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Detailed Methodology to Calculate Range of Renewable Net Short

March 8, 2011 **Workshop on the Proposed Method to Calculate New Renewable Generation Required to Meet Policy Targets**

California Energy Commission

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What To Expect From This Presentation

- Discussion of methodology to incorporate demand side assumptions and existing renewable generation that impacts the calculation of renewable net short
- A discussion of forecast ranges not a single point forecast
- Not a discussion of the type, location or timing of renewables to meet a RPS goal

Need For Consistent Methodology

			1	2a	2b	3	4	5a	5b	6	7
	All Values in TWh for the Year 2020	**Formula**	**CEC IEPR 09 Impact of AB32**	**ARB 33% RES - Low Load**	**ARB 33% RES - High Load**	**CAISO/CPUC 33% Integration Study**	**RETI CTPG**	**WECC TEPPC Reference Case**	**WECC TEPPC State Adjusted**	**CPUC 2010 LTPP**	**CEC Staff Illustrative Example RNS Estimate**
1	Net Energy For Load		341.8					326.5	328.2		
2	Statewide Total Deliveries (Retail Sales)		320.4	303.3	303.3	301.4	300.1	303.7	305.2	303.3	303.3
3	Non RPS Deliveries (CDWR, WAPA, MWD)		12.3	4.5	4.5	12.3	13.6	13.6	13.6	13.6	13.6
4	Small LSE Sales (<200 GWh)		0.0	0.0	0.0	0.0	0.0	2.3	2.3	2.3	2.3
5	Retail Sales for RPS	5=2-3-4	308.1	298.8	298.8	289.1	285.7	287.8	289.4	287.4	287.4
6	Additional Energy Efficiency		34.7	22.0	0.0	0.0	0.0	0.0	19.4	17.0	17.1
7	Additonal Combined Heat and Power		32.3	14.0	0.0	0.0	0.0	0.0	7.0	7.6	7.2
8	Additional Rooftop PV		4.8	2.0	0.0	0.0	0.0	0.0	1.8	0.0	1.9
9	**Adjusted Statewide Retail Sales for RPS**	9=5-6-7-8	236.3	260.8	298.8	289.1	285.7	287.8	261.3	263.0	261.2
	Existing Renewable Generation										
10	Total Instate Renewable Generation		29.8	28.8	28.8	28.8	39.4	29.8	29.8	29.8	34.3
11	Out of State Claims		2.7	3.7	3.7	2.5	2.1	0.0	0.0	2.8	9.2
12	**Total Existing Renewable Generation for CA RPS**	**12=10+11**	**32.5**	**32.5**	**32.5**	**31.3**	**41.5**	**29.8**	**29.8**	**32.6**	**43.5**
13	**Total RE Net Short to meet 33% RPS In 2020**	**13=(9*33%)-12**	**45.5**	**53.6**	**66.1**	**64.1**	**52.8**	**65.2**	**56.4**	**54.2**	**42.7**

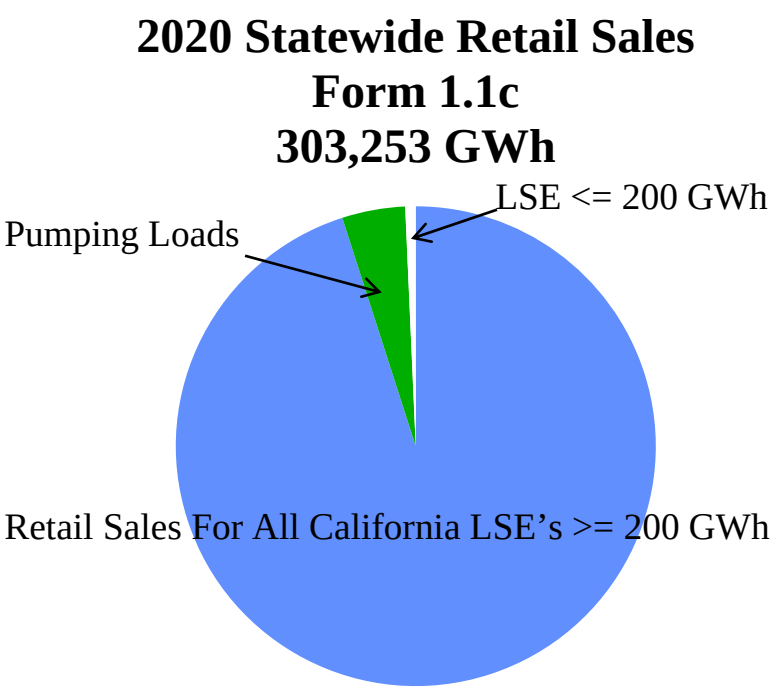
Question Session Following Each Section

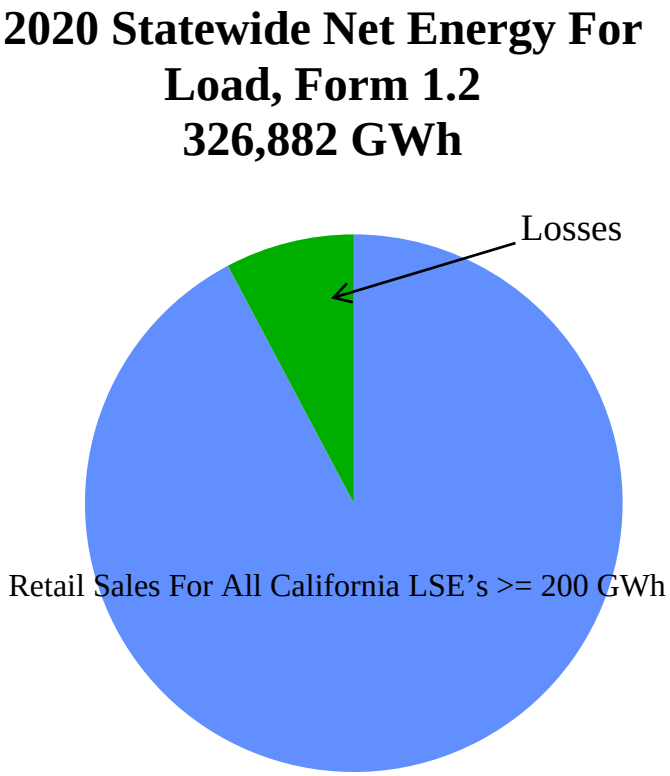
Section 1	1	Statewide Total Deliveries (Retail Sales)	
	2	Non RPS Deliveries (CDWR, WAPA, MWD)	
	3	Small LSE Sales (<200 GWh)	
	4	**Retail Sales for RPS**	4=1-2-3
	5	Additional Energy Efficiency	
Section 2	6	Additional Rooftop PV	
Section 3	7	Additional Combined Heat and Power	
Recap of 1 to 3	8	Adjusted Statewide Retail Sales for RPS	8=4-5-6-7
	9	**Total Renewable Energy Needed For 33% RPS**	**9=8* 33%**
Section 4		Existing and Expected Renewable Generation	
	10	Total Instate Renewable Generation	
	11	Total Out-of-State Renewable Generation	
	12	**Total Existing Renewable Generation for CA RPS**	**12=10+11**
Recap of All	13	**Total RE Net Short to meet 33% RPS In 2020 (GWh)**	**13=9-12**

Section 1 Demand Forecast

- Retail Sales Forecast or Net Energy For Load from ***California Energy Demand 2010-2020 (CED 2010), Adopted Forecast***
  - Form 1.1c or Form 1.2 (with loss adjustments)
- Demand Forecast Adjustments CED 2010
  - Form 1.1c – LSEs with retail sales less than 200 GWh
  - Form 1.1c - CDWR, MWD, WAPA - pumping loads

Section 1 - Electricity Sales Versus Net Energy For Load In CED 2010





Section 1 Demand Forecast Adjusted Retail Sales Baseline

2020 Retail Sales CED 2010 Form 1.1C

less 2020 Pumping Loads CED 2010 Form 1.1C

less 2020 LSE <= 200 GWh CED 2010 Form 1.1C

= 287,437 GWh 2020

Section 1 Demand Forecast Range of Adjusted Retail Sales

- Optimistic Economic Scenario 2.3% Higher Than Adopted
- Pessimistic Economic Scenario 1.9% Lower Than Adopted

Source CED 2010

Section 1 Demand Forecast Range of Adjusted Retail Sales

- 294,412 GWh 2020 Optimistic Adjusted Retails Sales For RPS Calculation

- 281,675 GWh 2020 Pessimistic Adjusted Retails Sales For RPS Calculation

Demand Forecast Update Schedule For 2011 IEPR

- May 2011 Preliminary Forecast
- August 2011 Revised Forecast
- November 2011 Final Adopted Forecast

Section 1 Demand Reduction Programs

- Uncommitted Energy Efficiency
  - forecasted amounts above that already included in Form 1.1c retail sales forecast
- High, Medium and Low range forecasts from CEC's *Incremental Impacts of Energy Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast*

Section 1 Demand Reduction Programs

The proposed range of uncommitted energy efficiency for both the IOU and POUs are:

Low Range = 15.2 TWh

Mid Range = 17.1 TWh

High Range = 19.9 TWh

Includes 1.9 TWH decay and 25% POU estimate

Questions or Comments on Section 1

Section 2 Incremental Distributed Generation (DG)

Clean Energy Jobs Plan – Possible Impacts to RNS Calculation

- 12,000 MW of DG with an emphasis on PV
- 6,500 MW Combined Heat and Power (CHP) Over Next 20 Years

Section 2 Sources For Roof Top PV Range

AB 32 Scoping Plan as well as the *California Solar Initiative* include 3,000 MW roof top PV

Portion of this 3,000 MW goal included in CED 2010

MW goal must be converted to energy to include in calculation of RNS

Section 2 Data Needed To Include Roof Top PV Goal In RNS

Installed Capacity: 3,000 MW goal

Annual Capacity Factor: 14.8%

Additional roof top PV in CED 2010 compared to CED 2008 :1,956 GWh

3,000 MW*14.8%*8,760/1000 = 3,889 GWh

1,933 GWh = 3,889 GWh – 1,956 GWh

14.8% roof top PV capacity factor assumed in CED 2010

Questions or Comments on Section 2

Section 3 Incremental (New) CHP

To estimate the amount of CHP incremental to the demand forecast, it is necessary to look for changes in the policy and business landscape for CHP that will push development beyond the “current trend” estimates.

Section 3 Sources for Incremental CHP

An October 2009 ICF *Market Assessment Report* PIER sponsored provided an inventory of existing CHP capacity, as well as estimates of technical and market potential for new CHP in California that took into account the AB 32 mandates and also an assumed CPUC CHP sponsored settlement agreement.

Section 3 Details Needed to Include Range of New CHP in the RNS

Installed capacity : 2,240 MW to 5,532 MW

Percent of installed CHP capacity on the demand side: 50% to 90%

Annual capacity factor : 73.8% to 81.6%

Source *ICF Combined Heat and Power Market Assessment Report, October 2009*

Section 3 Range of New CHP in the RNS

2,240 MW 2020 New Installed CHP

50% Percent on Demand Side

73.8% Annual Capacity Factor

RNS Mid Range CHP Energy Adjustment

2,240*.50*.738*8760/1000 = 7,241 GWh

Section 3 Range of New CHP in the RNS

5,532 MW 2020 New Installed CHP

50% Consider Self Gen

81.6% Annual Capacity Factor

RNS High Range CHP Energy Adjustment

5,532*.50*.816*8760/1000 = 19,772 GWh

Recap of Steps 1 - 3

	All Values in TWh for the Year 2020	Formula	Lowest Renewable Net Short Estimate	Mid Range Renewable Net Short Estimate	Highest Renewable Net Short Estimate
1	Statewide Total Deliveries (Retail Sales)		297.5	303.3	310.3
2	Non RPS Deliveries (CDWR, WAPA, MWD)		13.6	13.6	13.6
3	Small LSE Sales (<200 GWh)		2.3	2.3	2.3
4	Retail Sales for RPS	4=1-2-3	281.6	287.4	294.4
5	Additional Energy Efficiency		19.9	17.1	15.2
6	Additional Rooftop PV		1.9	1.9	0
7	Additional Combined Heat and Power		19.8	7.2	0.0
8	Adjusted Statewide Retail Sales for RPS	8=4-5-6-7	240.0	261.2	276.9
9	**Total Renewable Energy Needed For 33% RPS**	**9=8* 33%**	**79.2**	**86.2**	**92.1**

Questions or Comments on Section 3

Section 4 Existing Renewable Generation

- Renewable generation currently in place and expected to be operational for California in the target year both in- and out-of-state
- Need method to capture full year of generation for plants with commercial on-line date (COD) after January 1
- Energy generated fluctuates depending on weather conditions

Section 4 Two Methods For Estimating In-State Existing Renewable Generation

1. Practice to date has been to use most recent full year actual generation data from the CEC's Quarterly Fuels and Energy Reporting (QFER) requirement (reported energy)

2. Apply a capacity factor to the reported installed generation capacity to estimate energy (calculated energy)

Section 4 Example of QFER Reported and Calculated Energy Method For 2009

Plant Name	Reported Capacity 2009 (MW)	Description	Reported 2009 Generation (GWh)	Calculated 2009 Generation (GWh)
AES Mendota	28	Wood/Wood Waste	189	208
Eagle Rock #11	110	Geothermal	525	800
California Wind	1,914	Wind	4,847	5,365

Section 4 In-State Non Hydro Existing Generation Range For 2009

1. 2009 QFER reported data from generators with COD prior to 1/1/2009

2. In-State Renewables with COD 1/1/2009 to 12/31/2011 used Renewables Office Contract Database for annual energy forecast

Section 4 Existing Small Hydro In- and Out-of-State Generation

- In-State average the 2005-2009 QFER reported generation

- Out-of-State average 2007-2009 Power Source Disclosure reported generation

Section 4 Proposed Out-of-State Existing Range For 2009

- Retail electric service providers are required to report to the Energy Commission under the Power Source Disclosure Program
  - “claimed” purchases by fuel type and
  - Distinguish purchases by in-state sources or out-of-state imports
- Exclude out-of-state contracts with expiration dates prior to 12/31/2015

Section 4 Range For Existing Generation TWh

			Historical Generation Method	Staff-Proposed Method	Installed Capacity Method
2009 QFER Excluding Small Hydro and 2 Non-RPS Plants			24	24	31.6
2009 Power Source Disclosure Program Out-of-State Renewable Purchase Claims; Excluding Small Hydro			5.2	5.2	5.2
2009 Power Source Disclosure Program Out-of-State Short-Term Contracts			-1.8	-1.8	-1.8
QFER In-State Small Hydro Claims (Average 2005 – 2009)	**2005**	5.3			
	2006	5.9			
	2007	3.7			
	2008	3.6			
	2009	4.0			
	AVERAGE	4.5	4.5	4.5	4.5
Power Source Disclosure Program Out-of-State Small Hydro Claims (Average 2007 – 2009)	**2007**	1.0			
	2008	1.2			
	2009	1.3			
	AVERAGE	1.2	1.2	1.2	1.2
Facilities That Started Generating Since the End of the Most Current Full-Year QFER Data Set					
Instate Renewables Contracted Annual Generation With COD January 1, 2009 Thru November 30, 2010			1.2	1.2	1.2
Instate Renewables Contracted Annual Generation With COD January 1, 2009 Thru November 30, 2010			4.6	4.6	4.6
Facilities Expected to Begin Generation Before the End of the Next Calendar Year					
Under Construction Renewables With COD 1/1/2011 to 12/31/2011 Estimated Annual Generation			0.0	4.6	4.6
Summary Values for Use in Renewable Net Short Calculations					
IN-STATE RENEWABLE			29.7	34.3	41.9
OUT-OF-STATE RENEWABLE			9.2	9.2	9.2
TOTAL EXISTING RENEWABLE			38.9	43.5	51.1

Questions or Comments on Section 4

Recap – 2011 Renewable Net Short Range For 2020 (TWh)

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