DOCKETED	
Docket Number:	21-ESR-01
Project Title:	Energy System Reliability
TN #:	247819
Document Title:	Matthew T. Rothstein, Deputy Lake County Administrative Officer Comments - Clean Energy Resources for System Reliability
Description:	N/A
Filer:	System
Organization:	Matthew T. Rothstein, Deputy Lake County Administrative Officer
Submitter Role:	Public Agency
Submission Date:	11/30/2022 12:56:08 PM
Docketed Date:	11/30/2022

Comment Received From: Matthew T. Rothstein, Deputy Lake County Administrative Officer
Submitted On: 11/30/2022
Docket Number: 21-ESR-01

Clean Energy Resources for System Reliability

Chair Hochschild and Honorable Commissioners:

The County of Lake appreciates the chance to comment regarding Clean Energy Resources for System Reliability, and we value the important work of the California Energy Commission.

Like your Commission, we believe the energy future we are seeking to create must benefit ALL Californians.
By putting skilled California laborers to work and utilizing reliably available American-made materials, we can develop the capacity we need in a manner than has multiplying effects on our economy.

By recognizing elements like number of beneficiaries and expected useful life of a given project when developing grant scoring criteria, and not penalizing projects that include private sector investment, we can create opportunities for development of energy assets in rural, impoverished California communities.

By encouraging novel combinations of proven technologies, we can more reliably meet Californiaâ€™s future energy demands and climate-focused goals.

In Lake County, multiple communities are considering or developing very small scale Closed-Loop Pumped Hydro Long-Duration Energy Storage systems that embody this complement of characteristics.

They are multi-benefit systems, typically in the 90-120 MW-hr range, paired with renewable generation to provide valuable grid services in normal conditions, reliable long-duration power even during extended outages, and deliver critical water flow during major fires.

Unlike the massive dam-based open loop pumped storage hydro of years past, these systems rely on large, roofed tanks on top of hills. This approach, while having a higher first cost than the older reservoir approach, yields a much lower footprint, ecologically, and largely eliminates water loss through evaporation.

As your Commission will uniquely appreciate, decisions surrounding Long-Duration Energy Storage investments will meaningfully affect the lives of every California-connected individual, and we are sincerely hopeful these remarks are useful as you undertake your important work.

You will agree, the public interest is well served by the Legislature setting well-reasoned policy goals, and regulatory bodies allowing that guidance to inform competitive selection processes when opportunities to provide grant funding present. Technology neutrality serves a compelling State interest, allows the best solutions to emerge in the near-term and leverages Californiaâ€™s world leading capabilities in technology innovation.

Defining metrics by which potential projects will be evaluated promotes the optimization of limited funds to serve multiple societal goals. The County of Lake finds the following are critical to ensuring optimal expenditure of limited public funds:

1. Expected useful life. Different energy technologies have vastly different expected useful lives. At one end of the spectrum are electrochemical batteries. When regularly used, these typically have expected useful lives measured in years. At the other end of the spectrum, Hydro-electric turbines expected useful lives measured in decades, with numerous examples of hydro plants in operation for over 100 years. It is clearly sensible to invest limited public funding in assets that have a longer useful life. For example, if two projects were otherwise identical, but one had an expected useful life of 10 years and a second project had an expected useful life ten times as long, the longer-lived project is clearly of greater benefit to both the local community and to California, as a whole.

2. Round-trip efficiency. No energy storage system is 100% efficient, but some are better than others. Some long duration electro-chemical technologies are impressively low cost and discharge insensitive but are plagued with very low round trip efficiency. Best available technologies in the energy storage space can show efficiencies in the range of 80%-90% and maintain that efficiency over their entire useful life, while some Long-Duration Energy Storage (LDES) technologies have RTE in the range of 60%-70%. In other cases, a technology might have a relatively high initial round trip efficiency, only to see that initially impressive number degrade quickly with use. It is not in the public interest for the State to incentivize installation of systems that considerably increase total energy use. Therefore, it is a reasonable policy goal to direct inclusion of a weighted average lifetime Round Trip Efficiency metric when evaluating LDES projects.

3. System power. In addition to regularity of operation, another variable is system capacity (MW-hrs). A system that discharges 25 MW and 100 MW-Hr/day is superior to a system that discharges 1 MW and 4 MW-hr a few times per year.

The benefits of a larger, regularly discharging system are many. Additional capacity at peak conditions helps the entire grid meet load demand, particularly for helping to avoid the need for use of highly polluting emergency generation. Regular injections of energy during peak conditions are a downward force on overall prices, marginally increasing supply during periods of scarcity, again benefitting Californians as a whole. Finally, particularly to the extent funded systems are renewably recharged, regular discharge during peak conditions helps offset the Greenhouse Gas (GHG) emissions of simple

cycle combustion turbines and emergency diesel generators, the highest GHG-emitting assets in the generating fleet. Criteria for State funding opportunities should recognize the benefits of larger capacity systems on the overall grid.

4. Co-located renewables. Long-Duration Energy Storage (LDES) systems co-located with renewable power sources deliver additional benefits to both their local community and the grid. To the local community, co-location of renewables with the LDES system means the duration of the system is not limited to the amount of energy that can be stored. To the grid, LDES systems exclusively recharged by renewable energy allow the offsetting of the most polluting generating assets with an entirely clean one, thereby maximizing the GHG efficiency of a system. LDES systems powered exclusively by renewable energy should receive additional consideration when applying for funding.

5. Local skilled trade labor. Not all systems are equal in terms of the number of local skilled labor hours needed. Some systems are largely prefabricated and require relatively small amounts of local skilled labor. Other types of energy storage, including very small scale Closed-Loop Pumped Storage Hydro need significant amounts of earthwork, concrete, welding, electrical, and other skilled trades. Program implementors have an opportunity to advance many public interests by giving preference to project applications that use more local labor; not those that rely primarily on components manufactured out of state or even overseas.

6. Additional benefits. In the case of the system Lake County is considering, the Long-Duration Energy Storage (LDES) infrastructure, itself, provides a major additional benefit to our community in the form of water supply for firefighting purposes and new wildland firefighting infrastructure. Not all projects will be able to provide additional benefits to a community, but buying down first costs makes broader benefits possible in a greater range of scenarios. It would be very reasonable to positively recognize LDES systems and other energy projects that do provide additional benefits in any eventual scoring system(s).

7. Expected Annual operating hours. Some Long-Duration Energy Storage (LDES) technologies rapidly degrade with use, while others are effectively discharge insensitive. Technologies that rapidly degrade are thus typically (and reasonably) reserved for emergency use. Discharge insensitive technologies, because they do not face those degradation issues, can be used much more frequently and still fulfill their primary emergency microgrid support role.

While it is true both types of technology are Long-Duration Energy Storage, the two types of systems are not of equal value to the public. For example, if a discharge insensitive system were to operate on a daily basis, providing late afternoon ramping services, and a comparative system were to only operate during an emergency, the two systems would have significantly different lifetime grid-facing benefits, even if their emergency power benefits were identical.

8. Economically Disadvantaged Communities. Long-Duration Energy Storage (LDES) is

needed in many locations. Even State investments in the hundreds of millions of dollars cannot fully meet the need. Economically Disadvantaged Communities may not be able to meet their energy storage needs without State and/or Federal support, and should have priority in funding assistance. Residents of Economically Disadvantaged Communities are also typically less resilient to the costs of evacuations and losses. Economically Disadvantaged Communities that would most benefit from State support in accessing LDES are rarely those that show up as the most affected communities when using the CalEnviroScreen tool. As one example, of the just over 8,000 census tracts in California, fewer than 40 are also listed as High Fire Threat District (HFTD) classifications 2 or 3, and it is HFTD 2 and 3 where the vast majority of Californiaâ€™s de-energization events occur.

9. American made materials. Many Long-Duration Energy Storage (LDES) technologies rely almost entirely on components manufactured outside of California or even outside of the United States. Implementing agencies should include in their scoring systems for grant opportunities recognition of American made materials. Reliance on materials from conflict zones is clearly not in Californiaâ€™s interest, and prioritizing American made materials has many benefits.

10. Toxic materials/ End-of-life disposal issues. Long Duration Energy Storage (LDES) technologies come with a broad range of potential environmental impacts, from use of relatively inert substances at one end of the spectrum to substances that could produce significant health and environmental impacts if released to the environment. This potential impact is exacerbated for LDES technologies that have relatively short life spans.

The impacts of use of toxic materials could be partially mitigated through planned recycling options, but the availability of such services years into the future is an assumption that may or may not come to fruition, and thus represents a risk factor for those technologies. Given the tremendous need for energy storage in California and the wide range of potential applications, it may not appropriately serve the public interest to entirely prohibit use of LDES technologies that contain toxic materials. However, it would be appropriate, for example, to include a preference for non-toxic materials in the scoring criteria used by State agencies to disburse grant funds

11. Individuals served by microgrid capabilities. Long-Duration Energy Storage (LDES) installations that are able to feed a microgrid bring additional value to their communities, and provide the experience needed to advance the grid to a decentralized future. We must also ask the question of how many customers are being served: it stands to reason a project that assists 8,000 has a greater benefit to Californians and the grid than a project that benefits 80 customers.

12. Overall Economic Activity. Some energy project opportunities may require almost exclusively State funding. Others need only a small portion of the funds to come from an outside source in order to achieve financial viability. Each State dollar spent on Long-Duration Energy Storage projects can benefit the economy and workers of California.

High-leverage projects (those with other, non-State funding sources) allow limited State funds to go further. Projects with significant private investment also demonstrate they are considered more economically viable by markets, and thus are more likely to actually come online. It is reasonable for greater weight to be granted to projects that need only a modest amount of public funding.

Again, the County of Lake wishes to thank the California Energy Commission for the opportunity to make these comments. We greatly appreciate your work to identify the right complement of energy resources to support grid reliability and ensure an optimal balance of public priorities can be met.

Sincerely,
Matthew T. Rothstein
Deputy County Administrative Officer
Public Information Officer
Matthew.Rothstein@lakecountyca.gov

Additional submitted attachment is included below.

COUNTY OF LAKE
ADMINISTRATIVE OFFICE
Courthouse - 255 North Forbes Street
Lakeport, California 95453
TELEPHONE (707) 263-2580
FAX (707) 263-1012
e-mail: Matthew.Rothstein@lakecountyca.gov

MATTHEW T. ROTHSTEIN
Deputy County Administrative Officer
Public Information Officer

November 30, 2022

California Energy Commission
715 P Street
Sacramento, CA 95814

Chair Hochschild and Honorable Commissioners:

The County of Lake appreciates the chance to comment regarding Clean Energy Resources for System Reliability, and we value the important work of the California Energy Commission.

Like your Commission, we believe the energy future we are seeking to create must benefit ALL Californians.
By putting skilled California laborers to work and utilizing reliably available American-made materials, we can develop the capacity we need in a manner than has multiplying effects on our economy.

By recognizing elements like number of beneficiaries and expected useful life of a given project when developing grant scoring criteria, and not penalizing projects that include private sector investment, we can create opportunities for development of energy assets in rural, impoverished California communities.

By encouraging novel combinations of proven technologies, we can more reliably meet California's future energy demands and climate-focused goals.

In Lake County, multiple communities are considering or developing very small scale Closed-Loop Pumped Hydro Long-Duration Energy Storage systems that embody this complement of characteristics.

They are multi-benefit systems, typically in the 90-120 MW-hr range, paired with renewable generation to provide valuable grid services in normal conditions, reliable long-duration power even during extended outages, and deliver critical water flow during major fires.

Unlike the massive dam-based open loop pumped storage hydro of years past, these systems rely on large, roofed tanks on top of hills. This approach, while having a higher first cost than the older reservoir approach, yields a much lower footprint, ecologically, and largely eliminates water loss through evaporation.

As your Commission will uniquely appreciate, decisions surrounding Long-Duration Energy Storage investments will meaningfully affect the lives of every California-connected individual, and we are sincerely hopeful these remarks are useful as you undertake your important work.

You will agree, the public interest is well served by the Legislature setting well-reasoned policy goals, and regulatory bodies allowing that guidance to inform competitive selection processes when opportunities to provide grant funding present. Technology neutrality serves a compelling

State interest, allows the best solutions to emerge in the near-term and leverages California's world leading capabilities in technology innovation.

Defining metrics by which potential projects will be evaluated promotes the optimization of limited funds to serve multiple societal goals. The County of Lake finds the following are critical to ensuring optimal expenditure of limited public funds:

1. **Expected useful life.** Different energy technologies have vastly different expected useful lives. At one end of the spectrum are electrochemical batteries. When regularly used, these typically have expected useful lives measured in years. At the other end of the spectrum, Hydro-electric turbines expected useful lives measured in decades, with numerous examples of hydro plants in operation for over 100 years. It is clearly sensible to invest limited public funding in assets that have a longer useful life. For example, if two projects were otherwise identical, but one had an expected useful life of 10 years and a second project had an expected useful life ten times as long, the longer-lived project is clearly of greater benefit to both the local community and to California, as a whole.

2. **Round-trip efficiency.** No energy storage system is 100% efficient, but some are better than others. Some long duration electro-chemical technologies are impressively low cost and discharge insensitive but are plagued with very low round trip efficiency. Best available technologies in the energy storage space can show efficiencies in the range of 80%-90% and maintain that efficiency over their entire useful life, while some Long-Duration Energy Storage (LDES) technologies have RTE in the range of 60%-70%. In other cases, a technology might have a relatively high initial round trip efficiency, only to see that initially impressive number degrade quickly with use. It is not in the public interest for the State to incentivize installation of systems that considerably increase total energy use. Therefore, it is a reasonable policy goal to direct inclusion of a weighted average lifetime Round Trip Efficiency metric when evaluating LDES projects.

3. **System power.** In addition to regularity of operation, another variable is system capacity (MW-hrs). A system that discharges 25 MW and 100 MW-Hr/day is superior to a system that discharges 1 MW and 4 MW-hr a few times per year.

   The benefits of a larger, regularly discharging system are many. Additional capacity at peak conditions helps the entire grid meet load demand, particularly for helping to avoid the need for use of highly polluting emergency generation. Regular injections of energy during peak conditions are a downward force on overall prices, marginally increasing supply during periods of scarcity, again benefitting Californians as a whole. Finally, particularly to the extent funded systems are renewably recharged, regular discharge during peak conditions helps offset the Greenhouse Gas (GHG) emissions of simple cycle combustion turbines and emergency diesel generators, the highest GHG-emitting assets in the generating fleet. Criteria for State funding opportunities should recognize the benefits of larger capacity systems on the overall grid.

4. **Co-located renewables.** Long-Duration Energy Storage (LDES) systems co-located with renewable power sources deliver additional benefits to both their local community and the grid. To the local community, co-location of renewables with the LDES system means the duration of the system is not limited to the amount of energy that can be stored. To the grid, LDES systems exclusively recharged by renewable energy allow the offsetting of the most polluting generating assets with an entirely clean one, thereby

maximizing the GHG efficiency of a system. LDES systems powered exclusively by renewable energy should receive additional consideration when applying for funding.

5. **Local skilled trade labor.** Not all systems are equal in terms of the number of local skilled labor hours needed. Some systems are largely prefabricated and require relatively small amounts of local skilled labor. Other types of energy storage, including very small scale Closed-Loop Pumped Storage Hydro need significant amounts of earthwork, concrete, welding, electrical, and other skilled trades. Program implementors have an opportunity to advance many public interests by giving preference to project applications that use more local labor; not those that rely primarily on components manufactured out of state or even overseas.

6. **Additional benefits**. In the case of the system Lake County is considering, the Long-Duration Energy Storage (LDES) infrastructure, itself, provides a major additional benefit to our community in the form of water supply for firefighting purposes and new wildland firefighting infrastructure. Not all projects will be able to provide additional benefits to a community, but buying down first costs makes broader benefits possible in a greater range of scenarios. It would be very reasonable to positively recognize LDES systems and other energy projects that *do* provide additional benefits in any eventual scoring system(s).

7. **Expected Annual operating hours.** Some Long-Duration Energy Storage (LDES) technologies rapidly degrade with use, while others are effectively discharge insensitive. Technologies that rapidly degrade are thus typically (and reasonably) reserved for emergency use. Discharge insensitive technologies, because they do not face those degradation issues, can be used much more frequently and still fulfill their primary emergency microgrid support role.

   While it is true both types of technology are Long-Duration Energy Storage, the two types of systems are not of equal value to the public. For example, if a discharge insensitive system were to operate on a daily basis, providing late afternoon ramping services, and a comparative system were to only operate during an emergency, the two systems would have significantly different lifetime grid-facing benefits, even if their emergency power benefits were identical.

8. **Economically Disadvantaged Communities**. Long-Duration Energy Storage (LDES) is needed in many locations. Even State investments in the hundreds of millions of dollars cannot fully meet the need. Economically Disadvantaged Communities may not be able to meet their energy storage needs without State and/or Federal support, and should have priority in funding assistance. Residents of Economically Disadvantaged Communities are also typically less resilient to the costs of evacuations and losses.

   Economically Disadvantaged Communities that would most benefit from State support in accessing LDES are rarely those that show up as the most affected communities when using the CalEnviroScreen tool. As one example, of the just over 8,000 census tracts in California, fewer than 40 are also listed as High Fire Threat District (HFTD) classifications 2 or 3, and it is HFTD 2 and 3 where the vast majority of California's de-energization events occur.

9. **American made materials.** Many Long-Duration Energy Storage (LDES) technologies rely almost entirely on components manufactured outside of California or even outside of the United States. Implementing agencies should include in their scoring systems for

grant opportunities recognition of American made materials. Reliance on materials from conflict zones is clearly not in California's interest, and prioritizing American made materials has many benefits.

10. **Toxic materials/ End-of-life disposal issues.** Long Duration Energy Storage (LDES) technologies come with a broad range of potential environmental impacts, from use of relatively inert substances at one end of the spectrum to substances that could produce significant health and environmental impacts if released to the environment. This potential impact is exacerbated for LDES technologies that have relatively short life spans.

    The impacts of use of toxic materials could be partially mitigated through planned recycling options, but the availability of such services years into the future is an assumption that may or may not come to fruition, and thus represents a risk factor for those technologies. Given the tremendous need for energy storage in California and the wide range of potential applications, it may not appropriately serve the public interest to entirely prohibit use of LDES technologies that contain toxic materials. However, it would be appropriate, for example, to include a preference for non-toxic materials in the scoring criteria used by State agencies to disburse grant funds

11. **Individuals served by microgrid capabilities.** Long-Duration Energy Storage (LDES) installations that are able to feed a microgrid bring additional value to their communities, and provide the experience needed to advance the grid to a decentralized future. We must also ask the question of how many customers are being served: it stands to reason a project that assists 8,000 has a greater benefit to Californians and the grid than a project that benefits 80 customers.

12. **Overall Economic Activity.** Some energy project opportunities may require almost exclusively State funding. Others need only a small portion of the funds to come from an outside source in order to achieve financial viability. Each State dollar spent on Long-Duration Energy Storage projects can benefit the economy and workers of California. High-leverage projects (those with other, non-State funding sources) allow limited State funds to go further. Projects with significant private investment also demonstrate they are considered more economically viable by markets, and thus are more likely to actually come online. It is reasonable for greater weight to be granted to projects that need only a modest amount of public funding.

Again, the County of Lake wishes to thank the California Energy Commission for the opportunity to make these comments. We greatly appreciate your work to identify the right complement of energy resources to support grid reliability and ensure an optimal balance of public priorities can be met.

Sincerely,

Matthew T. Rothstein
Deputy County Administrative Officer
Public Information Officer
Matthew.Rothstein@lakecountyca.gov