

ENERGY EDGE INVESTMENT ISSUE BRIEF

HOW CAN ENERGY COMPANIES BETTER PLAN FOR CLIMATE CHANGE?

THE ROLE OF NEXT GENERATION DIGITAL TECHNOLOGIES, STANDARDS, AND METRICS

Climate changes including temperature, precipitation, and occurrences of severe weather, will both directly and indirectly impact energy companies' facilities, logistics, and market. Assessing exposures and planning to adapt investments and operations will reduce asset risks and bring competitive advantage to the forward-thinking companies.

The application and integration of next generation technologies, such as distributed ledgers, the Internet of Things (IoT) and satellite imagery offers opportunities to undertake this adaptation more efficiently and effectively. Integrating these technologies with smarter ways of developing standards and deploying climate adaptation metrics could revolutionize the way companies plan for climate change. Energy Edge can introduce energy companies to these concepts and develop appropriate strategies in conjunction Adaptation Ledger Ltd., in order to identify and co-implement the optimal applications to bring about lower physical asset risks, better operations, and competitive advantages.

[By Karl Schultz, Energy Edge Climate Practice Director and Co-founder, Adaptation Ledger Ltd. Acknowledgement further goes out to contributions by Adaptation Ledger Ltd. principals Tom Baumann and Ira Feldman.]

The need for climate adaptation planning and investment

As noted in a past Energy Edge policy brief, I once visited a country in Asia with immense hydropower resources in order to help the government plan for climate change. While greenhouse gas emissions are low, changes in temperature and precipitation are projected to be significant and impact water resources – both from glacial melt and from changes in seasonal run-off levels. Perhaps not surprisingly, I learned that the designs and feasibility analyses for the multi-billion dollar, run-of-river hydroelectric plants, to be constructed in the next decade, did not consider how climate change will impact water supply from precipitation and glacial melt.

What would be the impact of a 5% change in water resources on one plant's revenues? The answer depends on the precise circumstances, but it could greatly exceed \$20 million/year. The impact of floods and landslides could be possibly much more and threats to power supply have a detrimental impact on an entire region's economy. And the indirect impacts of climate-induced stresses on water supply, food supply, urban infrastructure, etc., influencing governance, national security, civil stability, and migration - to name some responses - could be even greater than the simpler technical and cost challenges energy projects might face.

Energy companies need to manage a variety of different risks: price volatility may be short term, but most energy projects are long term. Investments made today are likely to be around into the middle of the 21st century. This is more than far enough into the future for assets to be exposed to massive shifts in both commodity demand – owing in large part to global responses to climate change – and to climate impacts – temperature, precipitation, extreme weather, etc. - that most research foresees will be significant regardless

of future emissions control. The U.S. Securities and Exchange Commission sees these risks as potentially impacting a company's value and risk profile.¹

And while uncertainties are inherent in climate projections, over the past decade climate models have improved considerably. In some regions, forecasts can be made for areas as small as 5 by 5 kilometers. Adaptation tools are rapidly developing to assess how future climate scenarios will impact water, wind and solar resources, flooding, droughts, and electricity demand.

Doing investment and operations planning better with Next Generation Technologies

Meanwhile, over the last 25 years, digital innovations such as the Internet and smartphones have connected billions of people and devices. More data was created in the last 2 years than during the previous 5000 years.² In order to harness the transformative potential of these new technologies, there is a strong need for innovations in governance and finance: in the energy sector broadly, for addressing climate change related exposure in the energy sector, and especially for addressing business sustainability through climate adaptation.

The standard view of climate services must evolve beyond improved climate projections, vulnerability assessments and adaptation designs and planning. A priority for companies wishing to leverage climate services is on the gap in the global capacity to come up with and agree on workable approaches to define, measure, and credit adaptation projects. Financing of adaptation will be sub-optimal without clear ideas where to prioritize and how to reward good adaptation. This capacity gap also diminishes the efficiency, effectiveness, and quality of adaptation actions, and increases the risk of misallocation of limited adaptation resources.³

Energy Edge's Karl Schultz is also partner in a new initiative, [Adaptation Ledger™](#), and believes the tools are available to meet the challenge of climate adaptation, but that these various components have yet to be linked up. Adaptation Ledger has identified recent advances in several key areas that, if harnessed effectively, can come together to create an integrated approach:

Adaptation Pricing: Efforts to “put a price on carbon” on the basis of a tonne of carbon dioxide (CO₂) are and will be essential in meeting emission targets. Likewise, a price signal based on a unified metric of vulnerability reduction is necessary to support decision making by investors into climate adaptation solutions. Over the last several years, [The Higher Ground Foundation](#) has advanced the innovative concept of the Vulnerability Reduction Credit (VRC™).⁴ The VRC is based on a new standards framework supported by an online community of climate adaptation policymakers, professionals and scholars.

Smart Standards: Climate change impacts communities, economies and the ecosystems we rely on in many different ways and this requires correspondingly many different climate adaptation solutions. In addition, the emerging new climate governance approaches related to the Paris Agreement and also

¹ See Securities and Exchange Commission, 17 CFR Parts 211, 231, and 241 Commission Guidance Regarding Disclosure Related to Climate Change, at <https://www.sec.gov/rules/interp/2010/33-9106.pdf>.

² See, e.g., Åse Dragland, “Big Data, for better or worse: 90% of world's data generated over last two years,” SINTEF, May 22, 2013, available at: <https://www.sciencedaily.com/releases/2013/05/130522085217.htm>.

³ See, UNEP, Adaptation Finance Gap Report 2018, available at: <https://www.unenvironment.org/resources/adaptation-gap-report>

⁴ See: Schultz, K., “Financing climate adaptation with a credit mechanism: initial considerations,” Climate Policy, 12:2 (2012) at pp.187-197. DOI: [10.1080/14693062.2011.605563](https://doi.org/10.1080/14693062.2011.605563). Also, for extensive information on the VRC™ and its Standard Framework, see, the Higher Ground Foundation website at: <http://www.thehighergroundfoundation.org/>.

the Task Force on Climate-related Financial Disclosure (FSB TCFD) necessitate innovative governance solutions. At a practical level, the development of a new “smart standards” platform and a framework that can address each climate adaptation solution is necessary to achieve the scale and unified metric for VRC markets.⁵ which information technology, system architectures, domestic policy, and other relevant elements are developing, the vision laid out in this paper suggests:

The emerging and accelerating technological landscape holds promise in supporting the new generation of climate markets from the bottom-up in a post-2020 environment. Specifically, blockchain technology, trends referred to as IoT and Big Data, and smart contracts should be considered in the future design of climate markets.⁶

The Integrated Platform: Combining the innovations of the VRC framework (attribution for finance), blockchain (digital), and smart standards systems (governance) will provide the platform, an “adaptation ledger” to accelerate investments into climate adaptation solutions and manage resiliency.

Engaging with such an integrated platform, in particular one that creates and coordinates a fungible, single metric, certifying quantities of recognized “vulnerability reduction”, it is possible to:

- Prioritize projects thus bringing in efficiencies that increase the potential for effectively using limited resources,
- Serve as a means for leveraging finance from the revenue streams created, by setting a price on a quantified level of vulnerability reduction,
- Serve as a positive feedback mechanism as the “market” for adaptation technologies and effective project investment and operations improves through the incentive to optimize project vulnerability reduction, and
- Create incentives for sustainable, and self-sustaining projects, as credits are issued only if projects can prove that vulnerability reduction has been ensured for a (past) period of time.

Planning for climate change is a small investment that can offer huge returns. For instance, changes in plant siting could eliminate exposure to some devastating potential climate events but might not cost anything. Integrating digital technologies better – including real-time sensing that could be coupled with secure transmission of these (confidential) operational data onto distributed ledger systems, could bring about cost savings, improved operations and early warning against severe weather events in a fast, secure, and reliable system. This could further feed into VRC monitoring reports that could result in more rapid credit issuance that could support target setting and finance of investments.

It’s true that some adaptation investments do come at considerable costs, but by harnessing the new digital technologies that are already available, and integrating these with appropriate standards, metrics, and governance approaches, these investments can yield a host of benefits to smart energy companies, including lower future costs, risks, and competitive advantage.

⁵ See, e.g., Baumann, Tom, “Enhancing MRV with Digital Innovation,” presentation to CEPAL, January 23, 2018, available at: https://www.cepal.org/sites/default/files/presentations/tom_baumann_0.pdf.

⁶ See, World Bank Group, “Blockchain and emerging digital technologies for enhancing post-2020 climate markets,” March 2018, available at: <http://documents.worldbank.org/curated/en/942981521464296927/Blockchain-and-emerging-digital-technologies-for-enhancing-post-2020-climate-markets>.

To learn more:

Energy Edge has a team of experts covering all aspects of international energy investments, climate change and mitigation and adaptation responses, and are happy to discuss working with you on understanding your project's exposure to climate change and strategies to gain competitive advantage through smart design and investment choices. Please contact [Karl Schultz](#) for a preliminary chat or to set up a workshop discussion.

[Adaptation Ledger Ltd.](#) is advancing climate adaptation solutions and mobilizing finance through the integration of blockchain, smart standards and a unified metric for vulnerability reduction. It offers solutions including development of specific next generation technical applications, research and advisory services for a variety of clients and customers for finance, supply chain, and planning and operations. Adaptation Ledger is a leading member of the [Climate Chain Coalition](#), a global initiative to support collaboration among members and stakeholders to advance blockchain (distributed ledger technology) and related digital solutions (e.g. IoT, big data) to help mobilize climate finance and enhance MRV (measurement, reporting and verification) to scale climate actions for mitigation and adaptation.