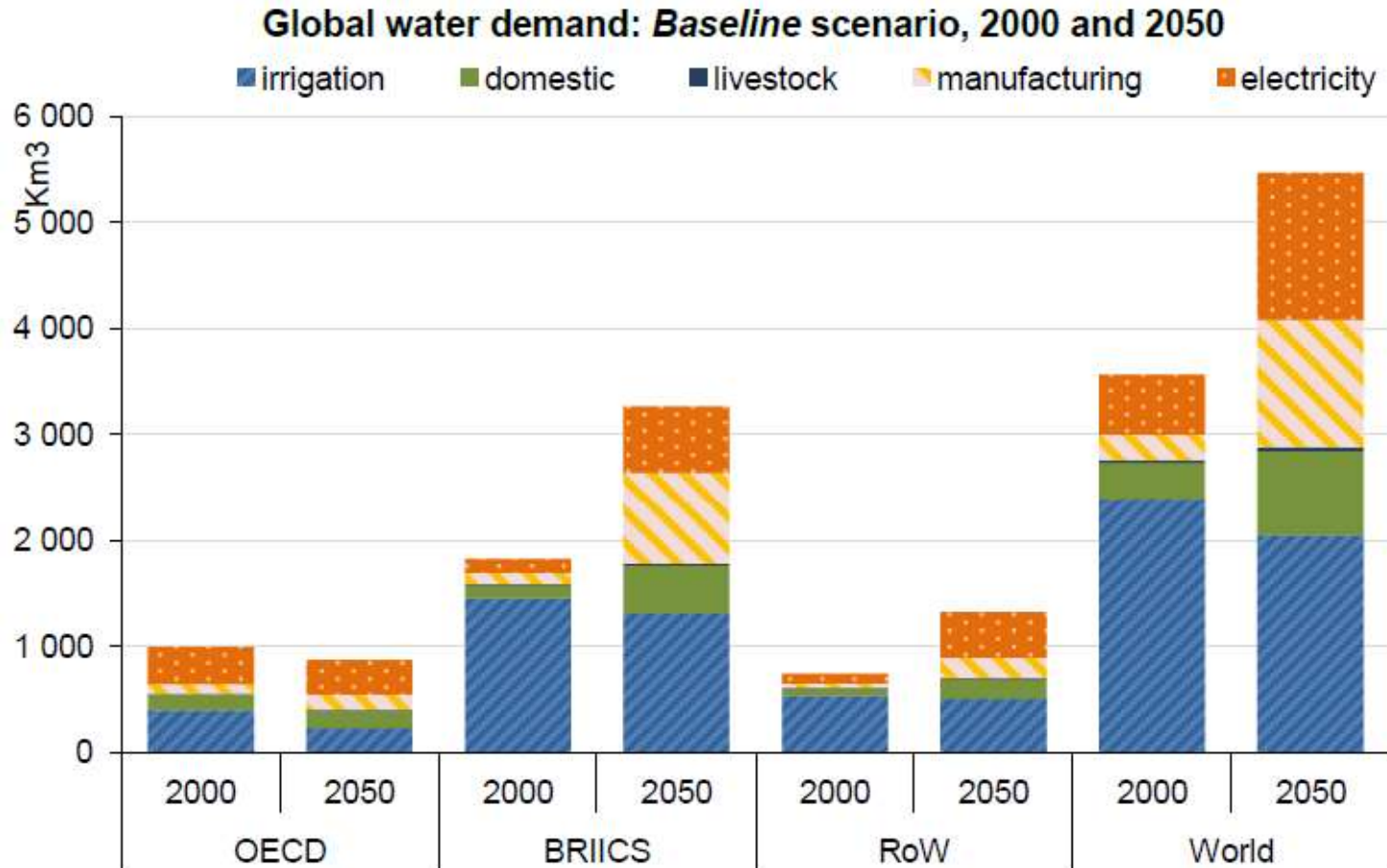
RCP8.5_2011_2040



RCP4.5_2011_2040



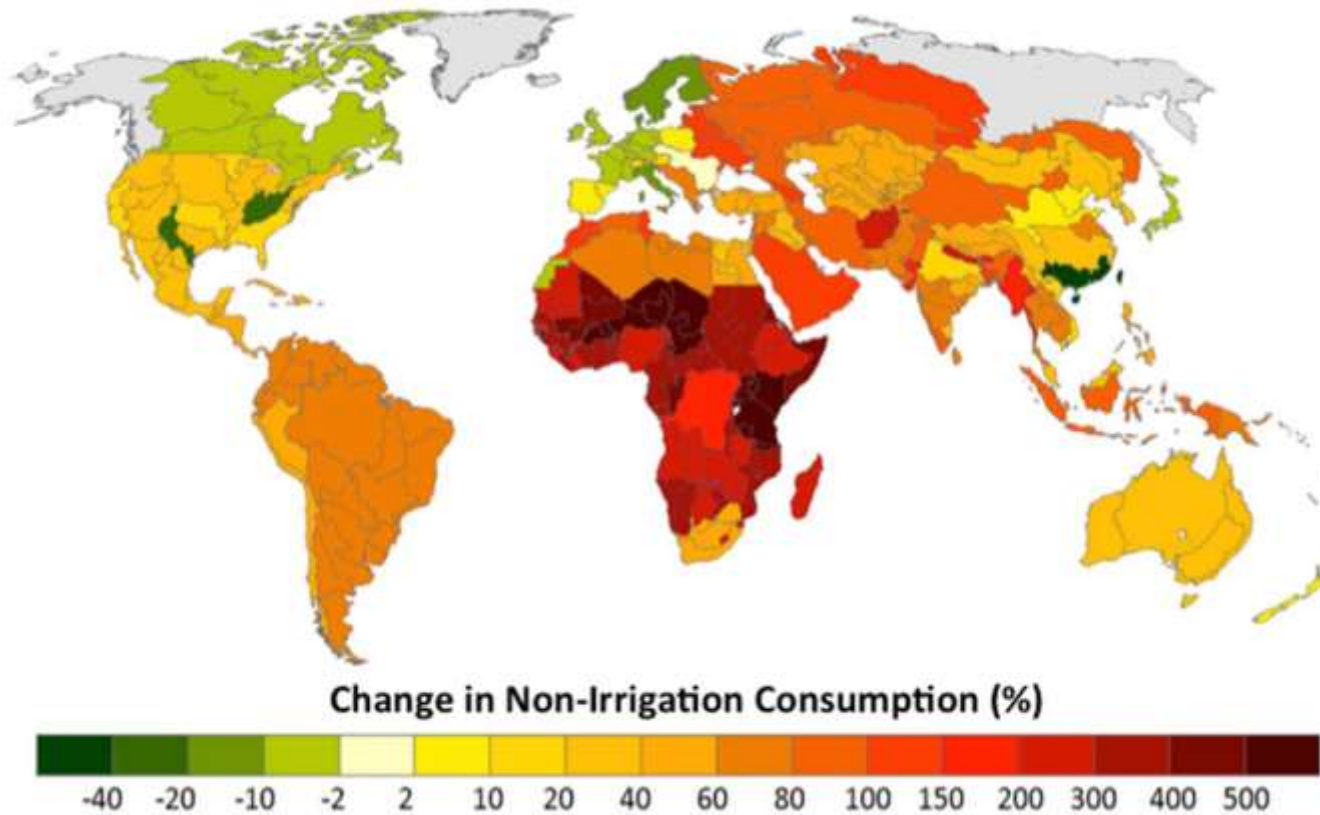
3. WATER QUANTITY RISKS & IMPACTS



Source: OECD (2012)

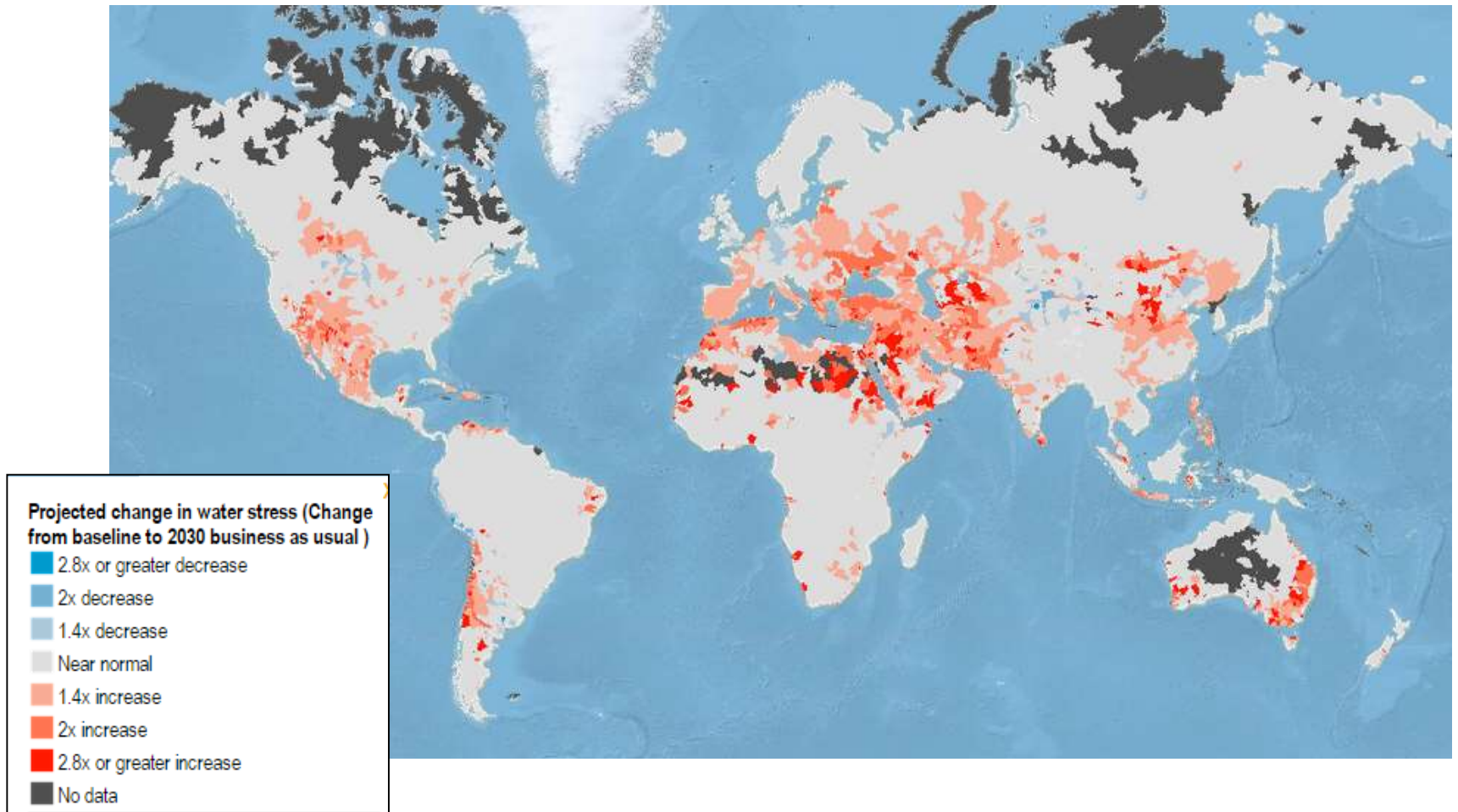


3. WATER QUANTITY RISKS & IMPACTS



Source: MIT (2014)

3. WATER QUANTITY RISKS & IMPACTS



3. WATER QUANTITY RISKS & IMPACTS

The road forward

- Increasing water demands pose the largest threat to water security
- Water managers can intervene by curtailing increases in demand
- Adapting to decreasing water supplies in regions where water is already fully allocated will be a significant challenge.
- Some areas that are not expected to get drier may face increased seasonal variability of water supply.



4. WATER POLICY & GOVERNANCE

Water Trends	Policy Responses
Increasing water demand	<ul style="list-style-type: none">■ Pricing■ Rights & Allocations■ Standards (e.g. Treatment)
Decreasing water supplies	
Declining water quality	
Unmet needs	
Changing expectations	
Climate change	



4. WATER POLICY & GOVERNANCE

Major governance challenges in 17 OECD countries (OECD 2011)

- Funding gap
- Capacity gap
- Policy gap (i.e. fragmentation of responsibilities)
- Boundary Mismatch (i.e. hydrological vs. administrative)
- Information & accountability gaps



RELATED SESSIONS

Monday August 24th 16:00-17:30

Revealing the Value of Water; Room FH 202

Wednesday August 26th, 16:00-17:30

Managing Change: Future Water Stress and Flood Risk Assessment Tools; Room FH 307





For additional information, please contact:

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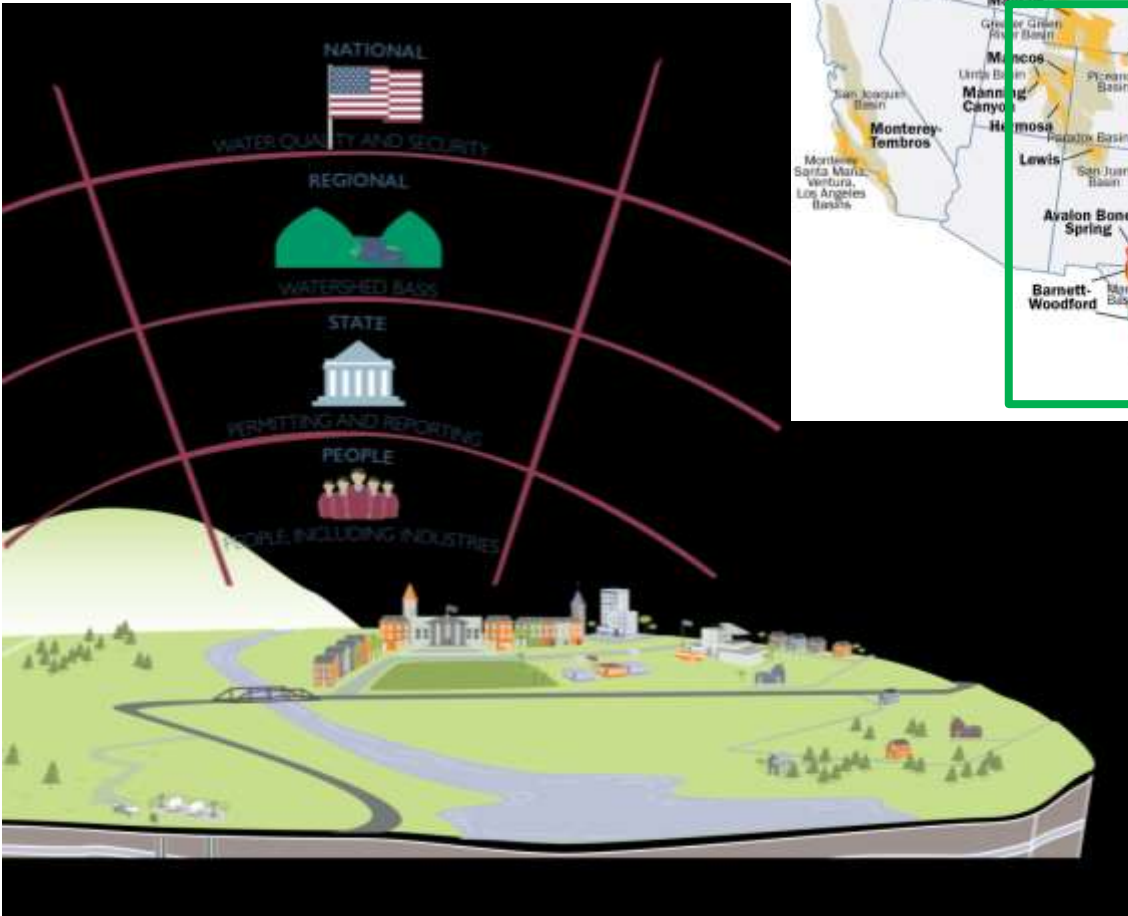
AMERICAN ENERGY:

NEW PERSPECTIVES ON THE SHALE ENERGY – WATER NEXUS



UNDERSTANDING THE U.S. REGULATORY FRAMEWORK

In the U.S., states are the primary regulators of resources – including both mineral development and water use.



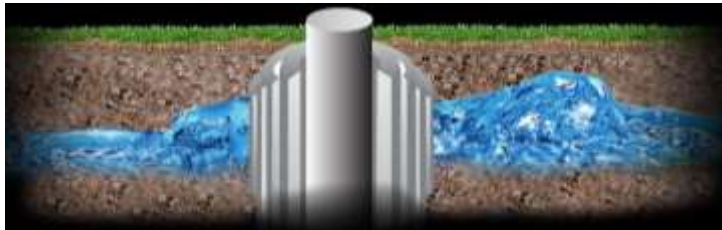
Shale Plays, Lower 48 States



The U.S. approach is consistent with the United Nations Commission on Sustainable Development recommendation that water should be managed at the lowest appropriate level in order to facilitate decentralized decision-making and stakeholder input.

WATER QUALITY : STRONG WELL CONSTRUCTION PROTECTS DRINKING AND GROUNDWATER

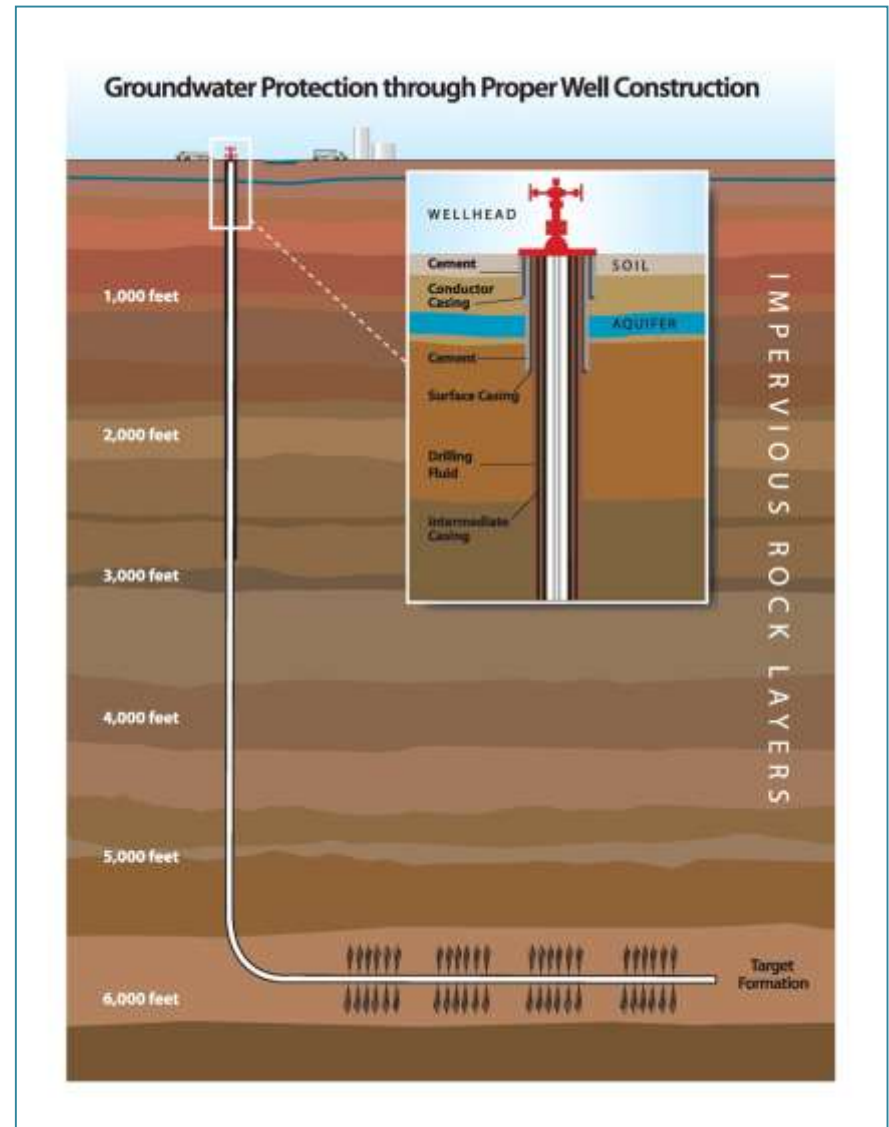
A 2015 draft report by the U.S. Environmental Protection Agency (EPA) confirms that hydraulic fracturing has not led to widespread, systemic impacts on drinking water resources thanks to the safety and effectiveness of state and federal regulations.



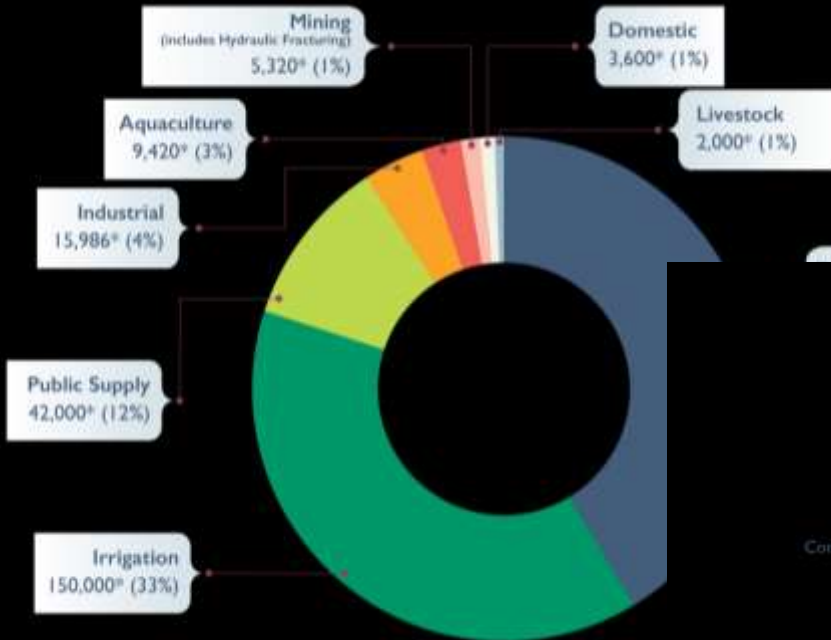
Regulated by Jurisdiction

- **Well construction***: material selection*, performance*, evaluation* – e.g.,
 - Cement regulation*
 - Casing and cementing depth*
 - Cement circulation*
 - Intermediate casing circulation*
 - Production casing circulation*
- **Well integrity***: Protect groundwater through a combination of redundant steel casing and cement sheaths, mechanical isolation devices
- **Well logging and other testing***: data gathering tools for formation evaluation, well design and construction

**Also covered by API Standards, Recommended Practices, or Guidance*



RETURNS ON U.S. WATER INVESTMENTS

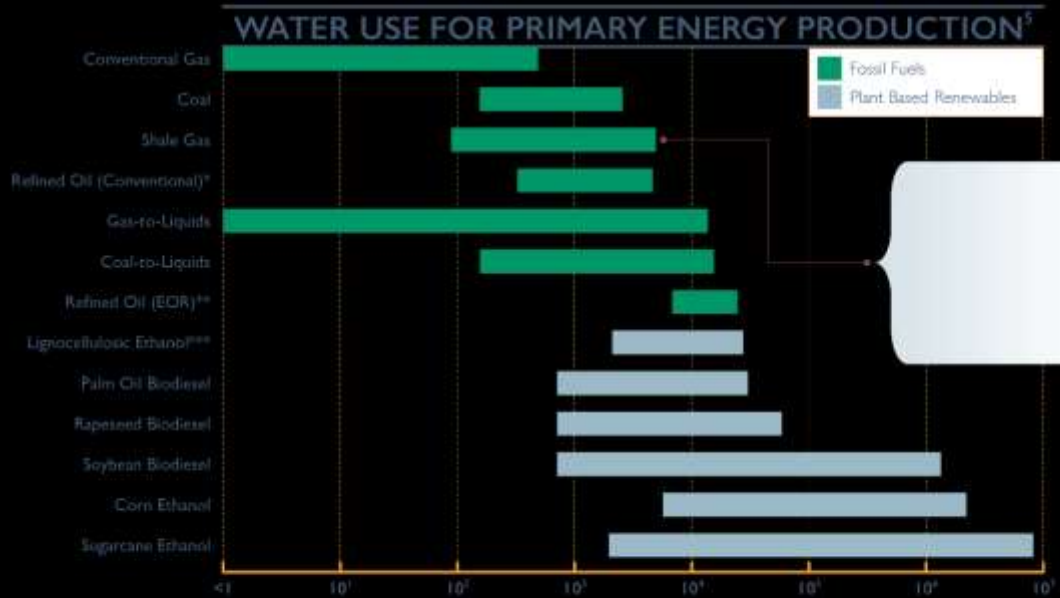


The U.S. oil and natural gas industry produces the hydrocarbon inputs for **56%** of U.S. energy production and **28%** of US electricity generation by using less than **1%** of the country's

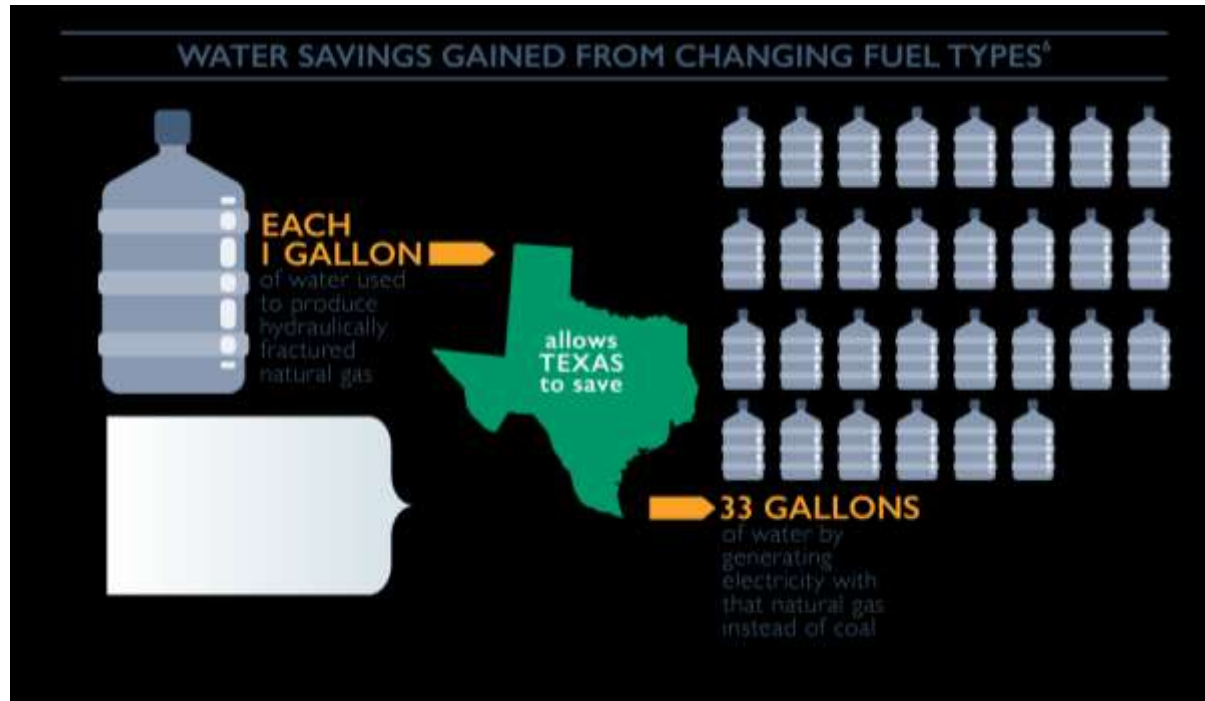
Estimated Use of Water in the United States in 2010, U.S. Geological Survey, Circular 1405

Oil and natural gas are currently relatively water efficient fuels.

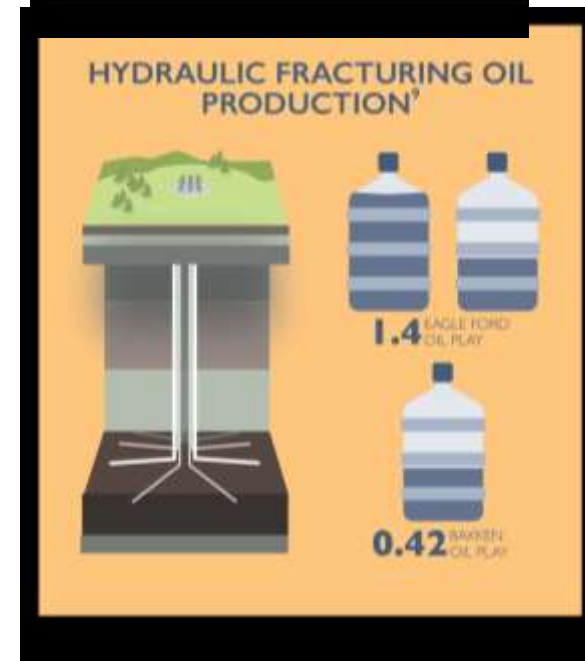
5) Water for Energy: Is Energy Becoming the Thirstier Resource?, International Energy Agency, Excerpt from the World Energy Outlook 2012
 * The minimum is for primary recovery, the maximum is for secondary recovery.
 Includes CO2 injection, steam injection and alkaline injection and in-situ combustion. *Excludes water use for crop residues allocated to food production.
 Notes: Ranges shown are for source-to-carrier primary energy production, which includes withdrawals and consumption for extraction, processing and transport. Water use for biofuels production varies considerably because of differences in irrigation needs among regions and crops; the minimum for each crop represents non-irrigated crops whose only water requirements are for processing into fuels



RETURNS ON WATER INVESTMENTS: HYDRAULIC FRACTURING



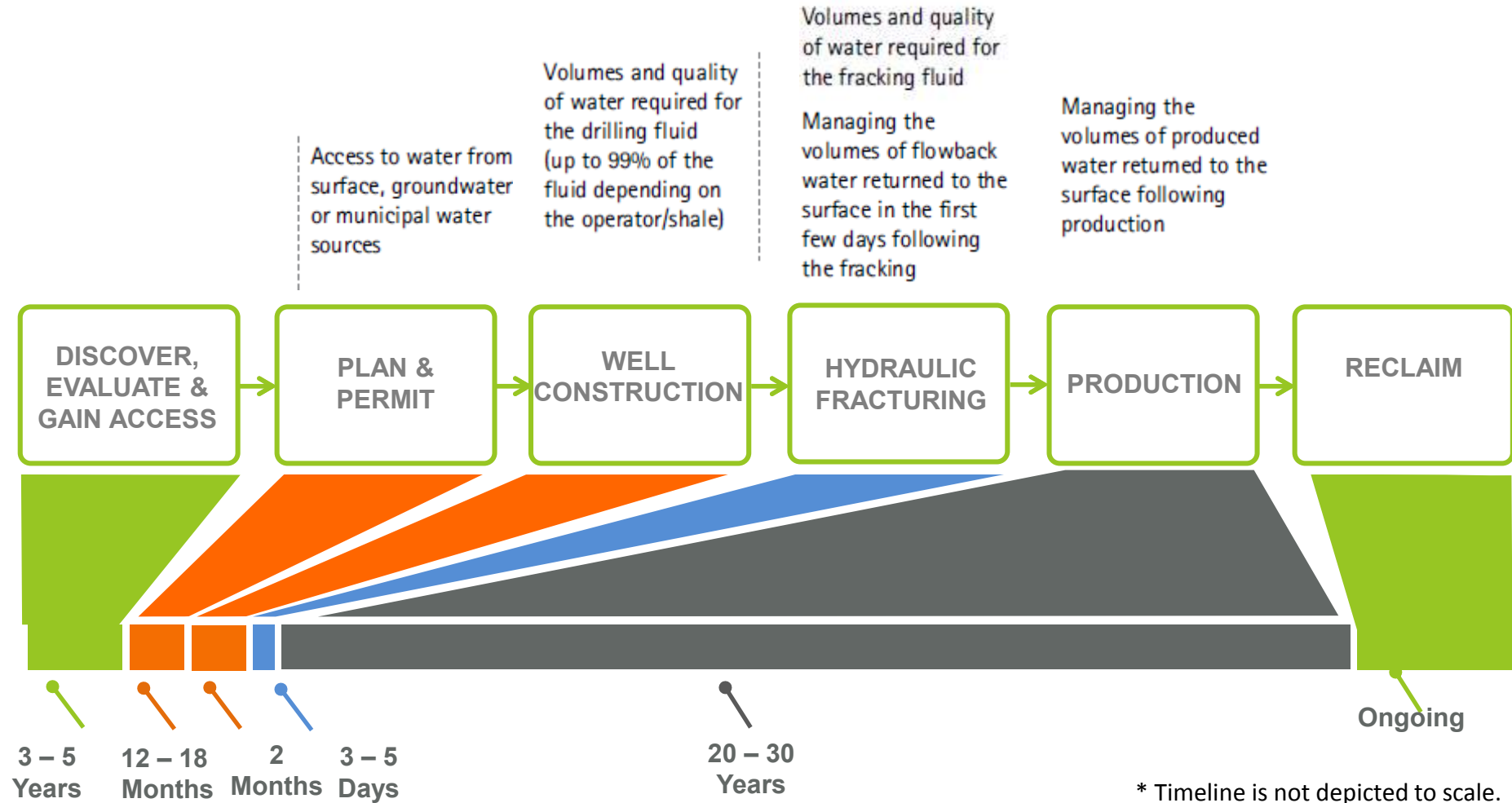
- **Generating electricity from natural gas can result in substantial water benefits; however, hydraulic fracturing is necessary to make accessing those deposits commercially viable.**
- **On a per unit of energy basis, using hydraulic fracturing to recover oil is also more energy efficient.**
- **Without hydraulic fracturing , the U.S. would lose 45 percent of domestic natural gas production within 5 years.**



WATER MANAGEMENT DURING OIL & NATURAL GAS DEVELOPMENT

To learn more, see:

- API HF2: Water Management Associated with Hydraulic Fracturing and
- API RP 100-2: Managing Environmental Aspects Associated with Oil and Gas Operations Including Hydraulic Fracturing



* Timeline is not depicted to scale.

API STANDARDS AND GUIDANCE RELATING TO HYDRAULIC FRACTURING

Overview of Industry | Guidance/Best Practices Supporting Hydraulic Fracturing (HF)

- API Spec 4F Drilling and Well-Servicing Structures
- API RP 4G Drilling and Well-Servicing Structure Inspection and Maintenance
- API Spec 5A Wellhead and Christmas Tree Equipment
- API Spec 7K Drilling Equipment
- API RP 8B Hoisting equipment (Inspection and Maintenance)
- API Spec 8C Hoisting Equipment
- API Spec 16A Drill-through Equipment
- API Spec 16C Casing and KTI Systems
- API Spec 16D Control Systems for Drilling Well Control Equipment
- API RP 16ST Cased Tubing Well Control Equipment Systems
- API Std 53 Blowout Prevention Equipment Systems
- API RP 92U Undersaturated Drilling Operations
- API Std 68B Reliability/Maintenance Data
- API Spec 02 QMS Requirements for Service Organizations for the Petroleum and Natural Gas Industry
- API Spec 12B Production Liquid Storage Tanks (Bolted)
- API Spec 12D Production Liquid Storage Tanks (Field welded)
- API Spec 12F Production Liquid Storage Tanks (Shop welded)
- API Spec 12J Oil and Gas Separators
- API Spec 12K Indirect Type Oilfield Heaters
- API Spec 12L Vertical and Horizontal Emulsion Treaters
- API RP 12N Flame Arresters Operations, Testing and Maintenance

- API Spec 12P Fiberglass Reinforced Plastic Tanks
- API RP 12R1 Production Service Tanks (Inspection and Maintenance)
- API RP 225B Storage Tanks Overfill Protection
- API Pub 4663 Remediation of Salt-Affected Soils
- API Bull 016 Spill Prevention Control and Countermeasure Plan
- API RP 40 Drilling and Servicing Involving Hydrogen Sulfide
- API RP 54 Drilling and Servicing Operations Occupational Safety
- API RP 55 Gas Processing Involving Hydrogen Sulfide
- API RP 59 Well Control Operations
- API RP 64 Overler Systems Equipment and Operations
- API RP 67 Oilfield Explosives Safety
- API RP 68 Oil and Well Servicing and Workover Operations Involving Hydrogen Sulfide
- API RP 74 Production Operations Occupational Safety
- API RP 75L Safety and Environmental Management Systems
- API RP 76 Contractor Safety Management
- API Std 65-2 Isolating Potential Flow Zones
- API RP 90-2 Annular Casing Pressure for Onshore Wells
- API RP 100-1 Well Integrity and Fracture Containment
- API RP 100-2 Environmental Aspects Related to Onshore Operations
- API RP 50 Environmental Protection Natural Gas Processing Plant Practices
- API RP 51R Environmental Protection for Operations

- API RP 52 Environmental Protection Land Drilling Practices
- API Bull E2 NORM Management and Inactive Wells
- API Bull E3 Well Abandonment and Inactive Wells
- API Bull E4 Waste Management
- API Bull HF4 Community Engagement
- API Spec 5L Line Pipe
- API Spec 6D Pipeline Valves
- API RP 6DR Repair and Remanufacture of Pipeline Valves
- API 6FA Flare Testing for Valves
- API Std 1104 Pipeline Welding
- API RP 1110 Steel Pipeline Pressure Testing
- API RP 1133 Guidelines for Onshore Hydrocarbon Pipelines Whetting High Consequence Floodplains
- API RP 1160 Managing System Integrity
- API RP 1162 Public Awareness Programs
- API RP 1169 Pipeline Inspection - New Construction
- API RP 1173 Pipeline SMS
- API Spec 11B Sucker Rods
- API Spec 11E Pumping Units
- API RP 11ER Guarding Pumping Units

- API RP 5A3 Thread Compounds
- API RP 5A5 Casing, Tubing, Drill Pipe Field Inspection
- API Spec 9B Threading, Gauges and Thread Inspection
- API RP 5B1 Thread Gauging and Inspection Practices
- API RP 5C1 Casing and Tubing Care and Use
- API TR 5C3 Tubular Performance property calculations
- API RP 5C5 Casing and Tubing Connections Testing
- API RP 5C6 Welding Connections to Pipe
- API Spec 5CRA Corrosion Resistant Alloy Pipe
- API Spec 5CT Casing and Tubing
- API Spec 5DP Drill Pipe
- API Spec 7-1 Drill Stem Elements
- API Spec 7-2 Rotary Shouldered Connection Threading and Gauge
- API RP 7G Drill Stem Design
- API RP 7G-2 Drill Stem Elements (Inspection and Classification)
- API Spec 16A Well Cements
- API RP 10B-2 Well Cement Testing
- API RP 10B-4 Formed Cement Testing
- API RP 10B-5 Well Cement Shrinkage and Expansion Determination
- API RP 10B-6 Cement Slotic Gel Strength Determination
- API Spec 10D Blow Spring Casing Centralizers
- API RP 10D-2 Centralizer Placement and Slip-Collar Testing
- API RP 10F Cement Float Equipment
- API TR 10TR1 Cement Strength Evaluation
- API TR 10TR2 Cement Shrinkage and Expansion

- API TR 10TR3 Cement Thickening Time Tests
- API TR 10TR4 Selection of Centralizers
- API TR 10TR5 Solid and Rigid Centralizer Testing
- API Spec 13A Drilling Fluids
- API RP 13B-1 Water-based Drilling Fluids Testing
- API RP 13B-2 Oil-based Drilling Fluids Testing
- API RP 13C Drilling Fluids Processing System Evaluation
- API RP 13D Drilling Fluids Rheology
- API RP 13J Drilling Fluids Lab Testing
- API RP 13K Heavy Brine Testing
- API RP 13M Completion Fluids Viscous Properties
- API RP 13M-4 Gravel-pack Fluid Leak-off
- API RP 100 Well Performer Evaluation
- API RP 10C Proppant Properties
- API RP 10D Long-term Conductivity of Proppants
- API Spec 110S Provers and Bridge Plugs
- API Std 1102 Progressing Cavity Pump Systems
- API Std 1103 Progressing Cavity Pump Surface Drive Systems
- API Spec 14A Subsurface Safety Valves
- API RP 14B Subsurface Safety Valves (Inspection and Maintenance)
- API Spec 14L Lock Mandrels and Landing Nipples
- API Spec 10E Side Pocket Manways

API is the world's leading standard-developing organization for the oil and natural gas industry.

Since 1924, API has developed standards for oil and natural gas operations.

API's formal consensus process is accredited by the American National Standards Institute (ANSI), the same institute that accredits U.S. national laboratories for their science and technology processes.

API standards are developed in an open process that requires regular review of its more than 600 standards covering all segments of the industry.

Nearly 200 API standards are cited over 3300 times in state regulations, and more than 100 standards are cited 270 times in federal regulations.

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WITHIN OPERATIONS, WATER CHOICES MAY HAVE TRADE-OFFS



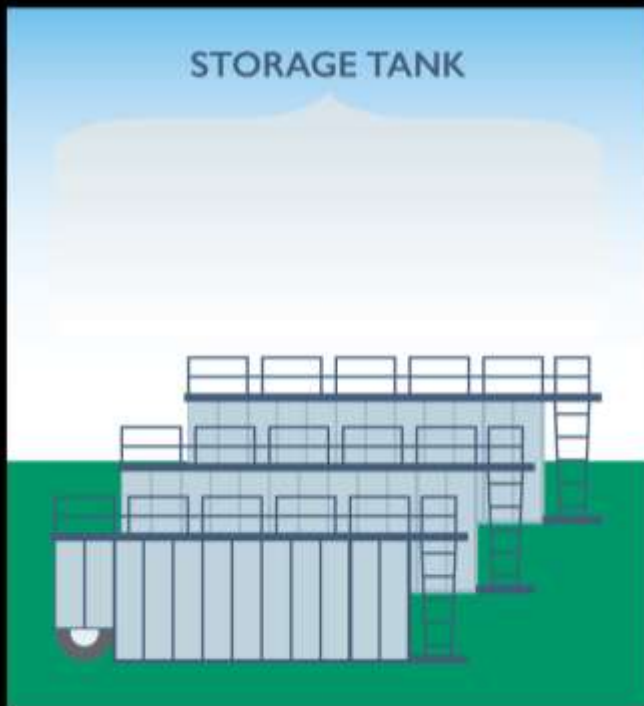
EXAMPLE 1: CROSS-LINK FRACTURE



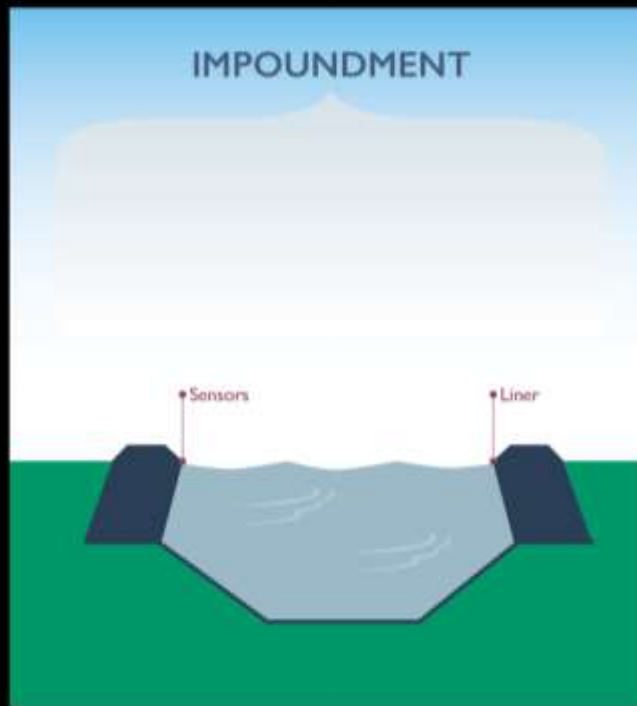
EXAMPLE 2: SLICKWATER FRACTURE



STORAGE TANK



IMPOUNDMENT



- Tanks isolate waters from the environment, creating closed loop systems.
- Impoundments facilitate evaporation, simultaneously returning water to the water cycle and reducing the amount that will need to be transported for treatment or disposal.

WATER TREATMENT TECHNOLOGIES ARE GROWING

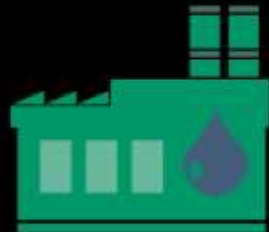
Advances in water treatment technologies increase reuse and recycling opportunities.



Upstream water use represents only **1%** of nationwide water use.



This use has simulated a **\$138 billion** water treatment market that by 2020, is estimated to increase by **\$357 million**"



- Developments
- Mobile vs. Stationary
 - Private vs. Public Investment
 - High Salinity Treatment
 - Groundwater Recovery

Questions?

Contact:

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American Petroleum Institute

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Email: emmerta@api.org



**Get
involved!**

Learn
the facts &
science
of shale energy
development.

Share
what you know
about shale
energy with
others in your
community.

Develop
policies and plans
that enable safe &
responsible
development.

Future Direction of the Oil & Gas Sector in Managing Water Resources:

A NGO Perspective

*Marielle Weikel
August 24, 2015*



Current State of Water Resources

- Water stress and scarcity are increasingly apparent physical effects of climate change, and there are growing pressures on freshwater resources from increasing withdrawals and declining quality (UNEP, 2013).
- The World Economic Forum identified “water crises” as the number one risk in terms of potential impact to the global economy in 2015 (WEF, 2015).
- Under current projections, virtually all freshwater ecosystems and biodiversity will face ecologically significant climate change impacts by the middle of this century, most of which will be detrimental from the perspective of the human livelihoods and communities (*and businesses*) that depend upon them (WWF, 2010).

Freshwater Ecosystems and Biodiversity Risks and Opportunities

- The conservation of freshwater biodiversity is important for the long-term and sustainable supply of raw materials, and to sustain human and ecological communities that depend on it.
- However, the biodiversity value of water resources is not always systematically considered in oil and gas development and/or operations decision-making.
- Only a few of the corporate and water-focused tools and initiatives, including a few tailored to the extractive sector, give attention to the overlap of water and biodiversity and ecosystem services issues.

Trends in Water Management within Oil & Gas Sector

- Companies are increasingly relying on tools and approaches that can help them better identify risks and improve their decision-making processes:
 - IPIECA Global Water Tool
 - GEMI Local Water Tool
 - WRI Aqueduct
- Companies are increasingly making progress in the following areas:
 - Tracking their global freshwater consumption
 - Tracking freshwater intensity
 - Reporting performance (e.g. CDP's Water Disclosure Project)

Opportunities for Water Management Improvement

1. Systematic consideration of not only risks associated with the physical and chemical properties of water resources, but also of impacts to and dependencies on freshwater ecosystems and biodiversity
2. Adoption of water-focused performance targets
3. Adoption of watershed –level stewardship approaches that ensure a clear recognition of the environmental and social dimensions of water management, extend beyond the operational “fence-line”, and take a collaborative approach

1. Freshwater Ecosystems & Biodiversity – *Integrated Biodiversity Assessment Tool (IBAT)*

- Central database for globally recognized biodiversity information:
 - Key Biodiversity Areas
 - Protected Areas
 - Ramsar Sites
 - IUCN Red List - including freshwater-dependent species
- Freshwater enhancements:


Allows decision-makers to access up-to-date information for screening potential site-level risks and opportunities to freshwater biodiversity and ecosystems within a project boundary, thus providing additional insight for decision making.

1. IBAT (continued)

The screenshot displays the IBAT web application interface. At the top, a navigation bar includes links for Home, Map, Country/Territory, IBAT and P56, Data Behind IBAT, Reports, and Downloads. Below this is a toolbar with buttons for Add, Load, Save, Clear, Show buffers, and a Print preview button. The main area is a map of Zimbabwe, showing various geographical features and administrative boundaries. A popup window titled 'Freshwater Biodiversity' is open over the map, displaying the identifier 'Hydroshed AFR_16812' and links for 'Species list', 'GEMI LWT', and 'Report'. On the right side, a 'Base Layers' legend is visible, listing various map layers such as Google Standard Map, Google Terrain Map, Google Satellite Map, Legally Protected Areas (IUCN Categories I-II, III-IV, V-VI, and not reported), Internationally Recognised Areas (World Heritage, Ramsar, Natura 2000, International Other), Priority Sites for Biodiversity (Key Biodiversity Areas, Alliance for Zero Extinction Sites, Unique/Highly Threatened Ecosystems), Species (Species Grid), Freshwater Biodiversity (Draft), Completeness (KBA, WDPA), and Regions of Conservation Importance (Endemic Bird Areas, Biodiversity Hotspots, High Biodiversity Wilderness Areas, WWF Ecoregions, Tiger Conservation Landscapes, Bird Migration Flyways). The map is zoomed in to a scale of 100%.

2. Performance Targets

- Cue from mining sector – Newmont example

 Water targets			
Year	Target definition	Target for sites	Target for Newmont
2015	Implementation of the Water Accounting Framework (WAF)	Complete a WAF	100 percent of sites to have completed a WAF
2016	Percent implementation against the sites' Water Strategy Action Plans	Complete 100 percent of actions and achieve 80 percent of water targets established in the site Water Strategy Action Plan	100 percent of sites complete their action plans for the year and achieve their water targets (80 percent in 2016 and 90 percent in 2017)
2017		Complete 100 percent of actions and achieve 90 percent of water targets established in the site Water Strategy Action Plan	

3. Watershed-Level Approaches

- Alliance for Water Stewardship
- Water Action Hub
- WASH and Freshwater Conservation Guidelines

An aerial photograph showing a wide river winding through a vast, dense forest. The water is calm, reflecting the surrounding greenery. The forest extends to the horizon under a hazy sky.

Marielle Weikel
Senior Director, Responsible Mining and Energy
Conservation International
mcanter@conservation.org

Thank You!





WATER MANAGEMENT AT SHELL GLOBAL ISSUES – LOCAL SOLUTIONS

Alfio Mianzan, Business Improvement Manager -
Water and Green Infrastructure



CAUTIONARY NOTE

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this announcement "Shell", "Shell Group" and "Royal Dutch Shell" are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. Likewise, the words "we", "us" and "our" are also used to refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. "Subsidiaries", "Shell subsidiaries" and "Shell companies" as used in this announcement refer to companies in which Shell either directly or indirectly has control, by having either a majority of the voting rights or the right to exercise a controlling influence. The companies in which Shell has significant influence but not control are referred to as "associated companies" or "associates" and companies in which Shell has joint control are referred to as "jointly controlled entities". In this announcement, associates and jointly controlled entities are also referred to as "equity-accounted investments". The term "Shell interest" is used for convenience to indicate the direct and/or indirect (for example, through our 23 per cent shareholding in Woodside Petroleum Ltd.) ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest.

This announcement contains forward looking statements concerning the financial condition, results of operations and businesses of Shell and the Shell Group. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management's current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Shell and the Shell Group to market risks and statements expressing management's expectations, beliefs, estimates, forecasts, projections and assumptions. These forward looking statements are identified by their use of terms and phrases such as "anticipate", "believe", "could", "estimate", "expect", "goals", "intend", "may", "objectives", "outlook", "plan", "probably", "project", "risks", "seek", "should", "target", "will" and similar terms and phrases. There are a number of factors that could affect the future operations of Shell and the Shell Group and could cause those results to differ materially from those expressed in the forward looking statements included in this announcement, including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Shell's products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share and industry competition; (g) environmental and physical risks; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, fiscal and regulatory developments including regulatory measures addressing climate change; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; and (m) changes in trading conditions. All forward looking statements contained in this announcement are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward looking statements. Additional factors that may affect future results are contained in Shell's 20-F for the year ended 31 December 2014 Royal Dutch Shell's 20-F (available at www.shell.com/investor and www.sec.gov). (These factors also should be considered by the reader. Each forward looking statement speaks only as of the date of this presentation. Neither Shell nor any of its subsidiaries nor the Shell Group undertake any obligation to publicly update or revise any forward looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward looking statements contained in this announcement.

Shell may have used certain terms, such as resources, in this announcement that the SEC strictly prohibits Shell from including in its filings with the SEC. U.S. investors are urged to consider closely the disclosure in Shell's Form 20-F, available on the SEC website www.sec.gov. You can also obtain these forms from the SEC by calling 1-800-SEC-0330.

THE RISING EXTERNAL PROFILE OF WATER



2015

Water crises

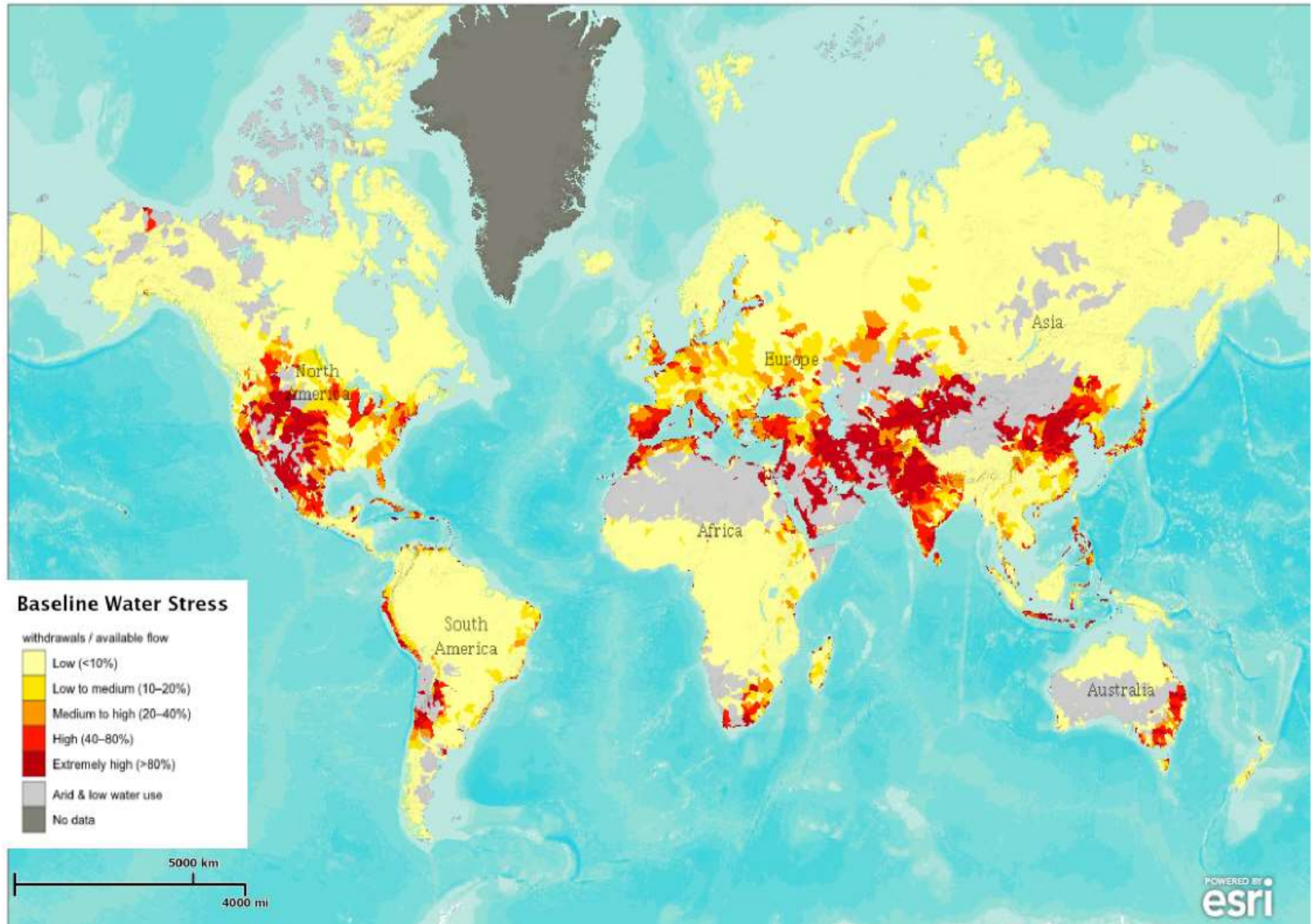
Rapid and massive spread of infectious diseases

Weapons of mass destruction

Interstate conflict with regional consequences

Failure of climate-change adaptation

GLOBAL WATER SCARCITY



STRESS NEXUS



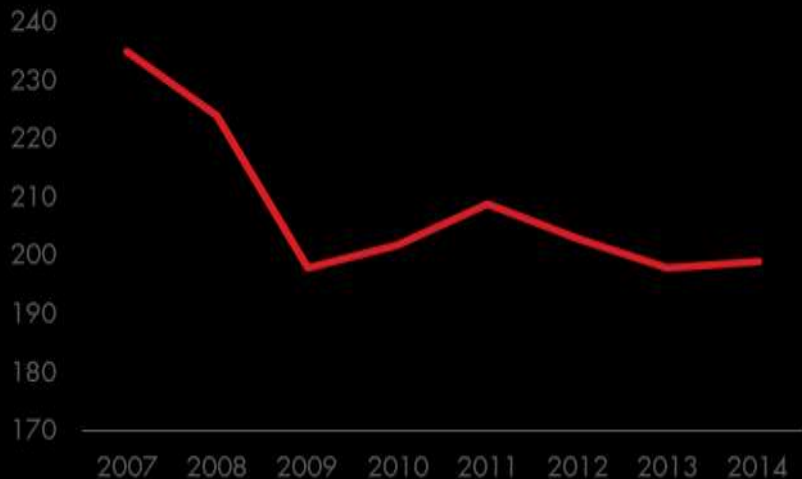
WATER MANAGEMENT

- Water regulation evolving rapidly
- Water management plans
 - water scarce areas
 - future water scarce areas

Centre of Excellence in Bangalore:

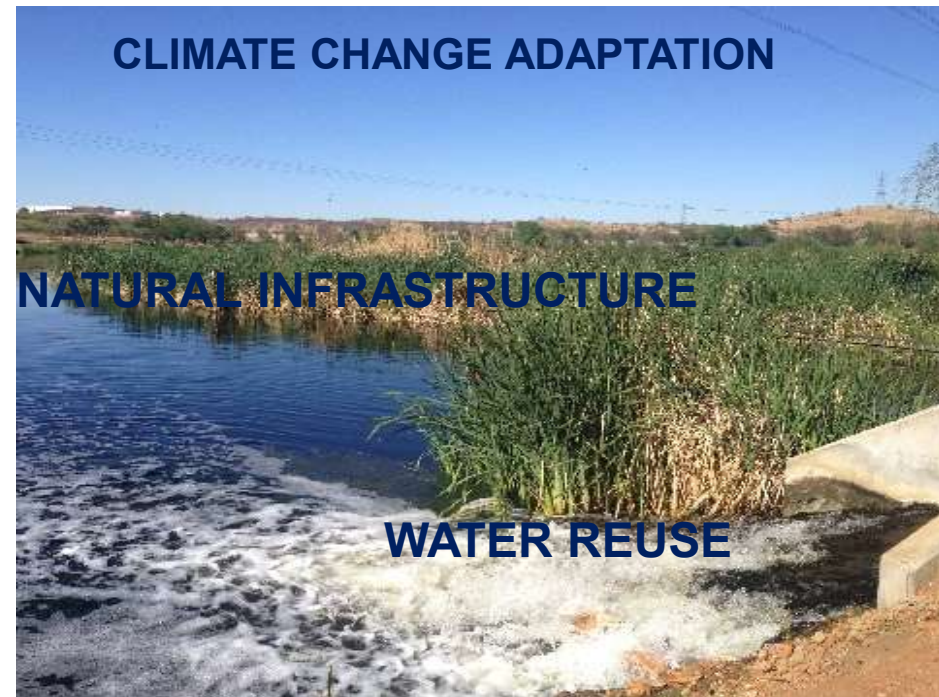
- Integrated project delivery
- Technical support
- Water R&D

Shell fresh water withdrawn



Dawson Creek water reclamation, Groundbirch

COLLABORATION



INNOVATIVE COLLABORATION: WATER RECYCLING AT GROUNDBIRCH





REDUCING FRESHWATER USE: DESALINATION
AT PULAU BUKOM, SINGAPORE

WATER OPPORTUNITIES

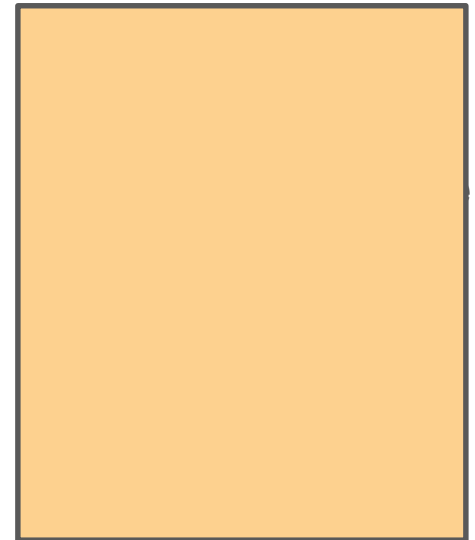
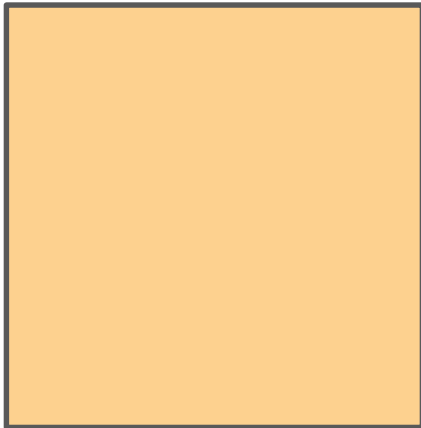
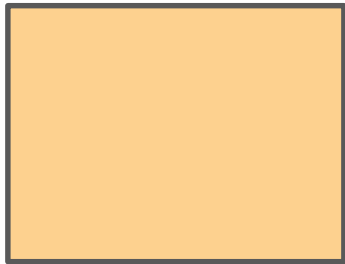


Activities

Water Types

Solutions

Destination



FOR MORE INFORMATION

<http://www.shell.com/global/environment-society/environment/fresh-water.html>



SHELL GLOBAL
Change location

- Environment & Society
- Environment
- Fresh water**
- Shell and fresh water
- Fresh water around the world
- Down the drain... and into energy production
- A natural filter for water
- Making fresh water on a small island
- Future of Energy
- Products & Services
- About Shell

You are here: Home > Environment & Society > Environment > **Fresh water**

Fresh water



Few natural resources are as essential for human development as fresh water, and its importance will only rise as the world's population increases and developing economies continue to grow. The world is not running out of water, but it is not always available where people need it or in a form that is easy to use. At Shell, we are taking steps to manage our use of fresh water in a responsible and sustainable way, with tailored local and regional solutions.



Shell and fresh water

We are taking steps to manage our use of fresh water in a responsible and sustainable way.



Fresh water around the world

Discover examples of how we save, reuse and recycle water.



Down the drain... and into energy production

In an unusual arrangement with the City of Dawson Creek, Shell engineers in Canada are using treated waste water instead of precious fresh water to make natural gas wells productive.



A natural filter for water

Extracting oil sometimes produces a lot of water, which must be carefully cleaned before it is disposed of. In the desert of Oman, reeds are now used to filter this water naturally before it evaporates in the sun.





Future Challenges:

Panel Discussion

Alistair Wyness
Water WG Chair

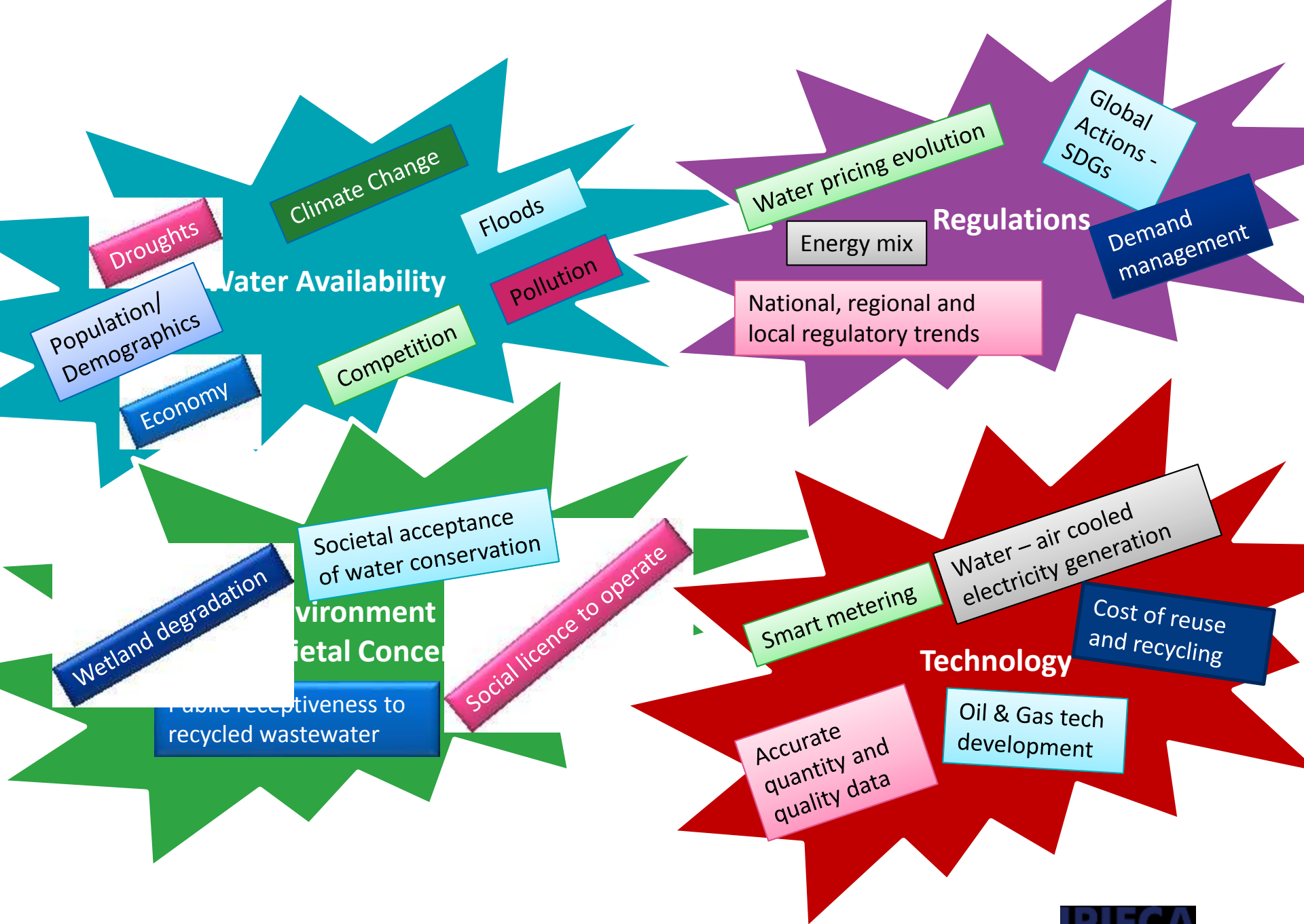
August 2015



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AND SOCIAL ISSUES

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■ Key future challenges

As prioritised by the IPIECA water working group

- Demand – supply imbalance, affected by population, economy and climate change
- Water price & value evolution
- Societal and environmental pressures
- Technical development to improve agricultural and industrial water efficiencies?
- Regulations (global, national, regional, local)
- Overlap between areas of oil & gas development & water stress/scarcity



Summary:

Wrap Up

Alistair Wyness
Water WG Chair

August 2015



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■ For More Information

<http://www.iecea.org/focus-area/water>

The screenshot displays the IPIECA website interface. At the top left is the IPIECA logo. To the right, there are links for 'Welcome', 'Sign in', and 'Register', along with language options: 'Français', 'Español', 'Português', 'Русский', and '简体中文'. Below this is a navigation bar with links for 'HOME', 'ABOUT US', 'NEWS', 'FOCUS AREAS', 'EVENTS', 'LIBRARY', 'MEMBERS' AREA', and '40TH ANNIVERSARY'. A search bar is located on the right side of the navigation bar.

The main content area is titled 'Water' under the 'Focus areas' section. The text describes IPIECA's multi-disciplinary Water Working Group, established in 2008, which aims to improve understanding of water as an important resource along the oil and gas supply chain. It includes producing guidelines for upstream fresh water management, promoting consistency in identification of water risk, sharing good practice, and promoting consistent freshwater reporting.

Below the main text are three columns: 'The issue' with an image of a river, 'IPIECA activities' with an image of a facility, and 'Member action' with an image of an industrial site.

On the right side of the page, there are sections for 'Water resources', 'Good practice guidance' (with a link to view water good practice guidance), 'Latest news' (with a list of recent news items), and 'Events' (with a note for members to login or register to view events).

Focus areas


- ▶ Biodiversity and ecosystem services
- ▶ Climate change
- ▶ Fuels and products
- ▶ Health
- ▶ Oil spill preparedness
- ▶ Reporting
- ▶ Social responsibility
- ▶ Water
 - ▶ Water Management Framework
 - ▶ Global Water Tool
 - ▶ Local Water Tool
 - ▶ Case studies

Home » Focus areas » Water


Water

IPIECA's multi-disciplinary Water Working Group, established in 2008, aims to improve understanding of how and why water is an important resource along the oil and gas supply chain. This includes producing guidelines for upstream fresh water management, promoting greater consistency in identification of water risk at the global and local scale, sharing good practice, and promoting consistent freshwater reporting.


The issue



IPIECA activities



Member action



Water resources

Good practice guidance

[View water good practice guidance.](#)

Latest news

- 10-Mar-15 WBCSD releases an updated version of the Global Water Tool
- 17-Dec-14 IPIECA member case studies on use of water risk tools
- 29-Oct-14 Launch of the CEO Water Mandate
- 29-Oct-14 New IPIECA guidance on efficiency in water use

Events

Members please login or register to view all available events.