



Clean energy transition—our urgent challenge: an editorial essay

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In the inaugural issue of *Wiley Interdisciplinary Reviews Energy and Environment* in 2012, urgency of addressing climate change was underscored. As we launch the journal's sixth year, the scientific evidence indicates action is even more urgent.

In 2017, the 25th anniversary of the United Nations Framework Convention on Climate Change (UNFCCC) is observed. The road from 1992 to 2017 has been at times disappointing. We have yet to demonstrate a global capacity to lower the volume of carbon emissions from the energy sector (Figure 1).

Unfortunately, over the last quarter of a century, carbon emissions have increased more than 50%. As noted by several scientists¹ (see Figure 2), the world is not yet on the path toward limiting warming to well below 2 °C.

Still, many note that the Paris Climate Agreement, concluded in December 2015, brought the requirement of transparent reviews of performance. The parties to the Agreement recognize the pledges fall short of what is needed, and the persisting problem of unequal burdens borne by those least responsible for the problem is painfully recognized. Countries will have to answer critics for their ambition, performance, and climate justice gaps.

To realize the required clean energy transition, deep decarbonization strategies are needed. *WIREs Energy and Environment* is fully committed to exploring such strategies, inviting high-level scientific contributions that address technologies, systems, solutions, and policies toward the ultimate goal of an energy system risking temperature change well below 2 °C.

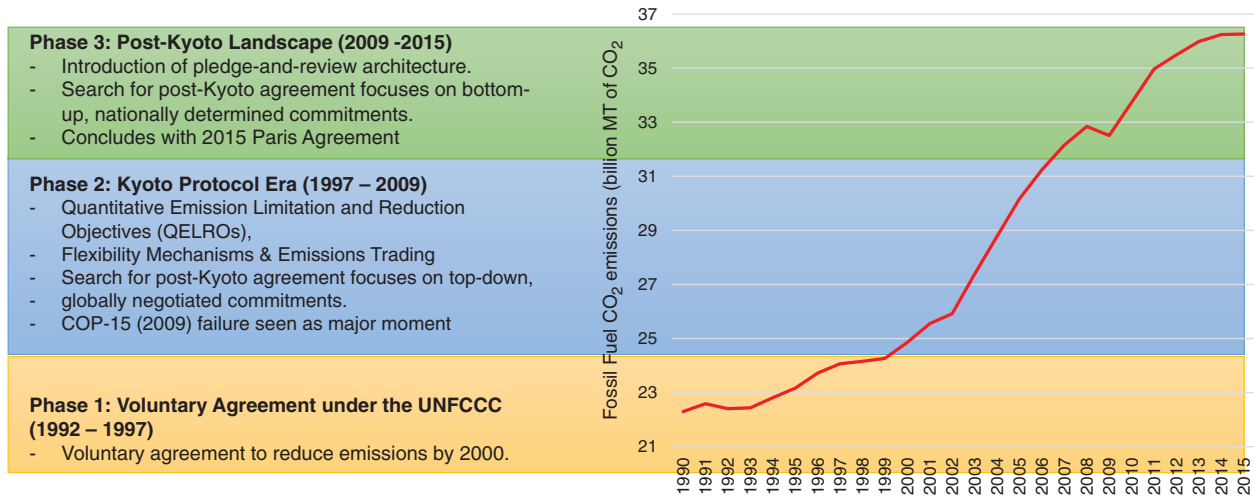
We note a number of papers published in 2016, which contribute to our understanding of the emissions challenge. For example, the use of bioenergy needs to be more carefully assessed from a biodiversity point of view.² Understanding the constraints of infrastructure transformation is a key issue for a clean energy transition.³ Finding new innovation strategies for integrating market,

finance, and policy factors for large-scale clean energy deployment in cities is of high importance as most of the environmental impact will come from urban areas in the future.⁴ Among the energy technologies investigated in the journal, we identify several important topics: e.g., in wind power the issue of capacity value is important⁵; or moving to more complex wind terrains with high wind potential,⁶ which have attracted much interest. On the policy side, we notice that improving emissions trading schemes,⁷ addressing equity issues,⁸ and funding energy innovation⁹ deserve more attention. As a new theme, we have introduced cyber security, which will become a highly important issue when digitizing energy systems and spreading the internet-of-things to energy devices and applications.¹⁰ As an example of basic energy research, the journal included a paper discussing the use of thermodynamics to guide future solar cell development, which may open up very radical new development paths.¹¹

In 2017, as part of our sixth anniversary, we will introduce special collections of papers on important themes. The first call of papers has just been launched on the development and diffusion of photovoltaics (PV) in developing countries with a special focus on Africa (http://media.wiley.com/assets/7347/84/PV_CallForPapers.pdf).¹² We plan new calls for papers in the areas of wind and solar bioenergy and sustainable development. Through these initiatives, the journal seeks to assist us in understanding the energy-climate challenge better.

We would also like to note a spin-off from *WIREs Energy and Environment*. Wiley has published a collection of articles from our bioenergy section with a summary analysis in book format under the title *Advances in Bioenergy* to attract a wider audience.¹³ Further books may be considered based on the experiences received from this first book.

Finally, as editors we make an urgent call for papers on deep decarbonization—addressing



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FIGURE 1 | United Nations Framework Convention on Climate Change (UNFCCC): a two-decade history of policy performance.

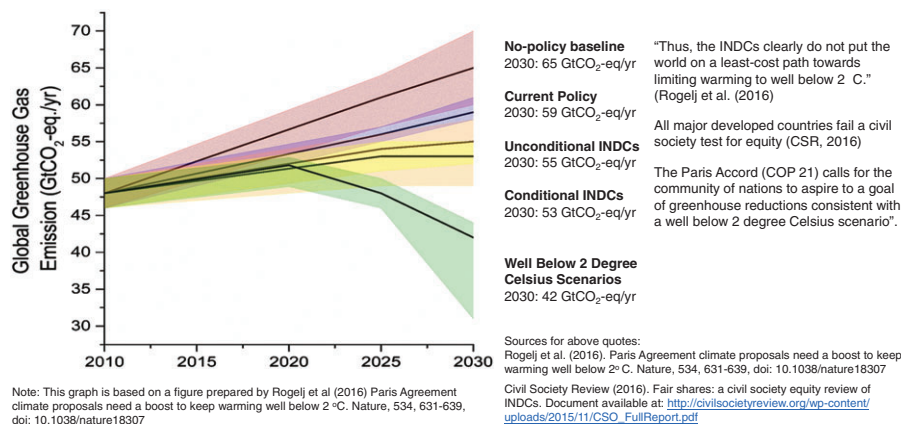


FIGURE 2 | Paris climate agreement: inadequate international commitment.

technology, economics, and social and policy needs in an interdisciplinary manner.

We also want to thank all who have contributed to the success of our journal, in particular the authors, reviewers, and Wiley editorial office staff.

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