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**Welcome to the Tortoise QuickTake podcast. Thank you for joining us. Today, Tortoise provides a timely update on trending topics in the market.**

Hello, this is Michel Sznajer, Portfolio Manager at Tortoise-Ecofin. Today, I would like to talk about trends in renewable energy in the light of two recent reports published by the IEA (The International Energy Agency) and IRENA (The International Renewable Energy Agency).

In its Renewable Energy Market Update, Outlook for 2020 and 2021, the IEA makes the following important observations:

- First, the IEA expects global energy demand to fall by 6% in 2020, the largest decline in 70 years and 7 times more than the decline in demand during the global financial crisis in 2009. With such a dramatic change in dynamics, Oil and Coal will be the most negatively affected while Renewables, the IEA forecasts, will continue to experience an increase in demand, indeed this segment will be the only energy source that will experience a rise in 2020;
- Second, in recent years, clean energy technologies, including renewables, have captured around one-third of total investments in global energy. In 2020, this proportion will jump towards 40% because these investments in clean energy - while declining in absolute terms in 2020 due to economic stresses - are much more resilient than the fossil fuel ones.

The message from the IEA is clear: Renewables are growing and will continue to grow despite the generally weak economic environment and the decline in overall energy consumption; and investments in renewables are proving more resilient than for other sources of energy. This matches the thesis we have presented repeatedly that the attractiveness of the renewables sector stems from its growth; secular growth, rather than cyclical growth, is the reason for this sector's resilience in a downturn and expansion in a vibrant economic environment.

Moving to IRENA's report on Renewable Power Generation Costs in 2019, the Agency makes the following important observations:

First, the global cost (weighted-average levelized cost of electricity (LCOE)) of utility-scale solar (PV) fell by 82% between 2010 and 2019; on a comparable basis the costs for onshore and off-shore wind fell by 39% and 29%, respectively. For those listening, there is an interesting chart illustrating these thoughts included in the transcript.

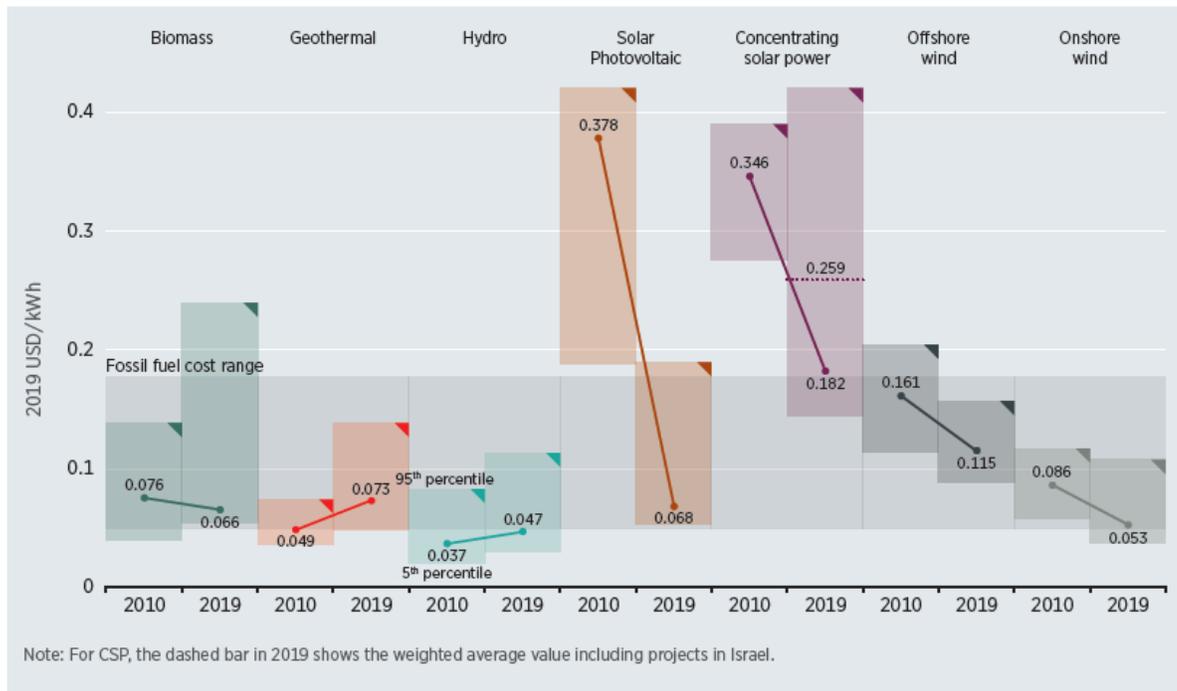
Second, as renewable power generation technologies have become the cheapest options almost all around the world, these renewable power sources accounted for 72% of all new capacity additions in 2019.

Third, replacing the quarter of the world's coal capacity (some 500 gigawatts) which has the highest operating costs with a combination of new solar PV and onshore wind would cut costs by up to USD 23 billion per year and reduce annual CO<sub>2</sub> emissions by around 1.8 gigatonnes, equivalent to 5% of last year's total global CO<sub>2</sub> emissions. Moreover, by 2021, new utility-scale solar PV will be cheaper than the marginal operating costs of 60% of existing coal-fired power plants. That's right, new solar will be cheaper than the running cost of most coal plants. This sets the stage for a growing number of stranded coal assets.

As renewables have become the cheapest power technology, there is no reason to keep operating polluting assets which, in many countries around the world, depend on imported feedstock. Migration to renewables is good for business as the technology is now cheaper without subsidies, good for the environment as it eliminates CO<sub>2</sub> emissions, good for the economy as it provides predictability of energy costs and reduces dependence on imports in many countries. We believe that renewables are entering a phase which will see an acceleration in their adoption around the world, which is a triumph all-around except of course for the coal value chain.

Let me stop here and thank you for your interest. Please reach out to continue the conversation.

**Figure ES.1** Global weighted average levelised cost of electricity from utility-scale renewable power generation technologies, 2010 and 2019



Note: This data is for the year of commissioning. The thick lines are the global weighted-average LCOE value derived from the individual plants commissioned in each year. The project-level LCOE is calculated with a real weighted average cost of capital (WACC) is 7.5% for OECD countries and China and 10% for the rest of the world. The single band represents the fossil fuel-fired power generation cost range, while the bands for each technology and year represent the 5<sup>th</sup> and 95<sup>th</sup> percentile bands for renewable projects.

Note: The LCOE is the ratio of lifetime costs to lifetime electricity generation, both of which are discounted back to a common year using a discount rate that reflects the average cost of capital.

#### Sources:

1. IEA, Renewable Energy Market Update, Outlook for 2020 and 2021, UBS Call –03 June 2020;
2. IRENA, Renewable Power Generation Costs in 2019; International Renewable Energy Agency, Abu Dhabi.

**Thank you for joining us. And stay tuned for our next cast. Have topics you want covered or other feedback to share? Write us at [info@tortoiseadvisors.com](mailto:info@tortoiseadvisors.com).**

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