

Proposed Concept Outline — For Discussion Purposes

California Environmental Protection Agency



Air Resources Board

Proposed Concept Outline for the California Renewable Electricity Standard

October 2009

Cooperatively developed by:

Air Resources Board
California Public Utilities Commission
California Energy Commission

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Purpose of this Document

Governor Schwarzenegger's Executive Order (EO) S-21-09 directed the Air Resources Board (ARB/Board) to adopt a regulation consistent with a 33% renewable electricity energy target established in EO S-14-08. The Board is to adopt the regulation by July 31, 2010. The rulemaking would be done in partnership with the Public Utilities Commission (PUC), the California Energy Commission (CEC), the California Independent System Operator (CAISO), and in cooperation with other regulatory agencies such as Department of Fish and Game and the State Water Resources Control Board.

This document provides a preliminary draft of the concepts developed for the California Renewable Electricity Standard (RES) regulation which would be used to implement EO S-21-09. This effort builds upon and complements the existing 20% Renewable Portfolio Program (RPS) program. The outline provides initial implementation concepts but does not address all of the areas that would be evaluated to support the regulation's development.

It is ARB's intent to develop an approach that utilizes, to the greatest extent practicable, the structures, policies and implementation mechanisms established by the CEC and PUC for the existing RPS program. The ARB's RES rule would reduce greenhouse gas emissions consistent with achieving 33% of total electricity retail sales from eligible renewable energy resources by December 31, 2020, as contained in the AB 32 Scoping Plan adopted in December 2008¹. Renewable generation obligations on regulated parties established by the current RPS program would continue in force. In general, renewable generation used to meet these obligations would count towards compliance with the ARB's RES.

This document provides stakeholders an opportunity to review and provide input on staff's initial recommendations, and to assist in their refinement and development. Stakeholders are encouraged to provide comments on all sections of the document, and particularly those marked as "*Feedback Requested*" where staff is seeking specific comments or feedback. **All numeric values used in this document are provided as examples only. Specific values that could be proposed for inclusion in the RES are still under development.**

How to Provide Comments

Please provide written comments, which include your name, date and company letterhead (or equivalent). Please submit your comments as an email attachment with the subject line "Comments for RES Concept Outline" to Gary Collord at: gcollord@arb.ca.gov. All comments will be posted on the RES comment webpage.

¹ See pages C-126 to 130 in Volume 1: Supporting Documents and Measure Detail, of the Climate Change Scoping Plan.

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California Renewable Electricity Standard**

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Part I - Regulation Schedule, Legal Authority and Requirements, and Procedures

Schedule:

In order for the Board to consider the regulation by the July 31, 2010 date established in Executive Order (EO) S-21-09, ARB staff has identified the following regulation development schedule:

- **October 2009** – Release preliminary draft regulatory concepts.
- **November 2009** – Release draft approach for technical analysis, and economic and environmental impact analyses.
- **December 2009** – Release draft regulatory language and preliminary technical analysis.
- **January 2010** – Release draft economic and environmental impacts analysis and CAISO modeling of operational reliability and scenario analysis.
- **February 2010** – Release revised draft regulatory language and staff report.
- **March 2010** – Initiate peer review of draft proposal.
- **June 7, 2010** – Release proposed regulation and staff report, initiating 45-day public comment period².
- **July 22-23, 2010** – ARB Board Hearing to consider proposed regulation.

Note that ARB will be meeting with stakeholders throughout the process and conducting public workshops in Sacramento every six to eight weeks.

² ARB is required to provide at least a 45-day public comment period to allow the regulated public the opportunity to review and comment on the proposed regulation. This is the notice to the public of the proposed action. The notice is mailed to those who have written to the agency requesting to be put on its mailing list to be informed of regulatory actions, to representatives of businesses affected by the regulation, and to other interested persons or groups.

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Legal Authority and Requirements:

The RES regulation would be adopted primarily using the authority provided in the California Global Warming Solutions Act of 2006 (Assembly Bill 32 or AB 32). Assembly Bill 32 provides the ARB with broad authority to adopt greenhouse gas emission reduction measures that achieve technologically feasible and cost-effective reductions.

When adopting GHG emission reduction regulations, Health and Safety Code (H&SC) section 38562(b), enacted by AB 32, requires the ARB, to the extent feasible, to:

- Design the regulations... in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California, and encourages early action to reduce GHG emissions;
- Ensure that activities undertaken to comply with the regulations do not disproportionately impact low-income communities;
- Ensure that entities that have voluntarily reduced their GHG emissions prior to implementation receive appropriate credit for voluntary reductions;
- Ensure that activities undertaken pursuant to the regulations complement, and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant 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;
- Minimize leakage and the administrative burden of implementing and complying with these regulations; and
- Consider the significance of the contribution of each source or category of sources to statewide GHG emissions.

In addition, H&SC sections 38562(d) (e) and (f) require the ARB to:

- Ensure reductions are real, permanent, quantifiable, verifiable, and enforceable by the Board;
- Ensure reductions are in addition to reductions otherwise required by law or regulation;
- Rely upon the best available economic and scientific information; and
- Consult with the PUC in the development of regulations as they affect electricity and natural gas providers in order to minimize duplicative or inconsistent regulatory requirements.

Finally, if the regulations include market-based compliance mechanisms, H&SC section 38570(b) requires the Board, to the extent feasible, to:

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- Consider the potential for direct, indirect, and cumulative emission impacts from these mechanisms, including localized impacts in communities that are already adversely impacted by air pollution;
- Design such mechanisms to prevent any increase in the emissions of toxic air contaminants or criteria air pollutants; and
- Maximize additional environmental and economic benefits for California, as appropriate.

Procedures:

ARB conducts a thorough public process as it develops air quality regulations. Government Code section 11346.46 requires an agency proposing to adopt complex proposals or a large number of proposals to involve the public. ARB staff involves the public in workshops and other preliminary activities well before the start of the formal rulemaking process. ARB staff's public outreach efforts typically include compiling a comprehensive mailing list of stakeholders and interested parties, establishing a webpage and list for electronic mailings, submitting articles to industry publications, holding public consultation meetings, and speaking at industry and community events. Interested parties are encouraged to get involved in the rule development process as early as possible. ARB staff is available to meet with groups, as well as individuals, throughout the rulemaking process.

In addition, California state government agencies follow the rulemaking procedures in the Administrative Procedure Act, or APA (Government Code section 11340 et seq.). Rulemaking also must comply with regulations adopted by the Office of Administrative Law (OAL) unless expressly exempted by statute. ARB would develop four primary documents during the preliminary rulemaking activity stage. Each of these is part of the formal rulemaking process. They include: the terms of the proposed regulation, the Initial Statement of Reasons (ISOR), the Economic and Fiscal Impact Statement (Form 399), and the notice of proposed rulemaking.

The APA requires a rulemaking agency to make specified determinations and findings with regard to a proposed rule. As part of this rulemaking, ARB must:

- find that no alternative would be more effective in carrying out the purpose for which a regulation is proposed or would be as effective as and less burdensome to affected private persons than the adopted regulation.
- determine whether the regulation may have, or will not have, a significant, statewide adverse impact directly affecting business.
- describe the potential cost impact of a regulation on a representative private person or business, if known.
- assess whether and to what extent the regulation will create or eliminate jobs and businesses. An agency must find that any business reporting requirement is necessary for the public health, safety, or welfare.

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- consider the substitution of performance standards for prescriptive standards.
- state whether a regulation affects small business.
- state whether a regulation differs from a federal statute or regulation and avoid unnecessary duplication or conflict.

In order to make these determinations and findings, the ISOR would include a technical analysis of the various compliance scenarios, an environmental impact analysis, and an economic impact analysis. In summary, the ISOR describes why the regulation is necessary and provides the basis for the agency decision to take the particular course of action.

Part II -- Section by Section Discussion of the Renewable Electricity Standard

1. Applicability of the Renewable Electricity Standard

- 1.a The Renewable Electricity Standard (RES) shall apply to California electrical corporations, electric service providers, community choice aggregators, electrical cooperatives, and local publicly owned electric utilities; hereafter referred to as “regulated parties”.

Feedback Requested

To reduce the administrative burden upon the smallest regulated parties, who may contribute little towards achieving program objectives, staff is exploring a threshold for application of the RES. Staff seeks comments on this concept and the appropriate exemption threshold for regulated parties. For example, a 500 GWh threshold would potentially exclude a few smaller electrical corporations and electricity service providers. This threshold would also exclude 22 local publicly-owned utilities (POUs), but still subject 96% of POU retail sales to the regulation. Staff also seeks comments on the appropriateness of including the California Department of Water Resources and the federal Western Area Power Authority as regulated parties in the RES.

- 1.b The RES would be effective by January 1, 2012. Compliance with the RES timeframe and other implementation requirements would apply independently of California’s 20 Percent Renewable Portfolio Standard (RPS) program.

Note: Staff’s objective is to develop a RES regulation which builds upon and complements the existing RPS program.

2. RES Eligible Resources

2.a Eligible Resources

Eligible renewable resources or fuels currently eligible under the Renewable Portfolio Standard (RPS) program would continue to be eligible under the RES³. These generally include power generating facilities using a combination of one or more of the following: biodiesel, biomass, conduit hydroelectric, small hydroelectric, incremental hydroelectric generation from efficiency improvements, digester gas, geothermal, landfill gas, municipal solid waste, ocean wave, ocean thermal, tidal current, photovoltaic, solar thermal, wind and fuel cells using renewable fuel.

³ Refer to the CEC’s RPS Eligibility Guidebook and Public Resources Code Section 25741 as limited by Public Utilities Code Section 399.12(c) for a description of RPS eligible technologies and eligibility conditions.

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Feedback Requested

Staff may evaluate other technologies and the limitations currently placed on certain RPS eligible technologies. Staff seeks comments on the appropriateness of including other technologies and modifying existing RPS program limitations.

2.b Excluded Technologies

The regulation will not extend eligibility to large hydroelectric or non-renewable generating facilities, such as nuclear facilities.

2.c Geographic Eligibility

Facilities located in- or out-of-state, and connected to the Western Electricity Coordinating Council (WECC) transmission system, would be eligible for the RES.

Feedback Requested

Staff seeks comments on the potential impact of modifying the deliverability requirements for out-of-state generating resources. In particular, further evaluation of the eligibility, delivery, and environmental conditions currently applied to imported power is needed for the RES.

2.d Purchase and Use of Renewable Energy Credits (RECs)

Power purchase agreements for energy and RECs, REC-only transactions, and generation owned by regulated parties would be eligible to satisfy the RES. RECs traded separately from energy generation would be eligible for the RES, provided the RECs were tracked by the Western Renewable Energy Generation Information System (WREGIS) and the regulated party could demonstrate that the REC attribute, and its GHG emission reduction attributes, were not used towards other renewable generation or GHG reduction program requirements.

Note: According to a recent joint study adopted by the PUC and CEC, WREGIS is capable of verifying the amount of electricity generated from renewable energy resources and can ensure that renewable energy credits are not double counted by other electricity sellers within the WECC.

3. RES Compliance

Similar to the existing RPS program, RES compliance would generally be assessed on the basis of a regulated party's proportion of electricity sales obtained, or load served, from eligible renewable resources. A renewable energy credit, or REC, would be created for each MWh of renewable generation reported to and verified by the WREGIS tracking system.

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Staff is evaluating various metric options to implement and monitor compliance with the RES. One option would be to measure compliance based on MWh of eligible renewable generation obtained by regulated parties, similar to the current RPS program. As most parties are familiar with the current RPS program, the details of the current RPS program are not explained in detail in this document. Readers not familiar with the RPS program can find detailed information on the program on the CEC and PUC's websites. In addition CEC and PUC staff may be consulted for additional information.

Another option for implementing the RES would be to develop a system whereby verified MWh of eligible generation would be converted to tons of GHG reductions to determine a regulated party's compliance. Through this conversion process, a "RES compliance credit" would be generated and serve as the metric for measuring a regulated party's compliance. The conversion of MWh to tons of GHG reductions could be based on GHG factors created for each resource technology. The information and formulas outlined in Attachments 2 and 3 illustrate how MWh could be converted to tons, how other load adjustment factors might be applied, and how GHG factors could be applied to various technologies.

The energy agencies recommend that the metric used to determine compliance with the RES be based solely on MWh of eligible generation, consistent with the existing RPS program. Additionally, they recommend that if ARB adopts a metric based on GHG emission reductions, a uniform metric (implying the same RES credit amount) should be adopted for all eligible renewable technology types. **(See Attachment 1 for a more detailed discussion of recommended approaches proposed by the CEC.)**

Feedback Requested

Staff is exploring options for the best RES metric, which may include other approaches than those described above, and seeks comments on potential approaches. With respect to converting MWh to GHG tons, as outlined below, please comment on the feasibility of using prescribed GHG factors for various resource types. For example, what are the potential system impacts of this approach?

3.a Compliance Period Targets

Each regulated party would ensure that sufficient power is procured from eligible resources to meet its RES obligation for an applicable compliance period. A regulated party's compliance with its RES obligation could be determined by the methods specified below. **(See Attachment 2 for an example of how a large regulated party might comply with the RES between 2013 and 2020.)**

Table 3.1 below illustrates a possible pathway for steadily increasing the amount of required RES obligation for two possible metrics. One metric is based on the percentage of generation, and the other is based on a GHG metric. In this example, both assume annual compliance targets.

Table 3.1 Example of Annual RES Obligations

Year	RES Obligation	
	% Generation	GHG metric
2013	20.00	90 MTCO ₂ eq/GWh
2014	20.00	90 MTCO ₂ eq/GWh
2015	22.22	100 MTCO ₂ eq/GWh
2016	24.44	110 MTCO ₂ eq/GWh
2017	26.67	120 MTCO ₂ eq/GWh
2018	28.89	130 MTCO ₂ eq/GWh
2019	31.11	140 MTCO ₂ eq/GWh
2020	33.30	150 MTCO ₂ eq/GWh

Note: Table 3.1 is for illustrative purposes only and is based on an assumed marginal power average GHG emission rate of 450 MTCO₂eq/GWh. The emissions of the displaced power and the amount of reductions necessary would be evaluated and refined as part of the regulatory development process.

- 3.b Compliance Schedule
 Compliance periods would be on an annual or multi-year basis, beginning with 2013. Alternatively, the compliance schedule may include annual reporting obligations with enforceable compliance targets at two- or three-year intervals.

Feedback Requested
 Staff recognizes annual compliance may be too frequent and is evaluating the appropriateness of different compliance schedules. Staff seeks comments on establishing interim compliance targets and the frequency of meeting these targets to ensure steady progress towards meeting the 33% mandate.

- 3.c Generation of RES Compliance Credits
 RES compliance credits (whether based on a percent generation or GHG metric) that exceed a regulated party's obligation for a compliance period,

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could be used for future compliance periods or traded with other regulated parties. Such RES compliance credits would remain valid until used.⁴

3.d GHG Metric Calculations

Please see Attachment 3 for an example calculation.

4. Monitoring and Verification

4.a Regulated Parties

Regulated parties would be responsible for maintaining appropriate records and documentation, and providing requested information to the ARB and/or the specified energy agency necessary to determine program compliance.

4.b Administration

The RES regulation would be designed to utilize as much of the current monitoring, reporting, and verification systems developed and implemented by the CEC and PUC for the RPS program, including WREGIS verification of eligible renewable generators.

4.c RES Implementation Guidelines

As a supplement to the RES regulation, ARB, CEC, and PUC may jointly prepare a non-regulatory guideline document that provides assistance to regulated parties in complying with the RES regulation.

4.d Potential Agency Monitoring and Verification Roles

ARB is continuing to collaborate with the CEC and PUC on the nature and extent of interagency roles for implementation of the RES. ARB may ultimately enter into interagency agreements to formalize the role of the energy agencies in providing monitoring, verification, and other support for the RES regulation.

5. Compliance and Enforcement

5.a Compliance Requirements

Regulated parties would submit sufficient information to the CEC and PUC on their power procurement and delivery activities, including net-metered distributed generation, necessary for the energy agencies and ARB to determine compliance with the RES. To the extent possible these submittals would be combined with reporting requirements established under the RPS program.

⁴ As discussed in the opening paragraphs of this section, each MWh of renewable resources produces one REC. In a GHG based metric, the REC would continue as the basis of compliance (and the RES compliance credit would represent the GHG emission value assigned to the REC).

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5.b Agency Roles

The CEC or PUC would collect information and provide annual reports to the ARB on the status of regulated party compliance. The annual report would provide sufficient information to determine: 1) the location of eligible RES resources and amount of power delivered from procured or owned generation; 2) the amount of RES compliance credits generated; and 3) each regulated party's compliance with annual or periodic RES obligations.

5.c Compliance Determinations

The amount of qualifying RES credits procured by each regulated party from eligible renewable generation would be determined annually or on a periodic basis. The regulation is satisfied when RES credits from qualifying renewable power equal or exceed a regulated party's RES obligations. ARB would review verification documentation provided by the CEC and PUC, and take appropriate enforcement action when a regulated party fails to meet compliance obligations.

5.d Enforcement Approach

A regulated party's reporting obligations would begin with calendar year 2012, and full compliance with RES obligations would start with calendar year 2013.

5.e Penalties for Non-Compliance

ARB would develop a sliding-scale schedule that would establish the number of violations based on the extent and quantity of RES credit shortfalls incurred by a regulated party. Any shortfall in meeting annual RES obligations would be carried forward and added to subsequent compliance period obligations. If ARB finds that a shortfall was due to circumstances beyond the reasonable control of the regulated party, the ARB may allow up to three years for the shortfall to be remedied.

Note: AB 32 incorporates the existing ARB equitable, as well as criminal and civil, penalty provisions as enforcement tools for violation of regulations adopted under AB 32. AB 32 also provides that violations of regulations adopted pursuant to AB 32 are to be considered as emission violations, which is an aggravating factor in penalty determinations. On this basis, financial penalties of up to \$75,000.00 per day per violation for intentional violations may be assessed. AB 32 also grants ARB the ability to develop a method to determine what the number of daily violations would be, where appropriate, for a given violation.

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- 5.f RES Procurement Planning
Staff anticipates that procurement planning procedures for the RES regulation would be similar to the current procedures, schedules, and CEC and PUC oversight activities employed for the current RPS program.

- 6. **Reporting and Recordkeeping**
Information to be added.

- 7. **Periodic Review**
ARB would conduct periodic reviews, in consultation with the energy agencies, of RES implementation progress and evaluate the need for program adjustments.

- 8. **Definitions**
Information to be added

Attachment 1

Energy Commission Comments

RES Program Design Options

We suggest the ARB consider the following two general approaches to link renewable procurement and greenhouse gas reductions in the RES program design: 1) convert MWh of renewable procured to GHG reductions upfront and make the compliance obligation in terms of GHG reductions, or 2) make the compliance obligation in terms of a MWh renewable procurement requirement.

The Energy Commission supports using a MWh as the metric for the compliance and enforcement obligation. However, if the RES is based on a GHG emission reduction compliance and enforcement obligation, we offer two calculation options below, with a discussion of pros and cons.

Option A – Uniform GHG Emission Reduction Factor

Description – Each renewable MWh would be assigned a uniform GHG emission reduction factor, regardless of type, location or system consequences of the type of renewable resource selected. The uniform factor would be based on new natural-gas fired power plant, which is the type of power plant that would be added to meet new electricity needs.

Benefits of approach:

- Most congruent with current RPS; the de facto measurement is MWh of energy produced, with a uniform GHG factor overlay.
- Simple to administer. Also, avoids adjudicating technology-specific weighting factors which may be a fruitless process given that avoided greenhouse gas emissions are partly a result of complex dispatch decisions in the electricity system that are not necessarily a function of the renewable fuel used to produce electricity.
- Allows LSEs greater flexibility in selecting the renewable resource that most closely matches their system need without an additional cost consequence.
- Is consistent with the way the GHG target was set in the Scoping Plan.

Cons of Approach

- This approach does not distinguish among resource options, locations or system attributes, so may not provide an incremental incentive to select the least GHG intensive resource.

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- Using an average RES/GHG reduction factor to calculate the MMTs of RES “reductions” generated by each retail provider may undercount the actual GHG reductions from some retail providers and over count those of others.

Option B – Average Marginal Emission Reduction Factor by Balancing Authority

Description – Use displacement of existing generation by balancing authority in the WECC. The ARB could calculate an average marginal Emission Reduction Factor by balancing authority in which a renewable facility is located; published annually by control area operator; no adjustments for technology type.

Pros:

- Consistent with approach used to assign GHG emission reduction to renewable energy in other states:
 1. AB32 directs ARB to build on practices in other GHG emission reduction systems, to the extent feasible (need to check wording in AB32)
 2. The task of assigning GHG emission reductions to renewable energy has been resolved by states participating in the Regional Greenhouse Gas Initiative for voluntary purchases of renewable energy.
 3. States such as New York, Massachusetts, and Maine use this approach.
 4. The Center for Resource Solutions uses a similar approach in calculating the GHG emission reduction value of voluntary RECs.
- This option reflects the GHG reduction impact of renewable energy for the host balancing authority.
- Fair (any LSE can contract with any renewable generator)
- Avoids shifting resources (no penalty for LSE with existing mix that is high in GHG)
- Consistent with GHG emission reduction goals (renewables placed in high GHG areas get more credit than those placed in low GHG areas)

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Cons:

- This approach measures displacement of existing generation in the year the renewable energy is generated. This approach is used to assign GHG emission reduction for voluntary purchases of renewables in a number of RGGI states; however, if ARB decides to assign a GHG emission reduction value based on the avoided need for adding new generation, this approach would not be appropriate.
- This approach measures the displacement in the host balancing authority; however, the electricity that the renewable facility displaces may be located in another balancing authority within the WECC.
- There may not be much differentiation among balancing authorities within the WECC. The average marginal unit is likely to be natural gas in all WECC balancing authorities, although some locations may have older, less efficient gas plants operating on the margin
- Administrative complexity. WREGIS tracking should be required for RES eligibility. WREGIS data could provide MWh by LSE by control area. However, the GHG assignment would need to occur outside of WREGIS.
- ISO New England calculates, peak, off-peak, and annual average marginal CO₂ emissions. However, in the WECC, balancing authorities are not currently required to compute or publish their regional resource mix. It is not clear whether peak, off-peak, and annual average would be sufficient, or whether data would be needed on an hourly basis to compute the average marginal emissions reductions displaced by renewable energy.

Attachment 2

Example of a Large Regulated Party Compliance in a GHG metric

Step 1 - Calculate the Load Subject to the Regulation:

	Year						
	2013	2015	2016	2017	2018	2019	2020
Targeted RPS Percent	20.00%	22.22%	24.44%	26.67%	28.89%	31.11%	33.30%
RES Reduction Factor (MT/MWh)	0.09	0.1	0.11	0.12	0.13	0.14	0.15
Load Subject to RES (GWh)	85,000	87,000	88,000	89,000	90,000	90,000	90,000

Step 2 - Calculate the RES Obligation:

RES Obligation (MMT)	7.65	8.70	9.68	10.68	11.70	12.60	13.50
Approximate RES GWh needed	17,000	19,333	21,511	23,733	26,000	28,000	29,970
GHG Reductions > 20% RPS in MMT per Year	0.0	0.9	1.8	2.7	3.6	4.5	5.4

Step 3 – Calculate the RES Compliance Credits:

Examples of Generation Methods	GWh of Qualifying Renewables Provided						
	2013	2015	2016	2017	2018	2019	2020
Resource A	0	1,000	2,000	4,000	4,500	5,000	6,000
Resource B	10,000	12,000	13,000	13,500	15,000	16,000	16,000
Resource C	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Resource D	1,500	1,500	1,700	1,800	2,000	2,000	2,000
Resource E	400	600	1,000	1,200	1,400	1,600	1,800
Resource F	2,000	1,500	1,000	750	600	1,000	2,000
Total Qualifying Renewables (GWh)	17,900	20,600	22,700	25,250	27,500	29,600	31,800

Step 4 – Determine if the RES Compliance Credits are Sufficient:

Generation Method	GHG Factor MT/MW-hr	RES Compliance Credits (MMT)						
		2013	2015	2016	2017	2018	2019	2020
Resource A	0.400	0.00	0.40	0.80	1.60	1.80	2.00	2.40
Resource B	0.450	4.50	5.40	5.85	6.08	6.75	7.20	7.20
Resource C	0.440	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Resource D	0.350	0.53	0.53	0.60	0.63	0.70	0.70	0.70
Resource E	0.450	0.18	0.27	0.45	0.54	0.63	0.72	0.81
Resource F	0.400	0.80	0.60	0.40	0.30	0.24	0.40	0.80
RES Compliance Credits Generated (MMT)		7.61	8.80	9.70	10.75	11.72	12.62	13.51
Compliance Margin (MMT)		-0.05	0.10	0.02	0.07	0.02	0.02	0.01
Approximate RES Percentage		21.1%	23.7%	25.8%	28.4%	30.6%	32.9%	35.3%

Attachment 3

GHG Metric Calculations

Calculation of RES Obligation for a Regulated Party

Determination of RES Obligation:

$$ER_o = ERS \times LS$$

where:

“ER_o” is the calculated RES obligation of a regulated party in MMT

“ERS” is the RES standard for a year as shown in Table 3.1

“LS” is the amount of load subject to the regulation in GWh

Calculation of load subject to the RES would be based on the formula:

$$LS = DE - EL$$

where:

“LS” is the amount of load subject to the regulation in GWh

“DE” is the total amount of electricity delivered in GWh

“EL” is the amount of electrical load excluded in GWh

Calculation of Excluded Load would be based on the formula:

$$EL = CHP + DG_{net} + LCFS$$

where:

“EL” is the amount of electrical load excluded in GWh

“CHP” is the electricity amount obtained from CHP in the regulated party’s service territory in GWh

“DG_{net}” is the electricity amount from net-metered distributed generation in the regulated party’s service territory in GWh

“LCFS” is the electricity amount used to charge electric vehicles under ARB’s LCFS program in GWh.

Example Calculation: For a regulated party that provides 55,000 GWh, 5,000 GWh of which are excluded load:

$$RES \text{ Obligation in 2020} = 50,000 \text{ GWh} \times 150 \text{ MT/GWh} =$$

7.5 million metric tons

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Feedback Requested

Staff seeks comments on the concept of excluding generation from technologies promoted in the AB 32 Scoping Plan (such as rooftop PV and CHP systems) subject to the RES obligation. Is it appropriate to include an approach that reduces the RES obligation due to these technologies (which reduce a regulated party's load), but avoids double counting emission reductions? Additionally, staff seeks comments on the concept of excluding future load deliveries to plug-in hybrid vehicles from the RES obligation.

RES Generator GHG Factors

For each eligible renewable generation technology, the regulation would consider the following factors and specify the amount of RES compliance credits assigned to each technology:

- a) The GHG emissions of the resource or technology,
- b) Line loss savings,
- c) The diurnal generation range,
- d) System impacts,
- e) The GHG emissions of displaced power, calculated as an average, statewide estimate of emission reductions achieved when renewable power with no associated GHG emissions is used in lieu of the otherwise expected mix of marginal generation.

Feedback Requested

Staff will be evaluating the value and potential impact of the factors proposed for establishing RES compliance credits. For example, is it feasible or appropriate to reduce the RES GHG factor for remote generating resources subject to higher line losses? Are there other adjustment factors that should be applied based on the location or operational regime of various resources? Should resources that are less stable and require additional thermal support receive a smaller RES GHG factor?

The following table illustrates example RES GHG factors by generation type:

Example of RES GHG Factors by Generation Type

Generation	RES GHG Factor⁵
Resource A	400 MTCO ₂ eq/GWh
Resource B	450 MTCO ₂ eq/GWh
Resource C	400 MTCO ₂ eq/GWh
Resource D	450 MTCO ₂ eq/GWh
Resource E	400 MTCO ₂ eq/GWh
Resource F	350 MTCO ₂ eq/GWh
Resource G	350 MTCO ₂ eq/GWh

Note: The above illustration is based on an assumed GHG emission rate of 450 MTCO₂eq/GWh of displaced energy. Displaced power emissions and the amount of needed reductions would be refined under the regulation.

Calculating RES Compliance Credits from Renewable Technologies

RES compliance credits produced through the procurement of eligible renewable generation technologies would be calculated by applying the following equation:

$$ER_c = \sum_{i=1}^n G_i F_i / 1000$$

where:

“ER_c” is the RES compliance credit in MMT

“G_i” is the amount of generation of technology *i* in GWh

“F_i” is the GHG factor for technology *i* in MT/MWh

“1/1000” is a conversion factor.

Example Calculation: RES compliance credit calculation for a regulated party using 4 resource types to comply with a RES obligation.

Resource	G (GWh)	*	F (MT/GWh)	/1000	=	MMT
A	5	*	400	/1000	=	2.0
B	2	*	450	/1000	=	0.9
C	1	*	400	/1000	=	0.4
D	10	*	450	/1000	=	4.5
Totals	18					7.8

⁵ Values are illustrative only and the list is not inclusive of all eligible generation methods.