



**ADAPTATION™**  
**LEDGER**

**Introducing Adaptation Ledger:  
Advancing Climate Adaptation Solutions and Mobilizing Finance Via  
Integration of Blockchain, Smart Standards and a Unified Metric for  
Vulnerability Reduction**

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**The Adaptation Imperative and the Ongoing Digital Revolution**

Decades of evidence makes it clear that we urgently need to strengthen communities and economies, even the planet's ecosystems, to be more resilient and less vulnerable to natural disasters linked with climate change. Each year floods, droughts, forest fires, and massive storms are getting worse and costs are increasing by billions of dollars -- that's beyond the loss of life.

In brief, we propose using disruptive technologies to address climate disruption. Distributed Ledger Technologies (DLT), popularly known as "blockchain," can overcome the challenges of scaling climate actions and investments as part of the transformational change needed to achieve the goals of the Paris Agreement.<sup>1</sup> We believe new technologies such as blockchain can provide efficiency, transparency, accountability, extensibility, scalability, inclusiveness, and integrity to help make climate adaptation solutions attractive to investors and reduce our vulnerability -- and losses.

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<sup>1</sup> Marcu, Andrei, "Governance of Article 6 of the Paris Agreement and Lessons Learned from the Kyoto Protocol," Fixing Climate Governance Series, Paper No. 4, Centre for International Governance Innovation (CIGI), May 2017, available at: <https://www.cigionline.org/sites/default/files/documents/Fixing%20Climate%20Governance%20Paper%20No.4%20WEB.pdf>.



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.<sup>2</sup> In order to harness the transformative potential of these new technologies, we need innovations in governance and finance -- this is especially true for addressing sustainability through climate adaptation.

### **The New Adaptation Pathway, The New Adaptation Ledger**

In our view, in order to address the challenge of climate adaptation a new conceptualization of adaptation solutions and finance will be needed. Global climate vulnerabilities will multiply and become even more intractable without systems rethinking and reengineering. In brief, incorporation of digital and governance innovations in systems integration is imperative to advance climate adaptation solutions and finance.

The adaptation side of the climate change equation is lagging behind much-needed efforts to reduce greenhouse gasses, the mitigation side of the equation. And, while a number of notable efforts proceed with respect to adaptation action, the truth is that it is not nearly enough.<sup>3</sup> The financial sector has yet to mobilize on adaptation in a meaningful way.<sup>4</sup> Best practices for adaptation in specific contexts are lacking; such standards are only beginning to be drafted.<sup>5</sup>

The current state of play suggests that incremental change will be inadequate. We believe that a new pathway is needed -- one that can be envisioned by bringing new tools and approaches to bear. We suggest that transformative change can only occur if

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<sup>2</sup> See, e.g., Dragland, Åse, "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>.

<sup>3</sup> We acknowledge that the adaptation landscape currently includes numerous potentially relevant activities and initiatives but integration is lacking.

<sup>4</sup> Particularly noteworthy, however, is the work of the Global Adaptation and Resilience Investment Working Group (GARI), website available at: <https://garigroup.com>.

<sup>5</sup> Regarding standards and metrics, see efforts such as 1<sup>st</sup> and 2<sup>nd</sup> International Conferences on Adaptation Metrics in Rabat (2016) and Ben Geurir (2017), Morocco. The 2016 event is described in ALICE BISIAUX, "COP 22 Presidency Holds Conference on Adaptation Metrics," October 3, 2016, available at: <<http://sdg.iisd.org/news/cop-22-presidency-holds-conference-on-adaptation-metrics/>>. The Higher Ground Foundation has undertaken expert validation and published its VRC Standard Framework, and is piloting the framework, website available at: [www.thehighergroundfoundation.org](http://www.thehighergroundfoundation.org). See also, Feldman, Ira, "Standards for Climate Adaptation – through ISO and beyond," presentation at COP 21, Paris, December 1, 2015, available at: [http://greentrack.com/wp-content/uploads/2016/02/Ira-Feldman\\_Paris-GHGMI-ISO\\_FINAL.pdf](http://greentrack.com/wp-content/uploads/2016/02/Ira-Feldman_Paris-GHGMI-ISO_FINAL.pdf).



we commit to fight climate disruption with disruptive digital technologies, like distributed ledger technology and also innovative governance solutions. A major effort to “re-tool” the system is essential -- making that happen requires capacity building that combines fundamental climate knowledge with the application of digital solutions.

Currently, there is no integrated, coordinated, and highly responsive platform with a design that creates clear incentives for developing (defined broadly) standards for climate adaptation to organize the essential tools (technologies, practice, metrics, exchange mechanisms and finance, in other words, climate services) required to support effective global action on climate adaptation.

Climate services exist, no doubt. But, research suggests that the challenges lie in creating demand driven climate services.<sup>6</sup> We suggest that beyond the standard view of climate services to include improved climate projections, vulnerability assessments and adaptation designs and planning, the most critical climate service challenges lie in creating a dynamic but integrated system for investment and transactions that brings in the whole set of players from public, private, and third sectors. These integrated climate services are what may transition the newly woken institutions and communities into active participants in a dynamic, ambitious set of investments that serve the interests of communities better, realizing where necessary the shorter-term priorities for longer term challenges.

Our focus in integrating climate services is primarily on the gap in the global capacity to come up with and agree on workable approaches to define, measure, and credit adaptation projects. Finance of adaptation is 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.<sup>7</sup>

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<sup>6</sup> See, JPI Climate, “Workshop Demand driven climate services in Europe - Exploring opportunities for developing research and innovation projects.” 11-12 June 11-12, 2015, Norway House, Brussels, video available at: <https://www.youtube.com/watch?v=8bNoL7mEu54>. See also, Lourenço, Tiago Capela, et al., “The rise of demand-driven climate services,” Nature Climate Change, January 2016, at pp.13-14, available at:

<https://search.proquest.com/openview/0eb9f227079ef85fd0f7e5208fb140e5/1?pq-origsite=gscholar&cbl=1056412>.

<sup>7</sup> See, UNEP, Adaptation Finance Gap Report 2016, available at: <http://web.unep.org/adaptationgapreport/2016> and GARI, “Bridging the Adaptation Gap,” 2016, available at: <http://427mt.com/wp-content/uploads/2016/11/GARI-2016-Bridging-the-Adaptation-Gap.pdf>.



To move beyond ad hoc efforts and advance the adaptation side of the climate services ledger, the authors believe that a new cross-cutting framework is needed. Our proposed integration of key components -- or "moving parts" -- suggests an immediate and more effective path forward by integrating technology, policy and the financial sector.

We believe the tools are available to meet the challenge of climate adaptation, but these various components have yet to be linked up. Our contribution here is to identify the 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 (CO<sub>2</sub>) 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™).<sup>8</sup> 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 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.<sup>9</sup>

**Disruptive, Next Generation Technology:** A recent World Bank Group report examines the role of emerging digital technologies and architectures to enhance and connect the heterogeneous climate actions across countries, to facilitate post-2020 climate markets that achieve the highest possible ambition most cost-effectively. Noting the speed with

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<sup>8</sup> 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/>.

<sup>9</sup> 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](https://www.cepal.org/sites/default/files/presentations/tom_baumann_0.pdf).



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.<sup>10</sup>*

**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.

We seek to synergize standards systems, blockchain/digital tools and Vulnerability Reduction Credits (VRCs™) to better align adaptation solutions with climate finance and usher in a new era of accelerated and coordinated adaptation action. What is new here is a systematic, applied integration of a suite of tools and testbeds combining all these elements in order for them to deliberately work together.

VRC pilot projects under development shall endeavor to apply several digital technology applications, for example earth observation remote sensing and internet-connected meters on the ground. Smart Standards for the creation of sectoral adaptation methodologies that can be automated with smart contracts, and transfer of VRCs using blockchain technology shall ensure transparency and efficient financial transactions, and thereby enable more frictionless adaptation investment.

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,

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<sup>10</sup> 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>.



- Serve as a means for leveraging finance from the revenue streams created, by setting a price on a quantified level of vulnerability reduction,
- Allow for more transparent, “bottom-up” decision-making in adaptation investment, as communities, private and public adaptation technology and service providers, and project developers have a fair chance at gaining credits,
- 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.

### **Adaptation Ledger™ Co-founders and Principals**



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Over the course of 2018 we will provide a roadmap and recommendations to support a pathway that integrates the new digital solutions and restructures existing approaches and tools to help achieve the goals of the Paris Agreement.

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