The Renewable Energy Law Review

Second Edition

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Karen B Wong

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PREFACE

I was incredibly honoured to be the editor of the first edition of *The Renewable Energy Law Review* and was delighted to learn of the positive reception for the publication. The second edition has been expanded to include chapters for Germany and Mexico and we look forward to including additional jurisdictions each year as the growth of renewable energy continues globally.

Little did I know, working as a young associate in the 'early days' of renewable energy projects, that, fast-forward to over 30 years later, the industry would be as large and as active as it is today across the globe. As a US-based partner at Milbank practising in the energy industry, I see different political environments, tax and other incentives in place in our 50 states and, having worked on multiple international projects on four different continents, I know that the regimes across the world are equally unique. This compendium has been formulated to provide you with a good overview of the legal framework and current status and challenges in structuring, financing and investing in renewable energy projects in the selected jurisdictions.

Whether you are someone already active in this sector or merely interested in learning more about the policies, legal structures and state of play in the renewable energy industry globally, I hope that this guide will aid you in your efforts as a participant in an industry that is increasing the number of new sources for energy projects with fewer carbon emissions. As a young, naive and idealistic student applying to law school, I had a genuine desire to acquire the necessary skills and tools of a profession that would empower me to change the world. Frankly, I never imagined that I would have a legal career – to date spanning over three decades – that would offer me the opportunity to do just that in my capacity as an attorney facilitating transactions that literally help to keep our skies bluer and our air cleaner globally.

Karen B Wong
Milbank LLP
Los Angeles
July 2019

Chapter 17

UNITED STATES

Karen B Wong and Henry T Scott[1]

I INTRODUCTION

The renewable energy industry in the United States has adjusted to a rapidly changing political landscape. Long-standing state and federal policy drivers, emerging and improved technology, and momentum conducive to the development of renewables have resulted in the US renewable energy industry faring better than many expected over the past year. This chapter contextualises these developing policies and trends by providing a brief and focused overview of renewable energy from the US perspective. First, this chapter summarises major developments over the past year in the US renewable energy industry. Second, this chapter discusses the policy and regulatory framework underlying the development of renewable energy in the United States, project development through common sources of debt financing, and federal renewable energy tax credits and the associated tax equity project finance structures. This chapter also discusses distributed renewable energy and various forms of non-project finance renewable development, such as utility-owned projects and non-profit projects. Lastly, this chapter discusses trends and changes within renewable energy manufacturing, with a focus on recent policies affecting domestic solar manufacturing.

II THE YEAR IN REVIEW

Despite political uncertainty and gridlock in Washington, renewable energy in the United States has remained in good health. Renewable generation surged from 711TWh in 2017 to 747TWh in 2018;[2] 7,588MW of wind energy capacity and 10.6GW of solar energy capacity (including approximately 6.2GW of utility-scale solar installations) were installed in 2018,[3] while approximately 17,213MW of wind capacity were under construction at the

1 Karen B Wong and Henry T Scott are partners at Milbank LLP.

2 See Bloomberg Finance LP and the Business Council for Sustainable Energy, '2019 Sustainable Energy in America Factbook', 22 (2019).

3 See American Wind Energy Association, 'U.S. Wind Industry Fourth Quarter 2018 Market Report: Public Version', available at the American Wind Energy Association website, https://www.awea.org/resources/publications-and-reports/market-reports/2018-u-s-wind-industry-market-reports/4q2018_public. See the Solar Energy Industries Association website: https://www.seia.org/research-resources/solar-market-insight-report-2018-year-review.

end of the first quarter of 2019, and more than 12GW of solar capacity are expected to be installed in 2019.[4] Additionally, hydroelectric capacity is expected to grow from 101GW to approximately 150GW by 2050, thanks not only to new power plants, but also to upgrades to existing plants and increased pumped storage hydropower capacity.[5]

This growth has been propelled by extended federal incentives, advances in green technology and congenial state policies. As at February 2019, 29 states, three territories and the District of Columbia have enacted mandatory Renewable Portfolio Standards (RPS), while eight other states and Guam have voluntary renewable energy standards or targets.[6] Hawaii was the first state to adopt an RPS that mandates that its electric utility companies acquire 100 per cent of their net electricity sales from renewable energy sources by 31 December 2045[7] and Vermont currently boasts an RPS that mandates 90 per cent of net electricity sales from renewable energy sources by 2050.[8] California, which has one of the nation's most ambitious RPS programmes, requires utilities to derive 33 per cent of their energy from renewable sources by the end of 2020, 44 per cent by the end of 2024, 52 per cent by the end of 2027 and 60 per cent by the end of 2030 (with the ultimate goal of obtaining 100 per cent of the retail sales of electricity to end-use customers and the electricity to serve all state agencies from renewable energy resources and zero-carbon resources by the end of 2045).[9] As a result of the enactment of Senate Bill 100 by the California legislature in 2018, the state's RPS requires that 60 per cent of total retail sales of electricity come from eligible renewable energy resources and zero-carbon resources by the end of 2030 and 100 per cent by the end of 2045.[10] Although the larger California investor-owned utilities have enough renewable energy capacity under contract to meet the 2020 threshold, and one already has enough contracted capacity to reach the 2027 target,[11] the higher RPS requirement is likely to result in a need for additional renewable energy generation. Solar mandates on new buildings, such as the California Energy Commission's decision to require solar photovoltaic on all new homes commencing in 2020, will propel additional distributed solar development.[12] In addition, the January 2019 bankruptcy filing by California's largest utility, Pacific Gas &

4 See American Wind Energy Association, 'U.S. Wind Industry First Quarter 2019 Market Report: Public Version', available at the American Wind Energy Association website, https://www.awea.org/resources/publications-and-reports/market-reports/2019-u-s-wind-industry-market-reports/q12019_marketreport. See the Solar Energy Industries Association website: https://www.seia.org/research-resources/solar-market-insight-report-2018-year-review.

5 See Hydropower Vision, A New Chapter for America's 1st Renewable Electricity Source, prepared by the US Department of Energy Wind and Water Power Technologies Office, available at the US Department of Energy website: https://www.energy.gov/sites/prod/files/2018/02/f49/Hydropower-Vision-021518.pdf.

6 See State Renewable Portfolio Standards and Goals, prepared by the National Conference of State Legislatures, available at: http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx#gu.

7 See US Energy Information Administration, Hawaii and Vermont Set High Renewable Portfolio Standard Targets (29 June 2015), available at: https://www.eia.gov/todayinenergy/detail.php?id=21852.

8 See Vermont Department of Public Service, State Renewable Energy Goals, available at: http://publicservice.vermont.gov/renewable_energy/state_goals.

9 See the California Public Utilities Commission website: www.cpuc.ca.gov/rps/.

10 See https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100.

11 See the California Public Utilities Commission website: www.cpuc.ca.gov/RPS_Homepage/.

12 See Building Energy Efficiency Standards for Residential and Nonresidential Buildings, California Code of Regulations, Title 24, Parts 1 and 6, available at: https://ww2.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf.

Electric Company (PG&E),[13] may result in the rejection of power purchase agreements with renewable energy generators with above-market prices. The PG&E bankruptcy underscores a number of challenges traditional utilities are facing, including the erosion of customer base due to the emergence of new competitors such as community choice aggregators, and potential liabilities arising in connection with climate-induced natural disasters, such as the recent California wildfires.

Renewable energy projects in the United States continued to rely on the federal production tax credit (PTC) and investment tax credit (ITC) in 2018. Under the Protecting Americans from Tax Hikes Act of 2015, the PTC was extended to 2020 for eligible wind projects and the ITC was extended to 2022 for eligible solar projects.[14] In 2017, there was approximately US$6 billion of tax equity investment in wind and US$4 billion of tax equity investment in solar.[15] While there was no direct change to either the PTC or the ITC under the Trump administration's tax plan that passed on 22 December 2017, it was initially feared that the reduction in the minimum corporate tax rate from 35 per cent to 21 per cent, the new base erosion and anti-abuse tax, and the ability to elect 100 per cent bonus depreciation under the new tax plan would have a significant negative impact on projects relying on these tax credits. This proved not to be the case, as the combined tax equity investments in solar and wind projects increased to US$12 billion for 2018, with the majority still focused in the wind sector as the volume of solar tax equity investments in 2018 declined from the previous year.

Similarly, buoyed by state mandates and favourable IRS rulings regarding the applicability of the ITC, the advent of large-scale energy storage could fundamentally change the US renewable energy industry. Storage offers valuable flexibility and resilience; it can be used to throttle demand, alleviate transmission congestion and increase system reliability.[16] Importantly, it plugs gaps in reliability by making renewable energy available at any hour of the day, fixing the timing imbalance between renewable energy generation and use (referred to colloquially as the 'duck curve').[17] On 30 May 2019, Mitsubishi Hitachi Power Systems and Magnum Development announced the Advanced Clean Energy Storage initiative, a project to develop the world's largest renewable energy storage project in Utah with the goal of providing electricity with zero-carbon emissions to the Western United States.[18]

Since the successful completion and commercial operation of the 30MW Block Island Wind Farm Project, the first US offshore wind project, in 2016, there has been tremendous interest in the US offshore wind market, which according to the American Wind Energy

13 See the US Bankruptcy Court for the Northern District of California website: http://www.canb.uscourts.gov/case-info/pge-corporation-and-pacific-gas-andelectric-company.

14 Pub. L. No. 114-113, Div. Q, 129 Stat. 2242 (2015).

15 See Emma F. Merchant, 'Tax Equity Investors Break Their Silence on Congressional Tax Bill', Greentech Media, 12 January 2018, available at: https://www.greentechmedia.com/articles/read/tax-equity-investors-break-their-silence-on-tax-bill#gs.AFrcbP0.

16 See Paolo D'Aprile et al., 'The New Economics of Energy Storage', McKinsey & Company, August 2016, available at: https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-new-economics-of-energy-storage.

17 See Harnessing the Potential of Energy Storage, prepared by Edison Electric Institute, May 2017, available at: http://www.eei.org/issuesandpolicy/generation/Documents/EEI_HarnessingStorage_Final.pdf.

18 See 'World's Largest Renewable Energy Storage Project Announced in Utah', 30 May 2019, available at: https://www.apnews.com/Business%20Wire/4cd173038f674c1793a55180fbe3ab7b.

Association, represents a potential for more than 2,000GW of energy.[19] The state policies adopted by Maryland, Massachusetts, New Jersey, New York, and Rhode Island to promote offshore wind development, which include the requirement for power companies to purchase energy from offshore wind projects, has provided the stability needed to spurn the development of an American supply chain for the industry and could lead to the installation of 22,000MW of offshore wind projects by 2030 according to the Department of Energy.[20] The first of the large utility-scale offshore wind projects expected to commence construction in 2019 is the 800MW Vineyard Wind project jointly being developed by Iberdrola's affiliate Avangrid Inc, and Copenhagen Infrastructure Partners.[21] The Bureau of Ocean Energy Management notes that there are 15 active leases for offshore wind projects and others may be forthcoming.[22]

The private sector's march towards clean power is emblematic of current trends. An ever growing list of the world's most influential companies, including institutions such as Bank of America, large retailer Walmart and Silicon Valley giants Apple and Google, have committed to sourcing 100 per cent renewable power.[23] Indeed, large companies are driving demand for renewable energy: American corporations signed a record 6.4GW of power purchase agreements in 2018, with Facebook alone signing 22 renewable energy deals, the highest number of deals for 2018.[24]

III THE POLICY AND REGLATORY FRAMEWORK

i The policy background

Obama-era regulations from the US Environmental Protection Agency (EPA) aimed at limiting greenhouse gas emissions from existing fossil fuel-fired electric generating units have potential to spur substantial growth in renewables, but recent reversals in federal government policy are expected to dilute or eliminate the impact of those rules. The EPA rules set state-specific goals for reducing emissions from the power sector;[25] the wind and solar sectors are poised to help states meet the proposed compliance plans.[26] The final rules were released

19 See AWEA website, https://www.awea.org/policy-and-issues/u-s-offshore-wind.

20 id.

21 See https://www.vineyardwind.com/the-project.

22 See https://www.boem.gov/Lease-and-Grant-Information.

23 See the RE100 website: http://there100.org/companies; Shayle Kaan, 'The Private Sector May Lead the Charge Against Climate Change During the Trump Administration', Greentech Media, 15 December 2016, available at: https://www.greentechmedia.com/articles/read/the-private-sector-may-lead-the-charge-against-climate-change#gs.5djNUc4 and https://www.apple.com/newsroom/2018/04/apple-now-globally-powered-by-100-percent-renewable-energy/.

24 See Christian Roselund, 'Corporate solar procurement knocks it out of the park in 2018', pv magazine USA, 18 December 2018, available at https://pv-magazine-usa.com/2018/12/18/corporate-solar-procurement-knocks-it-out-of-the-park-in-2018/. See Emma Foehringer Merchant, 'The Year of the Corporate PPA', Greentech Media, 21 December 2018, available at https://www.greentechmedia.com/articles/read/the-year-of-the-corporate-ppa#gs.f6je78.

25 See the US Environmental Protection Agency website: https://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants.

26 See 'A Handbook for States: Incorporating Renewable Energy into State Compliance Plans for EPA's Clean Power Plan', by the American Wind Energy Association and the Solar Energy Industries Association, available at the Solar Energy Industries Association website: https://www.seia.org/research-resources/handbook-states-incorporating-renewable-energy-state-compliance-plans-epas-clean.

in August 2015 (the Clean Power Plan) but faced immediate legal challenges from a large number of affected states, state agencies, utility companies and energy industry trade groups. After an emergency stay was granted by the US Supreme Court, the US Court of Appeals for the DC Circuit heard oral arguments on the merits of the case in September 2016. In March 2017, President Trump issued an executive order setting out his administration's policy to promote energy independence and economic growth, and ordered the EPA to review the Clean Power Plan for consistency with the new policy. Subsequently, at the EPA's request, the US Court of Appeals held the case in abeyance and last extended that status on 5 April 2019 for an additional 60 days.[27] On 16 October 2017, the EPA proposed the repeal of the Clean Power Plan[28] and published the proposed repeal rule, known as the Affordable Clean Energy (ACE) rule, on 31 August 2018.[29] The EPA's final repeal rule was expected in June 2019.[30]

ii The regulatory framework

Renewable energy regulation in the United States is centred on the regulation of electric generation and transmission. The applicable regulatory areas for electricity from renewable sources consist of a number of distinct subjects, including: (1) the 'siting' of generation projects – regulation by state authorities of the energy facility's initial construction and operation; (2) the interconnection of generation projects to an electric grid; (3) the rates at which generators sell electric output; (4) the financial, corporate and organisational regulation of generation companies; and (5) the regulation of electrical reliability.

Regulation of electric generation is the responsibility of both state and federal governments. First, electricity generators must obtain certification from state entities to construct and operate generation facilitates. Traditionally, states exercise siting regulation through state laws that require a generation project to obtain a certificate of public convenience and necessity (CPCN), which allows the certificate holder to exercise a right of eminent domain to obtain property necessary for the energy project. More recently, in most (but not all) states, laws have been enacted relaxing the need for a CPCN for some or all generator facilities.

Second, renewable energy is regulated when it is transmitted to an electric grid. Here, the generation project sells electricity to a service provider, typically a local utility or an independent system operator. While the service provider is the entity that must comply with interconnection regulations, the generation project is still affected. The Federal Energy Regulatory Commission (FERC) has asserted jurisdiction over interconnection to the high-voltage transmission grids (typically 100kV and above, but sometimes lower voltages too) where the grids allow power flows across state lines. State regulatory authorities control the interconnection process in Hawaii, Alaska and Puerto Rico, and in the Electric Reliability Council of Texas, which occupies most of central Texas and is not synchronously

27 See the Environmental Defense Fund website: https://www.edf.org/sites/default/files/content/2019.04.05%20Order%20Continuing%20Abeyance.pdf.

28 82 FR 48035 (16 October 2017).

29 83 FR 44746 (31 August 2018).

30 See Lisa Friedman, 'E.P.A. Plans to Get Thousands of Pollution Deaths Off the Books by Changing Its Math', NY Times, 20 May 2019, available at: https://www.nytimes.com/2019/05/20/climate/epa-air-pollution-deaths.html. See also https://www.powermag.com/epa-will-issue-final-carbon-rules-for-power-plants-in-june/?pagenum=1.

interconnected with the rest of the United States. Service providers in FERC jurisdiction offer interconnection agreements to generation projects, to which the parties file the agreements with FERC.

Third, the regulation of electric utility rates is the heart of the regulatory framework. FERC has jurisdiction over wholesale rates for electricity in interstate commerce; it controls the prices at which generating facilities sell power to utilities 'for resale' to customers in any part of the United States where power flows across state lines. FERC has two different methods for determining the rates at which wholesale electricity can be bought and sold: market-based rates and cost-based rates. Cost-based rate regulation is the older system, typically applied to traditional vertically integrated utilities with captive customers and to independent transmission companies. Here, rates are based on accounting costs that comply with FERC's Uniform System of Accounts, including an allowed rate of return on invested capital. Conversely, market-based rate regulation is used by FERC for companies that do not have market power or that have mitigated their ability to exercise market power. Once a generator obtains market-based rate (MBR) authority from FERC under Section 205 of the Federal Power Act, the generator may sell wholesale electric energy, capacity and ancillary services (as specified in the MBR tariff) at market-based rates.

Fourth, FERC's corporate regulation of utility mergers and consolidations, and leases and sales (or other dispositions) of jurisdictional facilities under Section 203 of the Federal Power Act is a significant aspect of electric regulation. FERC has to approve any transaction in which the ownership or control of jurisdictional facilities will change.[31] In deciding whether or not to approve a change of control, FERC considers four factors: the effect of the proposed transaction on competition, the effect on rates, the effect on regulation, and the possibility of any cross-subsidies between cost-based and market-based utilities.[32]

Finally, FERC has imposed electrical reliability standards, pursuant to which it reviews generation facilities' reliability, imposing fines and requiring remedial actions for violations.

This regulatory framework underlies the broader pursuit of renewable energy development in the United States. The National Renewable Energy Laboratory notes that the aim of renewable energy regulation is fourfold: facilitating new renewable energy generation, ensuring adequate grid infrastructure, ensuring a secure short-term electricity supply and ensuring long-term electricity security.[33] These goals can only be understood and achieved through a regulatory framework that works in conjunction with national and foreign policy, tariffs and project development of renewable energy.

31 This includes sales of equity interests of 10 per cent or more, directly or indirectly, in any public utility. It should be noted that 'jurisdictional facilities' include both physical facilities such as transmission or interconnection facilities, and 'paper facilities' such as contracts, rate schedules or a tariff (including a market-based rate tariff) that have been accepted for filing under Federal Power Act Section 205.

32 This last factor was added by the US Congress pursuant to the Energy Policy Act of 2005.

33 Mackay Miller and Sadie Cox, National Renewable Energy Laboratory, *Overview of Variable Renewable Energy Regulatory Issues* (2014), available at: https://www.nrel.gov/docs/fy14osti/61350.pdf.

IV RENEWABLE ENERGY PROJECT DEVELOPMENT

i Project finance transaction structures

Consistent with project financing transactions worldwide, the use of a special purpose vehicle (SPV), known as the 'project company', is commonly used in US project finance transactions. Moreover, many project sponsors will develop multiple projects using different single-purpose project companies with separate financing transactions for each project.

Limited liability companies (LLCs) are the most common type of business organisation used for project companies because an LLC offers limited liability protection similar to that of a corporation but can be treated as a disregarded or flow-through entity for US federal income tax purposes. The flow-through nature of an LLC enables gains, losses and depreciation from a project to be passed to the holder of an ownership interest in an LLC, referred to as a 'member', and avoids the double taxation that would result when using a traditional corporation. This is particularly advantageous in the renewable energy sector when the sponsor of a renewable energy project cannot efficiently or fully utilise the tax benefits from PTCs or ITCs. By utilising an LLC entity, parties can structure the management and ownership of a project company to facilitate a tax equity transaction, in which management rights can be vested in the strategic developer but ownership can be shifted to passive tax equity investors, who can avail themselves of the PTCs to be generated by the project or the ITCs associated with the project. In addition, parties can agree on adjustments to the allocations of gains and losses as necessary to address different risk allocation factors.

Generally, the bank market and the private placement market provide the primary sources of debt financing for US renewable energy projects. Banks typically provide project companies with construction and term loan facilities for the development, construction and operation of a renewable energy project, as well as letter of credit facilities to enable project companies to satisfy certain credit support obligations required under project contracts. In addition, banks often offer other specialised debt facilities, such as equipment supply loans to facilitate the purchase of wind turbine generators or solar equipment prior to a project's completed development and final permitting. Often construction and term loan facilities will refinance these equipment supply loans. Sometimes banks will provide equity bridge loans to support the project's equity contribution commitments. A unique bank product that has developed in the renewable energy industry is a 'back-leveraged term loan', which is essentially a term loan made at a level above the project company and is secured by the membership interests owned by a project developer in the parent of a project company (and not the direct assets of a project company). Back-leveraged term loans have evolved to minimise interparty negotiations with tax equity investors when a 'partnership-flip' structure has been implemented. Banks also offer back-leveraged term loans to project holding companies, which include the partnership-flip structure discussed below.

Institutional investors that participate in the private placement transaction also offer a source of debt financing with fixed interest rates. Here, projects are financed through the issuances of bonds in capital markets, which are offered under Section 4(2) or Rule 144A of the Securities Act of 1933. Private placements under Section 4(2) are typically made only to accredited investors, such as a pension fund or an insurance company. Offerings in the bond market under Rule 144A are made only to qualified institutional buyers, which are sophisticated purchasers with over US$100 million of qualifying assets. While Section 4(2) private placements are usually made to a very small number of accredited investors through an administrative agent mixed with bank transactions, Rule 144A offerings are usually sold to a large number of investors administrated by a trustee under an indenture on behalf of qualified institutional buyers. Rule 144A transactions typically require less oversight and consent requirements than traditional bank transaction and Section 4(2) placements and offer a less onerous covenant package, given that waivers and modifications are harder to obtain when the transaction has been widely syndicated.

PTCs and ITCs have also changed the landscape of renewable energy project finance structures to the extent that a tax equity investor must own the renewable energy project to avail itself of these tax credits and other tax benefits. The partnership-flip transaction is a popular vehicle for project companies to implement to monetise their PTCs and ITCs and other tax benefits. In this structure, a tax equity investor enters into an equity contribution agreement or a membership interest purchase agreement prior to or during the construction phase of a project, pursuant to which the tax equity investor commits to contribute capital contributions or to purchase a membership interest in the project company (or parent) at the time (or immediately before in the case of a project monetising the ITCs) that the project is placed in service. The proceeds from the tax equity investment are applied to repay the construction debt. There are variations to this structure, known as the pay-as-you-go, or PAYGO, structure, in which the tax equity investor contributes less than 100 per cent of the equity provided under a traditional partnership-flip structure and agrees to make ongoing contributions during the operational period of the project as PTCs are generated.

The single investor lease or a leveraged lease transaction is an alternative structure used to monetise the ITCs associated with a renewable energy project. In a lease structure, a tax equity investor acquires the project and its tax attributes, and then leases the asset back to the developer, who operates the project and pays rent to the tax equity investor–lessor.

ii Distributed and residential renewable energy

Distributed generation covers technologies that generate electricity at or near where it will be used. In the United States, distributed energy is comprised of microgrids – such as structures on residential homes, industrial facilities or college campuses – that feed into larger electrical grids maintained by utility companies.[34] Distributed generation capacity, which is 90 per cent sourced from solar panels but also relies on wind, fuel cells and heat power, amounts to nearly one sixth of the nation's capacity from existing centralised power plants.[35] While some distributed generation systems are isolated from any centralised electrical grid, almost all distributed generation systems allow for net metering – connecting customers to a centralised grid from which they can purchase power when they are under-producing and to which they can sell any excess power generated.[36] As at April 2019, 48 states and the District of Columbia compensated customers for distributed energy, although rates and prices varied greatly.[37]

34 See Environmental Protection Agency (EPA), *Distributed Generation Electricity and Its Environmental Impacts*, https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts#ref1.

35 See EPA, *Distributed Generation Electricity and Its Environmental Impacts*, https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts#ref1. Distributed generation estimated at about 200 gigawatts in a 2007 study by the Federal Energy Regulatory Commission (FERC). The total nameplate capacity of US centralised power plants was more than 1,100 gigawatts as of 2012, according to the US Energy Information Administration.

36 See Richard Revesz and Burcin Unel, *Managing the Future of the Electricity Grid: Distributed Generation and Net Metering*, 41 Harv. Envtl. L. Rev. 43 (2017).

37 See Database of State Incentives for Renewables and Efficiency, Net Metering, 2019, available at https://s3.amazonaws.com/ncsolarcen-prod/wp-content/uploads/2019/07/DSIRE_Net_Metering_April2019.pdf.

The emergence of significant distributed generation installations in the United States has sparked policy debates over the price at which customers are compensated for sales of energy to utility companies.[38] Some states use set scales to compensate customers at the same rates they pay for consumption of energy, others impose lower rates for energy produced versus consumed, and others still impose special 'standby' charges for the right to sell energy.[39] For states imposing lower rates for energy produced by distributed generation installations, the lower prices are justified by utility companies as an 'avoided cost' – the costs the utility company would have incurred in producing the energy itself.[40] While there is no federal policy on distributed energy pricing, there is proposed US Senate legislation, backed by environmentalists and renewable energy supporters, that would regulate and standardise rates and prevent unjustified utility charges.[41] Likewise, utility companies have largely opposed distributed energy because of concerns over lost profits, resulting in many utilities lobbying states for decreased compensation. Regardless, standardised regulation will be necessary to support the continued growth of distributed energy.

iii Non-project finance development

While the vast majority of renewable energy projects are developed through project finance structures sponsored by private SPVs, utility-sponsored projects and non-profit sponsored projects have grown in popularity in recent years.

Utilities have sponsored community solar projects funded through upfront or ongoing payments directly from community ratepayers.[42] The customer buys, from the utility or a third-party owner, the rights to the benefits of the solar energy produced by the community project. Utility-sponsored programmes can make solar power more accessible for residents – as opposed to distributed generation or residential solar – because it requires less purchase power per resident and allows customers to purchase solar electricity in monthly increments. Two examples of such projects are the Sacramento Municipal Utility District's Solar Shares[43] and Tucson Electric Power's Bright Tucson[44] programmes. Electric co-ops, municipal utilities and public utility districts cannot benefit from renewable energy tax incentives for their community solar projects, since these entities do not pay federal taxes; however, they can take advantage of Clean Renewable Energy Bonds, which are not available to private entities. Since 2008, private and investor-owned utilities have qualified for the PTC[45] or the 30 per cent ITC[46] by meeting certain requirements.

Non-profit organisations have also created successful renewable energy projects financed through tax-deductible community donations. These donations are used to cover project construction costs, in which the donors receive tax deductions – if the donors receive

38 See Richard Revesz and Burcin Unel, *Managing the Future of the Electricity Grid: Distributed Generation and Net Metering*, 41 Harv. Envtl. L. Rev. 46 (2017).

39 id., at 47.

40 id.

41 id., at 48.

42 See US Department of Energy, *A Guide to Community Solar: Utility, Private, and Non-Profit Project Development* (2012) https://www.nrel.gov/docs/fy12osti/54570.pdf.

43 See Sacramento Municipal Utility District, *Power Sources*, https://www.smud.org/en/Corporate/Environmental-Leadership/Power-Sources.

44 See Tucson Electric Power, *Bright Tucson Community Solar*, https://www.tep.com/community-solar/.

45 Section 45 of the Internal Revenue Code of 1986, as amended.

46 Section 48 of the Internal Revenue Code of 1986, as amended.

a return benefit, such as electrical savings, their donation would constitute a quid pro quo contribution and their donation would not be tax-deductible. The generated energy is sent directly to the non-profit, such as a school or church, which is connected through a distributed generation model to a utility. The non-profit uses the electricity directly or receives compensation for over-production. While the non-profit is not eligible for federal commercial ITCs, it is eligible for other grants and funding not available to public utilities or private entities. The non-profit model has been successful throughout the country for small-scale projects, such as the community solar project in Bainbridge Island, Washington, in which 26 community organisations and individuals donated to the cost of construction of solar panels that support the local school's energy needs.

Feed-in tariffs have also been introduced, albeit on a relatively limited basis, in the United States.[47] These policies provide guaranteed payments to renewable energy producers (including individual homeowners) for the actual amount of energy they produce. This makes renewable energy investments far more attractive to homeowners and other investors, as feed-in tariffs can be used to guarantee a reasonable rate of return on the levelised costs of energy for a project.[48] Further, data from Europe (where feed-in tariffs are more widely implemented) tends to show that feed-in tariffs are more cost-effective per kWh than upfront rebates and net metering, and encourage faster renewable energy uptake than these other options.[49]

V RENEWABLE ENERGY MANUFACTURING

Renewable energy manufacturing in the United States has shifted in the wake of the Trump administration's policies. An 'America first' protectionist stance on trade, significant funding decreases to the Office of Energy Efficiency and Renewable Energy, and Trump's administration's repeal of Obama-era renewable and clean energy goals has focused the Trump administration's energy policies on non-renewable energy sources such as coal and natural gas. The most dramatic effect of changing policy priorities has been on US-manufactured solar panels. More than 80 per cent of US solar installations use imported panels, with most manufactured in Asia. The Trump administration placed a 30 per cent tariff on all imported solar panels, falling to 15 per cent over a period of four years, which was levied in response to competition from Chinese manufacturers. The 30 per cent tariff has added about 10 cents per watt to the cost of solar energy in the United States,[50] but the imposition of these tariffs did not appear to slow down development of solar projects, with a record 8.5GW of utility solar projects procured in the first half of 2018.[51] With manufacturing accounting for only

47 See Karlynn Cory and Toby Couture, State Clean Energy Policies Analysis (SCEPA) Project: An Analysis of Renewable Energy Feed-in Tariffs in the United States, National Renewable Energy Laboratory (June 2009).

48 id.

49 id.

50 International Trade Commission and Bloomberg New Energy Finance (2017) in Chris Martin, Jim Efstathiou and Air Natter, *World's Biggest Solar Players Say Trump's Tariffs Could Have Been Worse*, Bloomberg (2018) https://www.bloomberg.com/news/articles/2018-01-23/world-s-solar-leaders-say-trump-s-tariffs-could-have-been-worse.

51 See Nichola Groom, 'U.S. utility solar contracts "exploded" in 2018 despite tariffs: report', 12 September 2018, Reuters, available at https://www.reuters.com/article/us-usa-solar-idUSKCN1LT0EU.

20 per cent of jobs in the solar industry,[52] the most pronounced effect of the tariff and shifting US priorities for renewables is the increased cost of solar panels, triggering a possible slowdown in future solar deployment and innovation.

Despite energy policy shifts away from renewable energy sources, renewable wind and solar energy reached 8.8 per cent of total electrical generation in 2018 in the United States.[53] This increase in generation has been attributed to continued growth of US wind turbine and solar panel manufacturing. With more than 500 US manufacturing facilities specialising in wind power components, centred mostly in the east and north-east United States, costs for commercial and distributed wind technology have dramatically dropped, with wind turbine technology exports growing from US$16 million in 2007 to more than US$100 million annually.[54]

Further opportunities and challenges abound in the electrification of the transportation system. The ongoing succession of petrol-powered vehicles by plug-in electric vehicles (EVs), an ongoing trend that is projected to continue, entails a concomitant increase in electric energy demand.[55] In fact, EVs could create up to 774TWh of electricity demand (on par with the entire US industrial sector);[56] electricity demand from all types of EVs (including passenger EVs, commercial EVs and e-buses) is projected to rise from 74TWh in 2019 to 2,333TWh by 2040.[57] The conventional wisdom from the previous decade has been that night-time charging would alleviate strain on the electric grid. Yet, recent experience has been that solar energy production in the middle of the day has outstripped demand in areas with high solar retention. Plug-in electric vehicles, and other forms of electric storage, are a congenial solution to the problem of overproduction during peak solar hours, by providing a way to 'store' excess solar energy remotely. Accordingly, policies (from those that determine charging station locations to time-of-use rates for electricity) aimed at having consumers charge EV batteries with energy from renewable sources would do well to track this relationship.

52 See Nichola Groom, 'China's solar subsidy cuts erode the impact of Trump tariffs', 30 August 2018, Reuters, available at https://www.reuters.com/article/us-usa-solar/chinas-solar-subsidy-cuts-erode-the-impact-of-trump-tariffs-idUSKCN1LF18K.

53 US Energy Information Administration, Cara Marcy, *U.S. renewable electricity generation has doubled since 2008*, (19 March 2019) https://www.eia.gov/todayinenergy/detail.php?id=38752. In 2018, wind and solar generation accounted for 6.5 per cent and 2.3 per cent respectively of total electricity generation.

54 Office of Energy Efficiency and Renewable Energy, 'Wind Manufacturing and Supply Chain', available at https://www.energy.gov/eere/wind/wind-manufacturing-and-supply-chain.

55 See Electric Vehicle Outlook 2019, Bloomberg New Energy Finance (2019).

56 See Samantha Raphelson, 'U.S. Utilities Look To Electric Cars As Their Savior Amid Decline In Demand', NPR Here & Now Compass (29 March 2018) https://www.npr.org/2018/03/29/598032288/u-s-utilities-look-to-electric-cars-as-their-savior-amid-decline-in-demand.

57 See Electric Vehicle Outlook 2019, Bloomberg New Energy Finance (2019).

VI CONCLUSIONS AND OUTLOOK

Despite the fears and uncertainties arising from the shift in US policy priorities away from clean technology, and expiring government subsidies and tax credits, the renewable energy industry has continued to grow.[58] Moreover, there have been noteworthy developments in the US offshore wind energy sector due to technological improvements and governmental support at the state level.[59]

Looking to the future, any increase in renewable capacity must account for the challenges of lower demand for electricity for industrial and commercial customers, and those posed by the mass adoption of EVs – not only for individual passengers, but also for municipal and commercial purposes. The electrification of the transportation sector requires utilities to increase capacity, upgrade infrastructure and adopt demand-management techniques,[60] such as time-of-use rates, to support the influx in demand and prevent displaced fossil fuels from being replaced by dirty 'peaker' plants.[61] The marriage of renewable energy and the electrification of transportation will be supported by the country's increased funding for electric transportation research[62] and states' growing RPSs.[63] In addition, the deployment of energy storage and other technology advances in the renewable energy industry will help transform the intermittent nature of wind and solar resources to enable these low-cost renewable energy sources to ultimately function as more reliable baseload facilities. Moreover, given that renewable energy projects are now lower-cost generation resources than ageing coal and oil-fired plants, market forces will likely continue to drive investments in clean energy projects despite the phasing out of current US federal tax benefits.

58 See Chrissy Astbury, *How America's Solar Energy Policies Should Follow (and Stray) from Germany's Lead: Working Towards Market Parity Without Subsidies*, 27 Ind. Int'l & Comp. L. Rev. 2019 (2017).

59 In New Jersey, the Governor signed an executive order aimed at achieving 3.5GW of offshore wind generating capacity (see Executive Order No. 8, signed on 31 January 2018, available at https://nj.gov/infobank/eo/056murphy/pdf/EO-8.pdf), and the Public Service Commission of the State of New York issued an order adopting an offshore wind standard (see Order Establishing Offshore Wind Standard and Framework for Phase 1 Procurement, issued and effective 12 July 2018, available at http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b37EE76DF-81B1-47D4-B10A-73E21ABA1549%7d) authorising solicitations by the New York State Energy Research and Development Authority (NYSERDA), after which NYSERDA issued its first solicitation (see the NYSERDA website: https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Offshore-Wind-Solicitations/Generators-and-Developers/2018-Solicitation).

60 See Keith Dennis, Ken Colburn and Jim Lazar, *Environmentally Beneficial Electrification: The Dawn of 'Emissions Efficiency'*, The Electricity Journal, Vol. 29 Issue 6 (2016).

61 See Kevin Bullis, 'Could Electric Cars Threaten the Grid?', MIT Technology Review, 6 August 2013, available at: https://www.technologyreview.com/s/518066/could-electric-cars-threaten-the-grid/; News Release: NREL Research Determines Integration of Plug-in Electric Vehicles Should Play a Big Role in Future Electric System Planning, prepared by National Renewable Energy Laboratory, available at: https://www.nrel.gov/news/press/2018/nrel_research_determines_integration_of_electric_vehicles.html; Stephen Schey et al., 'A First Look at the Impact of Electric Vehicle Charging on the Electric Grid in The EV Project', EVS International Battery, Hybrid, and Fuel Cell Electric Vehicle Symposium, at 1, 2 (May 2012).

62 See, e.g., Office of Energy Efficiency & Renewable Energy, *Energy Department Announces $15 Million for Batteries and Electrification to Enable Extreme Fast Charging*, (23 October 2017) https://www.energy.gov/eere/articles/energy-department-announces-15-million-batteries-and-electrification-enable-extreme.

63 See Utility Dive, *Transportation Electrification Should Build on Energy Efficiency and Renewables Program Success*, (13 April 2018) https://www.utilitydive.com/news/transportation-electrification-should-build-on-energy-efficiency-and-renewa/521008/.

Appendix 1

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Karen Wong is a partner in the Los Angeles office of Milbank LLP and a member of the firm's global projects, energy and infrastructure finance group. With over 32 years of practice, Karen has spearheaded the development and financing for some of the largest thermal and renewable energy power projects in the world, including innovative concentrated solar power projects and coal gasification facilities involving carbon capture and sequestration projects, amounting to tens of billions of dollars across the United States, as well as in China, South East Asia and South America. Several of her transactions warranted 'deal-of-the-year' accolades by industry publications. Ms Wong was named 'best in energy, natural resources & mining' at the 2018 Euromoney Legal Media Group Americas Women in Business Law Awards, and was also named in the inaugural Women's Power List, published in 2017 by wind industry intelligence service A Word About Wind, and in subsequent lists, and is a well-recognised specialist in the renewable energy sector. She has been selected as one of the *Daily Journal*'s 'Top 25 Clean Tech Lawyers' in California, featured as one of the state's 'Top 75 Women Lawyers' and was included in *Institutional Investor*'s 'Guide to the World's Leading Project Finance Lawyers'. She is ranked by the 2019 edition of *Chambers Global* and *Chambers USA* for projects, *IFLR1000* and *Who's Who Legal: Project Finance*; was listed in *PLC Which lawyer?*; and is listed in both *Expert Guides: Project Finance* and *Expert Guides: Women in Business Law*.

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