Comment 1 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Benjamin
Last Name: Matek
Email Address: ben@geo-energy.org
Affiliation: Geothermal Energy Association

Subject: Geothermal Power
Comment:

Dear CPUC, CEC, ARB, and CalISO,
The Geothermal Energy Association encourages you to consider geothermal power as a vehicle to help meet California's carbon reduction goals. Geothermal power can provide substantial clean, economic and environmental friendly power to the state of California.

Geothermal power plants:
•Have one of the smallest land footprints of any energy technology

•Provide clean and baseload power that can substitute baseload fossil fuel sources megawatt for megawatt.
•When properly incentivized and engineered to do so, geothermal power can also provide ancillary services and flexible power including load following, ramping, and reserves.
•Employ about 1.17 persons per MW at each operating power plant. These are permanent jobs that last the entire 30-50 year lifetime of the power plant.
•Pay significant amount of property taxes, rents, and royalties to state treasuries to fund state budgets, infrastructure, and education.
•Only about half of the state's resources are currently utilized. There is an estimated 2.5 GW of traditional geothermal power that has not been developed across the state.
•Can help mitigate the looming environmental catastrophe at the Salton Sea by controlling patriciate matter emissions and providing revenues through, taxes, royalties and rents for restorations efforts.

The Geothermal Energy Association is a trade association comprised of over 100 U.S. companies that support the expanded use of geothermal energy and are developing geothermal resources worldwide and in California for electrical power generation and direct-heat uses.

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/1-renewablesympsium-ws-VTYHYFc6UmhVDAd0.zip

Original File Name: Cali Symposium.zip

Date and Time Comment Was Submitted: 2015-07-13 05:54:32

No Duplicates.

Comment 2 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Joshua
Last Name: Nordquist
Email Address: jnordquist@ormat.com
Affiliation: Ormat Nevada Inc.

Subject: Governor's Greenhouse Gas Reduction Goals
Comment:

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Please find the attached comments.
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Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/2-renewablesympsium-ws-AWJUM1AOBz4DagFo.pdf

Original File Name: CA Joint Agency Symposium comments _Ormat Nevada Inc..pdf

Date and Time Comment Was Submitted: 2015-07-14 09:04:05

No Duplicates.

Comment 3 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Bill
Last Name: Tippets
Email Address: billtippets@gmail.com
Affiliation:

Subject: Comments to renewablesympsium-ws
Comment:

The ideas and approaches presented in the symposium slides set out a reasonable set of expectations and opportunities for the State of CA to substantially reduce carbon/GHG emissions that would put the state on a trajectory to meet the long-term goal of 80% reduction below the 1990 GHG emission level by 2050. The State must provide policies, guidance, and financial support/incentives to promote - and have regulatory authority to enforce - its GHG emission reduction goals/targets/requirements.

Absent that set of State-based factors, it is highly doubtful that the various regoins of the state will consistently enact their own policies, guidance, financial commitments/incentives and requirements that would put them on the necessary GHG emission reduction paths. For example, based on past experience and current efforts in the San Diego Region, the regional Municipal Planning Organization has proposed to comply with only regulatory required targets, not to present a plan to achieve the State's long-term target(but not specifically a regulatory-requirement) to reduce GHG emissions by 80% below 1990 levels by 2050.

The San Diego MPO (SANDAG) voted several years ago to combine the currently proposed 2015 update of its Regional Transportation Plan/Sustainable Communities Strategy with the update of the non-regulatory Regional Comprehensive Plan - the RCP is supposed to serve as the regional policy blueprint to achieve sustainable urban form, transportation, housing, healthy environment, economic prosperity, etc.

The RTP/SCS update fails to present a plan that would put this region on a course to complement the state's 2050 GHG target. The proposed plan does not commit the region to do its "share" of GHG reductions, and puts greater onus on the individual cities and county governments if the region is to have any possibility to contribute substantively to the state's long-term goal.

It is essential that the State of CA create the strategy, priorities, approaches, etc. to achieve the 2050 goal - which should be made a mandate, along with an interim 2030 mandate for a 40% reduction below 1990 GHG levels. As noted in the symposium slides, CA should help lead a "western states" effort to coordinate electric energy production and use, including facility siting, and emphasizing distributed generation, community choice aggregation, research to improve storage and transmission, etc.) storage. Improved building energy use standards/requirements should be developed (with some allowance for phasing these in), but including mandated energy audits for all commercial/industrial buildings and residences at point of construction/occupancy or sale - and a requirement to meet new standards (again, with some allowance for phasing in those improvements). At the State/interstate level, the more that the State of CA can do to establish better energy policies across the western states, and provide for measures that take some of the pressure off individual regional entities and

local governments, the higher the possibility those local entities will be willing to undertake their own GHG reduction actions.

However, there must be both incentives to induce effective regional actions, as well as repercussions if effective actions are not undertaken. It is essential that each region of the State (e.g., the MPOs) develops its GHG reduction plans such that it presents an effective blueprint that both assumes some responsibility to reduce GHGs that the MPO has authority to enact as well as provides a systematic, integrated plan into which the local governments's climate action/adaptation plans fit and can add to the GHG emission reductions. It must provide guidance for long-term "smart growth" even if that does not currently comport with local general plans: since MPOs are comprised of those individual governments, the individual cities are in the best position to develop a transition plan so that there is equitable sharing of the costs and benefits of that smart growth.

In addition, because water production, transportation and treatment (particularly when it is treated for reuse) are currently, and will be increasingly, large energy users, the state and MPOs must be heavily involved in developing policies, guidance (targets) and regulations to reduce per capita consumption and ensure equitable access to and reasonable costs for disadvantaged communities (urban and rural/farm).

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2015-07-22 15:00:49

No Duplicates.

Comment 4 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Mike
Last Name: Levin
Email Address: mlevin@fce.com
Affiliation: FuelCell Energy, Inc.

Subject: COMMENTS OF FUELCELL ENERGY, INC. ON JOINT AGENCY SYMPOSIUM
Comment:

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Please see attached comments of FuelCell Energy, Inc. on the July
9, 2015 multi-agency symposium to discuss the development of
strategies to achieve Governor Brown’s 2030 greenhouse gas
reduction goals.
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Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/4-renewablesympsium-ws-BjQGMAc3A2UGLVJi.pdf

Original File Name: 2015-07-30; FCE Joint Agency Symposium Comments.pdf

Date and Time Comment Was Submitted: 2015-07-31 08:37:01

No Duplicates.

Comment 5 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Sigmund
Last Name: Gronich
Email Address: sigmundgronich@aol.com
Affiliation:

Subject: Biomass to Hydrogen and Electricity Options
Comment:

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I emailed you previously with a question about biomass to hydrogen
and electricity options.  I would like to add several references
concerning the option which provides support for it.  My strong
feeling is that it is not being considered and should be.  Your
official form indicates that it is too late to submit it under
normal procedures, so I hope you will be able to consider it as an
option by this email.  I would be happy to discuss it at any time.
I worked at the Department of Energy for 31 years in solar, biomass
and hydrogen fuel cell vehicles and am familiar with this approach.
It would be in my judgment the lowest cost, most direct way to
simultaneously clean up the grid and achieve a clean transportation
system.

Sig Gronich
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Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/5-renewablesympsium-ws-B3QCbQNlAD4BcgJs.zip

Original File Name: sigmundgronich.zip

Date and Time Comment Was Submitted: 2015-07-31 14:22:33

No Duplicates.

Comment 6 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: William
Last Name: Gloege
Email Address: oflibertysons@yahoo.com
Affiliation: Californians for Green Nuclear Power

Subject: We must have nuclear power to meet emission targets.
Comment:

Dear Governor Brown,

We should put nuclear power at the top of our energy generating means. It produces 63.3% of America's emission free electricity with only 100 reactors out of 6,000 total energy plants.

Nuclear power, by actual numbers, is the safest of all other forms, including accidents much ballyhooed by Big Media who are largely supported by fossil fuel ads. (Forbes, "How Deadly is Your Kilowatt?" 6/10/2012).

The US Navy has had about 100,000 crew serving on nuclear ships since 1955 without a single reactor injury or fatality. Follow up on these crew show no long term effects.

Sadly, California has cut its nuclear power generation to one plant Diablo Canyon. That extremely well run plant provides 3 million Californians with emission-free electricity with the 2 billion, 300 million watts the reactors create.

New reactor designs are nearly to market and these will be even safer than present designs.

False fears has been whipped up about nuclear's safety, by groups like the "environmentalist" Sierra Club, for example. But Time Magazine caught the Club in 2012 quietly talking millions from Chesapeake Energy. Club members never were told. All the while the Sierra Club worked to shut more nuclear plants with false fears - but zero evidence of harm or fatality.

The UN reports (UNSCEAR) on Fukushima say no one died from the accident and no one will be likely to become ill from released radiation, and if they are "...it will be too small to detect."

Get the facts on nuclear power, then build more reactors in our state to fight climate change - and desalinate sea water for our State caught in dire drought, itself caused by global warming. (Diablo Canyon will begin furnishing desalinated water to nearby communities soon).

William Gloege
Californians for Green Nuclear Power
(all volunteer group of citizens supporting nuclear power and Diablo Canyon) CGNP.org

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2015-08-04 09:04:12

No Duplicates.

Comment 7 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Paul
Last Name: Relis
Email Address: paulr@crrmail.com
Affiliation: CR&R Incorporated

Subject: Comments on 50 Percent Petroleum Reduction Strategy
Comment:

CR&R, a member of the Bioenergy Association of California (BAC),supports the comments by Julia Levin, Executive Director of the BAC that will be submitted by this Friday's comment submittal deadline. We have been a party to preparing those comments.

CR&R is a solid waste/recycling service provider for 50 cities in Southern California. We operate a 900 heavy duty-vehicle fleet. We will complete the construction of a $35 million anaerobic digestion facility by December of this year that will produce one million gallons of diesel fuel equivalent (DGE) of biomethane annually. By 2018 our facility will produce about 4 million DGE gallons per year of biomethane for use in our waste and recycling collection fleet based in Perris, CA and for injection into the natural gas grid. It is expected to be the largest such facility in North America that converts urban source separated green and food waste, converting it to biogas and then biomethane.

CR&R offers California a new means of reducing our reliance on petroleum by 50% that is the goal of the state, along with making an important contribution to an increased RPS goal and reductions in GHG emissions.

The BAC has prepared comprehensive comments on the benefits our industry offers California's efforts to achieve a 50% petroleum reduction, including providing the lowest carbon transportation of any kind, near-term reductions in Short-Lived Climate Pollution, compliance with new organic waste diversion goals, reduced air pollution impacts on disadvantaged communities suffering from diesel emissions, reductions in wildfire risk and impacts, and green job generation.

Given the benefits that facilities like ours offer the state, we implore you to incentivize fuels such as biomethane to contribute to the 5 Pillars of California's Climate Change Strategy. We ask that you assist in making the injection of biomethane into the pipeline easier and less costly, provide long-term certainty under the LCFS and accelerate certification of low-N0x engines and incentivize their deployment. And we ask that you allocate Cap and Trade dollars commensurate with the contribution our industry will make to supporting the state's Five Pillar platform.

CR&R's investment in its AD facility demonstrates our company's commitment to biomethane development in California. CR&R needs the Air Board to demonstrate its commitment to the development of a biomethane industry with cap and trade funding and supportive policies such as long-term LCFS and reducing the costs of connecting to the gas grid to distribute biomethane.

Together we can make the 50 Percent Petroleum Strategy a practical reality.

Sincerely,

Paul Relis
Senior Vice President
CR&R Incorporated

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2015-08-05 14:16:44

No Duplicates.

Comment 8 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: William J.
Last Name: Keese
Email Address: wjkeese@gmail.com
Affiliation:

Subject: Comments on July 9th Symposium
Comment:

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See attached letter
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Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/8-renewablesympsium-ws-UTRVMgNlAzwFZlQL.pdf

Original File Name: Eagle Crest Energy Comments -- July 9 Symposium.pdf

Date and Time Comment Was Submitted: 2015-08-05 15:20:43

No Duplicates.

Comment 9 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Claire
Last Name: Broome
Email Address: cvbroome@gmail.com
Affiliation: 350 Bay Area

Subject: Comments from 350 Bay Area on Accelerating Transition to Renewables
Comment:

Comments by 350 Bay Area on the July 9 CPUC/CEC/ARB/CAISO symposium on meeting California's 2030 GHG goals, focused on the transition to renewable energy generation

1the Pathways Analysis sponsored by CARB, CAISO, CPUC, and CEC and conducted by Energy + Environmental Economics (E3) should include relevant cost savings to accurately reflect the costs of the early deployment strategy compared to the other scenarios.

Specifically, the Pathways Project is designed to "evaluate the feasibility and cost (emphasis added) of a range of greenhouse gas reductions scenarios in California ". The cost impact is summarized on slide 18 of a previous presentation to CARB of the draft Pathways results (appended) and appears to show that the early deployment scenario has dramatically higher incremental costs by 2030 than the straight line or delayed deployment options. However, since the early deployment scenario (critically important for rapid reductions in GHG emissions) would result in a more rapid decrease of emissions of greenhouse gases and criteria pollutants than the other scenarios, there would be real and quantifiable health benefits with the early deployment scenario. It is misleading to fail to include those direct cost savings in the analysis, especially when policymakers may rely on figures such as slide 18 to conclude that early deployment is not economically feasible.

The Pathways analysis considers costs from a range of perspectives, not just that of the utilities, such as changes in consumer vehicles and residential heating investments, as well as the impact on household expenditures. Therefore, it seems entirely reasonable that it should also include well accepted estimates for savings from health benefits, which are a direct result of the early deployment intervention. For example, as part of the Clean Power Plan the EPA monetized the air pollution health co- benefits from reductions in criteria pollutants. This analysis was specific to California and would provide a credible source for figures on the benefits of reductions in Particulate Matter- 2.5 ($360,000-$800,000 per ton in 2011$) and Nitrogen Oxides ($11,000-$47,000 per ton in 2011$) (reference below).

1)the CPUC should be held accountable to meet their critical role in reaching California's greenhouse gas emission reduction goals.

A number of symposium presenters expressed concerns about over-generation and curtailment in the future with the increasing proportion of renewable resources on the grid, apparently assuming over-generation and curtailment are inevitable. However, Laura Wisland from the Union of Concerned Scientists said during the stakeholder panel that the UCS model shows that it is feasible to use fast response storage and Demand Response to maintain system flexibility and reliability, decreasing the use of gas generation and avoiding curtailment and overgeneration. The CPUC should

develop concrete plans to encourage investor owned utilities to accelerate investments in such approaches to grid reliability, especially given the decreasing cost of storage, the innovative applications of demand response, the expense and GHG profile of gas peaker plants, and the expense and opportunity cost of curtailment.

Ed Randolph of the CPUC discussed the complexity caused by the multiple current CPUC proceedings relevant to California's transition to renewable energy, but did not suggest any practical solutions. The CPUC should propose how they plan to meet the state’s goals with a more integrated process. In addition to a strategic approach to integrated planning, several suggestions from the symposium could be considered, such as adding storage to the renewable generation obtained for RPS procurements; permitting pump storage to qualify as storage (rather than current requirement for "new technology"); and increasing the time horizon of the long term procurement proceeding to 20 years.

see document plus Figure 18 in zip file attachment

reference: US Environmental Protection Agency, " regulatory impact analysis for the proposed carbon guidelines for existing power plants and emissions standards for modified and reconstructive power plants" June 2014. Table 4 –9 p. 4 – 27. Available at http://www2.epa.gov/sites/production/files/2014 – 06/documents/2014 0602 ria – clean – power – plan. Pdf

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/9-renewablesympsium-ws-BzRQY1RlWVUDZ1c2.zip

Original File Name: 350 Bay Area comments CARB CEC CaISO CPUC Renewables symp July 9 2015.zip

Date and Time Comment Was Submitted: 2015-08-06 14:32:52

No Duplicates.

Comment 10 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Anthony
Last Name: Andreoni
Email Address: tandreoni@cmua.org
Affiliation: CMUA

Subject: The July 9th Joint Agency Symposium on the Governor's GHG Reduction Goals
Comment:

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Please see our attached written comments on the July 9th Joint
Agency Symposium.
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Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/10-renewablesympsium-ws-WzgAa1woUGIEXVQ3.pdf

Original File Name: CMUA_Comments_on_the_Joint_Symposium_08_06_2015_Final.pdf

Date and Time Comment Was Submitted: 2015-08-06 15:10:34

No Duplicates.

Comment 11 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Joyce
Last Name: Dillard
Email Address: dillardjoyce@yahoo.com
Affiliation:

Subject: Comments ARB 2030 Climate Change Commitments-Renewables due 8.8.2015
Comment:

Transmission capability does not seem to be addressed as there is not an Economic Analysis. What infrastructure is needed at what cost.

As demands are made, such as feed-in-tariff with solar energy, is there a capability to upload that is equivalent to the download. We have heard there is not. What capital costs are associated with this aspect of renewable energy being able to be fed into the grid.

Baseline energy needs to be discussed. Is geothermal equivalent to coal in aspects of greenhouse gas emissions. What are the costs associated with different baseline fuels.

If an EMP Electromagnetic Pulse hit the system, will renewables be able to sustain. What period of time are we looking at outages.

Joyce Dillard
P.O. Box 31377
Los Angeles, CA 90031

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2015-08-07 13:47:26

No Duplicates.

Comment 12 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: V. John
Last Name: White
Email Address: tehya@ceert.org
Affiliation: CEERT

Subject: COMMENTS OF THE CENTER FOR ENERGY EFFICIENCY AND RENEWABLE TECHNOLGIES
Comment:

COMMENTS OF THE
CENTER FOR ENERGY EFFICIENCY AND RENEWABLE TECHNOLGIES
August 7, 2015

I. INTRODUCTION

The Energy + Environmental Economics Pathways modeling done as the analytical framework for California's greenhouse gas reduction planning is a cautionary tale for policy to achieve the State's long term emission reduction goals. The principal findings of that modeling can be summarized as follows:

- A policy of a 50% RPS coupled with aggressive electrification of both transportation and building sectors achieves a 26-38% GHG reduction below 1990 levels by 2030.
- Essentially complete decarbonization of electricity production is required to achieve the 2050 GHG goal of 80% below 1990 levels.
- Electric load kicks up sharply after 2030 due to electrification of transportation and space conditioning. Essentially all of this incremental load must be carbon free to hit 2050 greenhouse gas goals.

Clearly, as articulated by the exchange between E3's Dr. Ryan and CPUC President Picker at the Symposium: "Given the long term climate goals, 50% renewables by 2030 must be considered a floor and not a ceiling." Indeed, the key takeaway from the Pathways study is that we should prepare for success of a 50% by 2030 target; and that, just as 20% by 2020 quickly became 33% by 2020, 50% by 2030 could and should become 66% by 2030.

As we begin to put the challenges and successes of generating one-third of our electrical energy from renewable resources in the rear view mirror, California must now focus on the challenges and projected costs of moving from one-third to two-thirds of its electricity being renewable. The principal issue identified is "over-generation" resulting in curtailment and high costs. Among the analytic studies that can inform how best to address these issues, and build upon and inform E3's Pathways modeling is the 2030 Low Carbon Grid Study. The study's preliminary results, and CEERT's conclusions and policy recommendations, are summarized in the following section.

II. LOW CARBON GRID STUDY (LCGS)

A. LCGS Overview and CEERT Recommendations

The Low Carbon Grid Study (LCGS) was commissioned by thirty-seven energy development companies (mostly but not exclusively renewable), two foundations and the Energy Information Agency to study precisely these questions. Phase I results are posted on the study webpage www.LowCarbonGrid2030.org . Phase II results are undergoing peer review and will be posted shortly.

The study looks at a range of scenarios for the electric sector in 2030.

In summary, the principal lessons learned from the Low Carbon Grid Study which are relevant to setting a 2030 GHG/RPS target for the electric sector are:

- Explicitly consider long term GHG emissions in planning, procurement and operations, across all State agencies, and the California Independent System Operator. Simply specifying an RPS mandate and relying on spot cap and trade allowance prices is not sufficient to reach either the long-term targets or a least cost position.

- California's renewable portfolio must be diverse. There is a place for all commercially proven types of renewable resources in procurement going forward, both in California and from out of state, whether baseload or variable, in a "least cost/best fit" procurement.

- Details matter. There are a number of seemingly minor and obscure planning criteria, procurement practices, grid operation business practices, and tariff provisions that collectively make a great difference. Literally hundreds of millions of dollars per year, and millions of tons of carbon emissions are at stake. Resolving these issues, not simply raising the RPS percentage, will determine our progress and ability to meet our goals.

- The goal should not be to eliminate "over-generation" or "curtailment," but to manage them economically.

- Renewable resource penetrations roughly double today's contribution can be achieved without compromising reliability in any way, but these results will not be automatic and require conscious, sustained, advance planning.

Finally, the LCGS includes a comprehensive analysis of the rate impacts of actions to achieve a 50% GHG reduction in the electric sector by 2030 on a "Pathway" to achieve the 2050 long term climate policy goal of 80% reduction in GHG emissions below 1990 levels. Detailed results are currently in peer review, but the rate impact is plus/minus a few percent depending principally on future natural gas prices, cap and trade allowance prices, interest rates, and success of efforts to reduce costs and improve performance of renewable resources all of which are already commercially proven and operating on California's grid. No new technology needs to be invented.

B. Analysis and Findings

The following Figure 1 shows the range of carbon emissions for four scenarios ranging from 33% renewables (Baseline Case) to 66% renewables (Accelerated Case). The two intermediate cases, as discussed in more detail below, employ 55% renewables and bookend the range of results at that penetration level.

Note that in the Baseline Case electric sector emissions do continue to decline. In addition to holding procurement at 33% renewables, the final phase-out of imported coal, the continued explosive growth of behind the meter rooftop solar, the continuation of aggressive energy efficiency programs, and modernization of the gas fleet as a result of the long overdue retirement of the Korean War era coastal steam plants all work to continue to drive down carbon emissions. However, it is simply not enough to achieve the State's policy goals.

In the context of the Pathways work, these results simply amplify the necessity of achieving an aggressive 2030 carbon target for the electric sector through further renewable energy procurement to have any realistic hope of hitting the long term climate goals.

On the other hand, doubling the renewable content of the grid to 66% not only results in over 50MMT of emission reductions vs. the Baseline Case but significantly lowers the carbon intensity of electricity production. This allows significantly faster reduction of carbon emissions due to the electrification of the other sectors, putting the State on a trajectory to achieve the critical long term target. This matches the “Early Deployment” scenario in the Pathways study.

The two 55% Cases are of most interest for setting 2030 targets. For the study, 55% was chosen rather than 50% for renewable penetration to reflect the assumption that the license for Diablo Canyon nuclear plant would not be extended due to excessive costs vs. other zero carbon energy options. In the discussion about grid operations at this level of renewable penetration, the issue that is paramount in people’s minds for assessing cost and operability is “over-generation.” This results in “curtailment” of renewable energy during low load hours when gas is no longer “on the margin” and available to be “dispatched down.”

It must be noted that these terms have taken on the aura of doom in the public discussion, but are really nothing new or frightening. “Over-generation” is simply another word for potential exports – the coal exporting States of Wyoming and Montana are in “over-generation” 8760 hours per year without any reliability or cost problems. “Curtailment” is simply another word for “dispatch” – operation of a plant that has been “committed” (synchronized to the grid and supplying energy to serve load) at less than its maximum output to balance supply and demand. Given the inherent seasonal and diurnal variation in electric loads, “curtailment” has always been present as committed units are “dispatched” in real time. The only reason we make the distinction between curtailment and dispatch is that renewables (at least most of them, including wind and solar) are perfectly “dispatchable” but this inherent capability has not been historically used, and the cost of dispatching renewables is significantly higher than the cost of dispatching fossil plants since there are no savings in fuel costs when dispatching renewables.

The following Figure 2 is a curtailment duration curve for two of the several “55% scenarios” in the Low Carbon Grid Study that demonstrate the range of outcomes at this penetration level, dependent both on portfolio diversity and grid operational policies.

The “High Solar BAU” Case (a) assumes current trends will continue to overwhelmingly procure PV rather than a “balanced portfolio,” (b) enforces the current statutory “Bucket Rule” for RPS eligibility, (c) obtains the supply of Essential Reliability Services (aka “ancillary services” or “ERS”) principally from natural gas, and (d) enforces the “25% Regional Generation Rule” as currently proposed by the CAISO. It is also worthy of note that the “BAU” designation does not mean that this case is frozen at today’s practices – only that no new initiatives are undertaken.

The “GHG Target Case” is one that (a) assumes the same quantity of renewable procurement to serve the same load, but (b) procures a “balanced portfolio” including more out-of-state wind as well as in-state baseload geothermal and biomass plus some new concentrating solar power with storage (“CSP”) rather than simply all PV, (c) enforces the Bucket Rule (10% maximum unbundled RECs) on a portfolio basis rather than a project by project basis, (d) maximizes the supply and use of ERS from non-combustion sources rather than natural gas, (e) deals with the very real reliability constraints that underlie the 25% Rule using mainly zero carbon resources rather than natural gas, and (f) assumes that roughly double the AB 2514- CPUC mandated storage requirement is procured by 2030.

As shown in Figure 2, it is important to note the dramatic difference in “curtailment” (10.6% vs. 0.2%) and cost (~$500M/yr) between the two cases with exactly the same quantity of renewable energy. This demonstrates the importance of focusing not just on a specific RPS percentage, but also on adapting the rest of the system to maximize the efficiency of fossil fuel use and ease integration of the new renewables. Implementation of policies that incorporate balanced renewable integration, reliance on zero carbon reliability services, and regional integration are key to economically meeting the statewide GHG reduction targets.

Implementation of the 66% “Accelerated Case” was not considered in detail in the study, but yields roughly similar results to the 55% cases IF there is new storage procurement of four times the CPUC mandate rather than twice the amount as in the Target Case.

III. CONCLUSION

CEERT believes the Pathways modeling summarized at the Symposium demonstrates the absolute necessity, and feasibility, of complete de-carbonization of electricity production in order to achieve California’s long-term climate goals. E3’s work, along with independent analyses such as the Low Carbon Grid Study and other important modeling work by the Union of Concerned Scientists, strongly suggests California follow the “Early Adoption” path with aggressive 2030 interim targets.

Success in achieving these interim targets reliably and cost effectively will require a concerted and coordinated effort by all State agencies and CAISO, focused on the sustained pursuit of every avenue available to adapt historic practices in planning and grid operations towards this goal, with the full engagement and creativity of the private sector, to improve performance and drive down costs. Little new technology needs to be invented. Success can be achieved by doing the best we can with what we already have. Reliability of the electric supply is paramount and cannot be compromised, but the details of how that reliability is ensured must be part and parcel of the work ahead. The process will be one of adaptive management that learns by doing while focusing on the twin metrics of cost and GHG reductions.

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/12-renewablesympsium-ws-VzYGdAdyWGoHYglh.zip

Original File Name: Attachments for CEERT comments.zip

Date and Time Comment Was Submitted: 2015-08-07 14:14:16

No Duplicates.

Comment 13 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Amy
Last Name: Mmagu
Email Address: amy.mmagu@calchamber.com
Affiliation:

Subject: Comments on the CPUC/CEC/ARB/CalISO Renewables Symposium
Comment:

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Please see attached comments
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Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/13-renewablesympsium-ws-UzBTNARpWGhXOQJj.pdf

Original File Name: CalChamber Comments 50% Renewables.pdf

Date and Time Comment Was Submitted: 2015-08-07 14:52:45

No Duplicates.

Comment 14 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Jim
Last Name: Lanard
Email Address: JLanard@MagellanWind.com
Affiliation:

Subject: Comments on the CPUC/CEC/ARB/CalISO Renewables Symposium
Comment:

```
Attached are Magellan Wind's comments on the CPUC/CEC/ARB/CalISO
Renewables Symposium.

Thank you for your consideration.
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/14-renewablesympsium-ws-VDlRNlQyBzEKYABs.pdf

Original File Name: Magellan Wind -- Comments on CPUC--CEC--ARB--CalISO 7.9.15 Renewables Symposium.pdf

Date and Time Comment Was Submitted: 2015-08-07 14:58:07

No Duplicates.

Comment 15 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Ann
Last Name: Trowbridge
Email Address: atrowbridge@daycartermurphy.com
Affiliation: California Clean DG Coalition

Subject: CCDC Comments on July 9 Joint Agency Symposium on GHG Reduction Goals
Comment:

```
The California Clean DG Coalition appreciates the opportunity to
submit the attached comments regarding the Joint Agency Symposium
on the Governor's Greenhouse Gas Reduction Goals.
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/15-renewablesympsium-ws-AGNRNAFkU2NQCQZl.pdf

Original File Name: CCDC Comments on July 9 Joint Agency Symposium on GHG Reduction Goals.pdf

Date and Time Comment Was Submitted: 2015-08-07 15:17:38

No Duplicates.

Comment 16 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Greg
Last Name: Kester
Email Address: gkester@casaweb.org
Affiliation:

Subject: Comment Letter on the 50 Percent Renewable Portfolio Standard
Comment:

```
Attached please find a letter regarding the 50 Percent Renewable
Portfolio Standard from the California Association of Sanitation
Agencies. If you have any questions regarding this letter, please
contact Greg Kester (gkester@casaweb.com or 916-844-5262).
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/16-renewablesympsium-ws-BT1Qe1JkBXsDNFBl.pdf

Original File Name: 8-7-15 CASA Comments on RPS 50.pdf

Date and Time Comment Was Submitted: 2015-08-07 15:47:12

No Duplicates.

Comment 17 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Shelly
Last Name: Sullivan
Email Address: ssullivan@onemain.com
Affiliation: AB 32 Implementation Group

Subject: ARB Renewables Symposium
Comment:

```
Good Afternoon:

Attached please find the AB 32 Implementation Group's comments on
the ARB Renewables Symposium.
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/17-renewablesympsium-ws-AWAGYgdZWTlVYQdY.pdf

Original File Name: AB 32 IG Symposium Comments_Renewables_8_6_15.pdf

Date and Time Comment Was Submitted: 2015-08-07 16:19:40

No Duplicates.

Comment 18 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Claire
Last Name: Halbrook
Email Address: cehu@pge.com
Affiliation:

Subject: Joint Utilities' Comments on July 9 Symposium
Comment:

```
Joint Utilities' Comments on July 9 Symposium
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/18-renewablesympsium-ws-AmgCcQNlUl4KZgF0.pdf

Original File Name: JUG July 9 Joint Agency Symposium Comments_Final 8_7.pdf

Date and Time Comment Was Submitted: 2015-08-07 16:32:32

No Duplicates.

Comment 19 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Sahm
Last Name: White
Email Address: sahm@clean-coalition.org
Affiliation: Clean Coalition

Subject: Transmission charge impact on local renewables
Comment:

Please see attached
CLEAN COALITION COMMENTS ON THE IMPACT OF TRANSMISSION ACCESS CHARGES ON IMPEDING DEVELOPMENT AND CONTRIBUTION OF DISTRIBUTED RENEWABLE GENERATION IN ACHIEVING GREENHOUSE GAS REDUCTION GOALS

SUMMARY
Cost effective reduction of GHG emissions requires accurate assessment of the cost of alternatives and selection of the lowest total net cost option. Under current CAISO tariff language, transmission access charges (TACs) are assessed against the gross customer load of the state's major investor owned utilities instead of the portion of load served by transmission resources (i.e. as measured at the transmission interface). This has the impact of assessing the delivery cost of local distributed renewable resources that serve loads without the use of the transmission system comparably to generation delivery cost of utilizing the transmission system. As a result, local renewable generation is not credited with the full avoided cost value it can offer, and development of lower net total cost local renewables is depressed. Correction of this cost allocation would support accurate least cost and best fit procurement of resources required to reduce GHG emissions.

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/19-renewablesympsium-ws-VDcFbwBkU2EFbVIN.docx

Original File Name: Clean Coalition comments on TAC impact on GHG reduction.docx

Date and Time Comment Was Submitted: 2015-08-07 16:56:07

No Duplicates.

Comment 20 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Antonio
Last Name: Ortega
Email Address: aortega@iid.com
Affiliation: IID

Subject: Joint Agency Renewables Symposium
Comment:

```
Please see attached written comments from Imperial Irrigation
District.
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/20-renewablesympsium-ws-UDldMlE0VVkEYQJt.pdf

Original File Name: IID Comment Letter on Renewables Symposium.pdf

Date and Time Comment Was Submitted: 2015-08-07 16:56:36

No Duplicates.

Comment 21 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: William
Last Name: Westerfield
Email Address: William.Westerfield@smud.org
Affiliation: SMUD

Subject: SMUD Comments on July 9 Joint Agency Symposium
Comment:

```
Attached are comments from Sacramento Municipal Utility District.
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/21-renewablesympsium-ws-Uz9dPlI0Ul4AN1Vg.pdf

Original File Name: LEG 15-0646 - SMUD Comments - July 9 Joint Agency Symposium.pdf

Date and Time Comment Was Submitted: 2015-08-07 22:32:14

No Duplicates.

Comment 22 for CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) - 1st Workshop.

First Name: Matthew
Last Name: Barmack
Email Address: barmackm@calpine.com
Affiliation: Calpine Corp.

Subject: Calpine comments on the Joint Agency Symposium on the Governor’s GHG Reduction Goals
Comment:

```
Attached, please find Calpine's comments on the July 9th Joint
Agency Symposium on the Governor’s Greenhouse Gas Reduction Goals.
```

Attachment: https://ww2.arb.ca.gov/sites/default/files/BARCU/barcu-attach/22-renewablesympsium-ws-USJUKwZqU3ACawZ1.docx

Original File Name: symposium_letter_20150807.docx

Date and Time Comment Was Submitted: 2015-08-19 08:23:54

No Duplicates.

There are no comments posted to CPUC/CEC/ARB/CalISO Renewables Symposium (renewablesympsium-ws) that were presented during the Workshop at this time.