

The role of water in the low-carbon transition

CDP policy briefing 2016

Written on behalf of 643 investors with US\$67 trillion in assets



Water is Climate

Integrating water into climate policy is key to achieving long-term, sustainable economic growth.

There is nothing for policymakers to lose - and a great deal for them to gain - from fully integrating water into climate policy and facilitating the private sector to adopt a similarly integrated approach. Like land and energy, water is one of the natural resource 'building blocks' of sustainable development. This entails both risks and opportunities:

▼ GHG emissions

53% of companies responding to CDP in 2016 say they are realizing GHG reductions as a direct result of improvements to water management. And analysis of all the emissions reduction activities reported to CDP found that 24% are dependent on a stable supply of water;

▼ Access to energy

The World Bank's Thirsty Energy Initiative finds that "current energy planning and production is

often made without taking into account existing and future water constraints"¹. This is reflected in disclosures to CDP in 2016: more than a third (37%) of energy companies reporting to CDP say that they do not evaluate how water risk could impact their business in the future. Within the utility sector, that figure is one in five. This lack of strategic foresight constrains the ability to deliver on low-carbon energy targets set out in the NDCs²;

▼ Economic growth

The World Bank reports that water security, exacerbated by climate change, could cost some of the world's regions up to 6% of GDP by 2050³. They also report that better water resource management and policy could improve the growth rates of some regions by up to 6%.



1. World Bank 2016, "High and Dry: Climate Change, Water and the Economy", <http://www.worldbank.org/en/topic/water/publication/high-and-dry-climate-change-water-and-the-economy>

2. NDCs stands for Nationally Determined Contributions: the emissions reduction targets published by each signatory to the COP21 Paris agreement.

3. World Bank 2016, "High and Dry: Climate Change, Water and the Economy", <http://www.worldbank.org/en/topic/water/publication/high-and-dry-climate-change-water-and-the-economy>

The role of water in moving the world to a low-carbon future

The Paris Agreement and the associated NDCs have set the world on a course of rapid decarbonization and adaptation to changes in the world's climate. But water is needed to achieve these commitments. Meanwhile, global demand for water may outstrip supply by a margin of 40% by 2030⁴.

Being efficient in the way we use natural resources, including water and energy is a key element in our Sustainability Strategy. However, efforts to reduce water need often lead to higher energy demands and, thus, higher carbon emissions.

Endesa

Water availability has the potential to either enhance or derail national climate change adaptation and mitigation plans.

Climate NDCs plan for a large-scale shift and expansion of energy generation capacity using technologies that often require a stable supply of good quality water. A UNFCCC platform survey of 162 NDCs indicated that improved water security was fundamental to the success of almost all of them⁵.

Other constituencies that may make a claim on the same water supplies include citizens, agriculture (including food and biofuels), natural ecosystems, and alternative industrial uses. Future water policy must address prioritisation between these potential users.

Given the risks and opportunities, a holistic approach to water management at national level is needed to ensure that all actors can take effective action to support NDCs and implement the Paris goals.

The low-carbon industrial transformation requires water

Climate change mitigation requires investment in long-term infrastructure that will have an operational lifetime spanning many decades, and water requirements for energy generation will increase by 11.2% by 2050⁶ if current consumption modes remain unchanged.

Companies are acutely aware that water availability will be vital to the success of corporate decarbonization efforts: **24% of the emissions reduction activities reported to CDP in 2016 depend on a stable supply of water.** They also recognize that efforts to conserve water can have a positive impact on GHG emission reductions: **53% of responding companies say they are realizing GHG reductions as a direct result of improvements to water management.**

Company examples

- ▶ **Harmony Gold Mining Co Ltd.** has a group-wide goal to achieve zero water discharge at all of its operations by 2018. Achieving this target means that water that would have been discharged must be treated at an on-site facility, increasing electricity consumption and thereby, GHG emissions;
- ▶ **Endesa** reports that many current activities carried out to reduce GHG emissions require large amounts of water, increasing the company's dependence on and thus exposure to water-related risks. For example, Carbon Capture and Storage Technology (CCS) would allow the company to generate electricity from coal with nearly zero emissions, but would increase power plant's water needs and dependencies;
- ▶ CDP investment analysis⁷ of 12 of the largest and highest-emitting global cement companies found that across the companies, more than 50% of facilities are currently located in areas of water stress.

4. World Resources Group 2009, "Charting our Water Future", http://www.mckinsey.com/~media/mckinsey/dotcom/client_service/sustainability/pdfs/charting%20our%20water%20future/charting_our_water_future_full_report_ashx

5. Review of the integration of water within the Intended Determined Contributions (INDCs) for COP21. File: http://www.partenariat-francais-eau.fr/en/wp-content/uploads/sites/2/2016/05/2016-06_-_Review-of-Water-Integration-in-INDC-.pdf

6. "Managing Water under Uncertainty and Risk", United Nations World Water Assessment Programme 2012, http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/WWAP_WWDR4%20Facts%20and%20Figures.pdf

7. CDP 2016, "Visible Cracks", <https://www.cdp.net/Docs/investor/2016/cement-report-exec-summary-2016.pdf>

Technology focus: Carbon Capture and Storage

Carbon Capture and Storage (CCS) offers a potential technical solution for reducing GHGs in business sectors that are dependent on fossil fuels. Scaling up the use of CCS technology globally is an assumption for RCP 2.6, the most commonly used IPCC scenario for reducing GHG emissions via policy and technological means. However, CCS is highly water-intensive and studies suggest that its scaled-up application could lead to the energy sector's demand for water exceeding the available supply.

For example, while CCS could cut the GHG emissions of pulverized-coal-fired power plants by 80 to 90 percent, it could lead to a doubling in water consumption⁸. Scaling up CCS in the United States could increase the water consumption of the electricity sector by 80% by 2030, or about 7,500 megaliters per day, according to research by the US Department of Energy's National Energy Technology Laboratory⁹.

This extremely high demand would compete with the needs of other users including citizens, farmers and the local ecosystem. Politically, trade-offs would be required, and given the strength of other claims on water resources it is not clear that a full scale-up of CCS would be possible.

Transforming the global energy mix

A shift in energy generation is key to reducing emissions. But some renewable energy technologies are more water-intensive than others.

The IEA reports that “energy efficiency, wind and solar photo voltaic contribute to a low-carbon energy future without intensifying water demands significantly”¹⁰. They go on to report however, that several other low-carbon energy technologies – nuclear power, power plants fitted with CCS equipment and certain types of concentrating solar power – can be highly water-intensive.

For hydroelectric generation in particular, water availability is critical, and the lack of a stable water supply can affect countries where hydropower contributes a significant proportion of the energy mix. For example, companies operating in Brazil and South Africa reported to CDP that recent droughts in these countries resulted in heavy financial costs.

▼ The drought in Brazil pushed up water costs by US\$2.1 million in 2015 for **General Motors Company**, while at the same time the reduced availability of hydropower increased electricity costs by US\$5.9 million. The company responded by increasing their water conservation efforts and energy efficiency measures.

▼ **Hewlett-Packard** reports a US\$5 million increase in electricity costs due to the drought in Brazil and their reliance on hydropower.

▼ **Associated British Foods** and **Tongaat Hulett** report that the severe drought in South Africa cost them US\$35 million and US\$23 million respectively over the course of the CDP reporting year.

Another area where renewable energy poses great demands on water supply is biofuel crops. Future water needs for biofuels will depend largely on whether feedstock crops come from irrigated or rain-fed lands and the extent to which advanced biofuels – whose feedstock crops tend to be less water-intensive – penetrate markets¹¹. Climate policymakers must consider these issues if they are to develop successful national climate mitigation policies.

At our manufacturing facility in Sao Paulo, Brazil, electricity costs rose 32% between January and July 2015, due to local reliance on hydropower and local drought conditions. We were forced to truck water to the site due to inadequate municipal volumes.

Kellogg Company

8. World Resources Group, January 2015, Opportunities to reduce water use and greenhouse gas emission in the Chinese power sector, http://www.wri.org/sites/default/files/ghg-chinese-power-sector-issuebrief_1.pdf

9. National Energy Technology Laboratory research cited in “The Water Cost of Carbon Capture”, <http://spectrum.ieee.org/energy/environment/the-water-cost-of-carbon-capture>

10. IEA 2012, “Water for Energy: Is energy becoming a thirstier resource?”, http://www.worldenergyoutlook.org/media/weowebiste/2012/WEO_2012_Water_Excprpt.pdf

11. Ibid

Industrial synergies can help meet climate and water goals

There is good news: companies are already reporting that sound water management can reduce emissions and enhance the low-carbon transition.

Disclosures to CDP's water program in 2016 show that 53% of responding companies say they are realizing GHG reductions as a direct result of improvements to water management. With proper attention and consideration, water security can be transformed from a limiting factor into an enhancing one that galvanizes energy efficiency.

▼ Consumer staples giant **Nestlé SA** reduced their emissions by more than 80,000 tons of CO₂e in 2015, all while using 1.7 million m³ less water.

▼ By replacing brass with stainless steel in its products, **Assa Abloy Group** avoided energy- and water-intensive plating processes.

▼ Japan's **Suntory Beverage & Food Ltd** notes that a "significant amount of energy is used for pumping water and controlling water temperature", and has set a target of reducing water use by unit of production by 42% by 2020, compared with 2007. It cites reduced energy and GHG emissions as a direct co-benefit.



Conclusion and recommendations

Sound and effective water governance is essential for driving dynamic, low carbon economic growth. Climate policy that integrates water issues provides great opportunities for sustainable development.

Climate NDCs and the Sustainable Development Goals both acknowledge the role that governments and private sector actors must play in water stewardship, in order to achieve a sustainable, low-carbon future.

However, this awareness is still incomplete. Not all of the institutions and actors responsible for implementing NDCs have fully taken water availability issues into account. And not all companies are following the sector leaders in their approach to

integrating water and energy/climate goals to minimise trade-offs and maximise synergies.

Integrating water into the mitigation strategies of NDCs will benefit governments and businesses alike. Companies must consider the role that water plays in the planning and implementation of GHG emissions reductions activities. These activities in turn affect policymakers' ability to create effective climate and water policies.

CDP recommends that governments and policymakers:

- 1. Ensure that effective regulation of water use and sound water governance is considered to be part of the climate policy process and constitutes part of the national implementation plan for each NDC;**
- 2. Ensure the private sector considers both water and climate resilience in GHG emission reduction plans. Business should be encouraged and expected to identify and implement GHG mitigation and adaptation opportunities related to improved water management;**
- 3. Require annual reporting of action by business, for example via the Business Alliance for Water and Climate; recognizing the value of transparency in driving corporate action and investment, and helping policymakers to track national progress against NDCs and SDGs.**



CDP Contacts

Paul Dickinson
Executive Chairman

Paul Simpson
Chief Executive Officer

Frances Way
Co-Chief Operating Officer

Sue Howells
Co-Chief Operating Officer

Cate Lamb
Director of Programs

Morgan Gillespy
Head of Water

Orlaith Delargy
Program Manager, Water

James Lott
Senior Program Officer, Water

Kate Levick
Director of Policy and Regulation,
Government

Shirin Reuvers
Manager, Policy & Public Affairs

CDP UK

Third Floor, The Quadrant
4 Thomas More Square
London E1W 1YW
Tel: +44 (0) 20 3818 3900

@cdp
info@cdp.net
www.cdp.net

CDP Board of Trustees

Chairman: Alan Brown
Wellcome Trust

Jane Ambachtsheer
Mercer Responsible Investment

Jeremy Burke
UK Green Investment Bank

Jeremy Smith

Kate Hampton
Children's Investment Fund
Foundation

Takejiro Sueyoshi

Martin Wise
Relationship Capital Partners

CDP Advisors

Lord Adair Turner

Neil Morisetti

Tessa Tennant

For access to a database of public responses for analysis, benchmarking and learning best practices, please contact reporterservices@cdp.net.

This report is available for download from www.cdp.net.
