THE UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULARY COMMISSION

Hybrid Resources	**)**	**AD20-9-000**

COMMENTS OF
THE AMERICAN COUNCIL ON RENEWABLE ENERGY

The American Council on Renewable Energy ("ACORE") submits these comments in response to the Federal Energy Regulatory Commission's Notice Inviting Post Technical Conference Comments issued August 10, 2020 to address issues raised during the Technical Conference regarding Hybrid Resources held July 23, 2020 and identified in the Supplemental Notice of Technical Conference issued July 13, 2020. ACORE is a national nonprofit organization dedicated to advancing the renewable energy sector through market development, policy changes and financial innovation.

Single-resource power plants, like a field of solar panels or a hillside of wind turbines, are foundational to the modern renewable energy economy. They work well under the conditions of today's grid. As renewable penetration increases, more complex projects can offer a new and expanded array of services, further enhancing the reliability and cost-effectiveness of grid operations. Hybrid power plants leverage the best qualities of generators with modern technology, such as energy storage, leading to smoother output and optimizing project economics. Fueled by declining costs, improving technology and favorable policies, hybrid development proposals more than tripled between 2018 and 2019, representing over 100 gigawatts of capacity.[1]

[1] Lawrence Berkeley National Laboratory, "Generation, Storage, and Hybrid Capacity in Interconnection Queues," https://emp.lbl.gov/generation-storage-and-hybrid-capacity, accessed September 21, 2020.

In response to question three, *"How have the economics underlying hybrid technologies changed over the last three to five years? What future trends do you anticipate in this regard? Given these anticipated future trends, please comment on how you anticipate hybrid resources might be configured going forward. How could these changes impact interconnection requests?"*

The economics of hybrid resource projects have become significantly more favorable in recent years. This trend is spurred largely by cost declines of the underlying resource types but also by changing federal policy. Of the hybrid resource combinations in interconnection queues, solar energy coupled with energy storage is the most popular combination.[2] In fact, of the utility-scale solar projects in interconnection queues, nearly one-third are paired with energy storage.[3] This is because of the beneficial symbiotic relationship between solar generation and energy storage, as well as federal law which provides for an investment tax credit (ITC) for solar and solar-storage hybrid projects. The tax credit is currently at 26% and phases down annually. Energy storage charged at least 75% of the time by a co-located solar project is qualifying property for the ITC. Wind-plus-storage pairings are therefore less common, in part because of the lack of a wind-storage tax credit, but also potentially because wind tends to be less variable in very short-term operations. If Congress does not extend or alter the solar ITC, and the credit phases down, the bias toward solar-plus-storage projects may become less pronounced.

---

[2] Ibid.

[3] Lawrence Berkeley National Laboratory, "Hybrid Power Plants: Status of Installed and Proposed Projects," July 2020, https://eta-publications.lbl.gov/sites/default/files/hybrid_plant_development_2020.pdf.

In response to question four, ***"We understand that increasing numbers of hybrid resources are participating as a single resource in energy, capacity and ancillary services markets operated by RTOs/ISOs. What are the advantages to the hybrid resource participating as a single resource? What are the disadvantages?"***

RTO/ISOs are excellent managers of their markets, but they are not resource operators or traders. As innovation accelerates and more numerous and increasingly diverse hybrid resources develop, the owners of these projects may be best equipped to optimize project operations to ensure their most efficient performance. The choice of participating as a single resource allows for this self-optimization.

In response to question eleven, ***"Hybrid resources consisting of more than one technology type could potentially participate in the market as the separate component parts, or as a single integrated hybrid resource. Should hybrid resources have a choice of whether to participate in the energy, capacity and ancillary services markets operated by RTOs/ISOs as each of the resource types or as a single resource type? If so, why is this flexibility important?"***

Allowing hybrid resources the choice of whether to participate as a divisible or single resource type creates the greatest opportunity for new forms of investment, resource deployment and innovation. Some hybrid resources will be more valuable to the RTO/ISO as a single resource because of their unique composition or location. For others, it will be the opposite. Choice for hybrid resource owners allows the market to identify the most efficient solutions, which leads to the lowest costs as owners determine their own efficiencies and innovate new solutions.

In response to question eighteen, ***"Do existing RTO/ISO market power mitigation rules appropriately recognize the particular operating characteristics of hybrid resources?"***

Energy-limited resources do not fit well within standard RTO market power mitigation tools. There is an opportunity of producing in one hour that reflects a future hour. For example, if a resource owner expects a scarcity-based price of $1000/MWh at 7 pm when the sun sets on a peak day evening, and the price at 6 pm is $100/MWh due to high levels of solar energy still produced, a storage resource or hybrid generator-plus-storage resource's marginal opportunity cost for the last hour of charge it has left is $1000/MWh. That is a competitive bid level that does not reflect any exercise of market power, and market power mitigation rules should allow that $1000/MWh bid. Additionally, allowing such a bid increases potential suppliers during times of scarcity and, all else equal, provides downward pressure on price to the benefit of consumers.

In response to question twenty, ***"What are any other potential implications, advantages, and concerns for RTOs/ISOs regarding hybrid resources?"***

A fundamental issue to be resolved is the level of control RTO/ISOs exercise over hybrid resources. In certain well-defined instances where reliability is threatened, grid operators can and should retain the ability to curtail generation. Outside of these very rare instances, there are benefits to resource owners having full control and operating in ways that are optimal for that resource at a given time and location. Hybrid resources offer a tremendous range of operational actions. It will be more efficient if the owners are given the ability to self-optimize and control their output and charging decisions.

If RTO/ISOs were created in 2020, hybrid resources would have seemed a particularly attractive participant. Without historic concerns for managing the quirks of single-resource projects with rigid ramps and duration measured only in on-site fuel, hybrid resources will increasingly allow RTO/ISOs to manage energy as a fungible commodity. Hybrid resources, both in the diversity of their applications and the diversity of their constituent elements, help ensure a new level of robust and flexible generation. As the portion of the resource mix comprised of hybrid resources grows, more and more projects will be able to provide not just energy, but ancillary grid services as well.

In response to questions twenty-one and twenty-two, *"How do RTOs/ISOs currently calculate the capacity value of resources? Would those methods accommodate the characteristics of hybrid resources, or would new or modified methods be needed? If new or modified methods are needed, how should the capacity value, including any seasonal variations, be determined for hybrid resources?"*

We recommend the capacity value of hybrid resources be set as the sum of the value of their component resources as an initial approximation. However, this value may be higher or lower than the component sum when complementary efficiencies or interconnection bottlenecks are considered. Capacity value can also be higher when resource complementarities are considered. For example, the addition of energy storage to a solar project increases the capacity value of each resource on its own as synergies can be leveraged. Capacity value can also be lower for a given resource, for example, when sharing interconnections if interconnection service is lower than the sum of the resources' nameplate capacities; when sharing inverter capacity for DC-coupled systems; and when charging restrictions encumber energy storage due to a need to meet solar ITC requirements. Additionally, duration requirements such as an excessive ten-hour rule should not limit storage capacity value. As summer peaks become thinner with solar resources serving afternoon load, remaining hours of the peak can be served by 3-4 hour duration energy storage.

Choice is vital for hybrid resource owners as this allows the market to identify the most efficient solutions. Project owners should have the option of separate or combined capacity value ratings as they have multiple modes of operation from which they might choose. They should also have a choice between centralized dispatch and self-optimization. Centralized forecasting and dispatch are efficient in some cases, but not in all. Project owners may be able to self-optimize more efficiently than a central dispatch, and capacity market requirements should not limit this ability.

Respectfully Submitted,

Tyler Stoff
Director of Regulatory Affairs
stoff@acore.org

American Council on Renewable Energy
1150 Connecticut Ave N.W., Suite 401
Washington, D.C. 20036