

EDITORIAL COMMENTARY**Shifting to clean energy—An editorial essay**

Wiley Interdisciplinary Reviews Energy and Environment is a well-regarded forum for publishing interdisciplinary science in energy and environment with 30 full issues published by now. Though these fields are by definition very broad in scope, the journal has succeeded to create a solid profile, which is both timely and relevant. Since its inaugural in 2012, the journal has consistently addressed solutions for mitigating the climate change, both in terms of technologies and policies. The journal has also succeeded in framing the interdisciplinarity in energy-environment by including perspectives from fields such as climate, technology, economy, geopolitics, policy analysis, planning, among others.

Since the first issue was published, mitigation of climate change has been recognized by *Wiley Interdisciplinary Reviews Energy and Environment* as the key global challenge, which will affect the future of the modern society. We have addressed this quest through numerous reviews and in each of the previous editorials (Byrne & Lund, 2017; Lund & Byrne, 2014, 2016). Cutting emissions more strongly is timelier than ever.

Though the path to meet the climate goals set in the Paris Climate Accord in December 2015 seems to be very challenging and nations will need to make much stronger commitments to reduce their greenhouse-gas emissions than so far, we also witness some positive signals. The International Energy Agency (IEA) (2017) reports that global emissions have stayed at about the same level for the last 3 years, but now these need quickly to be brought to a declining path to close the gap between the trend and the goal in emissions. It is also becoming evident that just cutting emissions will not be enough to keep global warming within the required limits, as noted by the Intergovernmental Panel on Climate Change (IPCC) during its COP 23 meeting in Bonn in November 2017. Regarding to the Bonn summit, *The Economist* (2017) reported on “negative emission technologies,” which could help in extracting CO₂ from the atmosphere, and referred in this context to a recent paper in *Wiley Interdisciplinary Reviews Energy and Environment* by Wilcox and coworkers (2017). This demonstrates the importance of high-level science analysis in supporting the formulation of policies to cut emissions, which the journal can evoke. We find in the journal issues from 2017, a range of other interesting papers that relate to extracting CO₂ from the atmosphere or turning CO₂ into fuel, such as electrochemical reduction of CO₂ (Malik, Singh, Base, & Verma, 2017), or use of low-grade residual biomass from agriculture and forestry into synthetic fuels and chemicals (Dahmen et al., 2017) (the carbon neutrality of bioenergy is debated, but it seems that bioresiduals from industrial processes may be one of the most sustainable bioenergy alternatives).

We positively notice the increasing market penetration of clean energy technologies. New energy technologies such as solar and wind power are becoming the mainstream technologies of the future power system, as noted by the IEA 2017. With increasing shares of variable renewable electricity in the power system, new challenges are encountered due to the increasing mismatch between supply and demand. As noted by several articles published in *Wiley Interdisciplinary Reviews Energy and Environment* in 2017, this will require not only paying more attention to energy system integration issues, and developing new approaches and technologies for overcoming current barriers such as greater system flexibility (Flynn et al., 2017; Milligan et al., 2017), affordable energy storage (Lee, Kim, Yeom, & Kim, 2017), strategies to promote intersectoral coupling (Lah, 2017) and so on, but also putting new economic models and policies (Byrne, Taminiou, Kim, Lee, & Seo, 2017; Lah, 2017; Vogt-Schilb & Hallegatte, 2017) into place, which will widen market development for rapid decarbonization.

Mitigating climate change will rely on better technologies, policies, and economics that can enable replacement of fossil fuel-based energy production. Although many of the clean energy technologies necessary for the energy transition are already in place and established in the market, there is still ample need for new innovations. In particular, concentrating solar plants and fuel cell technologies, which were considered promising a few decades ago, but which did not take off in the same way as solar and wind energy, may become more topical in the coming years through recent advances, while also having the potential to respond to some of the energy system issues that the energy transition cause. Both technologies (Alexopoulos & Hoffschmidt, 2017; Cassidy, 2017; Krishnan, 2017) are covered by the *Wiley Interdisciplinary Reviews Energy and Environment*, in addition to other disruptive energy technologies.

In 2018, the editorial structure of the journal will be updated to further strengthen our multidisciplinary approach in energy and environment. Technologies, systems, analyses, economics, and policies form the core of the journal contents as

before, but our themes will be better aligned to reflect the global energy and climate challenges ahead. Also, special collections around focused themes are foreseen.

We have witnessed an increasing number of downloads of articles over the past year, which demonstrates that we have a broad audience for the journal, but also shows the usefulness of the articles the journal has already published. As originally intended, articles in the journal are quickly serving the function of important references for defining the field and expanding its horizons. We intend to further work on attracting interesting and topical articles to provide value to our readers.

Finally, we want to thank all who have contributed to the achievements of our journal, in particular the authors, reviewers, and editorial staff at Wiley office. The journal success solely builds on this joint effort.

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