Looking ahead with the Journal of Renewable and Sustainable Energy: Volume 11 and beyond

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The Journal of Renewable and Sustainable Energy (JRSE) celebrated 10 years of publication in 2018, and today I write to commemorate the vision put forward by founding Co-Editors-in-Chief, P. Craig Taylor and John A. Turner, but also to look forward as the journal continues to evolve. Both the journal and the sustainable energy field have grown in scope substantially since Craig and John took on the herculean task of launching JRSE. While ten years ago, solar and wind power generation were heavily subsidized, today solar and wind power have achieved effective grid-parity for many communities, from island nations to rural and urban environments across the globe. In some energy markets, solar and wind power are the cheapest alternatives available. We read in the news of new market penetration records and renewable portfolio goals for the near future. There is also a sense of urgency in the scientific community. Repeated inter-governmental and research reports warn us of the need to decarbonize the energy and transportation industries before alarming levels of global climate impact are crossed. The energy industry shares great responsibility for the current state of affairs, and therefore it should contribute the lion’s share of the technological solutions needed to drastically reduce anthropogenic impacts on our planet.

There are many exciting renewable energy developments scattered throughout the globe. Yet, the implementation of carbon-neutral technologies needs to be truly global to produce the needed outcome. According to the Renewables 2018 Global Status Report, China installed over 53 GW of solar PV capacity in 2017 alone. To put this number in perspective, this is about the total power grid capacity of California, which is now the 5th largest economy in the world. Global solar PV capacity has surpassed 500 GW, and the growth in countries such as China, US, India, Japan, and Chile has been truly spectacular. If the world can agree to respond to the climate change crisis, the developing world will likely leapfrog carbon intensive technology and embrace renewable generation to provide for its growing power demands. Good examples are everywhere. Solar and wind contribute more (in some states much more) than 10% of the power needs for several states in the US and for several countries in the world now. On some days, particularly in the autumn and spring when load is reduced, solar power can provide 100% of the power load for entire countries. Solar power capacity is now also equivalent to the thermal solar heating capacity worldwide. Solar PV capacity alone has matched wind capacity globally in 2018, and will likely dwarf all other renewables in the next few years, with the exception of large-scale hydroelectric power generation, which is a critical but less sustainable technology. Together, solar and wind resources now contribute more than 7% of the world’s current electrical and thermal power capacity, and this figure will continue to grow. While there is much to be done before reaching the 100% renewable portfolio goals, already pledged by multiple communities (countries, states, cities, towns, companies, etc.), the market penetration of renewables today is drastically different than it was 10 years ago when Craig and John launched JRSE. As an example, California has pledged to move to a 100% renewable energy portfolio by 2045. Before that, multiple California towns, and even major cities like Los Angeles and San Diego, will reach similar levels of renewable penetration.

Central to the transition to a much larger market penetration of weather-dependent, carbon-neutral technologies is the quest for better integration of such resources into a more modern and robust version of the power grid. Optimal integration efforts require a much better understanding of time-dependent atmospheric effects on wind and solar resources. The same is true for the critical meteorological and climatological changes expected as the market penetration of sustainable resources continues to grow. Over the lifetime of renewable power plants, local climate conditions will likely change, and the viability of such installations will depend strongly on our ability to understand the physics of atmospheric phenomena at multiple time and spatial scales. These are now only poorly mastered in this context. To

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1”Renewables Global Status Report,” REN21, see http://www.ren21.net/gsr-2018/.
2”SB-100 California Renewables Portfolio Standard Program: Emissions of Green Gases,” California Senate Bill No. 100, see URL: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100.
address this focal area, JRSE will adjust its scope to maintain current coverage and give special attention to papers that improve our understanding of the physics underlying renewable energy resourcing, energy meteorology, and climate impacts. To place JRSE at the center of this incipient field, we now highlight renewable energy resource assessment, analysis, and forecasting as primary fields of interest to the journal readership.

Naturally, we have expanded the Editorial Board to reflect the importance of these topics. Professor Jan Kleissl, a leading expert in solar forecasting and micro-grid integration from UC San Diego, has joined the Editorial Board as Deputy Editor. We will be adding eight world-class scientists and researchers as new Associate Editors (AEs) in a variety of fields related to weather-dependent renewable energy integration. Dr. Melinda Marquis (NOAA), Professor Jack Brower (UC Irvine), and Professor Leonardo Chamorro (UI Urbana-Champaign) will join us as new AEs in January of 2019. Professor Raúl Bayoán Cal (Portland State University), Dr. Hugo Pedro (UC San Diego), Professor Kristian Pagh Nielsen (Danish Meteorological Institute), Professor Joakim Widén (Uppsala University), and Dr. Jamie Bright (Australia National University) will join the editorial board by March of 2019. The expansion of the Editorial Board will allow JRSE to continue to serve the research community while adding new strengths and a unique and completely new focus area to the journal.

We also recognize that, as the market penetration of renewables increases beyond a critical point, the marginal return of replacing the remaining carbon-intensive technologies away from the grid decreases. Overcoming these growing pains will require substantially more refined energy policies than the ones we now have in place. Since the growth of renewable energy is intrinsically connected to energy economics and policy, the renewable energy community must have access to the latest research in this area. With this in mind, we expect to publish more transformational contributions to decarbonization policies in JRSE as well.

In the past decade, the suite of tools available to researchers has changed very rapidly with the explosive growth of data sciences and the related fields of big data, data mining, artificial intelligence, machine learning, and many other non-reducible, non-deterministic modeling techniques. Due to the impact of these emerging fields in all areas of research, JRSE now invites new types of paper contributions, including those with data and code file supplements that can accelerate the rate of discovery in response to the strong sense of urgency mentioned above. As the landscape changes, JRSE will continue to adapt to better serve the research community. Research in renewable and sustainable energy is now, more than ever, critically important to the future of humanity.

Finally, I would like to thank again the founding Co-Editors-in-Chief and the entire Editorial Board of JRSE for the decade-long effort to bring JRSE to its current position of relevance in this field. Of course, JRSE would not be where it is now without the strong support and the technical expertise of the staff at AIP Publishing. I am indebted to the entire AIP staff, but particularly to Dr. Jessica Hoy, Ms. Bridget D’Amelio, Mr. Joe Castellano, and the Peer review manager from Origin Editorial, Ms. Linda Boniello, for their professionalism and for the special attention extended to me during the onboarding and transitional periods. I am looking forward to leading the continued success of JRSE for many years to come with this superb team of professionals and with our exceptionally qualified Editorial Board members.