Briefing

Climate change, water

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Policy pointers

Maintaining public acceptance of large hydropower requires filtering out potentially damaging projects and embracing contemporary best practice to manage environmental and social risk.

The voluntary Compliance Report Template used by EU ETS states to assess 'respect' for the World Commission on Dams' (2000) framework is not effective in avoiding or mitigating social and environmental risks or in improving public acceptance.

The European Union should seize opportunities to link with other emerging carbon markets and adopt the multi-stakeholder HSAP, to promote and guide more sustainable hydropower projects (from the earliest planning stages right through to operation).

Large hydropower, with its ability to provide national grid 'base load', should complement, not compete with, other renewables in the global transition to clean energy.

Hydropower sustainability assessments can unlock carbon financing

Public funding of hydropower through multilateral channels has grown, but many OECD governments are reluctant to expand support through carbon financing schemes, largely due to controversy over dams' environmental and social impacts. The EU Emissions Trading Scheme finances large hydropower only if it "respects" the World Commission on Dams' (2000) framework on sustainability. But the compliance procedures currently used to measure this are inadequate. Instead, market regulators should require use of the Hydropower Sustainability Assessment Protocol (HSAP). The HSAP can help realise lawmakers' aspirations to use OECD support only for socially and environmentally acceptable hydropower and to foster renewable energy resources that complement each other. Although a HSAP costs US$80–150,000 this would not be a financial barrier to accessing the EU ETS when carbon prices rise beyond US$6 per tonne.

The 'dam debate'

By 2012, hydropower accounted for 2.4 per cent of the world's primary energy supply,[1] 16.2 per cent of electricity supply and around 85 per cent of global renewable electricity.[2] As measures are negotiated at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change to prevent dangerous climate change, and amid increasing energy demand, hydropower remains a way to generate power with low greenhouse gas emissions[3] and so displace fossil fuels. Unlike solar or wind, hydropower can provide a variety of essential power services including supplying base load to national grids and so enabling greater flexibility in the use of other intermittent renewables.

But badly planned or sited dams can significantly harm local communities and river basin ecosystems, and have sparked iconic battles for social justice.[4] Faced with extensive lobbying from human rights and environmental organisations, OECD governments have increasingly scaled back bilateral support for large hydropower, often adopting a 'small hydro is good, large hydro is bad'[5] approach.

In 'the dam debate', large hydro is either part of a long-term climate friendly energy solution or a high-risk and dangerous technology, damaging communities and the environment. OECD countries do not yet appear confident in their ability to regulate in favour of the former. One exception is the European Union Emissions Trading Scheme (EU ETS),[6] which contributes to the global Clean Development Mechanism (CDM). Since 2004, it has taken an innovative approach[7] by accepting large hydropower credits

(>20MW) if it "respects" the World Commission on Dams (WCD)[8] framework, designed to avoid the pitfalls of previous damaging projects.

The HSAP offers a hydropower-specific monitoring scheme that allows transparency

Global CDM and EU ETS portfolios

The power sector accounts for over 75 per cent of registered projects within the Clean Development Mechanism (CDM),[9] and most of these are renewable energy projects. Together, wind and hydropower comprise over half of total registered CDM projects (Figure 1) and are expected to deliver 52 per cent of emissions reductions by 2030 (Figure 2).[10]

According to the UNEP DTU CDM pipeline database, 2,064 hydropower projects have successfully registered with the CDM Executive Board, with European states supporting over half of these. Over the decade from 2005 to 2015, CDM and EU ETS mechanisms have been the largest form of OECD bilateral support for hydropower (in output terms)[11] supporting some 94.6 GW: more than twice the 39 GW of hydropower commissioned globally in 2014.[12]

EU ETS compliance procedures need improving

The EU ETS has supported 573 hydropower projects needing a WCD compliance review (and 790 which are below the 20 MW threshold). In 2009 the EU ETS states agreed on a Compliance Report Template for demonstrating compliance. Developers of hydropower projects larger than 20 MW could submit the template with applications for carbon financing. But while having the advantage of being widely understood by project developers, the template simplified and watered down the WCD's aspirations, using standard project development terms to describe difficult concepts, and failing to transmit the rationale behind the WCD's framework. So it does not clearly communicate, measure or analyse 'respect' for many of the WCD's core intentions.[13]

The template is also self-assessed by project proponents and there is no monitoring or follow up. In many respects its failings can be illustrated by the observation that 74 per cent of hydropower schemes supported by the EU ETS since 2004 are in China, despite China dismissing the WCD's recommendations when they were first published.

HSAP: clear and measurable

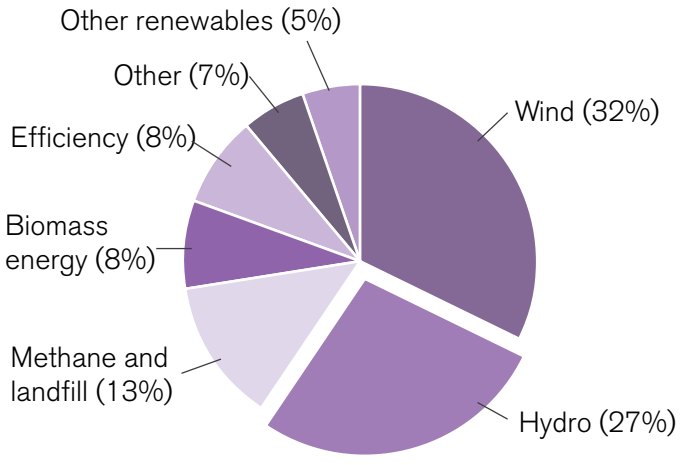
In 2010 the International Hydropower Association led the development of the Hydropower Sustainability Assessment Protocol (HSAP),[14] which draws on assessments of good and best practice in hydropower design, delivery and operation. The HSAP has the significant advantage of producing clear scores on a set of 23 sustainability indicators, covering similar ground to the WCD but in a more measureable manner. It has the support of NGOs, multilateral banks, commercial banks and the hydropower industry and can be applied at all four project stages (early stage, design, construction and operation), offering a hydropower-specific monitoring scheme that allows transparency and feedback on compliance, and therefore gives confidence to carbon market backers. However, although EU ETS states are aware of the HSAP, it has not yet replaced, nor been accepted as an alternative to, the Compliance Report Template.

Is HSAP too expensive or is it just what EU ETS needs?

The cost of running a full HSAP process with independent assessors is around US$80,000–150,000. This is significantly higher than the current cost of completing the EU ETS Compliance Report Template and may constitute a barrier to accessing carbon finance if HSAP assessments are required when carbon prices are low.

Over the past ten years carbon prices have fluctuated considerably (see Figure 3). Falling carbon prices from mid-2011 offered limited incentive for private investment in hydropower and other renewable energy generation. At US$1.0 per CER (Certified Emissions Reduction unit) — the price in 2012 — carbon revenue is typically less than 1 per cent of power revenue for the average CDM hydropower project,

Figure 1. Composition of the CDM portfolio (adapted from Soanes et al 2015)[7]



whether above or below 20MW (which is not attractive to many investors).

However, where the value of a CER exceeds US$2, the average >20MW CDM project would recoup the cost of a single HSAP assessment in under three years once accepted and able to sell its carbon credits. This calculation includes incremental spending of US$1 million on an Environment and Social Impact Assessment (ESIA) during project preparation to address any risks that may be identified.[15] When undertaking all four HSAP assessments, achieving a three year payback requires carbon prices of US$6 per CER for an average 'large' project, including costs of improving the ESIAs and reservoir emissions monitoring. For hydropower projects under 20MW the corresponding carbon prices are US$6 and US$9. Such values are well within the historical range of carbon prices and the prices in some markets in 2015 exceed this level (for more discussion on this see 'Promoting sustainable hydropower through carbon financing'[7]).

Recently, prices of US$9, in line with partially recovered EUA prices (see Figure 3), allow carbon revenues to rise on average to around 6–7 per cent of power revenue on small and large hydropower projects respectively. As many governments are committed to using market mechanisms to finance emission reductions, it is reasonable to expect prices to continue this upward trend.

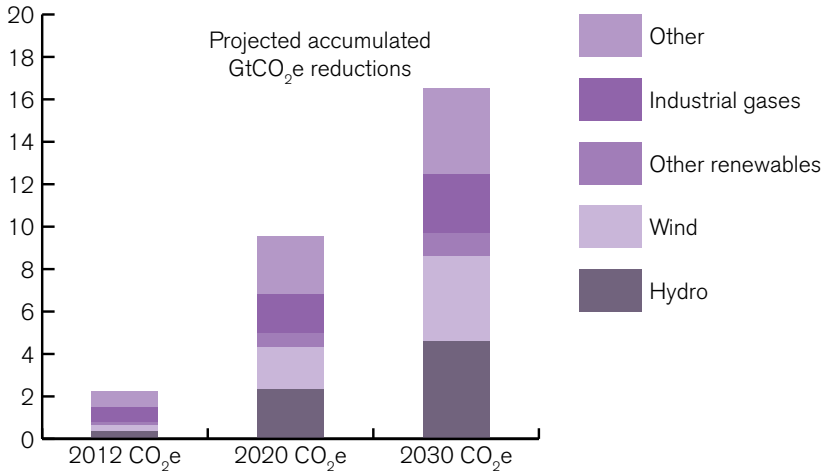
Adopt the HSAP to keep large hydropower in the mix

Climate change has raised the stakes in the debate over the acceptability of large dams. This is illustrated when making certain hydropower generation projects ineligible for carbon financing (whether on the basis of size or other criteria) is celebrated as a precautionary step to avoid environmental and social damage by some, and lamented as a lost development opportunity and response to climate change risks by others.

The emerging consensus today is towards greater focus on the sustainability metrics of individual projects. Assessing individual projects in the specific context of their river basins can also help to balance competing views about the role that hydropower should play in climate action.

The assessment of respect for the WCD Framework, as required for large hydropower projects by the EU Linking Directive (2004), would be systematically improved by adopting the HSAP. And if carbon prices continue to recover, the additional carbon revenue available through the EU ETS or other carbon financing could cover costs not only of the HSAP, but also of the enhanced monitoring that measures greenhouse gas emissions from hydropower reservoirs (required under the CDM). This makes entry into the carbon market commercially attractive as well as offering a route to better public acceptance.

Figure 2. Accumulated emissions reductions (giga tonnes of carbon dioxide equivalent) for each CDM technology, as anticipated when registered projects started (adapted from Soanes et al 2015)[7]

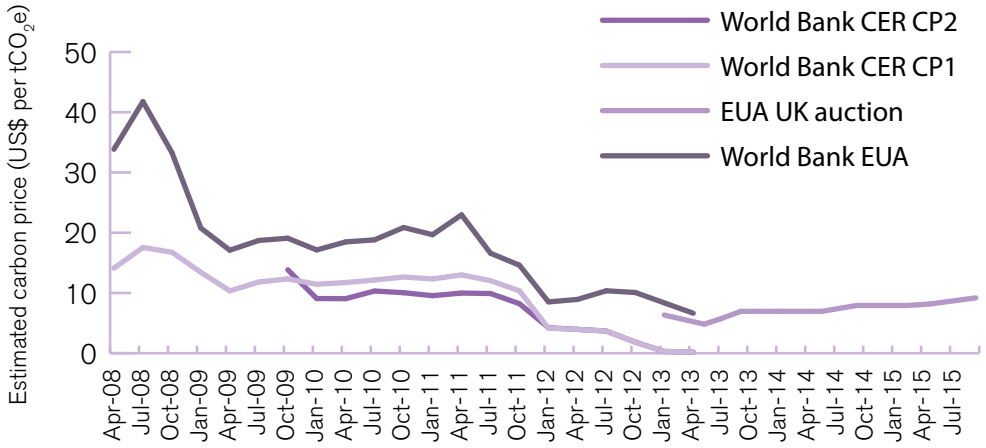


Carbon markets in transition

The landscape for carbon finance is changing dramatically. While it is uncertain how specific mechanisms such as the CDM will unfold, a decade of international experience provides strong evidence that instruments such as market-based emissions trading schemes and carbon taxes are indispensable policy tools for scaling-up public and private investment in low-carbon renewable energy generation.[16] Momentum is also building to diversify the mechanisms that channel climate-related finance to developing countries to speed their transitions towards low-carbon and climate-resilient economies.

The UNFCCC notes that climate and green financing initiatives from the local to national and transnational levels are all important.[17] The emergence of regional and sub-national emission trading schemes, and in particular plans in BRICS[18] counties such as China to actively develop countries' hydropower is significant. China started trialling emission trading in 2014 in advance of rolling out a nationwide system as early as 2017, which is expected to be the second largest system globally.[19] EU policy is to partner with compatible emission trading systems around the world and to link the EU ETS with other cap-and-trade systems.[20]

Figure 3. Carbon prices 2008–15 in US dollars per tonne of carbon dioxide equivalent. Prices are estimated quarterly averages for European Union Allowances (EUAs) and Certified Emissions Reductions (CERs) (CP1 pre 2012 and CP2 post 2012).[21] Prices have been converted from euros to US dollars using annual exchange rates.[22]



A common purpose across all schemes is financing sustainable development. For hydropower investment this should encompass improving sustainability through design and implementation of measures to avoid or mitigate environmental and social damage at the level of individual projects and within each specific river basin context. In this respect, adopting the HSAP as a standardised tool for assessing sustainability across all carbon financing schemes offers multiple advantages. The World Bank Group already offers financial support to HSAP assessments on a voluntary basis for projects it supports.[23]

The EU's adoption of the HSAP as a means to deliver the intentions of the EU Linking Directive would narrow the gap between the WCD's aspiration and practice, as lawmakers initially envisaged, and support emerging carbon markets' efforts to do likewise. This would increase confidence that the carbon markets, led by the EU, are supporting the development of sustainable hydropower that meets climate change objectives without compromising riverine ecosystems and the lives of local communities.

Lawrence Haas, Jamie Skinner and Marek Soanes

Lawrence Haas is an international consultant helping countries develop sustainable hydropower practice and a former Team Leader of the Word Commission on Dams. Jamie Skinner is a principal researcher in IIED's Natural Resources Group and leads the Institute's water team. Marek Soanes is a consultant working with IIED.

Knowledge Products

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Contact
Jamie Skinner
jamie.skinner@iied.org

80–86 Gray's Inn Road
London, WC1X 8NH
United Kingdom

Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
www.iied.org

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Notes

[1] Primary energy supply is calculated as an annual figure from a country's energy production plus energy imports, minus energy exports, minus energy 'bunkered' for international aviation and shipping, then plus or minus stock changes. In other words, it describes a country's overall domestic energy supply. / [2] International Energy Agency – Key World Energy Statistics (2014) www.iea.org/publications/freepublications/publication/keyworld2014.pdf and IEA Technology Roadmap for Hydropower (2012) www.iea.org/publications/freepublications/publication/technology-roadmap-hydropower.html / [3] Hydropower is not necessarily greenhouse gas (GHG) free, all reservoirs emit GHGs to some degree. / [4] For example the Sardar Sarovar dam in India; the Chixoy dam in Guatemala; and the Belo Monte dam in Brazil, to name but a few. / [5] Small hydro being defined as <20 MW of installed capacity. / [6] Switzerland aligns its policies to the EU so all EU ETS data in this report include the Swiss national contribution. / [7] See Article11 b 6 of the EU Directive 2004/101/EC of the European Parliament and of the Council (27 October 2004) / [8] The World Commission on Dams set out to define a framework for large dam planning that would filter out contentious projects and promote sustainable outcomes for communities and the environment. / [9] The Clean Development Mechanism (CDM) is one of the mechanisms defined in the Kyoto Protocol through which emissions reduction projects can generate Certified Emission Reduction units which may be traded in emissions trading schemes. Data presented here are from the UNEP DTU CDM pipeline database at http://www.cdmpipeline.org/ as of May 2015. / [10] Soanes, M *et al.* (2015) Sustainable hydropower and carbon finance, IIED Issue Paper. See http://pubs.iied.org/17580IIED.html / [11] OECD bilateral support is extended to hydropower in a variety of ways ranging from export credits, to grants and loans and carbon financing mechanisms. EU member governments also vote on Multinational Financial Institutions' participation on dam projects through Board membership. OECD bilateral funding is extended to developing countries, sometimes in partnership with MFIs, and sometimes without direct MFI financial participation across programmes for aid, trade and carbon financing. / [12] International Hydropower Association (2015). 2015 Hydropower Status Report www.hydropower.org/publications / [13] Skinner, J and Haas, L J (2014) Watered Down? A review of social and environmental safeguards for large dam projects. http://pubs.iied.org/17517IIED.html / [14] www.hydrosustainability.org/Protocol.aspx / [15] And thus include improved avoidance and mitigation measures in the project financing plan to help address such risks. / [16] IIGCC (2014) 2014 Global Investor Statement on Climate Change www.iigcc.org/publications/publication/2014-global-investor-statement-on-climate-change / [17] http://unfccc.int/focus/climate_finance/items/7001.php / [18] BRICS countries — the emerging economies of Brazil, Russia, India, China and South Africa. / [19] Nussbaum, A and Sink, J (2015) China to Launch National Pollution-Trading System to Cut Emissions (Bloomberg) http://www.bloomberg.com/news/articles/2015-09-25/china-said-to-plan-pollution-trading-expansion-to-cut-emissions / [20] http://ec.europa.eu/clima/policies/ets/linking/index_en.htm / [21] Adapted from: Kossoy *et al.* (2014) State and trends of carbon pricing 2015 (World Bank Group) and ICE Exchange data: https://www.theice.com/marketdata/reports/148 / [22] www.oanda.com/currency/historical-rates / [23] Liden, R and Lyon, K (2014) The hydropower sustainability assessment protocol for use by World Bank clients: lessons learned and recommendations. Water Partnership Program (WPP) Water Papers. Washington, DC, World Bank Group. See http://documents.worldbank.org/curated/en/2014/06/20106007/hydropower-sustainability-assessment-protocol-use-world-bank-clients-lessons-learned-recommendations