CleanEnergyGroup

Innovation in Finance, Technology & Policy

Appendix A

Recommended State RPS Eligibility Definitions

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The use of clear, precise definitions of RPS resource eligibility reduces administrative complexities and costs by avoiding debates over vague resource eligibility definitions.

The following definitions were crafted by Clean Energy Group[1] with input from several states in the Northeast and Mid-Atlantic region with existing RPS programs to provide a common RPS eligibility foundation while providing flexibility to allow for technology advancement and development. The definitions are technology and fuel inclusive and attempt to avoid discrimination against any one renewable resource. While some states include energy efficiency resources in their RPS, the model common definitions are focused only on renewable energy electricity generation.

Resource: Wind
Definition: *Electricity derived from wind energy.*

Rationale: Existing state definitions vary from the very generic—"wind"—to the more specific—"wind turbines", and include other variations without policy significance, such as "wind power", "wind energy", and "electricity derived from wind energy". The concept of wind power is universal and simple. The recommended fuel-based wind standard, "electricity derived from wind energy" is specific, inclusive of all wind-based electricity-production technologies, consistent with or implied in the various existing state "wind" definitions, and does not conflict with respective state policies or affect differing political realities. States could adopt the proposed definition with no significant alteration in the meaning of how any specific state defines wind-based electricity as an eligible resource in their RPS.

Resource: Solar
Definition: *Electricity derived from solar energy.*

Rationale: All states include solar power in their RPS policies. However, the definitions vary greatly, with some states not specifying any particular form of solar technology and other states listing specific eligible solar technologies. The recommended definition of "electricity derived from solar energy" is specific, universal, and inclusive of all solar-based technologies that create electricity using a technology that employs solar radiation. It includes photovoltaics and solar thermal *electric* technologies. The recommended model definition also provides a broad fuel-based definition that affords states the flexibility to incorporate new solar electric technologies as they are developed without requiring legislative or regulatory changes.

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[1] Clean Energy Group (CEG) is a national nonprofit organization working in the United States and internationally on technology, finance and policy programs in the area of clean energy. CEG also manages the Clean Energy States Alliance (CESA). CESA is a nonprofit state membership organization, incorporated in 2002, as a multi-state coalition of the leading state clean energy funds and programs working together to support and promote clean energy technologies

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Resource: Fuel Cells
Definition: *Electricity derived from any electrochemical device that converts chemical energy in a hydrogen-rich fuel directly into electricity without combustion.*

Rationale: Currently, there is little consensus among state RPS policies regarding whether certain kinds of fuel cells powered by natural gas and other "non-renewable" fuels should be included in the definition of technologies eligible for RPS compliance purposes. Only a few states qualify fuel cells as eligible technologies without imposing renewable fuel requirements.

The disparity of approaches by states regarding fuel cell eligibility is limiting the ability of RPS policies to promote fuel cell technology advancements. Because fuel cells represent an advanced energy technology that is vital to the transition to a clean energy future, the recommended definition includes fuel cells as eligible RPS resources, regardless of fuel source. This "technology-based" definition would allow fuel cells to participate in RPS markets, irrespective of fuel source. The definition encourages the use of the technology, rather than a specific fuel, with the intent of helping fuel cells to "compete" with other technologies in RPS compliance. From a policy perspective, the definition is based on the recognition that, with their low emissions profile and advanced energy character, fuel cells are important for environmental and climate reasons and their potential to act as a zero-emissions technology.

Resource: Geothermal
Definition: *Electricity derived from geothermal sources.*

Rationale: Most states include geothermal fuel resources in their RPS. While the definition of geothermal power varies among states, the different definitions are fairly broad, have no major policy significance and are not mutually exclusive. For example, some states not do define geothermal power while others use particular phrases in reference to this type of power, such as "steam turbine", "hot water or steam", "earth's crust", or "heat of the earth". Since the definitions are all very similar and often identical in meaning, states could adopt the proposed, inclusive definition with no significant alteration in the scope of eligibility under current state-specific definitions.

Resource: Oceans, Lakes and Rivers
Definition: *Electricity derived from the tidal currents, thermal gradients and waves of oceans, lakes or rivers.*

Rationale: Ocean-based technologies are eligible under several state RPS policies. However, most of the states with ocean-based resource eligibility do not clearly specify the three types of ocean-based technologies that might be eligible: tidal current, wave, and ocean thermal. For the most part, the various definitions used by states are general in nature and are not intended to restrict specific forms of ocean energy.

No state lists tidal currents, thermal gradients, and waves *in lakes and rivers* as eligible resources. Many of the aforementioned technologies will operate in all bodies of water. The recommended ocean/lake/river definition is intended to be inclusive of all the types of ocean, lake, and river-based energy technologies, with the exception of hydropower. Broadening the definition to include all three technology applications in oceans, lakes and rivers provides states with the flexibility to take advantage of these new, evolving technologies in all viable water-based locations.

Resource: Biomass

Definition: *Electricity produced by the direct combustion or co-firing of solid, liquid and gaseous fuels derived from organic, non-fossil materials, not to include:*

a) Construction and demolition waste;
b) Black liquor from pulp and paper mills;
c) Mixed municipal solid waste;
d) Old-growth timber.

Also included is methane from the anaerobic decomposition of organic materials from sources such as:

a) Landfills;
b) Wastewater treatment;
c) Agricultural operations;
d) Sewage treatment facilities;
e) Food and beverage processing, sales or distribution facilities.

Eligible biomass fuels may be co-fired, or blended, with fossil fuels, provided that only the renewable energy fraction of production from multi-fuel facilities shall be considered eligible.

The facilities must meet or exceed current federal or state air emission standards, whichever is more stringent. Biomass facilities must meet the emission limits of the state whose market it is selling into, rather than just the state that it is operating in, unless the emissions regulations in the operating state are more stringent.

Rationale: The term "biomass" is very general and can be interpreted to include a wide variety of resources, such as primary biomass resources (whole trees and crops grown for energy purposes), forest and agricultural wastes, urban wood wastes, municipal solid waste, landfill gas, and black liquor (a by-product of pulp and paper production). Methods of converting biomass to electricity also vary and include direct combustion, co-firing with coal, gasification, anaerobic digestion, and pyrolysis. Each of these technologies has varying emission rates and energy conversion efficiencies. As a result, the various state RPS definitions for biomass eligibility exhibit a high degree of complexity, variation, and ambiguity.

There are a number of policy-based restrictions placed on the eligibility of biomass involving such factors as air quality, a desire to support new biomass projects, and concern over the potential over-harvesting of forests and overuse of farm lands for energy crops. Furthermore, the use by some states of terms such as "non-hazardous", "sustainable" and "low-emission" introduces substantial uncertainty over which biomass fuels and facilities do and do not qualify. For example, there is no generally agreed upon standard to ensure sustainable biomass harvest and cultivation. Regardless of the policy rationale, these eligibility restrictions can make it difficult for biomass energy projects to benefit from RPS policies.

Therefore, crafting a standard biomass RPS-eligibility definition which allows for adding more biomass capacity and addresses the range of state biomass restrictions poses a significant challenge. Faced with this challenge, the recommended definition does not use descriptive restrictions such as "non-hazardous", "sustainable" and "low-emission" because these terms do not have commonly accepted definitions, only introduce ambiguity, and are difficult to enforce. Instead, the recommended biomass definition excludes those specific biomass resources that many states have excluded on policy grounds due to environmental concerns—black liquor, construction waste and mixed municipal solid waste. The exclusions also include old growth

forests because of the significant sustainability problem facing this resource and recognized public interest value in maintaining the remaining old growth forest.

The proposed biomass definition also includes a broad, inclusive category for methane gas resources—including landfills, sewage and wastewater treatment facilities, food and beverage wastes, and wastes from agricultural operations, including animal and crop wastes. This reflects the strong merits of this renewable resource and its consistency with state environmental, local generation, climate change and fuel diversity goals. Of particular importance, methane-based facilities significantly reduce emissions that contribute to climate change. Methane is a potent greenhouse gas, with a heat-trapping capacity of about 21 times that of carbon dioxide. An inclusive definition of methane gas resources does not raise any air emission, public health, hazardous substance, or sustainability issues of consequence.

The model definition further addresses the eligibility of mixed-fuel facilities (co-firing), such as coal facilities that also burn biomass fuels. The definition allows only the energy generated from the qualifying biomass fuels to benefit under an RPS. Rather than ban the eligibility of such facilities altogether, the definition allows for efficient combinations of fuel usage while providing benefits for the use of biomass-based eligible fuels.

Finally, to address air quality concerns, rather than using a qualitative term such as "low-emission", the model definition refers more specifically to emission rates as specifically defined by the state which is receiving out-of-state-generation, or the federal EPA standard, whichever is more protective of human health and the environment. This acknowledges the regional nature of air pollution and respects the legitimate efforts of states to protect their air quality.

Resource: Hydropower
Definition: *Electricity generated by a hydroelectric facility that:*

a) *operates as a run-of-river* facility, or has been re-powered without the use of new impoundments,*
b) *has a maximum design capacity of 30 megawatts or less,*
c) *uses flowing water as the primary energy resource, with or without a dam structure or other means of regulating water flow,*
d) *is not located at a facility that uses mechanical or electrical energy to pump water into a storage facility, and*
a) *meets all relevant environmental standards as determined by the state environment department.*

* *"Run-of-river" refers to a hydropower facility that releases water at the same rate as the natural flow of the river – outflow equals inflow.*

Rationale: Because of hydropower's unique characteristics, such as its technological maturity and extensive development, many states have restricted its RPS eligibility. The proposed definition incorporates the most common elements of state definitions on hydropower eligibility. The definition allows for RPS economic support for small-scale hydropower facilities that have operational characteristics designed to address the major environmental concerns associated with hydropower dam operation—damage to watersheds and fisheries.

The recommended definition avoids the use of vague terms and restrictions such as requiring certification as a "low-impact" hydropower facility, which would require a time-consuming case-by-case review for environmental acceptability. Instead, the definition relies on compliance with

established state environmental standards to ensure that RPS-supported hydropower projects are environmentally acceptable.

The most significant feature of the recommended definition is that it is designed only to support small-scale hydropower, by establishing an eligibility ceiling of 30 MW or less of aggregate capacity. This capacity cap was selected because it is the most common limit used by states. The small hydro eligibility focus also is designed to provide financial support to those projects that are likely to be less economically stable. Furthermore, the small-scale hydro focus is designed to avoid the environmental drawbacks associated with larger hydropower facilities with impoundments, as compared to smaller dams that operate under run-of river conditions.

Finally, the definition establishes RPS eligibility for incremental hydropower re-powering at existing small-scale hydro sites to provide support to additional generation achieved through increased efficiency or use of new equipment that will further a state's technology advancement goals.