



# **Creative US And International Debt And Equity Financing Mechanisms For Renewable Power And Energy Storage Projects And Technology Companies – Short Form**

**Panel: Value Stacking and Finance Innovations  
Solar Power International  
September 24 – 27, 2018  
Anaheim Convention Center, Anaheim, CA**

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- *Has Represented Clients In Renewable And Conventional Energy (Fuels And Power And Infrastructure) Project Finance Since 1978, Government Funding Initiatives (Grants, Loans, Loan Guarantees, etc.) Since 1980, And Clean Tech Private Placements Since 1999, Domestically And Internationally.*
- *A Founder And Original General Counsel:*
  - *Renewable Fuel Association – 1979-1984.*
  - *Clean Fuels Development Coalition – Since 1985.*
  - *Clean Fuels Foundation – Since 1990.*
  - *American Council On Renewable Energy/Biomass Coordinating Council – Since 2001.*
  - *Latin American Council On Renewable Energy – Since 2009.*
- *General Counsel, Global Solar Council (2017 – Present).*
- *Advisory Board, Consortium for Advanced Bioeconomy Leadership Education (CABLE) (2017 – Present).*
- *General Counsel, National Tribal Energy Association (2017 – Present).*
- *Assisted Clients In The Creation Of The Original Alternate Energy Tax Incentives In The 1978 And 1980 Tax Acts, And Their Expansions And Extensions Thereafter.*
- *Assisted Clients In The Renewable Fuels And Renewable Power Industries In The Development Of Provisions In The 1978 Public Utility Regulatory Policies Act, 1983 Caribbean Basin Economic Recovery Act, 1990 Clean Air Amendments (And Reformulated Gasoline Regulations Thereto), 1992 Energy Policy Act, 2005 Energy Policy Act, And The 2007 Energy Independence And Security Act, 2008 and 2014 Food, Conservation And Energy Acts, 2009 American Recovery And Reinvestment Act, FY2017 – FY2018 Budget Acts, and 2017 Tax Reform Acts.*
- *Named One Of The Top 100 Bioenergy Leaders Worldwide – BiofuelsDigest – 2011-2012 (#67), 2012-2013 (#50), 2013-2014 (#56), 2014-2015 (#49) and 2015-2017 (#42).*
- *AV Preeminent Rating By Martindale-Hubbell For Last 23 Years.*
- *Named One Of Washington, DC & Baltimore’s Top Rated Lawyers For Business & Commercial By Legal Leaders For 2012-2018.*
- *Vice Chairman For Project Finance, American Bar Association, Section For Energy & Natural Resources Since 2010.*
- *Kilpatrick Townsend Ranked #1 Worldwide For Infrastructure Construction and #1 in U.S. for Intellectual Property – Chambers – 2011-2017.*
- *Graduated With JD – Georgetown University Law Center And BA – University of Michigan – Summa Cum Laude And Phi Beta Kappa.*

# Policies That Drive Energy Storage

## **To Stimulate Economic Growth and Development of Economy, of Markets After 2018**

- FERC Order 841 (February 2018) – creates a framework for energy storage increasing value to the grid by increasing grid assets. This Order 841 provides states flexibility to promulgate rules to meet their particular energy needs. RTOs and ISOs will assist in implementing it.
- FERC Order 845, issued April 19, 2018, aims to provide a streamlined and transparent interconnection process.
- Orders 841 and 845 reduce barriers for energy storage in the wholesale electricity market.
- FERC Rulemakings AD16-25 and RM16-6 potentially could encourage storage growth – storage inclusion in RTO and ISO transmission and storage for frequency response, respectively. These rules allowing storage under regulated markets could increase storage by 70% says a January 2017 Morgan Stanley Report.
- FTA Clean Fuels (DOT Grants for electric vehicle battery technologies).
- Energy Efficiency & Renewable Energy (DOE Grants for Solar and Wind Manufacturing, Energy Storage, Fuel Cells, and related technologies).
- California's 1.325 GW energy storage mandate introduced in 2013 through A.B. 2514 and signed by Governor Brown. A.B. 2868, enacted in Summer 2017, mandates 500 MW of additional storage.
- The Energy Storage and Deployment Act of 2015 (S. 1434)(Senator Martin Heinrich, D-NM), introduced in late May 2015, would require 1% by 2021 (or more than 8 GW) and 2% by 2025 (or approximately 18 GW) of peak demand from renewable energy storage. Congress did not pass this legislation and it should be considered again.

# Policies That Drive Energy Storage

## To Stimulate Economic Growth and Development of Economy, of Markets After 2018 (continued)

- California’s Self-Generation Incentive Program (“SGIP”) reauthorized in 2014 to provide an additional \$415 million, (increased thereafter to more than \$566 million) in incentives or \$83 million per year – through 2019 for behind the meter wind, fuel cells, and energy storage, including a 200 MW energy storage mandate during that period at approximately \$1.80 per Watt. In early June 2016, the California Public Utilities Commission (“CPUC”) made some reforms to the SGIP. Most notably, it set aside 75% of annual funds for energy storage and 25% for renewable power and clean energy; restricted each project to a 20% cap (instead of 40%) and required natural gas products to use an increasing amount. In April 2017, CPUC doubled SGIP annual funding to \$166 million per year. In August 2018, the California Assembly passed SB 700 which would extend SGIP through 2026 with up to \$800 million of new funding enabling the addition of approximately 3 GW of new behind the meter energy storage.
- California, Connecticut, Massachusetts, New York and New Jersey collectively have more than \$100 million in grant funds for microgrids.
- Texas, with 450 MW of grid-scale energy storage, proposes to install 9 GW of energy storage battery capacity through RFPs issued by Oncor- a Texas transmission and distribution company.
- Similarly, New York’s NYSEERDA/Con Edison demand management incentive is \$2,100/kw (up from \$600/kw) for non-thermal battery storage and \$2,600/kw (up from \$600/kw) for thermal storage; providing 40% to 60% of the installed cost of the system. Demand-Response projects will receive \$800/kw (up from \$200/kw). In early June 2016, the California Public Utilities Commission made some reforms to the SGIP. Most notably, it set aside 75% of annual funds for energy storage and 25% for renewable power and clean energy; restricted each project to a 20% cap (instead of 40%) and required natural gas products to use an increasing amount.
- In April 2016, New York also procured through NYSEERDA RFPs for \$150 million in renewable energy including from fuel cells based on 20 year agreements for awardees with commercial operations on or after January 1, 2003.
- In 2018, microgrids have obtained grant funding for developing technologies from several states including California (\$45 million from CEC) and New York (\$40 million from NYSEERDA).

# Policies That Drive Energy Storage

## To Stimulate Economic Growth and Development of Economy, of Markets After 2018 (continued)

- Minnesota introduced HR 843 (Rep. Pat Garofalo) in 2016 to create rebates for property owners who install energy storage systems.
- New Jersey in 2015, awarded \$3 million to 13 different projects under the FY 2015 Renewable Energy Storage Initiative for energy storage. On March 1, 2016, New Jersey opened a 2<sup>nd</sup> round with double the funding to \$6 million.
- Maryland has new legislation (HB787) modeled after California's storage mandate in AB 2514. Maryland has enacted a new 30% ITC for energy storage in SB 758 in 2017. Virginia, Hawaii and New Mexico have introduced similar 30% ITC legislation for energy storage.
- Internationally, India's Solar Energy corporation recently issued an RFP seeking bids for procuring 100 MWs of energy storage capacity to support its massive 28 GW of installed solar over the next 5 years. As part of this effort, India's infrastructure finance company IL & FS in January 2016 announced it will develop 5,000 MW of solar storage at an energy park being constructed in the state of Rajasthan. Similarly, Australia's energy storage market should reach 250 MW by 2020. China, Japan and Germany each have strong and growing energy storage industries as recognized leaders behind the U.S.
- Proposed Energy Storage for Grid Resilience and Modernization Act of 2016 (H.R. 5350 Congressmen Honda (D-Calif.)) and S.1868 – Senator Heinrich) would expand the 30% ITC to all types of energy storage at the commercial and residential levels. It thus would open up access to additional investment capital. Congress did not pass this legislation which should be introduced again.

# Policies That Drive Energy Storage

## To Stimulate Economic Growth and Development of Economy, of Markets After 2018 (continued)

- Proposed Energy Policy Modernization Act of 2016 (passed by the Senate) would authorize \$50 million in annual R&D funding for Energy Storage through DOE. Congress did not pass this but the Senate introduced a broad ranging Energy Bill, entitled the “Energy & Natural Resources Act of 2017” (Senators Murkowski/Cantwell) (S.1460) (June 29, 2017), which was not passed and requires introduction again in 2018.
- The Clean Power Plan, if modified and implemented by the Trump Administration rulemaking, could spur renewable power and energy storage technologies and projects.
- Investments of \$5.3 trillion in 0% carbon power, over the projected \$7.8 trillion need for the renewable energy sector over the coming decades, is needed by 2040.
- Commercial and Industrial PPAs created 3.4 GW of renewable power growth in 2015. Google, Apple, Amazon, Walmart, Facebook, Microsoft were some of the leaders. In 2017 – 2018, C&I renewable PPAs have expanded substantially. Corporate Renewable – 5.4 GW of clean energy PPAs/ESAs were signed by 43 corporations in 10 countries in 2017 according to a January 2017 Bloomberg report.
- The Paris COPs 21 Agreement will require more than \$5.2 trillion in new renewable energy investments (including energy storage) to achieve a 2 degree Fahrenheit reduction target. With the US pulling out of the Paris Climate Accord, we are seeing more US states and cities moving toward 100% green power initiatives.
- Storage growth at grid level providing T&D upgrade deferrals, congestion mitigation, and ancillary services like voltage support, frequency regulation and providing reserve power for grid stabilization.

# Policies That Drive Energy Storage

## To Stimulate Economic Growth and Development of Economy, of Markets After 2018 (continued)

- Military bases are using used batteries to create microgrids of energy storage combined with solar to replace reliance on diesel fuel.
- Overall, Bloomberg New Energy Finance noted that worldwide clean energy funding fell 18% in 2016 from an all-time high in 2015 of \$348.5 billion to \$287.5 billion. Global solar investments at \$116 billion in 2016 were down 32% over 2015. Global wind investments at \$110.3 billion were down 11% over 2015. Biopower was level at \$6.7 billion in global investment between 2015 and 2016, as was small hydro at \$3.4 billion. However, most energy technologies grew by 29% in 2016 over 2015 with \$41.6 billion invested worldwide. Notwithstanding, through year ended 2017, the global cleantech investment finished its 8<sup>th</sup> consecutive year in a range of \$250 billion to \$35 billion, according to Bloomberg.
- In June 2018, ACORE launched a \$1 trillion investment initiative for renewables and grid technologies by 2030.

# Industry Highlights

## – Energy Storage Growth – 2014 – 2018

- World Energy Council Report (November, 2014) projects \$48 trillion in capital (including \$8 trillion for energy efficiency) is required between 2014 and 2035 to construct the required energy infrastructure supply chain. In July 2017, S&P's new report increased this prediction to \$90 trillion by 2032.
- Bloomberg, in a July 2018 Report, noted that global clean energy investment was \$138.2 billion in 1<sup>st</sup> half 2018.
- In June 2017, New Energy Outlook issued a report predicting that by 2040 globally:
  - Power demand will grow 58%, or at 2% annually.
  - Approximately \$10.2 trillion will be invested in new power capacity, of which approximately \$7.4 trillion will be for renewable power.
  - Wind and solar will represent 48% of installed capacity and 34% of power generation.
  - Levelized costs of solar PV decreases by 66%; while offshore wind costs decrease by 71% (or faster than onshore wind).
  - Growth of electric vehicles reduces costs of lithium ion batteries by 73%.
  - Lithium ion batteries for energy storage will become a \$20 billion market.
- GTM Research Report (March 2015) projected global energy storage to be more than a \$1 billion plus market for just battery-backed solar PV systems by 2018. GTM in June 2016 reported that the U.S. deployed 21.2 MW of energy storage in 1<sup>st</sup> Q 2016, of which 8.9 MW were behind the meter. It showed a 41.2 MW storage deployment for 2<sup>nd</sup> Q 2016, of which 27.19 MW was behind the meter. Storage increased by 16.4 MW and \$660 million in 3<sup>rd</sup> Q 2016. For 2016, GTM projected 287 MW of new energy storage deployment with more than 300 MW actually installed. 1<sup>st</sup> Q 2017 added 71 MW, a 50% decrease from 4<sup>th</sup> Q 2016 at 140.8 MW deployed, but a 276% increase over 1<sup>st</sup> Q 2016. GTM predicted another 478 MW of energy storage growth in 2017, but determined the growth ended 2017 at 295 MW, up from 231 MW in 2016. It also projects 2 GW per year by 2021 of new energy storage developments with annual revenues at \$3.3 billion and cumulative 2017-2022 revenues projected at \$11 billion.
- SEPA, in a July 2018 Report, determined 2017 storage increased to bring the total US deployment to 921 MW, including a 317% growth in residential energy storage. GTM reported 2018 US energy storage installations to be 43.6 MW in Q1 and 61.8 MW in Q2. It projects 393 MW in 2018 to a total of 16 MW in 2019. Globally, BNEF reported in August 2018, that energy storage is 131 GW of lithium batteries with 60% in China. Similarly, a Transparency Market Research Report (March 2014) predicts the global thermal energy storage market to increase from \$627.6 million in 2013 to \$1.82 billion, and from 2,038.3 MW in 2013 to 6,070.2 MW, by 2020.



# Industry Highlights

## – Energy Storage Growth – 2014 – 2018 (continued)

- January 2018 – The UK is targeting a 12 GW energy storage market by 2021, up from 60 MW in January 2018 with NEC commissioning a new 50 MW of storage there in January 2018. China announced a target of 120 GWh of energy storage by 2021.
- Australia connected its first large-scale solar and battery storage to the grid at 10.8 MW of solar and 5.3 MWh lithium-ion battery.
- However, Japan’s Institute of Energy Economics recently predicted that the overall global energy storage market would increase to a huge \$200 billion opportunity by 2020. It further predicted that Japanese companies seek to capture 50% of that growth by that date. This prediction would result in more investment than the June 2016 Bloomberg New Energy Finance prediction of \$250 billion of energy storage by 2040, and 25 GW of new batteries deployed by 2028.
- Navigant Report (March 2015) predicted a growth in global energy storage from 538 MW/\$675 million in revenues in 2014 to 21 GW/\$15.6 billion in revenues in 2024 and exceed \$23 billion in revenues by 2026. Recently, it also predicts a global growth in distributed energy storage (“DES”) systems from 196 MW in 2015 to approximately 2.4 GW by 2018, and exceeding 12.7 GW by 2025, representing approximately \$8.5 billion in annual revenues. By 2026, global utility scale storage is expected to reach 12.8 GW at a similar \$8.5 billion in revenues.
- As it’s cost continues to decline (40% since 2010), energy storage is projected to replace fossil fuel peaking power plants which discharge energy quickly into the grid when a sudden need arises. Moreover, more than 50% of U.S. coal power plants have closed since 2010 says Carbon Trackers in a 2017 report.
- IHS Market Report predicts overall global grid connected energy storage to reach an installed base of 526W by 2025.

# Industry Highlights

## – Energy Storage Growth – 2014 – 2018 (continued)

- The Smart Energy Producers Association (SEPA)'s September 2017 Utility Market survey determined that 33 utilities have installed 527 residential storage units onto the grid in 2016 increasing the national total to 1,762 residential interconnections.
- In 2018, 21 states have or are planning energy storage targets.
- California's 1.3 GW mandate by 2020 (A.B. 2514), along with other potentially big state markets like Texas, Puerto Rico, Hawaii and New York (now in 2018 with a new 1.5 GW mandate by 2030), and PJM states will continue to drive energy storage and technologies to compete for RFPs. Massachusetts provides a new storage voluntary target of 200 MWh by 2020.
- Today, this California mandate is being surpassed by transmission scale to distributed, behind – the meter solar and electric – vehicle linked system projects. California's 1.3 GW mandate further requires 875 MW to be distributed grid connected or customer-sited storage. Southern California Edison has announced more than 261 MW of new contracted energy storage capacity which is a 5-fold increase over its requirement.
- California has S.1347 which would add another 2 GW to the storage mandate, if enacted.
- Texas and PJM have more than 620 MW and 480 MW, respectively, of energy storage under development at year's end 2015.
- Technology advancements will better energy storage. 24 M has developed a new lithium ion battery that has 5 times more storage capacity. Similarly, Wildcat Discovery Technologies has developed electrolyte additives to boost lithium-ion battery performance of cathodes, anodes and voltages.
- A new IEA report in December 2017 found that electric vehicle batteries can be used for grid storage and could save \$100 billion to \$280 billion in avoided new electricity infrastructure investment by 2040.

# Industry Highlights

## – Energy Storage Growth – 2014 – 2018 (continued)

- AEE also reported in March 2014 that “battery prices have fallen 40% - 60% in the past 18 months.” Manufacturing innovations and product volume increases, AEE further notes, caused this price reduction. Along with balance of plant price reductions, the energy storage industry is expected to scale quickly. Solar Server’s January 2016 and World Energy Council’s January 2017 reports predicts an additional 70% reduction in energy storage costs by 2030. As \$1.00 per-watt-peak is the goal for solar, similarly the target for storage is \$100 per KWH.
- The White House announced on June 16, 2016 a series of commitments from 33 states for up to 1.3 GW of new storage procurements requiring approximately \$1 billion in investments.
- Energy storage initiatives through new grid resiliency and distributed energy incentive programs (including grants) have developed in New York, Connecticut, New Jersey and Massachusetts as a result of super storm Sandy driving potentially hundreds of millions of dollars to these storage technologies.
- The Oregon Energy Office issued a Storage Demonstration RFP, and Oregon enacted a storage mandate bill (HB2193) requiring Portland General Electric to have a minimum of 5 MWh of energy storage in service by January 2020. The State has \$300,000 for energy storage demonstrations. PacifiCorp issued an RFP on December 29, 2017 for 4 MW of energy storage projects, followed by Portland General’s late January 2018 RFPs for up to 39 MW.
- Germany, India and Japan have launched significant incentive-based energy storage initiatives.
- Behind the meter, which is approximately 10% of the overall storage market, tripled in 2014, and is projected to be 45% by 2019.
- In March 2017, 21 US States have more than 20 MW on energy storage each in their pipelines.

# Industry Highlights

## – Energy Storage Growth – 2014 – 2018 (continued)

- New York’s Reforming the Energy Vision (“REV”) Program, launched in April 24, 2014, provides significant incentives (including grants) for energy storage with several such projects announced in Summer 2015. Similar programs to incentivize energy storage and batteries have been established in Colorado (Clean Technology Products Program), Massachusetts (\$10 million) and New Jersey (\$6 million).
- New York – Energy Storage Deployment Act – A.6751/S.5190 – would set a binding storage procurement target of 1.5 GW by 2030, which Governor Cuomo enacted in late 2017. He hopes it will generate 30,000 jobs for New York. NYSERDA grants, NY Public Service Commission regulatory reforms and ConEd (52 MW)/PSEG (360 MW) RFPs for energy storage technologies are active. NYSERDA is to jump start this energy storage mandate with \$260 million. NY City issued the 1<sup>st</sup> City wide storage mandate in the U.S. of 100 MWh by 2020. The NY-S on Mega Watt Block Program is Governor Cuomo’s \$1 billion initiative which also will assist in developing solar and storage projects.
- New Jersey – Governor Murphy in May 2018 signed S.2314/A.3723 into law with it’s 2 GW storage mandate by 2030.
- NYC has set installed goals of solar of 1,000 MW by 2030 and 100 MW of energy storage by 2020. NY State is at 973 MW of installed solar and has leveraged more than \$2.8 billion in private clean energy investment as of 12/31/17.
- Connecticut – grants for 100 KW of energy storage and may propose substation storage demo projects.

# Industry Highlights

## – Energy Storage Growth – 2014 – 2018 (continued)

- Massachusetts – has a new Voluntary 200 MWh energy storage target by January 1, 2020 by Mass DOER. The State legislature passed a bill (H4857) signed by the Governor on August 9, 2018 with a mandate of 1 GW by 2025, which had been reduced from the original 2 GW request. The law also added a 1600 MW offshore wind target by 2035. Clean Energy Storage - \$150,000 grant for a demonstration project of utility controlled residential battery energy storage systems. The overall program totals \$10 million. In August 2016, Massachusetts became the 3<sup>rd</sup> state with an energy storage mandate. Mass DOER (Massachusetts Department of Energy Resources) solicits responses on utility electric storage mandate – awaiting decision this Summer 2017. Experts suggest the mandate be set at 600 MW or higher. The goal for energy storage from all sources could be 1,766 MW or 14.5% of the State's 2020 peak load. Similarly, in April 2017, Massachusetts issued an RFP for 9 GWh of clean power to be online by 2022 with the proposals due on July 27, 2017.
- Arizona – Utility (APS and TEA) RFPs for 20 MW of energy storage. Arizona requires 10% of peak generating procurements to come from storage. In February 2018, it announced a 3 GW target for energy storage by 2023.
- Michigan – Consumer Energy is reviewing a plan to take on 450 MW of energy storage by 2040.
- Florida – a non-deregulated electricity market – may see \$230 million in battery storage investments for utility – owned battery systems by 2021. On January 2, 2018, Florida introduced HB 1133 for a \$10 million pilot program for solar plus energy storage.
- Hawaii – HECO energy storage RFPs result in 3 projects of 60 MW – 200 MW. \$205 million set for solar power development under state's 100% RPS by 2045. Hawaii has new 2017 bills for storage tax credits and infrastructure loans. Hawaii added 731 residential energy storage systems in 2017 versus 40 in 2016.

# Industry Highlights

## – Energy Storage Growth – 2014 – 2018 (continued)

- Washington – 3 utilities awarded DOE EERE grants of \$15 MM for energy storage. HB 2230 – carbon tax with funds placed into several funds such as the sustainable Infrastructure Fund to deploy renewable energy and storage projects.
- Texas ERCOT – focus on energy storage and data centers with ONCOR with utility study for controlled distributive solar (including behind the meter). Texas also provides New Technology Implementation Grants (\$1 million program). Texas further enacted SB1731 in July 2017, to provide incentives for electric and other advanced vehicles joining 14 other states and the District of Columbia.
- Utah – PUC storage pilot for distribution infrastructure.
- Maryland – new 30% energy storage ITC in S.B. 758.
- Nevada – Gov. Sandoval signs AB405 for energy storage interconnections, but would not sign AB206 for a 40% RPS by 2030. Nevada Energy in May 2018 contracted for 100 MW of storage with 1 GW of new solar power in 6 new solar and 3 new battery storage projects.
- Virginia enacted S.B.125B to develop energy storage. It introduced a 30% ITC, similar to Maryland, in HB 1018 in January 2018.
- Energy Storage requires a pipeline of projects for growth and corporate sustainability. Alevo did not produce, while Tesla has developed, such a pipeline. Thus, Alevo entered bankruptcy and Tesla has flourished. The correct partnerships, like resourceful EPCs, can assist in developing this required pipeline.
- As more auto manufacturers develop electric vehicles, storage will grow for recharging infrastructure and auto batteries.

# Industry Highlights

## – Energy Storage Growth – 2014 – 2018 (continued)

- Three financing models are emerging: shared savings, leases and energy storage agreements akin to PPAs.
- Advanced Microgrid Solutions and Stem raised \$200 million and \$100 million, respectively, in independent project financings in 2016.
- AES has built a 30 MW battery for San Diego Gas & Electric's Aliso Canyon. First Solar is building a 50 MW solar powered battery for the Los Angeles Moss Basin area. Recurrent Energy plans to build 350 MW of battery storage as part of a 350 MW solar power project near Palm Springs. Each are significant solar + storage projects.
- BNEF in August 2018 reported that battery price should fall to \$96/kwh by 2025, with \$70/kwh by 2030.
- Electric vehicles could assist utilities in states like California to flatten duck curves by charging in the afternoon and storing electricity surpluses freeing up electricity for nighttime use. This approach could be the equivalent of adding 1 GW of storage capacity at cost savings of \$1.45 billion to \$1.75 billion says GTM in May 2018.

# Industry Highlights

## – Solar Growth – 2014 – 2018 (continued)

- At the project level, Solar power overall grew approximately 36% worldwide in 2015 alone with approximately 55 GW of installation. In the U.S., solar grew by 7.5 GW in 2015, representing \$30.2 billion of investment. In 2016, the U.S. solar industry installed 14.625 GW, or a 95% increase over the 7.5 GW installed in 2015. Globally, more than 77 GW (\$131.8 billion investments) of PV was installed in 2017, or a 35% increase. Installations for 2017, however, dropped to 4.9 GW by 48% in the U.S. To date, the U.S. has more than 40 GW of solar PV.
- The recent 5 year extension of the ITC could add 25 GW of new solar at approximately \$40 billion over that 5 year period. Solar CAPEX costs are expected to fall below \$1.00 per Watt by 2020.
- Canada is one of top 10 solar PV countries with an average of 675 MW added annually from 2014-2016.
- In May 2018, the California Energy Commission unanimously required solar panels on all new homes, condominium and apartment buildings up to three (3) stories tall after January 1, 2020.
- From a project financing standpoint, in the U.S., GTM states in a September 2017 report that new solar power installations of 16 GW occurred in 2016 (with 12.4 GW predicted for 2017 at 17% reduction over 2016; but instead it finished 2017 at 10.6 GW or 30% less than record breaking 2016) with 18.3 GW projected in 2022 and 85 GW projected globally in 2017 states GTM in April 2017. Furthermore, the distributed Solar - storage market could exceed \$49 billion by 2026.
- In September 2018, GTM reported that Q2 U.S. installations were 2.3 GW (for nearly 8.5 GW installed through early September 2018) and projected to be 10.9 GW for 2018 in total new installations.



# Industry Highlights

## – Solar Growth – 2014 – 2018 (continued)

- The Suniva Section 201 tariff decision, projected to cost the U.S. nearly 7.6 GW of new solar PV projects by 2022, was announced on January 22, 2018 by the U.S. Trade Representative. The tariffs is as follows:
  - 4 year ad valorem tariff on imports of crystalline solar photovoltaic (“CSPV”) cells and modules
    - Year 1 – effective February 7, 2018 – 30%
    - Year 2 – 25% (2019)
    - Year 3 – 20% (2020)
    - Year 4 – 15% (2021)
  - First 2.5 GW of imports annually are exempted as are certain General Systems of Preference (“GSP”) countries. These exempted countries, Bloomberg estimates, could manufacture 10.46 GW of modules and 3.8 GW of cells annually.
  - These tariffs are in addition to the antidumping and countervailing duties on Chinese and Taiwanese CSPV cells and modules.
  - SEIA projects a loss of 23,000 solar jobs from the Suniva tariffs.
  - South Korea filed the initial WTO complaint against this tariff in late January 2018, followed by similar actions by China, Taiwan, and Singapore. Then, 3 Canadian companies (Silfab Solar, Heliene and Canada Solar Solutions) filed suit in February 2018 with the U.S. Court for International Trade (NYC) seeking to enjoin these tariffs.
  - Solar prices have decreased by 74% since 2009 at just under \$20/mwh. The target is \$14.70/mwh by 2022.
  - A trend in California is for Community Choice Aggregators (CCAs) allowing communities to make their own agreements with energy providers and make up 10% of the California energy market and 16% by 2020.
  - Community Solar is available in 42 states plus Washington, DC with only 19 of them having format policies in place. The target by 2030 is for Community Solar to supply 1.7% to 2.6% of the electricity market states utility Dive’s report in August 2018. Today, it represents about 1 GW.
  - New Jersey in September 2018, implemented a 450 MW community solar pilot program for 3 years.

# Industry Highlights

## – Wind Growth – 2014 – 2018 (continued)

- Wind power installation worldwide exceeded \$8.5 billion CAPEX in 2014. However, in 2015, global wind power installation was \$14.7 billion or 73% over 2014. Further, globally, 8.6 GW of wind power was installed in 2015, with 9.4 GW under construction in 2016 and installed wind capacity increasing by 4 GW from 12 GW to 16 GW in North America led by the U.S. says a recent Lazard report. In 2016 and 2017, the U.S. added 8.2 GW and 6.9 GW, respectively, of wind power. In the U.S., 82 GW of wind power is now installed says the American Wind Energy Association.
- Globally, 2017 saw 52 GWs installed to increase overall worldwide wind power to 540 GW says AWEA in an August 2018 Report.
- The 5 year PTC extension could create an additional 19 GW of new wind capacity. However, a January 2017 White Paper by Marathon Capital states that a proposed decrease in corporate tax rates under the Trump Administration could have a greater negative affect on wind rather than solar projects.
- Massachusetts mandates 1600 MW of offshore wind by 2027.
- Zion Market Research's May 2017 report predicts that global offshore wind power market will grow to \$57.2 billion in 2022 from \$20.3 billion in 2016. Bloomberg New Energy Finance projects this offshore wind growth at 16% annual from 2017 – 2030 reaching 115 GW from 17.6 GW in January 2018. New York issued an RFP in January 2018 for 800 MW of offshore wind projects.
- AEP cancelled its 2 GW Wind Catcher Project in Texas after Texas PUC rejected it in July 2018.
- The 800 MW Vineyard Offshore Wind Project off Massachusetts, the largest to date, will have a starting price of \$74/MWh with a 20 year PPA under Massachusetts 1.6 GW target by 2027. Rhode Island purchased a 400 MW contract to Deep Water Wind in May 2018, after the 30 MW Block Island Wind Farm was constructed. New York has targeted 2.4 GW by 2030; which New Jersey has committed to 3.5 GW by the same date. NYSERDA is offering \$5 million in offshore wind assessment grants.
- The projected offshore wind build out is 9 GW over the next 10 years.

# Industry Highlights

## – Corporate Renewables 2015 – 2018 Growth

- RMI Business Renewable Center reported in mid August 2018 that corporate renewables for only the 1<sup>st</sup> half of 2018 has exceeded 3.86 GW. The previous high was for the entire year of 2015 at 3.12 GW.
- BNEF in August 2018 placed an even higher 1<sup>st</sup> half 2018 figure of 7.2 GW of corporate renewable electricity purchases versus 5.4 GW for the entire 2017.
- Top corporate renewable purchasers: Facebook, AT&T, Norsk Hydro, Alcoa, Microsoft, Walmart, T-Mobile, MGM Resorts, Google, Nike, Amazon, Apple, IKEA, General Motors and Fifth Third Bank. Many of these companies have pledged to operate at 100% using renewables in the near term. Facebook signed PPAs for 3 GW of new solar and wind, including 2.5 GW since September 2017.
- Corporate Renewable PPAs are priced on hub prices in an RTO or ISO, removing transmission risk for the corporate buyer. These PPAs are generally virtual or synthetic and not physical. They are structured as “contracts for differences.”
- Akamai, Apple, Etsy and SwissRe, in August 2018, became the first corporate renewables “aggregation” model, negotiating together for 125 MW of wind (near Chicago with Geronimo Power) and 165 MW of solar PV (in Virginia with sPower) using virtual PPAs.
- Renewable Energy M&A in 1<sup>st</sup> half 2018 amounted to \$180 billion.

# Challenges And Solutions

## A. **Growing The Bioeconomy, Renewable Power And Energy Storage Industry – Challenges and Solutions**

### 1. **Challenges** – What are the obstacles to growing bioeconomy, renewable power and energy storage?

- Perceived Lack of Funds at the Company and Project Levels.
  - Grants and Equity.
  - Bank and Corporate (Bonds) Debt.
- Lack of Certainty in Government Programs.
  - Government Funding Programs – Require Continuing Annual Appropriations for Existing and New Programs. Trump Administration significantly would reduce or eliminate loan guarantee, loan and grant programs for FY2019. We succeeded in keeping the programs funding through March 23, 2018 in the recently enacted Continuing Resolution (CR) and FY2018 Budget Act having (i) raised the ceiling on Federal program spending limits by \$300 billion (approximately \$160 billion for defense and \$140 billion for non-defense) and (ii) removed restrictive Section 714 which greatly would have reduced or eliminated program funding and entirely eliminated compensation for program officials. We similarly had succeeded in restoring federal government funding programs in the FY2016 and FY2017 Budget Acts/CRs.
  - Tax Incentives – Require Extensions of Existing and Creation of New Incentives for biofuels, biochemical, bioproducts, and biopower which otherwise had expired on December 31, 2017.
  - Many of them received a 1 year retroactive extension back to January 1, 2017 to December 31, 2017. Small wind, hydropower and other expired incentives received 5 year extensions with a phase down similar to solar power. These incentives were accomplished through the 2018 Budget Act, which addressed tax extenders after the 2017 tax legislation was enacted.
  - Energy storage not fully integrated into power units again was overlooked. Energy Storage Association (ESA) – written comments to Treasury and various 2017 Senate and House Energy Bills would accomplish a similar expansion to non-fully integrated systems, if addressed, but they have not been to date.
  - 2017 Senate and House bills would have prohibited wind incentives within 50 miles of military installations, but were not implemented.
  - Tax Cuts And Jobs Act of 2017 (“2017 Tax Reform Act”) reduced corporate taxes to 21% from 35% and, implemented a 100% capital expense depreciation in the first year, each through 2022, with the bonus depreciation percentage decreasing 20% per year thereafter through 2026. These incentives require further extension.
  - Federal Renewable Fuels Standard (RFS/RINs), State Low Carbon Fuel Standards (LCFS) and State Renewable Portfolio Standards (“RPS”) – Require Certainty. These federal RFS, state LCFS and state RPS laws have been under attack for many years, but support still remains high.

# Challenges And Solutions

## A. **Growing The Bioeconomy, Renewable Power And Energy Storage Industry – Challenges and Solutions (continued)**

### 2. **Solutions** – What are the energy and industrial policies needed to move forward?

- Creative Debt Financing and Equity Funding – Company, Project and Portfolio Levels.
- Insurance Protections. The insurance industry creatively would wrap technology risks and credit enhance bank, taxable corporate debt (project company bonds) and tax exempt municipal bonds.
- Tax Incentives Availability as part of the 2017 Tax Reform Act and 2018 Budget Act. The ESA has filed written comments to Treasury along with introduction of Congressional bills to expand the use of 30% ITCs for energy storage beyond the current applicability of energy storage equipment fully integrated into renewable power units. - i.e. non power unit integrated independent systems and those systems integrated into the grid for power stability and resilience. More likely – states most/will take over to create, expand and/or extend tax incentives. Maryland has enacted a comprehensive 30% ITC for energy storage. New Mexico, Virginia and Hawaii have similar energy storage ITC bills before their respective state legislatures.
- The 2017 Tax Reform Act will provide corporate tax rates at 21% (instead of 35%) through 2022 and 100% first year expensing of capital depreciation costs for equipment purchased after September 27, 2017 through December 31, 2022, when the rate decreases 20% annually through December 31, 2026. These incentives will create interesting structuring opportunities.
- RFS, LCFS and RPS Certainty. There was a Senate bill (Senator Udall (D-NM) – S.1264) in Congress in 2016 for a Federal RPS in the last 2017 Congress. A similar measure is required in the current Congress.
- Infrastructure Bill – Trump Administration proposed it at \$1.5 trillion – with a carve out at least for electricity which may present additional new funding opportunities.
- Opportunity Zone Funding – New under the 2017 Tax Reform Act. Opportunity Funds are certified investment vehicles that deploy funds into Opportunity Zones. These Opportunity Funds are required to hold at least 90% of their assets in Opportunity Zones. A maximum of 25% of a state, District of Columbia, territories or possessions, low- income census tract (as defined in Section 45 D(e) of the Internal Revenue Code) may be designated Opportunity Zones. Investments are eligible for capital gains tax deferral after 5 years and for permanent exclusion after 10 years of keeping those investments in place. These investments can be provided into (a) businesses, such as new technology companies, and (b) projects of all types. At present, more than 8700 Opportunity Zones are designated by Treasury.

# Challenges And Solutions

## A. **Growing The Bioeconomy, Renewable Power And Energy Storage Industry – Challenges and Solutions (continued)**

### 3. **Good News** –

- Plenty of funding is available, even though global clean energy investments in renewables fell to \$53.6 billion, down 17% year-on-year from \$64.8 billion and overall clean energy investments fell 18% to \$287.5 billion in 2016 according to Bloomberg New Energy Finance in April 2017 – generally attributed to falling CAPEX as technology betters.
- Bloomberg also noted that 2017 represented the 8<sup>th</sup> consecutive year in which U.S. clean energy investment was within a range of \$250 billion to \$350 billion.
- Moreover, the International Energy Agency in a 2017 forecast stated that renewable energy investments would exceed \$7 trillion by 2040, with \$ trillions more invested in demand side management and energy efficiency.

### 4. **Bad News** – These funds are difficult to access and structure, particularly with federal funds and incentives continuously in the “crosshairs.”

# Equity And Equity Equivalent Funding

	Type of Funding	Corporate-Level Funding	Project-Level Funding	Dilutive (“D”) or Non-Dilutive (“ND”)
1.	Grants (State and Federal – DOE, USDA, DOT)	✓	✓	ND
2.	Angel Funding (including Crowdfunding (as modified in June 2015 by Regulation A-Plus), Foundations and Family Offices – Prime Coalition, CREO Syndicated, as part of Clean Energy Investment Initiative -- up to \$4 billion (Recent White House Initiative) Equity (Keiretsu – largest/2014 - \$24 billion in angel private placements with 6% to cleantech)	✓		D
3.	Venture Capital Equity (Zymergin raised \$44 million in series A round for its microbial programming to high value bioproducts from Data Collective, Draper Fisher, HVF, Innovation Endeavors, Obvious Ventures, True Venture and Two Sigma Ventures.)	✓	✓	D
4.	Private Equity (TIAA – CREF North American Sustainable Energy fund - \$1 billion; UK’s Smart City Enterprise Investment Fund of \$150 million for energy efficiency; Bill and Melinda Gates Foundation is committing \$2 billion over 5 years for clean technology. Also, \$1 billion Breakthrough Energy Fund and \$2 trillion Saudi Arabia Public Investment Fund.)	✓	✓	D
5.	Strategic Equity (Bioeconomy companies raised approximately \$1.3 billion in the past 12 months or a 16% increase in deals and 17% drop in deal size per raise). Total acquired Saft for \$1.1 billion. Tesla announced the proposed \$2.6 billion acquisition of Solar City.	✓	✓	D
6.	Infrastructure Funds Equity (USDA’s 4 new 2x \$150 million, \$100+ million and \$25+ million equity and debt funds – Advantage Capital Partners, Rural Business Investment Corporations (“RBICs”) – Made In Rural America, Meritus and Innova, respectively, KKR raised a 2 <sup>nd</sup> fund of \$3.1 billion, \$3.5 billion Black Rock Global Energy & Power Infrastructure Fund III and Sovereign Wealth Funds)		✓	D
7.	State (California, Connecticut, Hawaii, Illinois, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New York, Washington) and Federal Green Funds, State Revolving Funds (tend to be grants, loans, loan guarantees and not equity as government entities shy away from investments)		✓	ND
8.	International Green Funds (Australia, Brazil, Canada, Caribbean Energy Security Initiative (\$20 million US fund), European Investment Bank (Euros 8 billion), India, Malaysia, UK) (tend to be grants, loans, loan guarantees and not equity as government entities shy away from investments)	✓	✓	ND
9.	Tax Equity – ITCs, PTCs, Bonus and MACRS Depreciation and NMTCS		✓	Initially D to later ND
10.	Sponsor Equity – Project Developers, Hedge Funds (use has grown in last 2 years), EB-5 and YieldCos		✓	D
11.	Portfolio Equity - MLPs/ REITs/ YieldCos		✓	D

# Grants

## 1. DOE

- Closed and open grants for energy storage applications:
  - August 2018 – ARPA-E reports that, to date, it has provided over \$230 million in grants to more than 103 energy storage transportation and stationary applicants, causing more than \$600 million in private sector investor thereto.
  - In August 2018, ARPA-E reported that its energy storage goal is to provide reliable operation for 10 to 100 hours at rated power for a levelized cost of 5 cents/KWH cycle in any location.
  - On May 3, 2018, ARPA-E announced \$30 million for energy storage technologies for securing grid resiliency.
  - On April 30, 2018, DOE awarded \$19 million grants for batteries and vehicle electrification technologies.
  - In June 2018, DOE announced \$40 million for 31 microbe-based R&D projects.
  - In May 2018, DOE announced \$68.5 million for advanced vehicle technologies.
  - In May 2018, DOE announced the following FOAs:
    - i. \$28 million for bioenergy processing from wastes.
    - ii. \$15 million for carbon use in algal systems.
    - iii. \$20 million for advanced biofuel and biopower R&D.
    - iv. \$15 million for nonfood dedicated energy crops.
    - v. \$30 million for long duration energy storage.
  - In May 2018, DOE announced \$72 million for high temperature concentrating solar power technologies. It additionally announced another \$33.5 million for PV and systems integration technologies.
  - In May 2018, DOE announced \$3 million for its BRDI program for bio-based products and bioenergy technologies.
  - In late February 2018, DOE announced \$11.5 million in grants for energy infrastructure on tribal bonds.



# Grants (cont'd)

## 1. DOE (continued)

- Closed and open grants for energy storage applications:
  - In December 2017, DOE's ARPA-E program issued an RFP for \$100 million for innovative energy technologies with a concept paper due February 12, 2018.
  - ARPA-E's budget was to be tripled to \$1 billion by 2021 (but for recent proposed projected FY2019 program cuts). Recent technology fundings of 45 cleantech projects resulted in more than \$1.2 billion in follow-on private sector investments. On February 26, 2016, ARPA-E announced \$30 million for its new "Integration And Optimization of Novel Ion Conducting Solids ("IONICS") program for energy storage in the transportation sector, grid storage, hydrogen fuel cells and electrolyzers. Some recent energy storage awardees for 2015 – 2016 include: Primus Power (zinc-flow batteries), Fluidic (zinc air batteries), Envia Systems (lithiumion batteries for EV and hybridcars), SAFCCell (fuel cells for distributed power) and Sun Catalytics (microgrid flow batteries).
  - ARPA-E in 2017 offered \$25 million for concepts focused on creating energy efficiency in data centers.
  - In December 2017, DOE announced \$12 million per advanced early stage solar research.
  - In late February 2018, DOE announced \$11.5 million for grants for energy infrastructure on tribal lands.
  - On February 23, 2018, DOE announced \$10 million for CHP grants to provide cost effective support to the electric grid.

# Grants (cont'd)

## 1. DOE (continued)

- Closed and open grants for energy storage applications:
  - The DOE's Office of EERE issued a program entitled "Solar Energy Evolution and Diffusion Studies II – State Energy Strategies" for approximately \$20.9 million to cover two topics: 1 - increasing foundational understanding of technology evolution, soft costs, and barriers to solar deployment in the US. 2 - tackling soft costs and market barrier challenges at the state and regional level by maximizing the benefits of solar electricity through energy and economic strategic planning. Closing application date – May 2, 2016.
  - The DOE's Office of EERE, on behalf of the Buildings Technologies Office ("BTO"), announced an FOA for Buildings Energy Efficiency Frontiers and Innovation Technologies ("BENEFIT") 2016. This FOA combines early-stage topics (Innovations) with later-stage, roadmap-driven topics (frontiers) that complement the core funding provided by the program. Closing application date – April 19, 2016. Award ceiling of \$2MM.
  - DOE provided \$9 million for 58 grants to small business and \$32 in grants for small business projects to develop clean energy technologies in July 2017.
  - DOE provided \$46.2 million in early stage solar grants in July 2017.
  - DOE provided \$19.4 million in 22 new cost-sharing batteries, materials, engine and mobility systems in July 2017.
  - DOE's EERE provided \$8 million for algae-based biofuels in 2d Q 2017.
  - In October 2017, DOE announced \$15 million for batteries and electricity to enable fast charging.

# Grants (cont'd)

## 1. DOE (continued)

- Closed and open grants for energy storage applications:
  - The Fuel Cell Technologies Office (“FCTO”), part of the DOE’s EERE portfolio, operates the “Hydrogen and Fuel Cell Technologies Research, Development, and Demonstrations” program. It is geared to support a technology–neutral approach towards research, development, and demonstration to address challenges for fuel cells and hydrogen fuels (including institutional barriers such as hydrogen codes and standards). Award ceiling: \$3MM.
  - DOE, on June 16, 2015, announced to Clean Energy Impact Investment Center as part of the Administration's White House Clean Energy Investment Summit, where private industry pledged \$4 billion for investment.
  - DOE, on August 25, 2015, opened an \$18 million solicitation for advanced PV technology in its Sunshot Program.
  - DOE, on June 23, 2016, set up a \$16 million grant program between National Laboratories and the private sector for developing “promising energy technologies” such as fuel cells, batteries and other clean energy technologies.
  - \$1.8 million for wind turbine blades R&D awards (April 2016).
  - \$10.7 million for offshore wind development (3 awardees – May 2016).
  - On February 2, 2017, DOE announced \$30 million for Sunshot Program for integrating solar technologies into the grid.

# Grants (cont'd)

## 2. USDA

- Section 9007 offers up to \$500,000 in grant funding for renewable energy projects, including energy storage. The Farm Act of 2014 provides \$50 million for grants, loans and loan guarantees for each of FY2014 – FY2018. This mandatory funding amount of \$50 million for Section 9007 generally is broken into \$35 million for grants and \$15 million for loan guarantees which are subsidy-scored by the OMB at 20 to 1 plus, providing at least \$300 million for loan guarantees annually.
- USDA issued a final rule for Section 9007 on December 29, 2014. There are two application deadlines annually – April 30 and June 30 for FY2014 through FY2018 grant funds. Loan guarantees are accepted as applications are submitted to USDA.
- On April 21, 2015, USDA announced a new \$150 million “Made In Rural America” fund to facilitate private equity investments in agriculture related businesses. Advantage Capital Partners will manage the fund and then set up a 2<sup>nd</sup> fund at \$150 million. This fund is in addition to two earlier structured funds – Meritus (\$100 million) and Innova (\$25 million) in its Rural Business Investment Corporation (“RBIC”) program for equity investments and loans. In 2018, this RBIC program is still available for the funding of projects in rural areas.
- In November 2017, USDA announced it would “invest” \$2.5 billion in rural electric infrastructure improvements of 27 states assisting cooperatives construct new transmission and distribution lines, including \$127 million for smart grid projects. The largest loan totaled \$100 million to Alaska’s Golden Valley Electric Association for 80 miles of power lines and related infrastructure.

# Grants (cont'd)

## 3. DOT

- The former TIGER Grant Program, now called “Better Utilizing Investments to Leverage Discretionary Grants Program – has funding for EV charging, and possible associated battery technologies.

# Angel Funding and Crowdfunding Equity

## 1. Angel Funding

- Angel funding can be a great source of funding for companies looking to take their technology from the R&D level to a level that can attract VC funding. For example, Keiretsu Forum is the largest angel investor group and deploys the most such funding in the U.S. with chapters nationwide. The investments are often in a range of \$200,000 to \$3 million.
- In February 2018, Zebra Fuels (UK) secured \$2.5 million for biofuels and electric vehicle charging infrastructure technology.

## 2. Crowdfunding

- Crowdfunding Under the 2012 Jump Start Over Business Start Ups (“JOBS”) Act
  - Allows “crowdfunding” or a private financing comprised of pooled investments of up to \$1 million within a 12-month period from many small investors subject to certain restrictions. Such funding must be handled by a broker or “funding portal” registered with the SEC.
  - The new “Regulation A-Plus” Crowdfunding rule (issued in July 2015) will allow companies to raise funds from a wider pool of investors with less red tape. Blue Marble Materials will become the first bioproducts company to use the Regulation “A Plus.”
- On October 30, 2015, the U.S. Securities and Exchange Commission issued its final rules on crowdfunding under the 2012 JOBS Act and which were effective on May 16, 2016.
- Over \$34 billion was raised between 2009 and 2015 on over 450 crowdfunding platforms worldwide. That number has grown significantly even more platforms in 2016-2017.
- In renewable energy, two top crowdfunding platforms, Mosaic (specializing in solar projects) and Abundance (specializing in renewable energy), raised \$8 million and \$10 million, respectively, since their debut in 2013 and 2011, respectively.
- The average ROI for the top crowdfunding platforms in renewable energy has been approximately 5 – 7.5%.

# Angel Funding and Crowdfunding Equity (cont'd)

## 2. Crowdfunding (cont'd)

- The ROI for such crowdfunding platforms is too low for some VCs who are looking for double-digit returns, but it appeals to retail investors who are looking for steady income.
- In June 2018, Societe General acquired Lumo, the crowdfunding platform dedicated to renewable energy technologies.

## 3. Family offices – may provide funds at this very early funding stage.

## 4. Blockchain Technology Cryptocurrency Platform – this is an emerging area of fundraising where many new renewable energy companies are seeking funds through initial coin offerings (ICOs) instead of raising VC funds.

# Venture Capital Equity

- By year's end 2015, as reported by Bloomberg New Energy Finance ("BNEF"), global Cleantech VC investment rose significantly to \$10.8 billion globally, or up 11% over 2014's \$9.7 billion, after years of being down significantly. VC late stage deals were up by 20% since 4<sup>th</sup> Q 2016 in 2017.
- That said, renewable energy project financings increased significantly, as reported by BNEF. This increase occurred despite the precipitous drop in oil prices from nearly \$110/bbl in early 2014 to nearly \$40/bbl in late 2014/early 2015 to nearly \$60/bbl in 2018.
- Overall, for all industries, between 2013 and 2017, venture capital funding was up 41% generally reports the National Venture Capital Association. In fact, according to Bloomberg, 2017 saw the highest total deal value in VC since the dot-com era. More than \$84 billion was invested across 8,100 VC deals. For the 4<sup>th</sup> consecutive year, more than \$3 billion was raised by U.S. VCs. Many of the VC funds have refocused on sectors that scale rapidly, provide greater investor returns and enable earlier exits – such as social media and IT. Also, such funds had pivoted to new natural gas technologies until low oil and gas prices, renewable energy tax incentive extensions, COP21 proceedings and new EPA emissions reductions rules for carbon dioxide and landfill methane caused a refocus on cleantech industries. With the Trump Administration fossil VC funding has grown, although the shareholders of more than 60% of U.S. corporations are requiring green energy with a growth in corporate renewables in 2017 despite the current Administration's focus.
- Some of the top corporate Cleantech VC investors for 2015 – 2018 have been GE Ventures, Intel Capital, Samsung, EON, Air Liquide, Engie, Google Ventures and Tencent.
- In September 2018, Energy Impact Partners, in partnership with 14 electric utilities, raised a \$681 million fund for advanced energy technologies.
- **Globally**, in Q1 2016, renewable power transactions amounted to \$7.1 billion in VC-backed financial closings. By 2040, solar and wind will account for approximately 64% of the 8.6 TW of new power added worldwide requiring 60% of the \$11.4 trillion invested in clean energy. For wind and solar projects in the developing world, wind has 307 GW and solar has 272 GW installed to date according to a late September 2017 Financial Times article. By 2020, it predicts these amounts will increase to 349 GW of wind and 353 GW of solar projects installed. Solar encountered its 9<sup>th</sup> consecutive 2 GW growth quarter for PV in 4<sup>th</sup> Q 2017.
- **US** – in 2017, solar and wind for the 1<sup>st</sup> time exceeded 10% of US electric generation.



# Venture Capital Equity (cont'd)

- Industry sector examples for 2015 to 2018 include:
  - **ENERGY STORAGE –**
    - Raised almost 5.3% of overall \$10.8 billion in global clean tech VC investment for 2015, or \$572 million. In 2016, storage VC funding exceeded \$700 million or more than triple that in 2014.
    - In fact, 2d Q 2015 VC storage investments doubled similar 1<sup>st</sup> Q 2015 investments by \$126 million (13 deals) from \$69 million (7 deals).
    - Two such 2015 VC success stories were Primus Power (\$25 million Series D for zinc-flow batteries), and Ambri (\$35 million Series C for liquid metal batteries).
    - 1<sup>st</sup> Q 2016 had 54 million in 10 VC deals, compared to \$108 million in 6 deal in 4<sup>th</sup> Q 2015.
    - In 2016, Growing Energy Labs Inc. (Geli) (\$7 million Series A), Sunverge Energy (\$36 million), Enphase (\$10 million), VionX Energy (\$5 million), Skelton Technologies (\$4.3 million) and Voltaiq (\$1.6 million) raised VC funds for energy storage. In July 2017, Zouk Capital invested \$38.7 million in Green Hedge Energy, to fund UK energy storage projects.
    - In 2017, EES received \$13 million Series B, iron flow, flow batteries from Pangea Ventures BASF, Cycle Capital Management, Presidio Partners and InfraPartners. Primus Power (April 2017) raised \$32 million in a C round after raising \$62 million in Series A and B rounds.
    - In April 2018, Geli raised \$5 million of an \$8 million Series B raised from Shell Ventures and Southern Cross Renewable Energy Ventures. In May 2018, Voltaiq, a battery performance testing start-up raised \$6.6 million in a Series A from Anzu Partners, SJF Ventures and Bee Partners.
    - In August 2018, Sila Nanotechnologies raised another \$70 million to replace graphite anodes with Silicon anodes in its lithium ion batteries. Volkswagon invested \$100 million into Quantum Scope, a solid-state battery startup.
    - In August 2018, Chinese lithium extraction and battery manufacturing companies, Tianq Lithium, Ganfeng Lithium and Sechuan Yahua Industrial Group announced filing IPOs at \$1 billion each from the Hong Kong Stock Exchange. FMC is to spinoff its lithium subsidiary, Livent, on the NYSE.

# Venture Capital Equity (cont'd)

- **SOLAR** – The solar sector raised the following VC funding in 2015 – 2018 as the cost of solar has decreased 80% in the past 8 years:
  - Solar VC funding came in at \$406 million in 22 US deals in Q1 2016, or an increase in the number of transactions and decrease in the associated costs over Q4 2015 which was \$460 million raised for 17 deals.
  - In 2016-2017, D. Light raised \$40 million since October 2016 with the last \$10 million from Nord Fund, Shell Foundation and Beyond the Grid. Enphase raised \$10 million from Cypress Semi Conductor and Kleiner. Silicon Ranch raised \$50 million from Partners Group and Greystone Infrastructure funds on top of \$165 million in 2016.
  - In 1<sup>st</sup> half 2018, solar investment was down 19% at \$71.6 billion says Bloomberg in July 18, 2018.
  - In 2018, Wunder (U.S.) raised \$112 million in a Series B.
  - In July 2018, oil company, Vitol, partnered to invest in renewable energy (\$234 million) as has Shell, Total (in storage company, Ionic Materials) and Engie (bought electric charging company EV Box).
  - Durapower and Ice Energy raised VC rounds of \$40 million each summer in 2018.

# Venture Capital Equity (cont'd)

- **WIND** – The wind sector, led by the U.S. says a recent Lazard report, raised the following VC funding in 2014 to 2017:
  - In 2015 VC wind funding was \$520 million in 14 deals (compared to \$311 million in 14 deals in 2014).
  - In the 1<sup>st</sup> half of 2018, Bloomberg notes that wind investment was up 33% at 57.2 billion globally (US wind at \$17.7 billion) states Bloomberg in July 2018.
  - In 2018, Terra Farm Power raised \$650 million PIPE on NASDAQ; while Transalta Renewables (\$112.7 million – Toronto Stock Exchange) and Daqo New Energy (\$110 million – NYSE) completed secondary issuances.

# Venture Capital Equity (cont'd)

- **Biotechnology** – raised \$1.103 billion 1<sup>st</sup> Quarter 2017. Soffinova Partners in 2017 announced its new Soffinova Industrial Biotech I fund of nearly \$100 million.
- **Electric Vehicles** – In 2018, Youxia Motors (China) raised \$795 million in a Series B; Future Mobility Corporation (China) and Byton (China) each raised \$500 million in separate Series B rounds; and Proterra (US) raised \$100 million in a Series B. Contemporary Amperex Technology (China) did an IPO at \$852.5 million on Shenzhen Stock Exchange.
- The 5 year retroactive ITC extension for wind thru December 31, 2019 will drive more project growth and VC funding.
- Traditionally, VCs are looking at double-digit returns in 7-10 years in high-risk companies with low capital requirements. Popular VCs, such as Kleiner Perkins and Khosla Ventures, have had trouble with investments in certain renewable technologies. Other VCs, such as Mohr Davidoff, have left the renewable energy and biochemicals spaces.
- One of the main challenges VCs face in the clean energy space is the very expensive need for infrastructure investments. Because of this infrastructure gap, VCs often avoid investing in an energy-generating technology itself.
- Average time from initial funding to IPO is 8.3 years for cleantech versus 9.4 years for other venture-backed technologies (National Venture Capital Association Report).

# Private Equity

- Private equity, strategic equity and infrastructure funds often cross lines into each other's spaces.
- Pension funds, insurance companies, sovereign wealth funds, family offices and traditional private equity funds and companies invest equally as much in renewable energy (including energy storage), as in shale oil and gas.
- For the first time, in 2016, 5 US-based private equity funds made it onto the Infrastructure Investor list of top 30 funds due to investments in shale gas and oil. Those 5 funds together raised \$21.2 billion in 2014 and substantially more in 2015 and 2016. They are: Energy Capital Partners, First Reserve, EnerVest, LS Power Group, and Energy Investors Funds.
- In January 2016, the Abu Dhabi Bank committed to lend or invest \$10 billion in clean energy projects over the next 10 years.
- In April 2016, 8 banks and insurance companies (Bank of America, Massachusetts Mutual Life Insurance Company, Crédit Agricole CIB, the European Investment Bank, HSBC Group, International Finance Corporation, AllianceBernstein, Babson Capital Management, Natixis Group and Aligned Intermediary) pledged to invest \$8 billion in clean energy projects globally.
- In 2017, the top fund on the Infrastructure Investor list was Macquarie Infrastructure and Real Assets (based in Australia), which raised \$27.3 billion in the last five years for private equity and infrastructure, including investments into the energy sectors (including energy storage).

# Private Equity (cont'd)

- In January 2018, Stem raised \$80 million in a Series D round from Activate Capital, Temasek and the Ontario Teacher's Pension Fund.
- In January 2018, Carlyle Group created a business unite – Dynamic Energy Networks – to fund a contract and operate microgrids as an energy service company.
- In January 2018, Off Grid – (Series D – 55 million) – Helios Investment and General Electric.
- In 2017, Warburg Pincus recently raised a \$4 billion private equity fund for renewable energy projects and technologies. This fund is its 2<sup>nd</sup> energy fund – the first being a \$4 billion renewable energy fund run by First Green Partners.
- In 2017, Goldman Sachs, among other investors, remains bullish on renewable energy and expressly states that it is committed to invest \$150 billion in renewable energy technologies and projects as a private equity investor over the next 10 years.
- In 2017, KKR closed a \$2 billion private equity fund to invest in North American energy of all types (including energy storage). In February 2018, KKR has structured a new \$5 billion fund for infrastructure/energy.
- In 2017, Blackstone Group LP closed its second fund for energy, a \$4.5 billion energy private equity fund. Over the past several years, Blackstone has invested approximately \$8 billion throughout the energy industries (including energy storage). In February 2018, Blackstone has structured a \$40 billion fund for infrastructure/energy.
- In 2017, Aligned Intermediary (using pension funds such as New Zealand Superannuation Fund, Alaska Permanent Fund, TIAA-CREF and family office-Tamarisk) to fund early stage clean energy projects with initial funding at \$1.5 billion (including energy storage).
- In 2017, Climate Investor One – a \$1 billion funding facility for debt and/or equity to take emerging clean technology projects from an idea to reality (including energy storage).
- In 2017, Black Rock has invested 50% of its \$1.6 billion fund in renewable energy.

# Private Equity (cont'd)

- In 2017, Vision Ridge Partners (sustainable Asset Fund and Capricorn) – a \$430 million fund for clean energy technology companies and late stage projects (including energy storage).
- Viridity Energy, in 2017, is working on funding a railroad-based energy storage deal with the Southeastern Pennsylvania Transportation Authority and Constellation Energy. The project simultaneously will regulate frequency on the PJM Interconnection Grid.
- Breakthrough Energy Ventures (BEV), a Bill Gates controlled private equity fund with other investors such as Jack Ma (Alibaba), John Doerr (Kleiner Perkins), Vinod Khosla (Khosla Ventures), Jeff Bezos (Amazon) and others, announced in January 2017 a \$1 billion fund to be devoted to clean energy investments.
- In February 2017, SI Capital structured a \$120 million private equity fund for energy efficiency with a 1<sup>st</sup> closing of \$30 million by June 2017.
- Clean Capital and Generate Capital to acquire \$300 million of operating renewable power assets in 2017 in the C&I space.
- SUSI Partners in March 2017 closed \$70 million for an energy efficiency fund with a target of nearly \$300 million. It has a pipeline of more than 400 MWh of energy.
- SUSI plans to launch a \$1.1 billion Global Energy Transition Fund in 4<sup>th</sup> Q 2017.
- In February 2016, SUSI Partners of Switzerland announced the formation of a new fund (Euros 200 million) entirely dedicated to energy storage technologies and projects.
- Black Rock has a \$939 million BGF New Energy Fund with substantial investments into Johnson Controls, including its energy storage and battery business.

# Private Equity (cont'd)

- Younicos received a January 2016 capital infusion of \$50 million for its energy storage business from First Solar, Grupo Ecos and an unidentified investor.
- Green Charge Networks in January 2016 received \$58 million from Ares Capital for a portfolio of behind-the-meter energy storage projects.
- RES Americas received funding and finance for utility scale storage projects at \$32 million in November 2015.
- STEM received \$100 million in late 2015 from B Asset Manager affiliates, RWE and Mitsui for behind-the-meter batteries.
- In June 2018, Chevron Ventures launched a \$100 million Future Energy Fund for energy efficiency, grid management, reduced carbon emissions and renewable and alternative fuels technologies.
- In May 2018, KKR launched a \$1 billion Global Impact Fund for sustainable business development, next generation energy, agriculture and food technologies.
- In June 2018, Bloom Energy filed for an IPO for its fuel cell technology after raising more than \$2 billion.



# Strategic Equity

- Increased role for strategic investors is required.
- Strategic Investors, such as integrators, utilities, offtakers of electricity, EPCs, O&Ms are taking equity positions in energy storage projects and technologies. Strategic Investors may include private equity and infrastructure funds, when they intend to invest beyond the initial project and take a portfolio approach.
- Strategic Investors are coming into projects and technology companies at earlier stages of development due to the pivot of traditional renewable energy VCs into social media, IT and natural gas. They are taking on greater roles too, as developers/technology providers plan a portfolio of projects beyond their first commercial projects.
- A major energy storage joint venture company emerged in January 2018 called Fluence Energy, which represents the merger of AES and Siemens energy storage businesses.
- We are also seeing strategic investors acquire distributed energy technology companies as consolidations occurred 2014 – 2018 and should continue:
  - Wartsila acquired Green Smith Energy ( a storage company).
  - Drax Group acquired Opus Energy for \$453 million
  - Eneco (Netherlands utility) acquired Quby (Dutch smart thermostat company).
  - Scottish Power acquired Yunicos for \$54 million through its subsidiary, Aggreko.
  - Oracle acquired Opower (utility software company) for \$532 million.
  - Engie acquired Electro Power Systems from Capital Managements, Ersel Asset Management, SG Round Prime Industries.
  - Google acquired Nest (smart device company) for \$3.2 billion.
  - In January 2018, the Hager Group acquired Germany's E3/DC (energy storage solutions company).
  - In February 2018, Alberta Investment Management Corp. agreed to buy 5Power alongside AEE.
  - John Hancock Life Insurance Co., in March 2018, will buy 49% of Exelon Corp.
  - EDF in March 2018 announced plans to invest \$10 billion in energy storage by 2035 to develop another 106 W of storage on top of its current 56 W portfolio.

# Strategic Equity (cont'd)

- Utilities have invested more than \$2.9 billion in 130 distributed energy companies since 2009, with \$1 billion in 2016 along.
- In December 2017, BP took a 43% investment stake (\$200 million) in Lightsource, Europe's largest solar developer.
- In January 2018, Shell Oil invested \$217 million in solar energy project developer, Silicon Ranch, by acquiring a 43.83% stake from private equity firm, Partners Group, which exited the transaction.
- Solar City, in early April 2016, closed on \$338 million for commercial and residential solar and energy storage.
- New York's Con Edison, according to March 2016 report, expects to work around an otherwise \$1 billion transmission and distribution infrastructure upgrade by investing \$200 million in distributed energy resources like energy storage. On March 16, 2016, it closed an RFQ for information from potential energy storage bidders.
- GE announced in October 2015 that it is developing a business division devoted to energy storage, efficiency and generation. It will fund this division with approximately \$1 billion.
- Macquarie Capital closed the 1<sup>st</sup> non-recourse project financing for energy storage in March 2017 for Advanced Microgrid Solutions (AMS) with financing for 50 MW by CIT Bank in California.

# Infrastructure Funds Equity

- Rural Infrastructure Opportunity Fund, announced on July 24, 2014, will provide pension funds and large investors the opportunity to invest in energy and infrastructure projects in rural US. The initial \$10 billion of the fund is committed by CoBank, a cooperative bank and member of the Farm Credit System.
- In the first half of 2014, infrastructure funds worldwide raised \$13.6 billion, compared to \$25 billion in the first half of 2013. The financial industry believes the decrease is due to pension funds and sovereign funds cutting costs and investing directly in infrastructure assets, rather than through infrastructure funds, as they had been doing previously.
- \$10.7 billion, \$4.4 billion and \$13.1 billion in total capital were raised by unlisted infrastructure funds during the first, second and third quarters of 2015, respectively, as the market turns around.
- The Breakthrough Energy Coalition (BEC), formed by Bill Gates and a coalition of 27 major investors from 10 countries at the Paris COP21 meeting in November 2015, will commence with an initial investment of \$1 billion from Bill Gates personal funds. The BEC will invest clean electricity generation, storage, transportation, industrial use, agriculture and energy efficiency under a public private partnership (PPP) financing model. The fund structuring has occurred in January 2017.
- Generate Capital – raised more than \$150 million in 2015 and has over \$500 million in 2017 for cleantech asset backed lending, project finance, asset warehouses and other short term and custom financing.
- True Green Capital Management LLC, an infrastructure asset management firm, raised \$350 million for a 3<sup>rd</sup> fund for commercial and industrial solar investments. Its two previous solar project funds raised \$234 million.
- Joule Assets – raised a \$100 million fund in early 2016 to finance energy efficient retrofit technologies to create energy savings in buildings, e.g., efficient HVAC systems, LED lights and thermostats that are programmed for such savings.

# Infrastructure Funds Equity (cont'd)

- In February 2018, Orion Energy funded its new energy infrastructure fund of \$816 million.
- In March 2018, Aquila Capital launched a \$925 million Energy Transition Infrastructure Fund for renewable energy projects.
- In April 2018, Crescendo Power launched a \$30 million fund for 1 – 10 MW behind the meter energy storage and microgrid projects.
- In July 2018, Black Rock raised its \$3.5 billion Global Energy & Power Infrastructure Fund.
- In August 2018, True Green Capital Management raised \$350 million for True Green Capital Fund III for commercial and industrial solar projects.

# State and Federal Green Funds

State Green Bank Funds typically involve grants, loans and loan guarantees, as state and Federal governments historically have shied away from equity investments. State Green Banks typically leverage public sector funds with private sector money (as a traditional public-private partnership) to provide credit support, co-investment and warehouse facilities. Over time, such funds may become more aggressive in their approach to equity positions.

1. Connecticut Green Bank Fund – \$50 million plus in available funds. It has generated more than \$1 billion in clean energy investments since 2012. In February 2018, it announced closing more than 200 C-PACE projects of more than \$114 for solar and energy efficiency – 2<sup>nd</sup> only to California.
2. New York Green Bank – \$1 billion plus of NY State government and private sector funds, with approximately \$782 million in funding available at present. This bank commenced operations in 2013.
  - In January 2016, New York launched a \$5 billion Clean Energy Fund to oversee the funding for the Green Bank, NYSERDA, Innovation Research Agency (\$717 million), NY Sun Fund (\$961 million) and other state clean energy initiatives, including the funding for those organizations.
  - On April 1, 2016, New York enacted a \$2,000 per applicant rebate programs for battery-only and other types of electric vehicles.
  - In January 2017, the NY Green Bank closed its first energy storage transaction - \$25 million loan to Plug Power to supply energy storage systems to warehouse vehicles in NYC.
  - As of early 2018, the NY Green Bank has grown by more than 500% in portfolio investments for 2017 driving up to approximately \$1.6 billion in clean energy investments since its inception on a leveraged bases.
  - As of December 31, 2017, this funding has leveraged more than \$2.8 billion in private investment since 2011. Solar power alone resulted in 973 MW of new projects in NY in 2017.
3. Hawaii Green Bank – To be funded up to \$150 million by green bonds and may become a model for other states. The new 100% RPS in Hawaii by 2045 will require this amount and more.
4. California Green Bank – \$13 billion plus in available funds, raised through State tax-exempt bonds.

# State and Federal Green Funds (cont'd)

## 5. Michigan Green Bank

- A new funding source expected to leverage \$105 million into approximately \$3 billion in clean energy development projects.
- In February 2018, the Grow Michigan Fund was refunded at \$51 million for each of next 2 years for Michigan small businesses with typical loans of \$500,000 - \$3 million each.

## 6. Rhode Island Green Bank

- The new green bank would initially leverage approximately \$16 million in public funds.

## 7. Kentucky, Iowa, Pennsylvania and Ohio – are planning to establish green banks.

## 8. Washington State Clean Energy Fund

- \$36 million in state funding, initially attracting \$60.5 million in private sector funds, for R&D grants for smart grid, energy storage, wind, solar and other renewable energy technology development.

## 9. State Revolving Funds

- Funds created from a \$3 billion DOE allocation under the 2009 Recovery Act in varying amounts, state-by-state. These funds typically are used for working capital, reserve accounts, credit enhancements and grants.

## 10. State Funds Created From Shale Gas Revenues

- Alaska, North Dakota, Pennsylvania.

# International Green Funds

Similar to State and Federal Green Funds, International Green Funds typically provide grants, loans, credit enhancements and not equity.

## 1. Australia

- Australian Renewable Energy Agency (“ARENA”) is offering \$3.2 billion in funding for pilot and demonstration projects for renewable energy – available until 2022.
- Clean Energy Finance Corporation (“CEFC”) is offering \$10 billion in funding for renewable energy and energy efficiency – commenced operations on July 1, 2013. In December 2015, CEFC committed \$100 million to bioenergy investments through funding its new Australian Bioenergy Fund. CEFC has provided more than \$1.4 billion in projects valued at more than \$3.5 billion since inception.
- Australia, on June 26, 2015, enacted a new \$11 billion renewable energy funding law. In February 2016, Australia launched the \$1.42 billion Powering Australia Renewables Fund. In late March 2016, Australia set up the \$1 billion Clean Energy Innovation Fund jointly owned by ARENA and CEFC. It will focus on loans and loan guarantees.
- In 2017, South Australia created a \$150 million Renewable Energy Technology Fund for renewable energy, bulk energy storage and bioenergy projects (requiring a minimum of 15 MW and including energy storage facilities) using grants, loans and loan guarantees.
- In May 2016, CEFC provided Westpac Bank, in its new Energy Efficient Financing Program, \$200 million for financing energy storage, energy efficiency, rooftop and off grid PV, low emissions vehicles and waste-to-energy applications.
- Australia is moving to be 100% renewable powered by 2030. To do so will require a mass adoption of energy storage technologies.
- Queensland is providing since mid – 2017 \$1 billion for grants, loans and loan guarantees for sustainable and export-oriented industrial biotechnology and bioproducts. In August 2017, Queensland commercial its auction for 100 MW of energy storage by 2020, alongside 400 MW of new solar and wind farms.

# International Green Funds (cont'd)

## 2. United Kingdom

- UK Green Investment Bank provides funding with an initial capitalization of approximately U.S. \$5 billion – opened on April 1, 2012.
- Climate Private Public Partnership (“CP3”) is initially a \$3 billion green energy fund for post first commercial projects in developing countries.

## 3. Canada

- Sustainable Development Technology Canada (“SDTC”): SD Tech Fund originally (\$590 Million and recently appropriated \$330 million in new funds) (grants – pilots/demos for renewable energy technologies of all types including energy storage ).
- Ontario, in September 2017, announced a \$25 million funding for its new Low Carbon Innovation Fund.
- Ministry of Infrastructure and Committees created the new Canada Infrastructure Bank in 2017 that has \$35 billion with \$5 billion for Green Infrastructure. Canada intends to invest \$21.9 billion in green infrastructure through a series of agencies.

## 4. India

- The Government of India (GOI) plans to raise \$25 billion through 5 new funds to promote “green energy” – energy storage, advanced biofuels, biopower, solar power, wind power and hydro power – to create an “energy revolution” in India. In this effort, the GOI is launching a \$1 billion private equity fund for renewable energy in addition to a potential \$16 billion National Clean Energy Fund.
- In 2018, the U.S. – India Clean Energy Finance Program provides grants for small scale solar projects in India.

## 5. Brazil

- Brazil’s Development Bank (“BNDES”) launched the \$500 million plus Brazilian Climate Change Fund Program in 2009 to provide funding for projects that reduce GHG emissions in machinery and equipment that contribute to power efficiency (including energy storage).

## 6. Asia

- Asian Infrastructure Investment Bank (“AIIB”) expected to be funded at \$100 billion by approximately 57 founding countries by year end 2015.



# International Green Funds (cont'd)

## 7. Europe

- Santander, with Canada's Ontario Teacher's Pension Fund and Public Section Pension Investment Board, recently launched a \$2 billion renewable energy and water fund. European Investment Bank raised \$559 million for a renewable energy fund.

## 8. Africa

- Green Wish Africa REN fund in July 2015 raised \$17 million of an approximate \$60 million solar power fund.
- In February 2018, the ITC and Canada formed the Renewable Energy Program for Africa with \$122 million to spur renewable energy and energy storage.

## 9. World Bank's Global Environmental Fund (GEF)

- GEF has created a \$100 million fund to finance low-carbon energy assets.

## 10. United Nation's Green Climate Fund (GCF)

- The GCF recently funded \$168 million for 8 international environmental projects (in Africa, South Asia and Latin America).

## 11. Climate Investor One Fund (CIOF)

- The CIOF was formed in November 2015 as a \$1 billion facility to fast track renewable energy investments with an initial focus on 10 renewable power projects in Africa, Asia and Latin America. However, it will provide funding throughout the developing world.

## 12. Saudi Arabia Public Investment Fund (PIF)

- The new Saudi PIF will provide approximately \$2 trillion for clean energy investments globally.

# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs

1. Tax Equity generally includes funding for ITCs, PTCs, Bonus Depreciation and New Market Tax Credits (“NMTCs”). Such funds may be difficult to secure, where:
  - required funds are small (less than \$50 mm);
  - investments involve complicated and expensive structures;
  - transactions may require syndicators to secure multiple providers;
  - such incentives are subject to short term, politically-driven, legislative extensions; and
  - investors come from dissimilar industries with little knowledge of the intricacies of varying renewable energy industries.
  - Cohn Reznick/JP Morgan stated in September 2017 that \$11 billion of tax equity financing was raised for renewable energy projects (solar, wind, biomass) in 2016 versus \$10 billion in 2014 and \$6.5 billion in 2013. SEPA noted in a July 2018 Report that tax equity fell to \$4 billion in 2017 for solar project financing.

# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs (cont'd)

## 2. Tax Equity Funders:

- Often the universe of such funders is not large, as these funders require certainty in the projects, but may give up some economic upside to achieve such certainty. They also are more apt to remain in their traditional funding “comfort zones.” J.P. Morgan notes that, in 2015 through 2016, 20 wind and 28 solar tax equity investors were active. That number has increased to more than 35 in 2017.
- In 2017, J.P. Morgan states, tax equity from sanctions amounted to \$6 billion for wind and \$4 billion for solar. The \$10 billion is down from \$11 billion in 2016 and \$13 billion in 2015. J.P. Morgan predicted that due to the new tax law, tax equity could drop by 8% for wind and 3% for solar projects in 2018.
- New Base Erosion Anti-Abuse Tax (“BEAT”) from the 2017 Tax Reform Act would reduce/”claim back” ITC and PTC tax equity by 20% if the tax equity provider is a multinational company which uses cross-border payments to reduce its US taxes to less than 10% of an expanded definition of “taxable income” through various calculations. This BEAT provision would be at the lower percentage from 2018-2025, while such tax credits claimed after 2025 could be fully claimed back. This provision could reduce interest in tax equity funding by investors.

# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs (cont'd)

## 3. New Market Tax Credits

- Community Development Enterprises (“CDEs”) obtain allocations from Treasury on an annual competitive basis. They “invest” from these allocations into projects employing residents in qualified economically depressed areas that are also below the national census average (“NMTC zones”). NMTC zones may be found state-by-state on the Treasury – provided maps located at [www.treasury.gov](http://www.treasury.gov).
- Allocations “invested” often may amount to up to 10% to 20% of the total project costs (depending on the project’s size) for qualifying projects ultimately on a non-dilutive funding basis, after the CDE realizes its entire tax incentives from the qualifying project after 7 years.
- In return for the “investment,” CDEs obtain 39% in tax credits from a qualifying project realized over a 7-year period.
- Congress extended the NMTC provisions through December 31, 2019 at \$3.5 billion per year in the 2016 Omnibus Appropriation Act signed into law on December 18, 2015.
- The 2017 Tax Reform Act and 2018 Budget Act kept these incentives in place.

# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs (cont'd)

## 4. Tax Incentives Extension

- Congress provided a short tax incentives extenders package in early December 2014. The President enacted into law on December 19, 2014, The Tax Increase Prevention Act (HR5771), for one year retroactively (and not two years) through 12/31/14. Thus, the ITCs, NMTCs, Renewable Fuels Production Tax Incentives and Related Depreciation Provisions, all having expired by years end 2013, were extended for 2 weeks to year's end 2014 and retroactively to January 1, 2014.
- On December 18, 2015, the President enacted the Omnibus Appropriation Act of 2016 and Protecting American from Tax Hikes (PATH) Act of 2015, which extended many tax incentives for renewable energy projects as follows:

### **Production Tax Credits**

#### **Extension for Qualifying Wind Facilities through 2019.**

The legislation revises the Section 45 ten (10)-year production tax credit (PTC) to provide that qualifying wind facilities for which construction commenced prior to January 1, 2017, will be eligible for the current PTC rate (2.3 cents per kilowatt, adjusted for inflation). Qualifying wind facilities for which construction commences on or after January 1, 2017 and prior to January 1, 2020, will be eligible for PTCs at a reduced rate, as set forth on the following schedule:

- 20% reduction of the current PTC rate, for projects for which construction begins in 2017;
- 40% reduction of the current PTC rate, for projects for which construction begins in 2018; and
- 60% reduction of the current PTC rate, for projects for which construction begins in 2019.

# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs (cont'd)

## 4. Tax Incentives Extension (cont'd)

Qualifying wind facilities that commence construction after 2019 will not be eligible for the PTC. The 30% investment tax credit (ITC) election in lieu of the PTC is also preserved for qualifying wind facilities and phases down as follows:

- 24% for qualifying wind facilities for which construction begins in 2017;
- 18% for qualifying wind facilities for which construction begins in 2018; and
- 12% for qualifying wind facilities for which construction being in 2019.

### **Extension for Other Renewable Energy Facilities through 2016.**

The legislation also extended the 10-year PTC at the current PTC rate for projects for which construction commences on or before December 31, 2016 for the following: closed loop biomass facilities, open loop biomass facilities, geothermal facilities, landfill gas facilities, trash facilities, qualified hydropower facilities and marine and hydrokinetic renewable energy facilities. The 30% investment tax credit election in lieu of the PTC is also preserved for these qualifying renewable energy facilities through 2016. Senators Sanders and Wyden tried to further extend these particular incentives through 12/31/2022. Congress was successful in obtaining a one year retroactive (January 1 – December 31, 2017) PTC (or ITC in lieu of the PTC) extension for biopower, geothermal, landfill, gas, trash, hydropower, marine and hydrokintec projects, and the \$7,500 tax credit for alternative fuel vehicles and property (hydrogen, electric and other alternative fuel technologies) through the 2018 Budget Act, if construction began before January 1, 2018. However, that statute permitted a 5 year 30% ITC extension for fuel cells, small wind, fiber optic, combined heat and power (at (10% only) (which could boost the microgrid market), microturbine and geothermal heat through December 31, 2021, if construction commenced before January 1, 2022 with a percentage phase down similar to solar (26%, 22%, 10%) commencing January 1, 2020.

### **Extension of the Investment Tax Credit for Qualifying Solar Facilities.**

The legislation also provides for an extension of the 30% ITC rate for qualifying solar facilities if *construction commences* prior to January 1, 2020. This change is a significant departure from prior law, which required that qualifying solar facilities be placed in service during the applicable credit year. Qualifying solar facilities for which construction commences on or after January 1, 2020, will be eligible for ITCs at a reduced rate, as set forth on the following schedule:

- 26% for projects for which construction begins in 2020;
- 22% for projects for which construction begins in 2021;
- 10% for projects for which construction begins after December 31, 2021.

# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs (cont'd)

## 4. Tax Incentives Extension (cont'd)

The revised rules further provide, that unless the qualifying solar facility is placed in service prior to January 1, 2024, any project for which construction begins before January 1, 2022, will be entitled to a 10% ITC. The Section 25D credit for residential solar energy systems is also extended for systems placed in service prior to January 1, 2022, and is subject to the same reduced rates as the ITC.

### **Other Renewable Energy Provisions Affected by the Legislation**

- *Section 168(k) Bonus Depreciation* was extended for qualified property acquired and placed in service during 2015 – 2019 (with an additional year for certain such property with a longer production period) phased down as follows:
  - January 1, 2015 – December 31, 2017 – 50%
  - January 1, 2018 – December 31, 2018 – 40%
  - January 1, 2019 – December 31, 2019 – 30%
- The 2017 Tax Reform Act provides a 100% capital equipment expense depreciation for projects in the first year. It is available through 2022, after which the rate reduces by 20% per year through December 31, 2026

5. On May 5, 2016, the IRS/Treasury issued a written guidance (IRS Notice 2016-31) and then again on December 16, 2016 (IRS Notice 2017-04) to further clarify the triggers of “in construction” for each of the PTC under IRC § 45 and ITC under IRC § 48 for construction to begin before January 1, 2017 for certain facilities (e.g. solar, geothermal, and closed/open – loop biomass) and January 1, 2020 for wind power facilities. As part of this guidance, developers are allowed a “safe harbor” period of up to 4 years to place new projects in service, without having to demonstrate that construction has been “continuous” but before December 31, 2020. In July 2018, the IRS issued its solar in construction guidance (Notice 2018-59), which is substantially similar to the earlier guidance for wind power.

# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs (cont'd)

6. 2017 Tax Reform has left existing incentives in place to phase out under current law, and the 2018 Budget Act extended many of the “orphaned” tax incentives. It has reduced corporate tax rates to 21% (versus Trump – to 15%, House – to 20%), has permitted 100% first year capital expense depreciation, imposed at 20% BEAT Provision and, thus, could reduce tax equity players available (as tax equity likes to see an 8% + yield versus making loans to lower rates) causing increases in CAPEX and increases in PPA prices – 70% to 80% for wind and 35% - 40% for solar. However, an increase in the economy under the 2017 Tax Reform and 2018 Budget Acts could help flatten out these increases.
7. The 2018 Budget Act boosted the value of carbon sequestration (“CCS”) technologies from \$20 per ton to \$50 per ton for carbon geologically stored and slashed the carbon stored requirement from 500,000 tons per year to only 100,000 tons per year.
8. In May 2017, Senator Wyden introduced the “Clean Energy for America Act” to restore expired clean energy tax incentives and add a new ITC for the development of clean burning transportation fuels and energy efficiency in residential and commercial billings. These provisions did not become enacted but would be welcome.
9. State tax incentives – PTCs and ITCs – will be required as federal tax incentives expire and likely will not be replaced in a new Tax Reform Act. For example, Iowa has a solar tax PTC in place for projects placed in service on or before December 31, 2017. Also, Maryland has enacted a 30% ITC for energy storage, not to exceed \$5,000 for residential systems or \$150,000 for commercial systems. Virginia, New Mexico and Hawaii have similar bills which would follow Maryland’s lead.



# Tax Equity – ITCs, PTCs, Bonus Depreciations And NMTCs (cont'd)

10. The Biomass Thermal Utilization Act (BTU Act) (HR3161 and S.1480) introduced in Summer 2018, would extend ITC and 2.3¢/kwh PTC to high heating value (HHV) wood heating installations. The ITC would be 15% for HHVs of 65% to 80% and 30% ITCs where HHVs exceeded 80%
11. In May 2017, Sherrod Brown (D-OH) and Pat Roberts (R-KS) introduced the Agriculture Environmental Stewardship Act (S.988) to provide a 30% ITC for qualifying biogas and nutrient recovery systems. Initially introduced in 2016, these ITCs would represent, if enacted, the first project level ITCs in the bioeconomy since the 1978 and 1980 Tax Acts, which were “sunset” in the 1986 Tax Act. The provisions did not become enacted but would be welcome.
12. Prepaid PPAs and other such contracts, whereby the buyer prepays for part or all of the commodity and the seller reports the income over the time the goods are delivered, are now prohibited under the 2017 Tax Reform Act. That said, states, such as Florida, are allowing prepaid PPAs.
13. Mandatory Repatriation – Approximately \$2.6 trillion is parked off shore in US-owned holding companies. Under the 2017 Tax Reform Act, all post-1986 “net earning and profits” are subject to a repatriation tax of 15.5% for cash/cash equivalents and 8% for illiquid assets. These taxes are payable over 8 years at 8% per each of the first 5 years commencing in 2017, 15% in year 6, 20% in year 7 and 25% in year 8. The Treasury could use these funds for various opportunities such as infrastructure funding.

# Sponsor Equity – Project Developers, Hedge Funds and YieldCos

Sponsor Equity frequently includes equity from project developers, hedge funds and YieldCos, among others.

## 1. Project Developers

- Project Developer Equity generally comes from the developers of projects who often are start-ups using some of the funds from their company-level private placements for use in their projects.

## 2. Hedge Funds

- Hedge Funds frequently come in to displace Tax Equity or where Tax Equity is not readily available or available at all.
- This class of funding has grown in the renewable energy space in the last 1.5 years.
- Hedge Funds often are shorter term investments (with foreseeable exit events) and they require 20% plus IRRs.

## 3. YieldCos

- YieldCos, discussed in depth below in Portfolio Equity, also become a type of Sponsor Equity in a sellers' market or as take-out buyers, when projects ultimately are sold. With the use of low cost capital, they can pay more for such assets, particularly when competing to become the new owner.

## 4. EB-5 Funds

- These funds can be structured as debt or equity, but usually result in debt funding. Notwithstanding, EB-5 funds, whether structured as debt or equity, can be used on the equity end of the capital stack in a project financing. One Visa is provided for each \$500,000 placed into a qualifying project and requires 10 direct, indirect and/or induced jobs to be created.

## 5. Opportunity Zone Funding – New under the 2017 Tax Reform Act. Opportunity Funds are certified investment vehicles that deploy funds into Opportunity Zones. These Opportunity Funds are required to hold at least 90% of their assets in Opportunity Zones. A maximum of 25% of a state, District of Columbia, territory or possession, low- income census tract (as defined in Section 45 D(e) of the Internal Revenue Code) may be designated Opportunity Zones. Investments are eligible for capital gains tax deferral after 5 years and for permanent exclusion after 10 years of keeping those investments in place.

# Debt – Government Loan Programs

## Loan Guarantees Offer Low Cost – Long Term Financing Options

### Department of Energy

#### – Section 1703 (commenced in 2005)

1. Renewable Energy and Energy Efficiency (“REEE”) – \$4.5 billion senior debt available with 50 applications and 45 invited into Part 2.
  - Distributed energy, including renewable power technology and energy storage projects, are qualified and encouraged. At present, DOE has received a couple of battery storage applications.
  - No funds are obligated as no term sheets are yet executed with Part 2 applicants. Several of the Part 2 applicants are now in due diligence.
  - On July 21, 2016, DOE added electric vehicle recharging infrastructure into its REEE program. On January 9, 2017, DOE added similar infrastructure for alternative fuel vehicles.
2. Clean Fossil Energy (“CFE”) – \$8.5 billion senior debt available – for applications including distributed clean fossil energy and storage. Currently 25 applications filed and 20 invited into Part 2.
  - Several of the Part 2 applicants are now in due diligence. This amount was reduced to \$6.5 billion senior debt with a December 21, 2016 obligation of \$2 billion to a fossil methanol project.
3. Last Part 1 is September 19, 2019 and Part 2 is November 30, 2019 for REEE and CFE due to October 21, 2015 amendments.
4. Nuclear - \$12 billion in senior debt available with 7 applications under review. DOE recently obligated an additional \$3.7 billion from this amount to the Vogtle Nuclear Project in the earlier rounds. Final applications are due, unless extended, as follows: Part 1 – September 19, 2019 and Part 2 – November 30, 2019.
5. Advanced Technology Vehicle Manufacturing (“ATVM”) - \$16 billion in senior debt available with 15 applications under consideration – rolling application process. This program has no sunset date.
6. Until recently, senior debt amounts of up to \$4.5 billion were available in Renewable Energy (REEE) and up to \$8.5 billion (recently \$2 billion obligated to reduce the amount to \$6.5 billion) similarly were available in Advanced Fossil Energy (AFE) Program – DOE extended the rounds through November 30, 2019. That said, our Ad Hoc DOE Loan Program Coalition, co-led by Kilpatrick Townsend, has succeeded in restoring significant levels of funding to these programs (including DOE’s ATVM’s direct loan program), after Congress stripped them down in Fall 2017.

# Debt – Government Loan Programs

## Loan Guarantees Offer Low Cost – Long Term Financing Options

### Department of Energy

#### – Section 1703 (commenced in 2005) (continued)

7. Total – **\$41 billion for four programs** – battery technologies may fit into the ATVM program if for vehicle use as part of the vehicle engines. DOE also is considering the use of stationary energy storage systems as part of the infrastructure to provide charging for electric vehicles. Approximately \$65 billion in senior debt requests have been filed for the 4 DOE programs.
8. Uncapped Senior Debt Amounts. Facility Plan provides for multiple smaller projects.
9. DOE, on August 24, 2015, amended the REEE and CFE programs to include chemicals and products. It also provide a Facility Plan where multiple projects can be treated as one project in one application. A recent June 2016 guidance would permit the staggering of certain fees until the closing of each project. On July 21, 2016 and again on January 9, 2017, these programs were amended to make eligible the deployment and manufacturing of alternative fuel and electric vehicles infrastructure. California, in the next 5 years, seeks to spend more than \$1 billion on similar infrastructure.
10. Four “Gating” issues for loan guarantees: (a) “First commercial” means not three or more identical technologies running commercially in the U.S., (b) U.S. site, (c) GHG emissions reduction and (d) reasonable likelihood of repayment.
11. Federal Finance Bank funding at Treasury rate + 37.5 basis points + credit rating spread for 22 year average term.
12. Fees – application, facility, maintenance, underwriting costs and credit subsidy.
13. Can finance 100% of 80% of total project costs, but request 65% coverage and 35% equity (and equivalents – state grants, tax equity, etc.), along with co-lending. Further, DOE can provide up to a 30 year term, but averages a tenor of 22 years.
14. Senator Murkowski’s S. 122 from 2015 would require borrowers to pay at least 25% of the credit subsidy fee as calculated by DOE. Thus, if DOE calculates the credit subsidy to be 10%, or \$10 million, on \$100 million of senior debt, then S. 1223 would require that at least 25% of the \$10 million, or \$2.5 million, will be payable by the borrower. At present, the borrower is required to pay at least 7% of the senior debt as a credit subsidy in the renewable energy loan guarantee program, while DOE funds the balance above 7% up to \$17 million. As such, in this example, the borrower would make out better under S. 1223 by paying \$2.5 million instead of \$7 million. This bill has not been reintroduced in 2017 in the current Congress. This approach was adopted in the recent new Murkowski/Cantwell Energy & Natural Resources Act of 2017 (S.1460) (June 29, 2017).

# Debt – Government Loan Programs

## **Loan Guarantees Offer Low Cost – Long Term Financing Options (continued)**

### **Department of Energy**

#### **– Tribal Energy (commenced July 2018)**

- a. Provides \$2 billion for tribal energy projects of all types involving federally-recognized tribes and Alaska tribal corporations. Projects need not be on tribal lands. Fees payable to DOE are nearly 95% less than those in 1703 and reimbursable through loan proceeds. The program continues through January 30, 2020.
- b. Federally regulated lending institutions replace the FFB and make loans 100% guaranteed by DOE. These lenders are the applicants in lieu of the borrowers (who are the applicants in the 1703 Program) similar to the USDA loan guarantee programs. The DOE can guarantee up to 90% of total project costs. GHG emissions reduction requirements are not as severe as in 1703.

# Debt – Government Loan Programs

## Loan Guarantees Offer Low Cost – Long Term Financing Options (continued)

### US Department of Agriculture

#### – Section 9003 of Farm Bill - Integrated Biorefineries (commenced in 2008)

1. Farm Act of 2014 expanded program from advanced biofuels to include renewable chemicals and biobased products (with a 15% restriction on available program funds), along with electricity with a new Interim Final Rule, dated June 24, 2015, and a new Notice of Solicitation, dated July 6, 2015, with initial Round 1 application due dates as of October 1, 2015 and April 1, 2016, and 2<sup>nd</sup> Round (October 3, 2016 and April 3, 2017) in a 2 phase program.
2. Section 9003 of Farm Bill - Integrated Biorefineries (commenced in 2008) – \$250 million of senior debt per projects with 60% - 80% coverage generally for 20 year terms. Approximately, \$1 billion available – can integrate storage into biopower unit further integrated into a biorefinery. LOIs are due each fiscal year on September 1 and March 1, with applications due on October 1 and April 1, depending on weekends and holidays. At present, many Part 2 invitees are competing for these funds with 5 projects obligated by 2017 conditional commitments. This financing is available for advanced biofuels, green chemicals and biobased products. In December 2017 and July 2018, Kilpatrick attorneys assisted in the closing of two \$105 million/40 million annual gallon 9003 renewable diesel projects.
3. Competitive and project sites can be located in non “rural” areas.
4. First Commercial = First Commercial. – Not like DOE’s definition First Commercial. The Program expanded in 2015 to Renewable Chemicals and Biobased Products However, Biobased Product Manufacturing Facilities may have up to 3 commercial projects over a 5-year period.
5. Term – 20 years. Interest rates are fixed, variable or a combination of both.
6. Fees – nothing like DOE, 1% - 2% of senior debt at closing and 0.5% - 1.0% annual renewal fee with 80% senior debt coverage, depending on size of project. 3% of senior debt at closing and 1% annual renewal fee with 90% senior debt coverage.
7. Parent Guarantees may be negotiated downward or eliminated under the new Interim Final Rule through a new non-recourse “project financing” structure.
8. Multiple qualified projects can be bundled under one application, so long as funds are available.
9. In the previous 9003 rounds, Kilpatrick attorney’s clients have been 22 for 22 in reaching the finals and/or receiving conditional commitments.

# Debt – Government Loan Programs

## **Loan Guarantees Offer Low Cost – Long Term Financing Options (continued)**

### **US Department of Agriculture**

#### **– Section 9007 of Farm Bill (commenced in 2008)**

1. Section 9007 of Farm Bill (commenced in 2008) – \$25 million of Senior Debt – can stack 9007 and B&I together. This financing is available for renewable power, biofuels and biochemicals/bio-based products if the majority of the output is for clean energy. Approximately \$300 million remains available from FY2018 funds at 15 year terms. Competitive and required project sites in a “rural” area of less than 50,000 person census tracts.
2. Commercial – means at least one year of operations – can be a tough standard to meet!
3. \$25 MM senior debt cap, or up to 75% of total project costs (whichever is less), at 60% to up to 85% loan guarantee coverage. Interest rates are fixed or variable.
4. Equity – 25% of total project costs.
5. Term – 15 years or useful life of equipment for energy projects (7 years for working capital and 30 years for real estate).
6. Fees – nothing like DOE, approx. 1% of senior debt at closing and 0.25% annual renewal fee.
7. Final rule issued in December 2014.
8. Commercial Advanced Biofuels And Renewable Power, but not Renewable Chemicals and Biobased Products, technologies are qualified financeable projects for 9007 loan guarantees and grants.
9. Previously, two separate legal entities with identical shareholding could obtain \$25 MM in senior debt coverage each for each of the 9007 and B&I loan guarantee programs for a single project. Further, one legal entity could obtain \$25 MM in aggregate funds from the B&I and 9007 loan guarantee programs. USDA published the B&I final rule on June 3, 2016, effective August 2016. As a result, today one legal entity can obtain up to \$25 MM of senior debt coverage for each of the B&I and 9007 loan guarantee programs for the same project, or \$50 MM in senior debt.

# Debt – Government Loan Programs

## Loan Guarantees Offer Low Cost – Long Term Financing Options (continued)

### US Department of Agriculture

#### – Business & Industry (“B&I”) Program (commenced in 1972)

1. Business & Industry (“B&I”) Program (commenced in 1972) – \$25 million of Senior Debt – can stack B&I and 9007 together. New 2016 rule for 1<sup>st</sup> time permits Loan Guarantee over (1) Subordinated Debt and (2) Leveraged Loan in a NMTC transaction. This program is agnostic on the type of industry. FY2017 and FY2018 had approximately \$1.5 billion available for funding at 15 year term. In late 2017, Kilpatrick attorneys closed the 3<sup>rd</sup> ever renewable chemical project finance for bondholders (\$56 million ethyl acetate manufacturing facility) having already closed the first two renewable chemical project financings – all using B&I.
2. Non-competitive and project sites must be located in “rural” areas of less than 50,000 person census tracts.
3. Commercial – now less flexible and like the 9007 Program – previously not necessarily one year of commercial operations, but now at least one year of commercial operations.
4. \$25 MM Senior Debt Cap, unless a rural cooperative applicant where the Senior Debt Cap is \$40 MM. Interest rates are fixed or variable.
5. Equity – 20% – 40% tangible balance sheet equity for energy projects.
6. Term – 15 years or useful life of equipment for energy projects (7 years for working capital and 30 years for real estate). Loan guarantee coverage is 60% to 80% of senior debt. However, loans of \$5 million or less in severely economically distressed areas can receive 90% coverage.
7. Fees – Closing – 3%/Annual Renewal – 0.5%. The B&I rules changed senior debt guarantees of \$5 million or less to 1% closing and 0.5% annual fees.
8. Final B&I Rule published June 3, 2016, effective August 2, 2016.
9. Commercial Advanced Biofuels, Renewable Chemicals, Biobased Products and Renewable Power projects are qualified financeable projects.
10. Parent Guarantees can be negotiated downward and eliminated.
11. Previously, two separate legal entities with identical shareholding could obtain \$25 MM senior debt coverage each for each of the 9007 and B&I loan guarantee programs for a single project. Further, one legal entity could obtain \$25 MM in aggregate senior debt coverage from the B&I and 9007 loan guarantee programs. USDA published the B&I final rule on June 23, 2016, effective August 3, 2016. As a result, today one legal entity can obtain up to \$25 MM of senior debt coverage for each of the B&I and 9007 loan guarantee programs for the same project.
12. New B&I final rule eliminates restriction of 51% minimum US project equity and provides loan guarantee coverage for subordinate debt and the leveraged loan in a NMTC transaction.
13. B&I, with its new final rules, “opened up” the universe of non-regulated lenders who could work in its program as qualified lenders of record – such as private equity companies under certain circumstances.



# Debt – Government Loan Programs

## **Loan Guarantees Offer Low Cost – Long Term Financing Options (continued)**

### **US Department of Agriculture**

#### **– Rural Utility Service (“RUS”) Program For Electricity (commenced in 1935)**

1. No Appropriations cap as borrowing is from Treasury.
2. Non-competitive and project sites can be located in non-rural areas, but power must be sold to cooperatives, municipalities or qualified utilities who resell the electricity in “rural” areas of less than 20,000 person census tracts.
3. Uncapped corporate financing - 100% recourse loan financing at Treasury rate + 12.5 basis points fixed for term of the shorter of 35 years or PPA term from Treasury’s Federal Finance Bank.
4. Uncapped project financing - 75% non-recourse loan financing at same terms as item #3 and 25% equity, each percentage applied against total project costs.
5. Fee – Annual fee is 0.125% of unpaid principal balance.
6. Energy Storage combined with renewable or conventional power will qualify.

# Debt – Government Loan Programs

## Loan Guarantees Offer Low Cost – Long Term Financing Options (continued)

### US Department of Agriculture

#### – Energy Efficiency and Conservation Loan Guarantee Program

1. Uncapped loan guarantees with up to a 90% senior debt coverage to finance energy efficiency (including energy storage projects otherwise not eligible for RUS funding) and conservation projects sited in rural areas of less than 20,000 person census tracts.
2. Interest Rate – Fixed or variable as negotiated between lender and borrower and as approved by USDA.
3. Projects will:
  - Improve energy efficiency and/or reduce peak demand on consumer side of meter including energy storage.
  - Modify electric load to reduce electric demand.
  - Stimulate a more efficient use of electric facilities.
4. Fees – One time guarantee fee – 1% of loan amount times the percentage of the guarantee which is between 60% and 90%.
5. Term – Up to 40 years or the useful life of the facility.

- **Farm Act 2018** – begins Conference Committee Action September 5, 2018. The Senate Version expressly amends the definition of “renewable energy” to include energy storage paired with renewables.

#### – US Small Business Administration (SBA)

1. The SBA Section 7(a) Loan Guarantee Program’s authorization recently was increased to \$23.5 billion.
2. Energy Storage projects can qualify for this funding if the borrower is a qualified small business.

# Debt – Government Loan Programs

## *Loan Guarantees Offer Low Cost – Long Term Financing Options (continued)*

### **US Department of Agriculture (continued)**

#### **Trump FY2019 Budget And Appropriations Thereto**

- The Trump FY2019 Budget Proposal would cut funding levels for many of these loan guarantee programs substantially (e.g. USDA 9003, 9007 and B&I). These measures also would gut the DOE 1703 loan guarantee program entirely and potentially the ATVM direct loan program.
- On December 8, 2017, Congress extended funding to leave the federal government open through March 23, 2018 under a Continuing Resolution.

**Infrastructure Bill** – Trump Administration proposed it at \$1.5 trillion with a carve out of at least for electricity which may present additional new funding opportunities.

# Debt – Other Financing Mechanisms

## Other Project Financing Mechanisms

- **Taking non-investment grade project company debt to investment grade financing**
  - Use AAA rated govt. loan guarantees to credit enhance non-investment grade project debt on a low-cost/long term basis.
  - Covered bonds. Credit enhanced project bonds historically with pools of mortgages, but attempts to shift to higher credit enhancements like AAA-rated Treasury Strips.
  - Holdco Loans – back-leveraged debt secured by cash flow allocated to sponsor equity shares and not secured by project assets.
  - WHEEL – Warehouse for Energy Efficient Loans – a first of a kind debt mechanism created by Citigroup and Renew Financial, where they issued asset-backed securities (ABS issues) to secure a \$12.58 million pool of otherwise unsecured residential energy efficiency loans.
  - TELPs – Tax Exempt Lease Purchases used as installment sales of a project to a municipality. A TELP is structured to appear that the project sponsor is leasing the project to the municipality. However, the municipality has an option to purchase the project for a nominal sum at the conclusion of the lease term. Lease payments may be treated as tax-free interest on installment debt.
- **Potential Clean Power Plan Allowance Funding**
  - Kilpatrick Townsend developed a new and innovative 100% project funding program under EPA's new Clean Power Plan (CPP) for the sale of GHG allowances to coal-fired power plants to finance renewable power and energy storage. To date, the Trump Administration has not entirely replaced these rules, but has inactive rulemaking ongoing.

# Debt – Other Financing Mechanisms

## Other Project Financing Mechanisms

### – Green Bonds

- Green bonds are intended to enable developers raise capital for projects with environmental benefits. Banks, Insurance Companies, Corporations, Municipalities, States and Universities have issued green bonds for clean energy projects.
- It is anticipated that green bonds will provide financing for renewable power, energy efficiency, energy storage, sustainable waste management, advanced biofuels, renewable chemicals, biobased products, sustainable land use, biodiversity conservation, clean transportation, and clean water projects. Some financial institutions predict a \$1 trillion to \$2 trillion market for green bonds, which will be used to scale up clean energy projects. Experts originally believed the green bond market would grow to \$158 billion by 12/31/2016, but it ended 2016 at over \$200 billion since inception. Japan is the latest growth area in 2017 for Green Bonds with denominations recently by Starbucks, Canadian Solar and EDF.
- The International Capital Markets Association administers two standards – the Green Bond Principles and Climate Bonds Standard that verifies the integrity of the “green bond” label.

# Debt – Other Financing Mechanisms

## – **New insurance policies:**

- wrap technology risk with investment grade (A to AAA rated) credit: extended warranty, serial loss-repeated failure of certain equipment, product defect-failure of certain components, performance curve (efficacy), availability, plant failure to produce product design output at design specification for design input, liquidated damages payment if design performance not achieved. One such policy is for 10 years with a onetime, up-first payment, which policy would wrap technology risk and credit enhance project debt (recently used to close the first of several biojet projects and immediately energy storage projects).
- credit enhance senior debt.
- protect revenue streams.
- protect tax equity with respect to Investment Tax Credits (ITCs) and New Market Tax Credits (NMTCs).
- provide price collars for feedstock and fuel supply agreements and price floors for offtake agreements.
- provide investment grade credit (A to AA rated) to counter: (i) inability to obtain long-term feedstock contracts and (ii) perceived risks of inadequate feedstock supply.
- Allianz Risk Transfer has issued a 10 year wind revenue hedge with an annual fixed payment to provide revenue certainty. This new insurance may be available beyond wind projects.

## – **New Product Warranties** – generally 2 to 3 years product warranties from credit-rated suppliers are being extended to 10 year warranties and paid for by the developers. These extended warranties mitigate technology risk and are becoming the market standard particularly for energy storage.

# Debt – Other Financing Mechanisms

## – PACE – Property Assessed Clean Energy Program:

- PACE pays for renewable power, energy efficiency, climate resiliency and water upgrades in residential, multifamily, commercial and agricultural buildings. Solar power dominates PACE financings although it is available for wind project providing electricity to such buildings. PACE is a good alternative for small projects, particularly in the 25 states plus restricting the use of PPA.
- PACE financing uses a tax mechanism with payments made through a special tax added to the property's tax bill with repayment terms up to 30 years depending on the improvement and service area. However, PACE generally does not monetize the tax benefits, leaving value on the table. This problem can be overcome by combining solar PPAs with the security of PACE, where permissible.
- PACE will play an increasing role in energy storage.
- Tax assessment on commercial buildings to pay back bank loans for energy efficiency. PACE legislation has been passed in 34 states and Washington, DC and has financed approximately \$1 billion in projects. More than 20 states have active PACE programs, but the 3 main users are California, Florida and Missouri. On August 24, 2015, President Obama announced new guidelines with the Federal Housing Administration (FHA) to remove existing PACE barriers and accelerate the use of PACE funding. One restriction removed is allowing PACE liens in states to be subordinate to FHA single family first mortgage financing. Bonds are awardable under PACE. For example, the Ygrene Energy Fund (Santa Rosa, CA) completed a \$150 million securitization of 6,210 energy and water conservation projects in residential and commercial properties in several states.
- On December 7, 2017, HUD stated it would no longer insure mortgages for homes with PACE liens reversing previous policy. Effectively, energy efficiency upgrades financed with PAC now have a reduced transfer ability option, as the homeowners cannot sell the PAC – assessed property to a new owner who would finance the property through an FHA insured mortgage.
- The 2017 Tax Reform Act would reduce the mortgage interest deduction from \$1 million to \$750,000 on new mortgages, including those including PACE loans.

# Debt – Other Financing Mechanisms

## – New Financing Models

- **Credit Enhanced Project Company Bonds** – taking non-investment grade project company debt to investment grade with loan guarantee/insurance wraps. 150 – 200 basis points over approximately 2.61% (for 20 year) and 2.248% (for 10 year) Treasury rates (as of July 19, 2017) plus a small percentage spread) for the credit enhanced portion of senior debt – sell the corporate debt/project company bonds to institutional market. Low cost/long term financing that we invented and obtained our 1<sup>st</sup> financial closing 6 years ago.
- **Clean Power Plan Allowance Funding** – Developed by Kilpatrick Townsend attorneys – GHG emissions allowances sold to utilities to finance up to 100% of clean energy projects through mass-based state CPP plans once the Supreme Court stay is lifted and current lawsuit is resolved in favor of EPA, if the Trump Administration does not fully rescind these rules but instead modifies them.
- **Potential Infrastructure Funding** –
  - On February 12, 2018, President Trump unveiled the \$1.5 trillion Infrastructure Proposal which currently envisions \$200 billion from the federal government leveraged with \$1.3 trillion from the private sector and states in the form of grants, loans and loan guarantees with focuses including electricity infrastructure, rail, roads, bridges particularly in rural areas.
  - **Green Bonds** – more than \$84 billion exist in 2016, with \$150 billion projected for 2017.
  - **Insurance Policies** – to wrap technology risk, protect revenue streams, provide floors on offtake agreements; new Allianz Risk Transfer has a 10 year wind revenue hedge with an annual fixed payment to provide revenue certainty. May be provided beyond wind projects. A new technology protection policy is available at 10 years with a reasonable upfront, one-time premium. It would wrap technology risk and credit enhance project loans or bonds. Kilpatrick assisted in closing the first two projects using this insurance in December 2017 and April 2018 for biojet manufacturing facilities. KWH Analytics with Swiss Re have developed a “solar revenue put” that guarantees up to 95% of a solar projects expected energy output protecting lenders from shortfalls in irradiance, investor or panel failure, system design flaws and weather events.
  - **Project Capital Stacks** – structured to reduce sponsor equity, with funds from EB-5, NMTCs, Opportunity Zone Funds, subordinated debt, state and federal grants, etc.
  - **International Debt** – US Ex-IM, OPIC, TDA – other Export Credit Agencies and Multilateral Development Banks.



# Debt – Other Financing Mechanisms

- **Potential Infrastructure Funding (continued) –**

- **Project Level** – New 100% Debt Credit Finance Facility – no equity required; thus, no company ownership dilution. Requires Investment Grade Credit Rated Product Offtakers and/or Performance Guarantee Providers with these contracts/guarantees equaling the term of the loan. Insurance Products can wrap required minimum % “take or pay” (i.e., “hell or high water”) provisions to pay debt service under the negotiated payment terms. Also, there are no liens on any of the assets. Further, all retainers and closing points are “baked into” the 6% interest rate for the lender. The lender has done \$3.6 billion of these transactions over the past 26 years outside of the energy, chemical and biobased product industries. The funds come from pension funds, insurance and other institutional investors. Two large biojet first commercial projects may represent the first ever energy closings with these funds.
- **Parent Company Level** – New loan fund of \$250 million which lends up to \$10 million for up to 10 years at a flat 10% interest. The loan is secured by cash flowing contracts. The funds are loaned solely to the parent company and can be used by the parent company as equity at the project level and/or working capital at the parent level.
- **Revenue Shortfall Funds** – up to \$50 million of funds annually per project at 12% interest for revenue shortfalls caused by nonperformance of new technology in initial commercial projects. These funds should interest lenders and equity providers, as they protect debt service payments and rate of return/dividends, respectively. These funds protect such shortfalls from technology risks and not from risks caused by pricing or other commercial shortcomings.
- **Smaller projects** – use all equity to close quickly and construct and, after one year of performance, then project finance the facility “selling” down equity to a 70/30 to 80/20 debt/equity model on better terms with lenders. This approach is similar to “back-levering” solar power projects as tax equity participants, requiring first liens on project assets, exit such projects.
- **Revolvers** – Use Debt and/or Equity revolvers to build projects, move funds back into the funds by replacing with other funds and put the revolver funds back to use to build the next project, and continue the process.

# Debt – Other Financing Mechanisms (cont'd)

## – **Capital stacks for projects:**

- In addition to the financing mechanisms already discussed, some other mechanisms can include:
  - On the equity side of the capital stack – NMTCs, ITCs and MACRs for tax equity (generally dilutive equity until the tax incentives are realized by the funder); EB-5 funding (structured as equity); state revolving funds (funding from DOE for grants, working capital); Opportunity Zone Funds; and state grants through state economic development agencies.
  - On the debt/collateral side of the capital stack – EB-5 funding (structured as debt) tax exempt bonds and other tax exempt financing, state revolving funds (reserve accounts as collateral for debt, credit enhancements); and state loans and loan guarantees.

## – **International Debt**

- The US Export Import Bank (Ex-Im), Overseas Private Investment Corporation, International Finance Corporation (IFC), each have loaned \$1 billion in each of the last several years for clean energy projects. Ex-Im received additional Congressional authorization enacted into law on December 4, 2015, to continue as a lender through September 30, 2019. One change is that loans exceeding \$10 million must be approved by the Ex-Im's board.
- The IFC is to increase its climate investments from \$2.4 billion to \$3.5 billion annually by 2020.
- Additional Export Credit Agencies and Multilateral Development Banks are lending billions of dollars to clean energy projects. The International Bank of Reconstruction and Development intends to leverage \$13 billion of private capital per year by 2020.
- The European Investment Bank recently has approved more than Euros 8 billion in project financing for energy storage, energy efficiency, advanced biofuels, renewable chemicals, biobased products, renewable power and energy infrastructure projects throughout Europe.

# Portfolio Equity – MLPs, REITs and YieldCos

## *Project And Portfolio Equity – Capital Markets Funding Mechanisms – M&A/IPO Low Cost Capital Raising Mechanisms*

### 1. MLPs

- As of February 18, 2018, pursuant to the Alerian MLP Index, approximately 131 (down from 149 in 2016) energy-related MLPs exist in 2017 and constitute 82% of all existing publicly-traded MLPs representing a market capitalization exceeding \$360 billion total energy MLP Market Cap (down from \$650 billion as of 12/31/15) with average dividends returns at approximately 6% – 8% (which had increased above 25% before the reduction in shale gas and oil prices). MLPs have been decreasing to low oil and gas prices, distribution cuts and leverage issues as a result of a downturn in the U.S. economy.
- FERC's recent ruling of March 15, 2018, that disallowed MLPs from recovering an income tax allowance and discounted cash flow as a double recovery of income tax costs also contributed to the yield realization.
- MLPs must derive 90% of their income, at present, from depletable natural reserves such as oil, gas and coal, but are not under an annual percentage income distribution requirement as are REITs. MLPs may own qualifying assets outside of the US. Assets are assigned tax free into this vehicle.
- Would require a statutory amendment to include renewable power generation, energy storage, renewable fuels and chemicals and certain infrastructures and such bills were already introduced in Congress. Kilpatrick Townsend attorneys co-authored the MLP Parity Act proposed legislation moving through Congress with bipartisan support for the past 6 years plus, but the 2017 Tax Reform Act and 2018 Budget Act did not include these provisions. In Fall 2017, Senators Coons (D-DE) and Moran (R-KS) and Congressmen Poe (R-TX) and Thompson (D-CA) re-introduced the respective measures into the current Congressional session. The American Petroleum Institute fully supports these measures. Currently applicable passive loss and at risk depreciation rules require renewable power assets to be assigned into the entity after the 5-year clawback period on monetized ARRA Section 1603 Cash Grants and ITCs and after the longer use of PTCs.

# Portfolio Equity – MLPs, REITs and YieldCos (cont'd)

## 1. MLPs (cont'd)

- MLPs are tax efficient as they are subject to one level of taxation as pass through entities (LLCs or Partnerships) and raise low cost capital through IPOs.
- Sol-Wind, in late December 2014, filed an S-1 to raise approximately \$100 million on the public market as an MLP IPO with an aggregation of 184 MW of mostly solar, but some wind, power assets located in the US, Canada and Puerto Rico. This hybrid MLP structure involves a partnership MLP that owns a “blocker” corporation (a limited liability company organized in Delaware that makes an election to be taxed as a corporation and not a partnership) which in turn owns the renewable power assets in another corporation (“MLP Hybrid”). This structure allows the tax incentives to be monetized within a corporation – like a YieldCo – and not like an MLP where the incentives could not be realized. It further permits MLP treatment of raising low cost public money in a tax efficient one-tier tax vehicle notwithstanding that Congress has not passed the MLP Parity Act. In fact, Sol-Wind’s MLP structure is like “an upside-down YieldCo.” A YieldCo is a public entity that owns a partnership; whereas Sol-Wind’s structure is a partnership that owns a corporation with a blocker company between them.
- Advanced biofuels, renewable chemicals, biobased products, renewable power, and energy storage units/projects are assets that are not yet, without legislative qualification, qualified for standalone MLP treatment. However, they may be assigned tax-free into a similar MLP Hybrid structure below the actual MLP to drive down the low cost public market funding generated by an MLP into the corporation holding the assets. Further, the Hybrid MLP, unlike a traditional MLP, will permit the energy storage assets to monetize any of their tax incentives.
- MLP popularity is again up. However, 2017 Tax Reform initiatives positively could affect the advantages that pass-through entities have over corporations, where the passthrough entities, in the form of an LLC or partnership, have members that are also corporations at the projected lower corporate tax rates.

# Portfolio Equity – MLPs, REITs and YieldCos (cont'd)

## 2. REITs

- As of February 18, 2018, according to NAREIT, all publicly-traded and private placement-initiated U.S. REITs represented \$1.4 trillion (up from \$900 billion on February 1, 2016) equity market capitalization with average dividends yields for overall REITs (including mortgage) of approximately 9.28% (up from 4.03-4.83% since 2009).
- At least 95 percent of a REIT's annual gross income must be derived from real property.
- At least 75 percent of the value of a REIT's total assets must be comprised of "real estate" assets.
- Taxed at personal, ordinary income level as a pass-through entity (so one, not two, levels of taxation). 90% of REIT income must be distributed annually – construct new projects. MLPs do not have this requirement.
- May require a statutory amendment to include renewable power generation or a Treasury guidance to accomplish the same (we have been working with DOE, Treasury and White House on this approach).
- REITs raise low cost funds through IPOs or private placements with one level of taxation as a pass through entity.
- Current definition of "real property" inherently requires no moving parts which is problematic for most renewable energy applications. The transmission industry received a private letter ruling; while certain solar and energy efficiency technologies have obtained a similar private letter ruling through the Hannon Armstrong Private Letter Ruling.

# Portfolio Equity – MLPs, REITs and YieldCos (cont'd)

## 2. REITs (cont'd)

- After receipt of a closely-held private letter ruling from the IRS in October 2012, Hannon Armstrong filed an S-1 and raised more than \$250 million for a new REIT on the capital markets initially to hold mortgages of buildings that have attached renewable energy systems (such as solar, energy efficiency, etc.).
- Hannon Armstrong recently purchased a wind portfolio from JP Morgan through its REIT by structuring the acquisition below the REIT in a corporation with a “blocker company” LLC in between the REIT and the corporation (“Hybrid REIT”) to comply with this definition of “real property.” In this regard, in October 2014, Hannon Armstrong, a REIT, invested \$144 million in a portfolio of 10 wind farms, following a \$107 million acquisition of a solar and wind portfolio in May 2014. These transactions are the first of their kind in wind acquisitions by a REIT. Advanced biofuels, renewable chemicals, biobased products, and renewable power are projects that could qualify under a Hybrid REIT structure, but not under a plain REIT structure without additional Congressional legislation.
- Energy storage units/projects are assets that may, without legislative qualification, be qualified for standalone REIT treatment or into a similar REIT Hybrid structure below the actual REIT to drive down the low cost public market funding generated by an REIT into the corporation holding the assets. Further, the Hybrid REIT, unlike a traditional REIT, will permit the energy storage assets to monetize any of their tax incentives.
- The 2018 Tax Reform Act positively could affect the advantages that pass through entities have over corporations, if the passthrough entities, in the form of an LLC or partnership, have members that are also corporations at the projected lower corporate tax rates. Further, unitholders who previously paid 39.6% on dividends received would now pay 29.6%. Corporate, unitholders, however, could lower their tax rate to 21%.

# Portfolio Equity – MLPs, REITs and YieldCos (cont'd)

## 3. YieldCos

- Bulge Bracket Banks (such as Citi Group, Bank of America, Barclays and JP Morgan) and other banks (such as Key Bank), were pursuing this structure with clients, as it requires no new legislation to qualify asset sources such as renewable and conventional energy. Renewable energy assets are packaged into a “Yield Co. Inc.” structure and listed in an IPO on the stock exchange. It represents a combined M&A and IPO. PTCs, ITCs and MACRs depreciation are available for use – all taken at a Schedule “C” Company level – as at risk and passive loss rules do not apply and restrict as in MLPs and REITs. This structure may be available for renewable power, energy storage, advanced biofuels, renewable chemical and biobased projects with long-term contracts and strong cash flows.
- Greentech Capital Advisors at the Bloomberg New Energy Finance Conference in April 2015, predicted that the YieldCo market of approximately \$27 billion would grow to more than \$100 billion in the near term. In reality, U.S. YieldCos raised \$7.9 billion in 2014 and 2015, but only about \$1 billion since the market turbulence after 2015, according to Bloomberg New Energy Finance in July 2017. Typical investor returns in a YieldCo typically are 5-7% per year. The mechanism also has a much lower cost of capital than private equity or project bonds. These yields have reduced significantly in the past year due to low oil and gas prices, expiration of renewable power tax incentives, etc.
- The YieldCo serves as an umbrella acquiring assets tax-free and then lists in an IPO, which unlocks additional equity to allow the YieldCo to develop further and provides investors with high-yield, low-risk, and steady long-term returns. The objective is for YieldCo to be a tax-preferred vehicle, similar to the MLPs and REITs.
- YieldCos, although taxed at 2 levels unlike MLPs and REITs that are taxed at 1 level, are taxed at a lower percentage rate capital gains level of approximately 20% versus MLPs and REITs which are taxed at higher percentage ordinary income tax level of 35%+.

# Portfolios Equity – MLPs, REITs and YieldCos (cont'd)

## 3. YieldCos (cont'd)

- Several companies, during the current Yieldco downturn, instead are placing assets into greenfield and brownfield, “warehouse” entities until the yields return. Warehouses are structures that use 3<sup>rd</sup> party debt and equity to fund asset construction (greenfield warehouses) and/or acquisitions (brownfield warehouses) before a drop-down into a YieldCo. At a restoration of the yields, these companies should begin assigning these warehoused assets into their YieldCos. Recently, however, Yieldcos are gaining new traction as energy prices rise and tax certainty has occurred.
- Some companies that have employed a YieldCo in the energy space:
  - Brookfield Renewable Energy Partners represented the first YieldCo in 2012, and in May 2017 acquired Sun Edison’s Terra Form YieldCos of 952 MW of 31 solar and wind projects for \$787 million.
  - NRG Energy, Pattern Energy, SunEdison’s TerraForm YieldCo (TERP) and second YieldCo IPO, SunEdison Global (GLBL) focused on generating clean power. SunEdison also has added solar storage assets into its Terra Form Power YieldCo. Recently, SunEdison twin YieldCos (TERP and GLBL) have suffered from their parent, SunEdison’s over-leveraged balance sheet. As such, TERP’s and GLBL’s respective stock prices plunged.
  - Terra Form recently has sued its SunEdison parent company. Also, on April 21, 2016, SunEdison filed for chapter 11 bankruptcy protection in the New York federal district court. The two SunEdison Yieldcos, however, are not part of the bankruptcy proceedings.
  - NextEra Energy Partners YieldCo, TransAlta and Abengoa YieldCo also acquired clean energy assets.
  - In early 2015, Abengoa closed a \$2 billion warehouse facility for its assets as priced dropped in Abengoa Yield. Recently Abengoa Yield changed its name to Atlantica Yield and sought new sponsors following its parent Abengoa S.A.’s filing for insolvency in Spain. Atlantic Yield, to date, has remained outside of the Abengoa bankruptcy.
  - Canada Pension Plan Investment Board in April 2018 purchased NextEra Yieldco’s 396 MW of 6 wind and solar power projects in Ontario, Canada.
  - Capital Dynamics acquired 8 point 3 Energy Partners LP Yieldco of 14 solar power projects (710 MW).
  - Global Infrastructure Partners bought NRG Energy Yieldco in Spring 2018 for \$1.3 billion for 681 MW.



# Portfolio Equity – MLPs, REITs and YieldCos (cont'd)

## 3. YieldCos (cont'd)

- Some companies that have employed a YieldCo in the energy space (cont'd):
  - First Solar and Sun Power, vertically integrated solar developers and competitors, raised \$420 million in the first joint-owned YieldCo in 2<sup>nd</sup> Quarter 2015, called 8point3 Energy Partners. It initially holds 432 MW of solar assets. Also, a new phenomenon has oil giant, Total, investing \$1.4 billion into SunPower. To date the 8point3 YieldCo has fared very well and expects to assign assets into it in 2016. In this regard, and despite the market's concerns with/affects on YieldCos generally, First Solar and Sun Power decided to sell their ownership in the 8point3 Energy YieldCo in early April 2016.
  - As discussed, 2014- and 2015-era YieldCos were largely off their IPO prices. SunEdison's TERP fell 57% in 2015 and GLBL fell 63% from its July 31 IPO price of 15. 8point3 fell 23% in 2015 from its June IPO price of 21. NRG Yield fell 41% in 2015. However, in 2017, YieldCos such as NRG Yield and Pattern Energy Groups have increased yields by 4.6% to 8.1%.
  - Tax Reform initiatives of lower corporate rates could increase the popularity of YieldCos.
- In February 2018, 3 yieldcos were sold in one week: (1) NRG Yield (Global Infrastructure Partners paid \$1.375 billion for 5.1 GW), (2) 8 point 3 Energy Partners (Capital Dynamics Energy Infrastructure paid \$977 million for 2.2 GW) and (3) Spain's Saeta Yield (Brookfield's Terra Form Partners paid \$1.2 billion for 1.03 GW).

# Tax Incentives

## Renewable Energy Tax Incentives

- Section 48 of the IRS Code (“IRC”) Investment Tax Credit (“ITC”).
- Section 45 of the IRC Production Tax Credit (“PTC”).
- All such incentives (55 for energy) which had expired (except generally for solar) by January 1, 2015, were extended as discussed above and tax certainty is largely in place for the foreseeable future.

## Required Government Action

- Congress Should Consider New Tax Incentives Such As ITCs specifically for Energy Storage
- House and Senate bills (Energy Storage Act 2015) were introduced in last three Congressional Sessions to provide various ITCs for energy storage equipment.

# ITC for Integrated Solar Storage

- An Investment Tax Credit (“ITC”) is available for 30% of the cost basis of qualifying solar energy property under Section 48(a) of the Internal Revenue Code
  - equipment which uses solar energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat, excepting property used to generate energy for the purposes of heating a swimming pool, are eligible for a 30% ITC until December 31, 2016, when the rate decreases to 10% in perpetuity.
- Storage may enjoy the 30% ITC and MACRS Depreciation when integrated into solar energy property under specific conditions.
  - The equipment and materials that use solar energy to generate electricity, and includes storage devices, power conditioning equipment, transfer equipment, and parts related to the functioning of those items.
  - In general, this process involves the transformation of sunlight into electricity through the use of such devices as solar cells or other collectors. However, solar energy property integrated into the power facility and used to generate electricity includes only equipment up to (but not including) the stage that transmits or uses electricity.
  - Example:
    - *Main function storage device is to make the best use of solar electricity and correct for deficiencies in the photovoltaic system.*
    - *Storage is not transmission equipment.*
  - The Internal Revenue Service (“IRS”) confirmed this applicability of the ITC to such energy storage equipment in a Private Letter Ruling (“PLR”) issued on May 5, 2014 (release date October 31, 2014) (PLR 201444025).
  - The IRS on March 2, 2018 issued a Private Letter Ruling (PLR 201809003) determining that an energy storage unit added to a residential solar PV installation already operating for 1 year and receiving the Section 25D ITC is also qualified to receive the 30% ITC so long as 100% of the electricity comes from the attached PV System. The Ruling suggests that similar rulings for commercial operations may qualify too.

# ITC for Integrated Solar Storage (cont'd)

- The IRS, in Notice 2015-70, requested comments under IRC Section 48 on whether the 30% ITC should be limited to property generating electricity or be available for equipment with dual uses such as storing and providing electricity like energy storage equipment. The Energy Storage Association, Solar Energy Industries Association, American Council On Renewable Energy, among others, filed comments supporting this expansion on or before February 16, 2016. We still await an IRS decision.
- The need for clarification for energy storage with respect to its ability to qualify for the solar ITC is that, in hybrid systems, how much of energy storage equipment qualifies is unclear. In this regard, the ITC applies to costs associated with that portion of the storage system that manages renewable electricity. Generally to qualify the storage system, it and the electricity generating unit must be simultaneously installed. Furthermore, 75% of the electricity used to charge the storage system must come from the solar unit. If not, the amount of the available ITC will decrease as the percentage of that co-system electricity charge falls below 75%. Storage devices that are independent of the solar generator or are connected to the grid do not qualify for this ITC. A change in this treatment to allow the full use of the ITC in all situations will spur the U.S. financing and growth of the industry.
- Proposed Energy Storage for Grid Resilience and Stabilization Act 2016 (H.R. 5350)(Congressman Honda, D-Calif.) would extend the 30% ITC to all types of energy storage at the commercial and residential levels tapering off in 2020. Senator Heinrich (D-NM) introduced similar legislation (S.3159) in July 2016 and to reintroduce it in 2017 (S.1868) for commercial operations. Senator Heller (R. NV) would introduce ITC storage legislation in 2017 for residential use for battery storage only and at least at 3 KWH. These changes would mirror those recommended by the Energy Storage Association to the IRS in written comments earlier in 2016. These proposed legislative measures required reintroduction in the 2017 Congress and/or be included in any Tax Reform legislation.

# ITC for Integrated Solar Storage (cont'd)

- The current impediments are that storage must be integrated into wind or solar with 75% throughout of the battery being one of these sources. This new proposed legislation would get around this issue.
- Other tax/financing legislative measures helpful to energy storage are:
  - National Infrastructure Development Bank Act of 2017 (H.R. 547).
  - Securing Energy Infrastructure Act (S.79)
  - STORAGE Act (H.R. 6286) (which would encourage states to require energy storage and supply side resource planning).
- New Energy Storage ITCs
  - Federal – The Energy Storage Tax Incentive and Deployment Act of 2017 (S.1868 and HR4649), introduced in September 2017, would provide a 30% ITC for all uses of energy storage under Sections 48 and 25D of the IRC. The 2017 Tax Reform Act and 2018 Budget Act did not adopt these measures, but the proposed tax incentive was scored for the first time at \$310 million over 10 years by the Joint Tax Committee.
    - State – Maryland, in early 2017, enacted an energy storage 30% ITC which would cover all uses of energy storage in the state.
    - State – New Mexico, in January 2018, introduced HB77 would provided a 30% ITC for up to \$50,000 for residential and up to \$75,000 for commercial energy storage from January 1, 2018 – January 1, 2024.
    - State of Virginia – HB1018 – in February 2018, similar to that in New Mexico, except the total available unreal funds is \$750,000 and prohibits any carry forward.
    - State of Hawaii – SB2016 – similar to federal 30% ITC as it scales back between 2018 and December 31, 2021 at 30%, 26%, 22% and 10%. New SB 2100 would reduce this credit to 25%

# RPS Certainty

- State RPS laws must be continued and expanded at the State level, as they drive renewable power demand and thus, the use of energy storage technologies.
- Today, 38 states and the District of Columbia have an RPS or a voluntary equivalent (with 29 states being mandatory RPS), 27 states have energy efficiency standards, 44 states, plus the District of Columbia, have net-metering policies. Many states (California – 50% (2030) (S.B. 100, attempted a 100% RPS by 2045, which did not pass the California Legislature in September 2017, recently was passed and then enacted by Governor Brown on September 10, 2018, along with an executive order requiring carbon neutrality by 2045. New York – 50% (2030), Hawaii – 100% (2045), Oregon – 50% (2040), Vermont – 75% (2032), Rhode Island – 40% (2035), Maryland – 50% (2028 if HB1453 and SB732 are enacted into law) and the District of Columbia – 50% (2032)) will have increased their RPS percentages at various years up to 2045. Twenty cities have set 100% renewable energy goals by 2040. California now has proposed legislation (S.B.1007) to increase its RPS to 100% by 2045.
- Environment America Record & Policy Center Report, issued in September 2017, states that over 40 cities and more than 110 major companies (e.g. Apple, Walmart, LEGO, etc.) (representing \$2.5 trillion in revenues) have pledged to use 100% renewable power by 2045.
- Senate Bill S.1264 (S. Tom Udall (D-NM)) would create a National renewable electricity standard (“RES”) requiring utilities to generate 8% of renewable power by 2016 and 30% renewable power by 2030.
- New EPA Climate Rules/Clean Power Plan could drive additional renewable power, energy storage and efficiency projects, depending on modifications by the current Administration should the federal court proceedings uphold them.
- FERC Order 745, providing for equal compensation to demand-response providers as is remitted to whole-sale energy producers, will further incentivize the use of energy storage.
- FERC Order 841 allows energy storage systems to participate in the wholesale electricity markets.
- FERC Order 842 creates accommodations for energy storage systems in interconnection agreements.
- FERC’s January 2018 Order terminating the DOE Notice of Proposed Rulemaking (“NOPR”) in the Grid Resiliency Pricing Rule (Docket RM18-1) also issued a new NOPR (AD18-1) in ISO and encouraged comments from storage companies by April 9, 2018.

# Conclusion

We live in a difficult period of sputtering economies, constrained cash flows, increasing risk aversion and other negative influences, as we attempt to expand and vary the world's energy assets.

As such, the continued creation of new, and refinement of existing, highly sophisticated debt financing and equity funding mechanisms are critical to the development and construction of new energy projects of all types.