



SIERRA CLUB  
CALIFORNIA

**November 19, 2009**

The Honorable Mary Nichols, Chairman  
Mr. James Goldstene, Executive Officer  
Mr. Gary Collord  
California Air Resources Board

submitted via email to: [gcollard@arb.ca.gov](mailto:gcollard@arb.ca.gov)

**Subject: Comments on the RES Concept Outline**

Dear Ms. Nichols, Mr. Goldstene, and Mr. Collord:

Sierra Club California appreciates the opportunity to offer the following comments on the “Proposed Concept Outline for the California Renewable Electricity Standard.”

**1. Applicability of the Renewable Electricity Standard**

We believe that the RES should apply to the same size regulated entities as currently exists for the RPS standard. Any deviation from this could create an unfair playing field and unnecessary administrative complexity.

Sierra Club California believes that state renewable policy should apply to all retail sellers and public utilities, particularly with respect to achieving the specified targets. This is one area where applying the RES regulation would not conform to existing RPS policy or law.

Overall we support ARB’s involvement in the RPS/RES process exactly because of the importance of AB 32. However, Sierra Club California also suggests that ARB carefully consider what features of the RES may be better suited for legislation than regulation. For example, establishing the 33% requirement in law, as well as setting rules for deliverability, eligible resources, renewable energy credits, compliance and enforcement, and facility siting, might be placed on a firmer legal basis if they are enacted as legislation.



## 2. RES Eligible Resources

2a. **Eligible Resources** - We recommend no changes to current RPS definitions of eligible resources. We also endorse the comments submitted by the Environment California Research & Policy Center in this proceeding with regards to eligibility of renewable resources.

2b. **Excluded Technologies** – We strongly oppose adding large hydroelectric power, nuclear power and non-organic municipal solid waste to California’s renewable energy eligible technologies. We also strongly oppose loosening or disregarding existing limitations placed on small or so-called “run of river” hydroelectric facilities.

2c. Geographic **Eligibility** – WECC includes the provinces of Alberta and British Columbia, the northern portion of Baja California, Mexico, and all or portions of the 14 Western states between. Sierra Club California recognizes that the state needs to allow imports of renewable electricity, but strongly urges ARB to craft rules about geographic eligibility that support the benefits provided by in-state renewables. These need in no sense to be “protectionist” in a manner that excludes out-of-state renewables. At the same time, we need to recognize that increasing reliance on out-of-state renewables carries significant burdens for higher cost, a limited resource pool, a strain on the renewable resources of other states, and reduced benefits for California. Crafting rules that require achieving the benefits that CARB has specified as its task—reduced air pollution and carbon emissions—would help to promote in-state renewables, without the need for “protectionist” rules that artificially limit imports with quotas or other fixed exclusions. Out-of-state power cannot supply the same quantitative or qualitative benefits as in-state power, and the rules should be based on the necessary benefits.

We strongly urge that imported power from out of state renewable generators be required to meet California RPS definitions of renewable resources. In addition, generation siting, construction, operation, etc. for power imported from out of the U.S. should also meet all California environmental standards. This is current RPS law, and it helps to insure that renewables provide their promised benefits, while at the same time protecting people and natural environments that would otherwise have to bear the burden of our energy usage.

We believe that the following important general directives given to CARB under AB32 should guide its decisions in the RES:

*Design the regulations...in a manner that is equitable, seeks to minimize costs and maximize the total benefit to California and encourages early action to reduce GHG emissions.*

*Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment and public health.*

Sierra Club California does not oppose having eligible out of state renewable generation meeting a portion of its needs. However, we disagree with the belief of the Governor and

some in the utility industry that this is necessary for obtaining sufficient supply, to control costs, or to promote a competitive market. The in-state technical and economic potential for wind and solar are very large; they are much more than sufficient to meet the 33% RES. This is one of the overwhelming findings of RETI:

“An initial assessment identified resource areas sufficient to provide renewable energy far in excess of California’s 2020 needs. At the direction of the Stakeholder Steering Committee, initial screening was performed to winnow the prospects to a more manageable number based on expected economic viability. As a result, 29 California CREZs capable of delivering total annual energy of approximately 200,000 gigawatthours per year (GWh/yr) were identified. In addition, about 70,000 GWh/yr of smaller scale non-CREZ resources were modeled in California.” (*RETI Phase 1B Report, p. ES 3.*)

There are a few key points here:

- RETI found 29 renewable resource zones in California
- RETI found a total resource base of 270,000 gwh/year—after economic screening
- The initial assessment was much larger

The 270,000 gigawatt-hour/year resource compares to the 2020 forecast by RETI of approximately 335,000 gigawatt-hours for California’s entire electricity consumption. This means that the state’s renewable energy resources, even after economic screening, equal 80% of the entire electricity demand of the state. In other words, there is an enormous glut of potential supply, far in excess of any potential need under a 33% RES.

RETI also did an inventory of out of state resources, including Northern Baja, neighboring states, and British Columbia. They also screened these resources, only considering those that are “most economically competitive for import.” (*ibid, p ES4*) RETI found an additional 110,000 gwh/year of resources meeting these criteria. Note that the volume of out-of-state competitive renewables is far less than the amount of renewable resources that were found in-state.

The idea that going out of state is either necessary or will somehow lower the cost of renewables is questionable on several grounds. First, other states in the West have also established renewable mandates:

state	consumption	RPS/RES	Renewable Need
	gwh	%	gwh
Oregon	48,696	25% by 2025	12,174
Washington	85,741	15% by 2020	12,861
Nevada	35,643	25% by 2025	8,910
Arizona	77,193	15% by 2025	11,578
British Columbia	~65,000	2008 RFP	5,000
Total Nearby States	312,273		50,523

Electric consumption data: [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html)  
Program RPS standards: <http://www.dsireusa.org/summarymaps/index.cfm?ee=1&RE=1>  
BC data: <http://www.empr.gov.bc.ca/EPD/Electricity/demand/Pages/default.aspx> ,

It is readily apparent that current legal commitments in neighboring states and British Columbia already represent a claim of 45% on the economically viable renewables identified by RETI in those states and provinces.

However, the reality for importing renewables into California is much more constrained than this data suggests. RETI did a further analysis that compared the cost of identified out-of-state renewables with the CREZ renewable costs within California:

“...110,000 GWh/yr of resources were identified in Arizona, Nevada, Oregon, Washington, British Columbia and Baja California Norte. Of these, about 15,000 GW(h)/yr were considered competitive with California CREZs in the base case economic assessment...” (RETI Phase 1B Report, p. ES12, with typo corrected in parentheses)

In other words, in the “base case” only 15,000 GWh per year is considered competitive with California’s potential renewable resources of 270,000 gigawatt-hours per year.

Assuming that RETI’s values are even remotely valid, arguing that California does not have “enough” native renewable resources to supply the market, or that it needs imports to create robust “competition”, borders on ludicrous.

If California were to go after the most competitive renewable resources in neighboring states and British Columbia, it would also be running head to head competition with other state renewable mandates for the relatively scarce “most affordable” renewable resources. California has by far the largest electricity demand, and by far the largest and most aggressive renewable mandate. There is every likelihood that California entering into smaller neighboring markets would tend to drive up the cost of renewable energy in those states, while the supply of low-cost out of state renewables would be inadequate to moderate the market price of renewables within California.

The competition for out-of-state renewables is also significantly understated by the table above. That is because the data for electricity consumption is for 2007 (and even earlier for British Columbia). All of these markets are expected to experience dramatic growth in the future, For example, British Columbia is forecast by BC Hydro to have 20% to 35% growth over the next 20 years, and is requiring that all new generation be carbon-free. (BC Hydro; <http://energyplan.gov.bc.ca/bcep/default.html#3> )As electricity demand grows, the demand for renewables under existing laws and policies would also grow proportionally. At the same time, the general evolution of renewable policies and the pressures of climate protection are likely to create even higher mandates than those that currently exist, especially in places that currently have lower requirements.

A further drawback of excessive reliance on out-of-state resource is the need for longer transmission of electricity. This can add significant expense. For example, the cost to

bring in 3000 megawatts of renewable power from British Columbia and the Pacific Northwest may cost \$4.8 billion for the “preferred alternative”. (RETI Phase 1B Report, p. 3-20.) On top of the huge capital cost, ongoing variable O&M cost is estimated at over 0.575 cent/KWh, which is 53% higher than operating costs of in-state transmission lines.

In addition, there can be significant energy losses for imported electric power. RETI estimates 0.2 Megawatts of power lost per mile (on a line 70% loaded with power) for out-of-state transmission, plus a generic 5% loss for transmission inside California. (RETI Phase 1B, p. 3-27) Distances from BC resources to the California border range from 600 to 800 miles, implying a loss of up to 160 Megawatts out-of-state and another 150 Megawatt loss in-state—a total of 300 Megawatts; for scale, the baseload of San Francisco is about 600 Megawatts.

The problems with construction of new transmission are compounded by the fact that it is nearly impossible to mandate that a new line carry only renewables or even carbon-free electricity.

In short, a California policy of—essentially—raiding other states and countries for their best and most affordable renewable resources is short-sighted, and may have a number significant negative effects.

On the other hand, the potential benefits of in-state renewable energy development are large. In general, in-state renewable generation is the first priority recommended by Sierra Club California, particularly distributed generation (DG). DG offers the benefit of reducing the necessary amount of transmission, which in some cases may become a significant portion of the cost of developing the remote generation resource. DG and large scale in-state renewables offer many economic and other advantages over more distant generation including, lower transmission losses, lower transmission costs, ability to bring on-line sooner due to less required new transmission facilities, lower deleterious environmental impact, support for in-state green jobs (whether they are union or non-union) helping the states’ economy and less vulnerability to transmission failure due to natural or man-made events such as terrorism. All of these are important objectives that CARB is tasked to strive to achieve through the general directives under AB32 as cited above.

CARB should create a set of rules of evaluation for location of renewable resources that require specific benefits of the RES be insured:

- Reduce the value for imported electricity according to the out-of-state line losses and extra costs
- Require that out-of-state renewables meet or exceed the same standards as a similar power source located in the state, as required by current law.
- Recognize the value of “delivered” Distributed Generation based on its avoidance of line-losses both in-state and out-of-state, according to the RETI or a similar formula

- Recognize that reducing the distance between generation source and load center increases the carbon and air quality benefit due to reduced energy losses where fossil fuels are used for resource adequacy.

2d. **Purchase and Use of Renewable Energy Credits (RECs)** – RECS should only be allowed for electricity delivered to California. To do otherwise would preclude California from receiving any direct benefits associated with displaced traditional generation. That is because the state and regional grid will still require the electric power supply, which the REC does not provide. RECs are the cheapest form of compliance, but this is clearly a case of “you get what you pay for”.

Unbundled RECs, stripped of actual delivery of electric power, are like empty calories, providing no nutritional value for the people of California. The lost values include:

- Continued operation of polluting power plants that affect air basins and afflict disadvantaged populations
- Open exposure to volatile fuel prices
- Ratepayers paying for, but failing to receive the benefits of, green jobs, economic growth, and dollars staying in the local and state economy
- Reduced experience and expertise in designing and operating a grid that relies increasingly on renewable energy

RECs are a type of derivative market which splits the “value” of renewable energy into artificial components, the “cost” of electricity commodity and the “excess cost” above the market price that is then converted into a “green value”. In other words, the “cost”, which ordinarily is a *negative value* to the buyer, in a confusion of economic relation is converted into “green” *positive value* for the buyer. The buyer of the REC assumes the burden of the higher marginal cost of the renewable, so that the renewable can compete with conventional power. It is a fact that green energy is worth more; however, the increased worth is not simply a function of the increased cost. In fact, the green value may in some cases exceed the price paid for the REC, if all externalities are properly accounted for. A further puzzle is the extent to which an unbundled REC is attached to the specific carbon benefit, or whether that is a further value.

In short, RECs—especially if imported from out of state— should be clearly identified as not meeting a number of critical state goals. Every purchased out-of-state REC means that an in-state fossil fuel plant will continue to operate, or that a new one might be built. This is incompatible with improving air quality or providing the other social, environmental and economic benefits cited above.

If CARB does decide to allow RECs for undelivered electricity, CARB could create a matrix grid that sets a maximum amount of out of state RECs allowed for any given regulated entity that would vary based upon

- The difference between what a regulated entity's current RPS is and what their target is,
- A scale that reduces over time.

Sierra Club California recognizes that there may be some benefits to RECs under certain circumstances. RECs provide some flexibility for compliance with RPS/RES, and they can alleviate the need to add new transmission. However, they can achieve these same goals without necessarily being purchased out of state. New constructive rules & regulations could set performance benchmarks for preferred RECs, and open a market for local and in-state RECs. These would give priority to RECs that provide specific benefits to the California and/or local grid.

For example, RECs purchased within California will provide multiple benefits to the state power grid, but might involve electricity in separate transmission zones that are not deliverable across zones due to transmission constraints. These constraints are likely only to occur at certain times, but otherwise the renewable power from these sources might flow freely to their intended destination.

A second market that could be opened is specifically REC purchases from local, distributed generation. This could be a significant help to the development of solar and other DG renewables, where REC income can supplement rebates and tax credits to make solar and other DG renewables pencil out.

### 3. RES Compliance

3a. **Compliance Period Targets** – We support retaining the existing metric of MWh currently in use under the RPS program.

3b. **Compliance Schedule** – We recommend following the same schedule that was a part of SB14 which already has been well vetted and supported by the legislature. That schedule is: (A) Until December 31, 2012, the same percentage as actually achieved by the retail seller during 2009; (B) 20% by December 31, 2013; (C) 25% by December 31, 2016; and (D) 33% by December 31, 2020.

### 5. Compliance and Enforcement

5e. **Penalties for Non-Compliance** – Penalties for non-compliance must be significant to the non-compliant utility. Otherwise they could be looked at as a “cost of doing business” and less costly than complying with the regulations. And compliance must be enforced by ARB in an objective and expeditious way according to the developed rules. Lack of effective enforcement of the RPS program has contributed in part to the failure of most utilities in making any significant increase in % RPS over the last several years and setting up the State to fail to meet the 2010 RPS objective of 20%. Effective enforcement will be an essential backstop to insure success under the RES program.

In addition, any “flexible compliance” concessions to utilities and/or retail sellers should be matched by increased firmness in the enforcement, as there is much less excuse for not complying.

We see the enforcement mechanism as a way to encourage meeting the various goals of the program. We agree with CEC that measuring compliance should be according to MWh, for its simplicity and conformity with current law and standards. On the other hand, compliance with GHG standards, local and state benefits, and other social, environmental and economic goals of the program could be factors for setting penalties. However, while these factors might be taken into account, non-compliant market participants should still be required to pay penalties, only these might be less for those meeting the various program goals, and more for those who are not. We think that this approach is to be preferred to simply looking at “number of violations” as proposed in the proposed concept regulations.

In addition to the sections already developed above, we would like to add a few additional points.

- **Deliverability & Storage:** SB 14 contained an important reform of deliverability that was based, in part, on concerns expressed by CAISO and some utilities in a letter to the legislature. Intermittent renewables do not always produce electricity according to time of need or demand. Storage is one important method for accomplishing a transfer of renewable energy to the time when it is needed and avoided the waste of excess renewable power. Storage also can balance over and underproduction of electricity and moment to moment variations in output.

Currently, California has over 4000 megawatts of pumped hydro storage. Sierra Club California requested the authors of SB 14 to add delivery to pumped storage as a legitimate form of delivery of renewable power, which was in fact added in a later amendment to the bill that was ultimately vetoed. We believe that delivery to storage should be included in any definition of delivery, especially since this adds considerable value to the renewable generation.

- **Capacity Value Report.** Renewable energy is currently valued in utility resource plans based upon the reliable power generated at peak. To date this has been only generally estimated, and lacks firm scientific research to determine reliable capacity values for various renewable energy sources. If renewables are undervalued for capacity, then the utilities, and thus the ratepayers, will have to pay for natural gas or other backup that is not needed. On the other hand, if renewables are overvalued for capacity, this may risk instability in the grid in certain circumstances. Thus is it important to get answers to this general question.

However, under current methods, capacity value for renewables is measured in isolation from the energy system as a whole. It is well known, for example, that solar energy that produces power during the day can be compatible with wind

power that increases in the late afternoon and evening just as solar power is phasing down. The result is that the two sources of renewable power can work together synergistically. Similarly, storage can increase the value of renewables if it is operated in conjunction with the intermittent renewable.

*Sierra Club California recommends to ARB that an Effective Load Carrying Capacity (ELCC) scientific study should be performed to accurately measure the capacity value of renewable energy, as well as the potential for operational synergy between optimized grid elements. Capacity values and operational guidelines should be developed from these findings in order to optimize the value of renewables in the California grid, and as guidance for all the regulatory bodies overseeing electricity supply in the state.*

- **Net Short & Cost of RES Program:** One of the responsibilities of ARB appears to be to perform a cost assessment of the RES program. Several attempts have been made in the past year or so to estimate the amount of physical renewable energy that would be needed to meet the 33% RPS/RES. This amount is determined by taking the expected growth of energy demand over the next decade, subtracting rooftop solar and other customer generation that is not under an RPS/RES mandate, and then determining the total amount of renewables that equal 33% of the demand. Of that amount, California already has about 11% of its current electricity coming from renewable energy. The number of gigawatts-hours of current renewables is considered to be generally available into the future, and is subtracted from the expected 33% total RPS value for 2020. This leaves a value for how much new renewables must be procured by 2020, a figure referred to as the “Net Short”.

RETI performed a Net Short calculation for the Phase 1B Report, arriving at about 67,000 gigawatt-hours of new renewables to meet the 33% RPS in 2020. This was subsequently revised downward by RETI in a side report issued in February 2009, on just the issue of need. The revision dropped the net short to 59,000 gigawatt-hours. In June, the California Public Utilities Commission released a report—33% Renewables Portfolio Standard Implementation Analysis Preliminary Result, June 2009—that was focused on the need for natural gas generation under the regime of AB 32 and ARB’s Scoping Plan. This included elements not contained in other reports, especially the new efficiency requirements and the target for combined heat and power. The report produced a careful line-item calculation for the net-short, and came up with 45,000 gigawatt-hours.

During this same period, CPUC staff produced a cost report for the 33% and 20% RPS. This report estimated a price tag of over \$110 billion for the RPS program, a figure that was widely quoted, and concern about cost became a key reason for criticism and ultimately veto of SB 14. Unnoted, however, was that CPUC used a net short of 75,000 gigawatt-hours (75 terawatt-hours), a figure that had no consistency with any of the other work of CEC or RETI.

**Table 3. New Renewable Resources Required to Meet a 33% RPS by 2020 in TWh**

	20% RPS	33% RPS
2020 retail sales forecast <sup>16</sup>	308	308
Required RPS resources	62	102
RPS resources claimed by utilities in 2007 <sup>17</sup>	27	27
<i>Resources needed to reach RPS</i>	35	75

Source: 33% Renewables Portfolio Standard Implementation Analysis Preliminary Result, June 2009, p 19. Forecast of demand in footnote 16 is from CEC 2007 forecast, and 17 is CEC 2007 Net System Power Report.

By contrast, the AB 32 evaluation by the CEC gave a much longer calculation, shown in the chart below. The initial assumptions are made much more explicit, by differentiating generation from sales, with the difference caused by line losses and non-utility electric power sales. Both reports show utility sales at 308 terawatt-hours (=308,000 gigawatt-hours). However, the CEC report has three (3) additional subtractions after utility sales that are not present in the CPUC report, all of which are tied to AB 32 implementation—i) the revised efficiency targets, ii) combined heat and power (on-site generation, not subject to RPS), and iii) additional DG solar. The baseline utility retail sales are thus reduced to only 236 terawatt-hours, and 33% of this is 77 terawatt-hours, much less than the 102 gigawatt-hours cited by CPUC. A further upward adjustment is made in the careful analysis of the CEC staff report in the amount of renewables. This is because CPUC staff used the Net System Power Report, which gives in-state generation only, while the CEC report added in out-of-state renewables. The net-short required to meet the 33% RPS is thus only 45 terawatt-hours; far less than the 75 terawatt-hours given by the CPUC report. The main difference is that the Energy Commission takes the AB 32 Scoping Plan into account in a serious way, while the CPUC report does not include it at all. As such, the CPUC report is not in conformity with AB 32.

**Table 5: Impact of AB 32 Complementary Policies on Derivation of Incremental Renewables Needed in 2020 (GWh)**

		2020 GWh
1	Statewide Net Energy for Load (Used in Production Cost Modeling)	341,755
2	Statewide Losses	21,387
3	LSE Statewide Retail Sales (line 1 – line 2)	320,368
4	Non-RPS Deliveries (CDWR, WAPA and MWD)	12,299
5	Adjusted Retail Sales for RPS Calculation (line 3 – line 4)	308,069
6	AB 32 EE Beyond Amount in Energy Commission Forecast	34,707
7	AB 32 CHP Beyond Amount in Energy Commission Forecast	32,304
8	AB 32 Rooftop PV Beyond Amount in Energy Commission Forecast	4,845
9	Adjusted Retail Sales for 33% AB 32 RPS Calculation (line 5 – 6,7,8)	236,213
10	Renewable Energy Needed for 33% (33% of Line 9)	77,950
11	Existing Renewable Energy as of 12/31/2008	32,469
12	33% Renewable Net Short (Cases 2 and 3 (line 10- Line11))	45,481

Source: Energy Commission staff, compiled from California Energy Demand 2008–2018 Staff Revised Forecast CEC-200-2007-0155F. Forecast extended to 2020 by Energy Commission staff. The actual rooftop PV, EE and CHP impacts in AB 32 Scoping Plan for 2020 are 4,500, 32,000 and 30,000 GWh, respectively. To these estimates the ARB Scoping Plan adds an amount to account for transmission line losses. Existing renewables based on 2008 production cost model simulation results (29,780 GWh) and eligible renewable generation for regions outside California (2,689 GWh).

Source: Impact of Assembly Bill 32 Scoping Plan Electricity Resource Goals on New Natural Gas-Fired Generation, California Energy Commission, Staff Report, June 2009.

These adjustments alone would reduce the cost of the 33% RPS/RES program by 40%; however, this is not the end of the story. It turns out the RETI, the CPUC report, and even the 2009 CEC report, *all used the 2007 CEC growth/load forecast*, which has now been superseded by the 2009 forecast. This new forecast made a *large downward revision* in the projected growth to 2018, and by implication to 2020 as well. The result is that even the 45 terawatt-hour net short figure is probably too large.

We recommend ARB to follow through with RETI, CEC, CPUC and CAISO to develop a new net short that incorporates all of the following:

- The 2009 CEC revised growth forecast
- ALL of the ARB Scoping Plan elements
- Corrected existing renewables value that includes in-state and out-of-state resources

This is important in order to correct the planning process regarding needed resources and transmission lines, as well as to correct the inflated cost figure that has done considerable damage to the reputation of the RPS/RES program. A finding that the 33% RPS/RES program might cost half of what was projected, or possibly even less, is important information for policymakers and the general public.

Thank you for your consideration of our comments.

Sincerely,

A handwritten signature in black ink that reads "Jim Metropulos". The signature is written in a cursive style with a large initial "J" and a long, sweeping underline.

Jim Metropulos  
Senior Advocate  
Sierra Club California

cc: **Robert Fletcher**, Chief, Stationary Source Division  
Chair, Renewable Electricity Standard Committee  
California Air Resources Board  
[rfletche@arb.ca.gov](mailto:rfletche@arb.ca.gov)