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October 12, 2018

Attention: Kenneth Sheehan, Director, Division of Clean Energy
New Jersey Board of Public Utilities

Re: Clean and Renewable Power Stakeholder Meeting
New Jersey 2019 Energy Master Plan (EMP)

In response to the New Jersey Board of Public Utilities Request for Comments in the above referenced stakeholder process, Brookfield Renewable is pleased to submit the following comments and recommendations.

Brookfield Renewable ("Brookfield") is a developer, owner and operator of renewable facilities globally. In the U.S., our assets include a diverse portfolio of hydropower, wind, solar and pumped storage, comprising nearly 6,000 megawatts of installed capacity and generating enough electricity to power more than 1.5 million homes each year.

Brookfield has a strong presence in PJM, including almost 875MW of carbon-free hydropower resources in Maryland, Pennsylvania and West Virginia, 377MW of hydropower in North Carolina and Tennessee that also supplies the PJM market, and 120MW of solar development projects in Virginia. Brookfield's hydropower facilities provide renewable, carbon-free power, local tax revenues, recreational opportunities, and both direct and indirect jobs throughout the region. Brookfield is also the controlling shareholder of Terraform Power, which owns and operates 285MW of distributed solar and wind resources in PJM, including 63MW of distributed solar in New Jersey.

Brookfield commends New Jersey for extending the state's RPS targets, as adopted in AB3723, to 50% by 2030 and applauds the 2019 Energy Master Plan's goal to establish a path to a 100% clean energy future. As outlined below, Brookfield requests that any proposal for achieving this goal consider increasing the participation of hydropower resources. Absent such changes, New Jersey will not fully benefit from the region's non-emitting, clean, and reliable hydropower resources. Specifically, Brookfield's comments in this submission focus on:

- The state's restrictive definition of eligible hydropower in the Renewable Portfolio Standard (RPS).

- Options to help address anticipated undersupply of Class I resources by expanding eligibility for existing hydropower, while still maintaining sufficient incentives for the build out of new renewables.

- Cumulative ratepayer savings ranging from $200 million to over $1 billion if the state were to consider broadening hydropower's eligibility requirements.

- The flexibility, reliability and resiliency benefits of hydropower resources to New Jersey and the region.

Background on the New Jersey RPS Program

New Jersey's RPS program contains three categories:

- Class I resources: wind, hydropower, tidal, wave, geothermal, landfill gas, anaerobic digestion, biomass, and fuel cells using renewable fuels;

- Class I in-state solar carve-out, and;

- Class II resources: hydropower and municipal solid waste.

Though program eligibility is seemingly diverse, suppliers have historically met their compliance obligations using a limited number of the eligible technologies. Apart from the in-state solar carve-out, **only one non-emitting renewable resource is used to satisfy Class I and Class II RPS requirements,** while the remainder is satisfied using combustion resources (See Figure 1 below).

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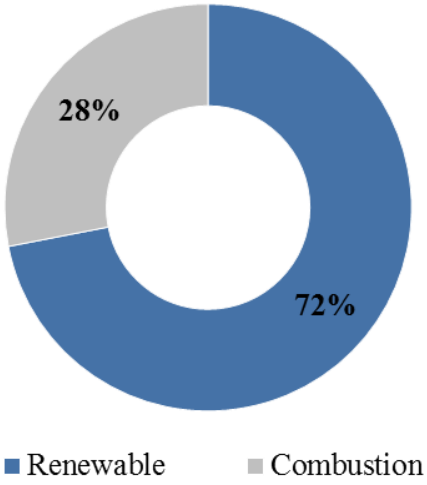
Figure 1
Non-Carve-Out Class I and Class II Retired Resources
Compliance Period: June 2017- May 2018



Wind	6,486,800 MWh	72%
Hydropower	31,185 MWh	0.3%

Landfill Gas	1,109,687 MWh	12%
Municipal Solid Waste	1,421,062 MWh	16%
Other Biomass Gas	26,003 MWh	0.3%

Hydropower's Limited RPS Participation

As shown above, hydropower represents less than 1% of New Jersey's 2017-2018 RPS compliance requirements. This outcome is illogical in the face of significant reliance on carbon emitting resources in Class I and II, and is a result of onerous and discriminatory facility-level eligibility criteria for hydropower resources. In fact, hydropower is the only technology with such eligibility restrictions, which include:

- Nameplate Capacity Limits
  - Class I: Facility must be 3MW or less
  - Class II: Facility must be 30MW or less
- Geographic Restrictions

  - Class I: Facility must be in-state
- Vintage Restrictions
  - Class I: Facility must be placed in service after July 23, 2012
- Third-Party Certification
  - Class I: Facility must be certified as low-impact by a nationally recognized organization based on a system that includes a variety of criteria.

Indeed, New Jersey imposes the most restrictive eligibility criteria on hydropower among PJM states[1], resulting in over 94% of all hydropower facilities registered in PJM-GATS being ineligible to participate in the State's RPS program (see Figure 2 below). Instead, these resources retire their environmental attributes elsewhere and New Jersey loses the ability to count these cost-effective resources towards its renewable goals.

[1] PJM Interconnection coordinates the movement of electricity through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia

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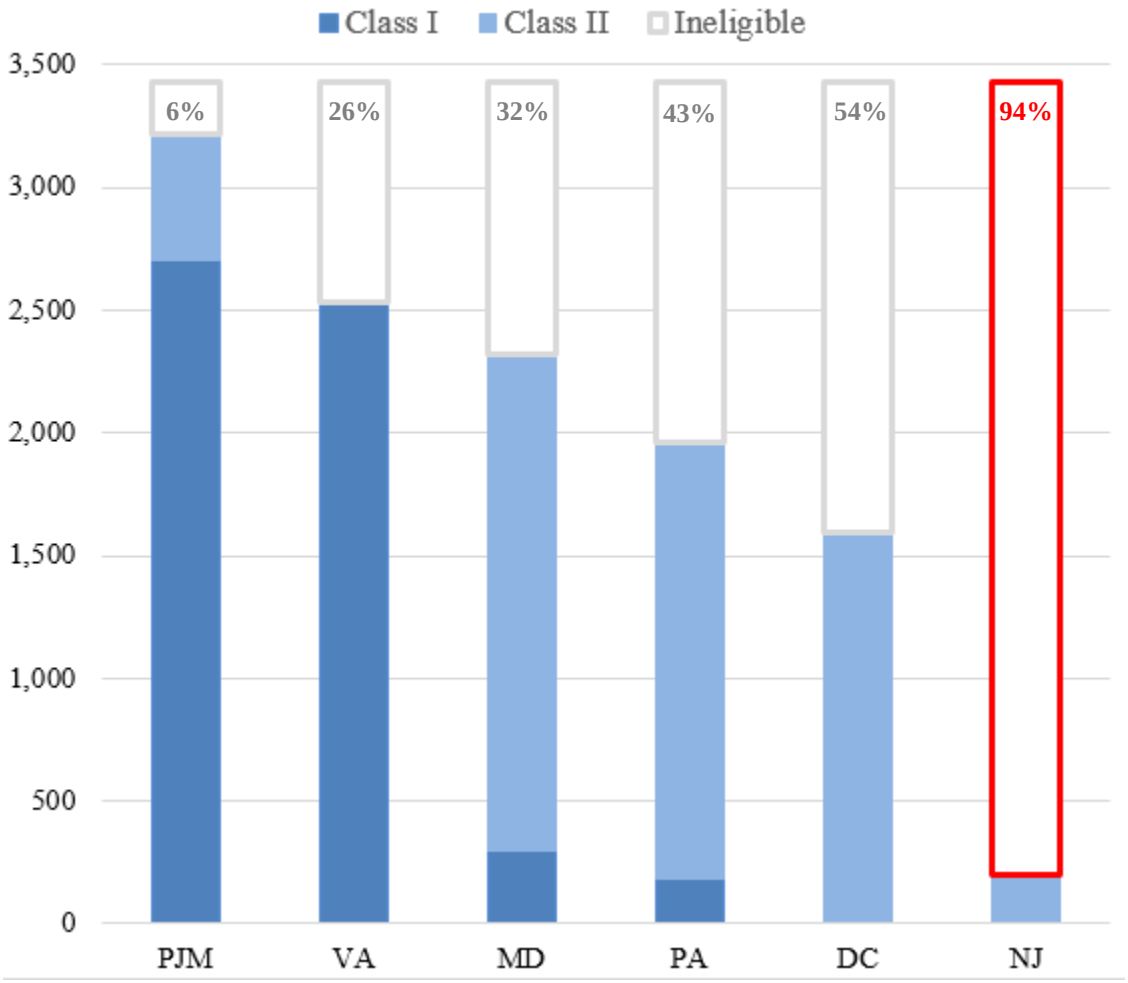
Figure 2
Hydropower Resources Registered in PJM-GATS, and
RPS Eligibility by State (MW)



Hydropower Can Address Anticipated Resource Supply Deficiencies

An increase in New Jersey's RPS requirement from 21 percent in 2020 to 50 percent by 2030, coupled with RPS expansions in other PJM states, poses challenges to meeting region-wide RPS obligations. Recent analysis by Exeter Associates for the Maryland Department of Natural Resources Power Plant Research Program finds that almost 112 GWh of renewable generation will be required in 2030 to collectively satisfy non-carve-out Class I resource requirements

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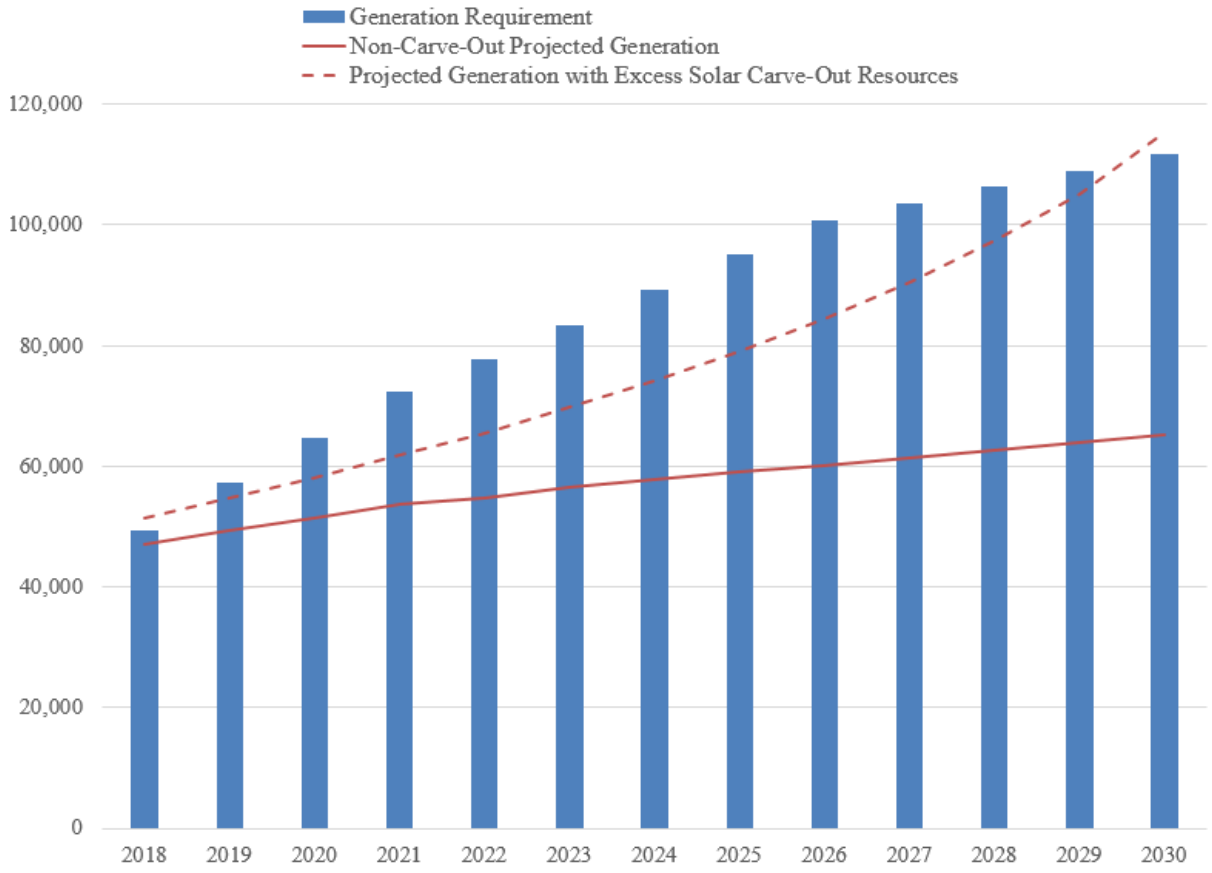
across all PJM states (see Figure 3 below) [2]. Exeter Associates also projects a deficiency of Class I supply beginning as soon as 2019. This deficiency persists in most years even after taking into consideration solar resources that exceed carve-out requirements.

Figure 3
Non-carve-out Class I RPS Obligation and Supply (Exeter Associates Analysis) (2018-2030) (GWh)



The preceding analysis assumes that market participants in PJM maintain their existing RPS requirements, when in fact RPS expansions are likely; Maryland, Delaware, Pennsylvania, and Washington, D.C. have considered or are considering expanding their RPS programs, further increasing the gap between the region's renewable generation requirement and available supply. These RPS expansions together with a move towards a 100% clean energy future in New Jersey will exacerbate anticipated supply deficiencies.

[2] 2017 Inventory of Renewable Energy Generators Eligible for the Maryland Renewable Energy Portfolio Standard, Revised Draft, August 2018. Prepared by Exeter Associates, Inc. for the Maryland Department of Natural Resources Power Plant Research Program.

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Addressing undersupply concerns through resource development in PJM alone will be challenging as projects in land constrained Mid-Atlantic States will be met with siting, permitting, and building concerns. In addition, while market participants might look outside the region to resolve undersupply, this is also subject to physical barriers. For example, PJM's Renewable Integration Study found that existing RPS compliance requirements represent a minimum transmission congestion cost of $4 billion, which presents a real barrier to meeting existing PJM RPS obligations[3].

Given these limitations, Brookfield recommends New Jersey consider expanding Class I eligibility to better include additional non-emitting renewable resources like hydropower to both access the full range of available resources and, as shown below, reduce compliance costs to ratepayers.

Hydropower Reduces Costs to Ratepayers

As part of the Energy Master Plan proceeding, Brookfield recommends that New Jersey evaluate scenarios to expand eligibility of Class I and II hydropower by loosening its currently restrictive size, vintage and geographic eligibility criteria.

Expanding the eligibility criteria to include additional hydropower resources could produce millions in ratepayer savings annually. For example, Brookfield modeling suggests that expanding eligibility to include just 300MW of hydropower in Class I (equivalent to Maryland Tier I eligible hydropower) could produce annual ratepayer savings of $5-7 million and cumulative savings of almost $200 million by 2050 under a 100% RPS. These savings would increase if eligibility were further broadened to include additional hydropower (see Figure 4).

[3] PJM Renewable Study Integration Reports. Available at: http://www.pjm.com/committees-and-groups/subcommittees/irs/pris.aspx.

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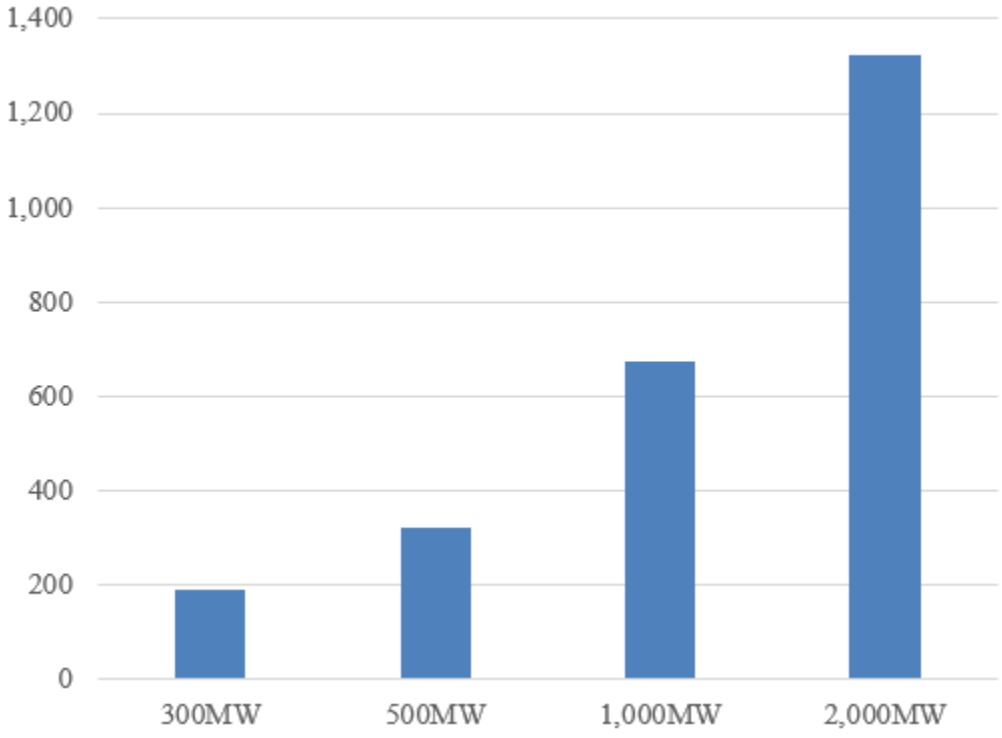
Figure 4
Cumulative Ratepayer Savings (2018-2050) from Incremental Class 1 Eligible Hydropower ($ Millions)



Hydropower Delivers Essential Grid Reliability and Resiliency Attributes

Hydropower is a reliable, renewable, carbon-free source of energy. Compared to other generation technologies, it is unparalleled in terms of flexibility and its ability to provide reliability and resiliency attributes to the grid, including inertia, reserves, capacity, frequency response, voltage control, ramping, and blackstart capability. A study by PJM found that hydropower's reliability attributes exceed those of all other resources, including traditional fossil fuel fired generation:

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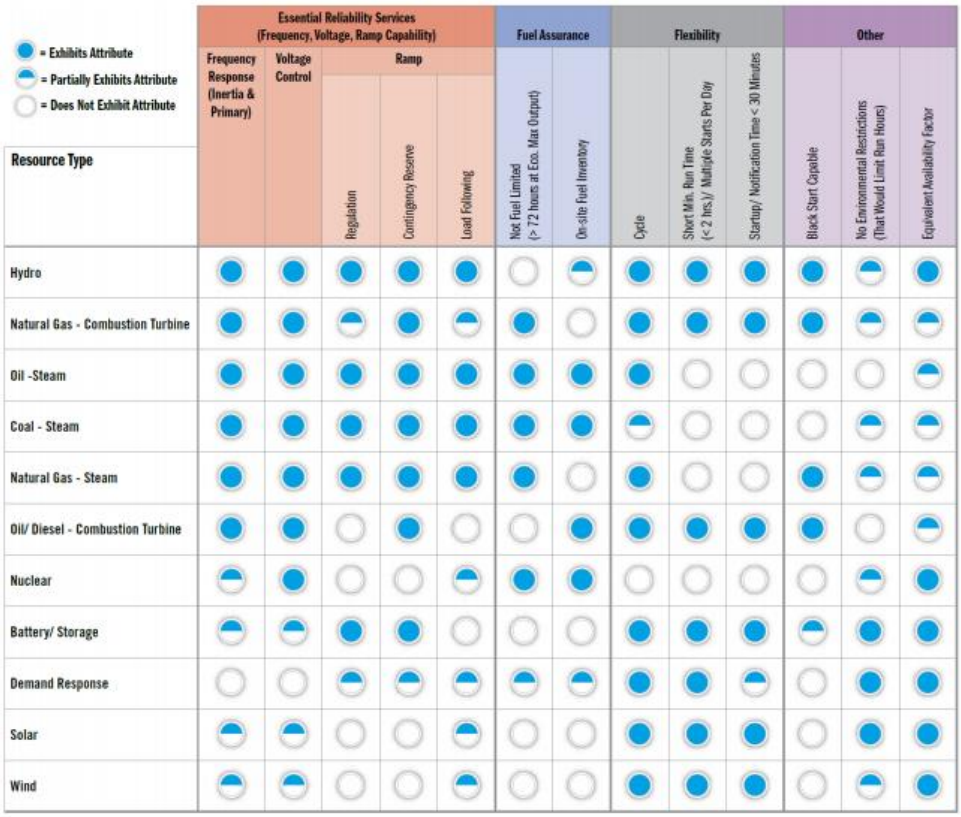
Figure 5
PJM Generator Reliability Attribute Matrix[4]



This finding was reinforced in a recent report by the Brattle Group, which identified hydropower as a cost-effective solution for addressing growing flexibility needs[5].

As a highly flexible source of baseload renewable energy and critical ancillary services, hydropower can be a substitute for traditional baseload resources that have retired in recent years due to age or other market pressures. It is also a natural complement to intermittent generation resources and can balance these resources to create a 100 percent non-emitting, renewable, reliable energy product.

[4] PJM's Evolving Resource Mix and System Reliability, PJM Interconnection, March 30, 2017. Available at: http://www.pjm.com/~/media/library/reports-notices/special-reports/20170330-pjms-evolving-resource-mix-and-systemreliability.ashx.

[5] Maximizing the Market Value of Flexible Hydro Generation, the Brattle Group, March 29, 2018. Available at: http://files.brattle.com/files/13659_maximizing_flexible_hydro_market_value_3-29-18_final.pdf.

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Conclusion

Expanding Class I and Class II eligibility to include PJM hydropower will provide New Jersey with the necessary optionality to access the broadest range of renewable resources available, helping the state achieve its clean energy goals at the least cost to ratepayers.

We thank the BPU for the opportunity to provide comments on the Energy Master Plan and would be pleased to provide any additional information.