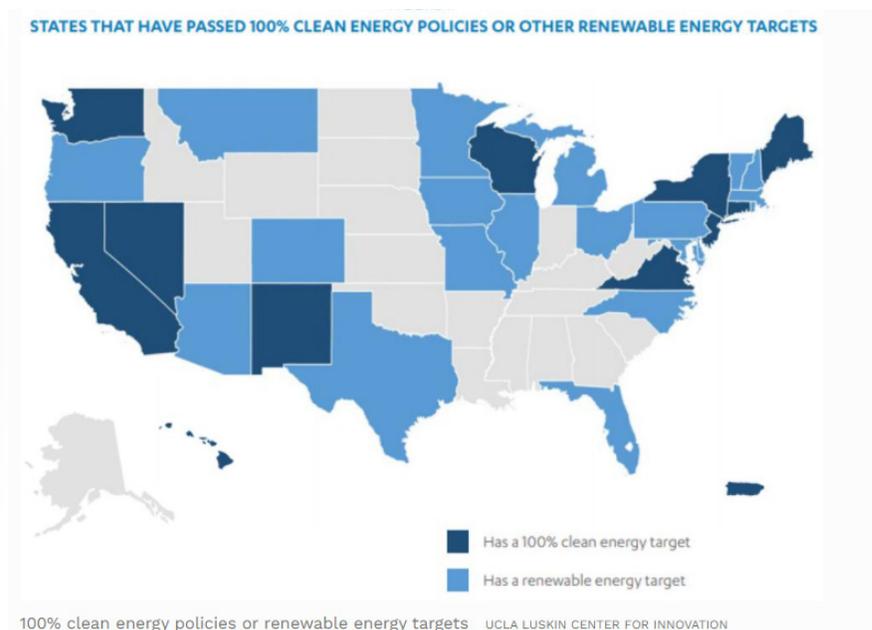


February 25, 2021

## Dear Clients and Colleagues:

In the last week, record cold weather hit most of the United States (US), causing gas and power prices to spike across the country, from less than \$3/btu to over \$600. Texas regulators ordered rolling blackouts as the cold weather froze wind turbines, and snow and ice reduced solar energy production. Some experts were quick to blame renewable energy as the cause of these blackouts. Even if the growing use of wind and solar energy meant the grid may be less reliable, Texas still produces over 50% of its electricity from non-renewables, and that was also affected as gas was in short supply and water pipes froze. In this commentary, we will provide an update on the situation regarding renewable energies.

In 2020, more US states mandated renewable energy targets.



Source: UCLA Luskin Center for Innovation

With or without these mandates, 2020 was another record year around the world for the growth of renewables. In the US, 78% of new electrical generating capacity commissioned was renewables,

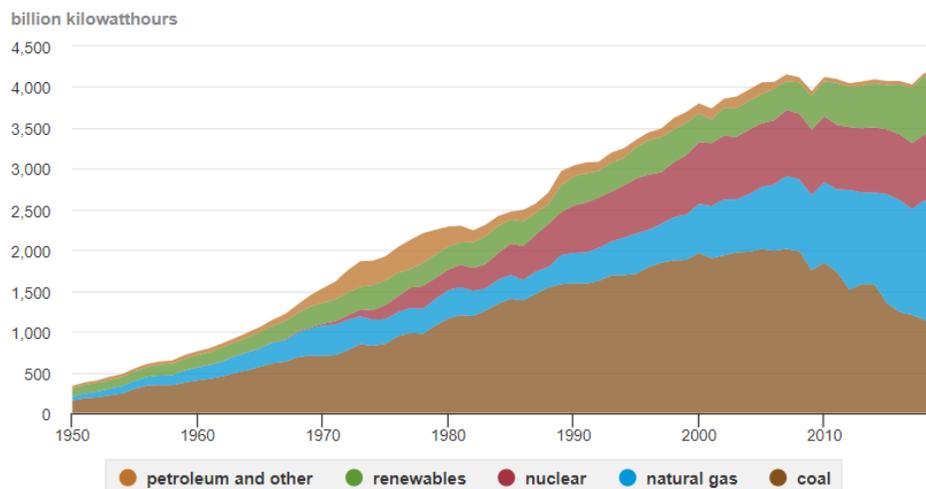
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according to a review by the Federal Energy Regulatory Commission (FERC)<sup>1</sup>. Combined, it accounted for 22,451 megawatts (MW) or more than 78.09% of the 28,751 MW of new utility-scale capacity reported to have been added last year. Wind (13,626 MW or 47.4%) and solar (8,543 MW or 29.7%) each contributed more new generating capacity than natural gas (6,259 MW or 21.7%).

Current capacity of renewables is now above 24% of total capacity in the US and should exceed 30% by 2025.

U.S. electricity generation by major energy source, 1950-2019



Note: Electricity generation from utility-scale facilities.  
 Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 7.2a, March 2020 and *Electric Power Monthly*, February 2020. preliminary data for 2019

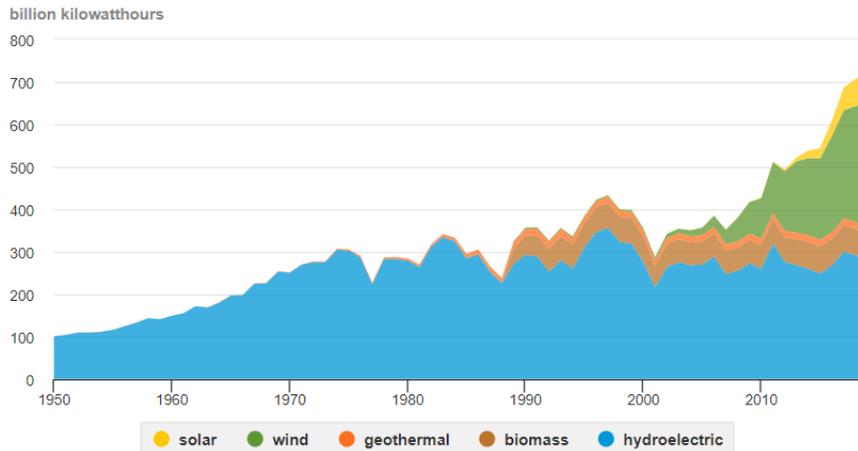
Source: US Energy Information Administration, Monthly Energy Review, March 2020

<sup>1</sup> Energy Infrastructure Update for December 2020

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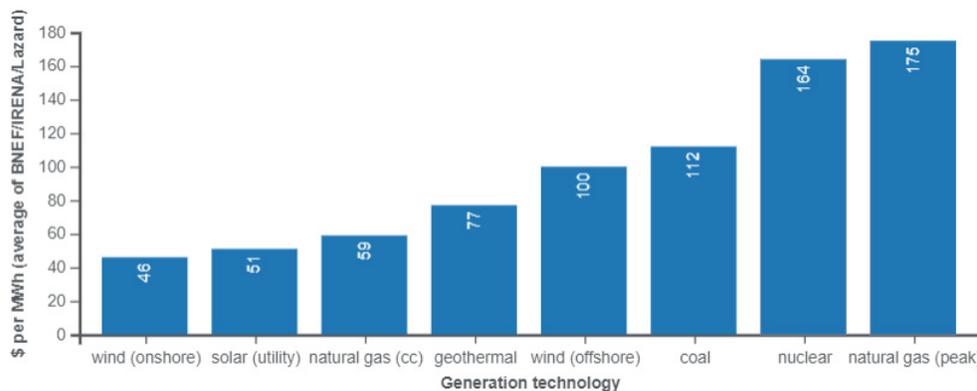
U.S. electricity generation from renewable energy sources, 1950-2019



Note: Electricity generation from utility-scale facilities. Hydroelectric is conventional hydropower.  
 Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 7.2a, March 2020 and *Electric Power Monthly*, February 2020, preliminary data for 2019

Source: US Energy Information Administration, Monthly Energy Review, March 2020

We often hear that renewables require subsidies to compete with oil and gas, coal and nuclear. Let’s take a look at the total cost and production cost of these various sources. The costs include capital costs, operations, maintenance, and de-commissioning and remediation. Recent major global studies of generation costs note that wind and solar power are the lowest-cost sources of electricity available today.



Sources: Lazard 2020, Bloomberg New Energy Finance (2020), International Renewable Energy Agency (IREA) 2020

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What about the reliability of wind and solar energies? If they could never represent 100% of generating capacity, what should the base load be? We can see in the above chart that geothermal energy is also attractive in terms of costs. It's clean and renewable, and better yet, is available 24/7, meaning it could be a base load energy. However, in 2019, geothermal only represented 0.5% of US electricity generation.

#### States with geothermal power plants in 2019

	State share of total U.S. geothermal electricity generation	Geothermal share of total state electricity generation
California	71.2%	5.6%
Nevada	23.5%	9.5%
Utah	2.8%	1.1%
Oregon	0.9%	0.2%
Hawaii	0.7%	1.1%
Idaho	0.5%	0.4%
New Mexico	0.4%	0.2%

Source: US Department of Energy

There are signs that things could change. A report released in May 2019 by the Department of Energy suggested that US geothermal power capacity could increase by more than twenty-six times by 2050, reaching a total installed capacity of 60 GW, thanks to accelerated technological development and adoption. This in turn would greatly reduce costs.

Since 2008, we've held Ormat Technologies in our portfolio, a world-leading geothermal energy company. Ormat Technologies (ORA US, ORA IT) was founded in Israel in 1965 to pursue its objective to further develop renewable energy. Active in the geothermal field since the early 1980s, the Integrated Two-Level Unit (ITLU) was a vital development in maximizing the thermodynamic efficiencies of lower-temperature resources. The patented ITLU design revolutionized the industry and, to this day, distinguishes Ormat from other companies. The company has been public since 2004, and has established its headquarters in Reno Nevada. Further, Ormat is an energy producer with 933 MW of production globally. Another important achievement is regarding the world's largest single binary geothermal power plant – the Ngatamariki in New Zealand – that began its commercial operations in 2013. Ormat provided the engineering, procurement and construction for the 100 MW geothermal project that delivers sustainable energy to power 80,000 homes annually.

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In addition to its geothermal expertise, Ormat is now a leading player in the field of energy storage and management. Its solutions started from energy and demand response management, and energy storage systems. The company provides grid operators with the power to enhance grid performance, stability, and responsiveness, while delivering capacity at the right time and the right price. It also provides commercial, industrial and municipal clients with reliable and good quality power solutions, as well as peak shaving and demand charge management solutions to lower their utility bill and, in the unregulated markets, provide ancillary market services to generate revenue.

Coming back to Texas, last August, Lone Star Demand Response, LLC and Viridity Energy Solutions, Inc. signed a new five-year business-to-business agreement to continue the delivery of first-class demand response (DR) curtailment management services throughout times of high electricity demand. This will bring Lone Star Demand Response into a position to carry on with protecting the various generation and transmission systems from overloading during peak times and to fine-tune the demand to match the available supply. While Lone Star Demand is not part of the portfolio, Viridity is owned by Ormat.

In short, geothermal and energy storage may be the solutions to increase the reliability of electricity production while keeping with the goal of increasing renewables and reducing the environmental impact.

Have a good day.

The Global Alpha Team

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