Renewable Energy Delivery, Scheduling, and Firming / Shaping

Iberdrola Renewables, Inc.
California Public Utilities Commission
Energy Division Workshop
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- **Own or control the output of renewable generation in California:**
  - Shiloh Wind Project (150 MW, Solano County)
  - Dillon Wind Project (45 MW, Riverside County)
  - Mountain View III Wind Project (22 MW, Riverside County)
  - High Winds Wind Project (162MW controlled, Solano County)

- **Developing new renewable resources in California**
  - Manzana Wind Project (~250 MW, Kern County)
  - Tule Wind Project (~200 MW, San Diego County)
  - Solar portfolio (miscellaneous)
  - Biomass portfolio (miscellaneous)

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- **Owner/operator/provider of renewable generation from WECC to California utilities:**
  - Klondike 3 Wind Project (75 MW, Oregon)
  - Klondike 3A Wind Project (75 MW, Oregon)
  - Star Point Wind Project (100 MW, Oregon)
  - Pebble Springs Wind Project (100 MW, Oregon)
  - Big Horn Wind Project (200 MW, Washington)
  - Simpson-Tacoma Biomass Project (45 MW, Washington)
  - Pleasant Valley Wind Project (128 MW controlled, Wyoming)

- **Provider of delivery service and/or firming and shaping energy services for most of these projects**

Generation and Delivery: Why We Do What We Do

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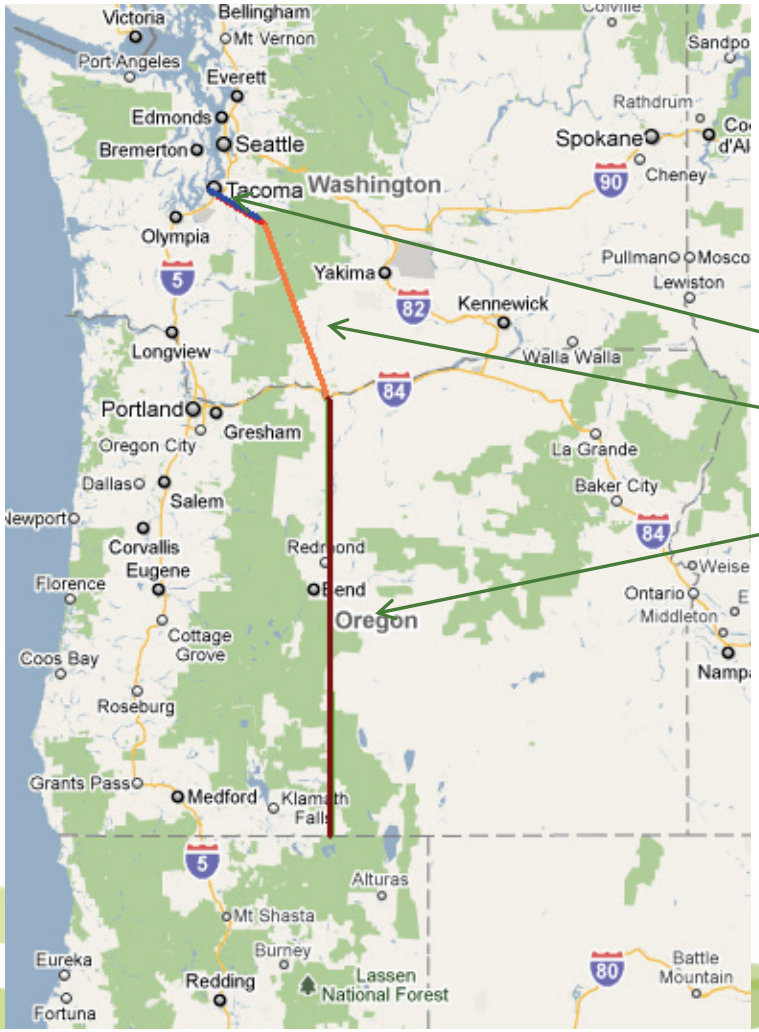
- **We provide a superior product: predictable, manageable, delivered renewable energy**
  - Complies with RPS
  - Fits into customers' portfolios
- **We offer these services to deliver a value-added product:**
  - Renewable energy
  - Delivery
  - Firming and shaping
  - Scheduling

California and WECC are Integral

- California is electrically interconnected to the WECC
- California is an organized market within a larger multi-state western market
- California benefits from diverse sources of generation and delivery both inside and outside the State
- Providing energy and transmission to California displaces California LSEs' highest-cost, least-desirable resources, no different from in-state renewable generation
  - Surplus hydro delivery from the Northwest to California, and surplus thermal delivered from California to the Northwest, have been mutually beneficial for decades

Firm Transmission Delivering Baseload Renewable Generation



- Iberdrola Renewables has a long-term PPA with SMUD to deliver the full output of the Simpson-Tacoma Biomass Project (California RPS Certification # 60697A).
- Iberdrola Renewables has reserved 45 MW on the following transmission segments:
  - Tacoma Public Utilities
  - BPA Network
  - BPA Southern Intertie
- In delivering Project Output to SMUD, the NERC E-tag identifies the generation source, the transmission path, the point of delivery, and the load-serving entity. The E-tag also captures the CEC renewable facility certification number.
- Thus, the Project directly serves California loads.

Verification: NERC E-Tag and CEC RPS Certification

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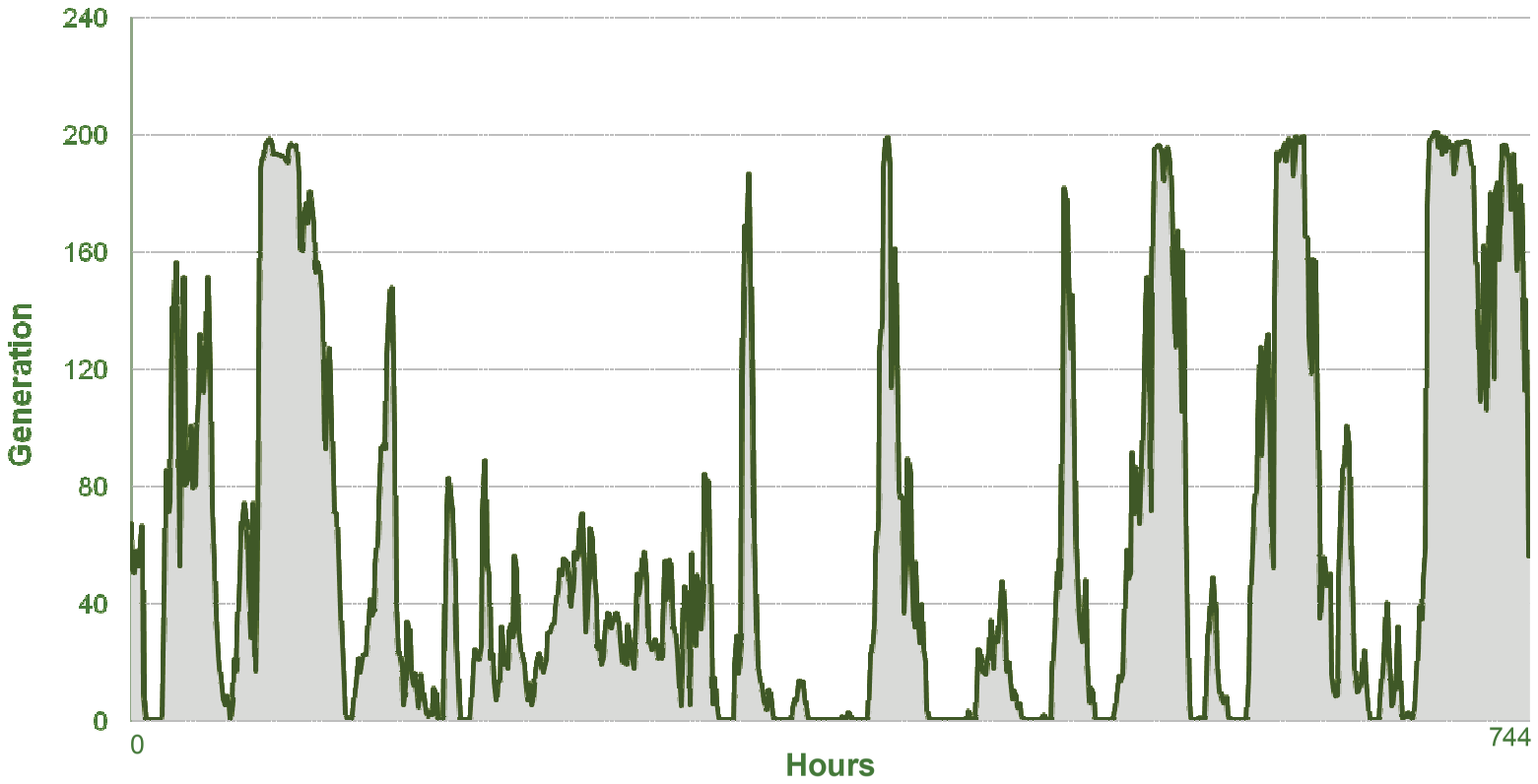
Physical Path							
CA	TP	PSE	POR	POD	Sched Entities	Contract	Misc
BPAT		PPMIRT	Source:	STKBiomass			No
	TPWT	PPMIRT	ST.PAUL	BPAT.TPU	TPWR		No
	BPAT	PPMIRT	BPAT.TPU	JohnDay	BPAT		No
	BPAT	PPMIRT	JohnDay	CaptainJack	BPAT		No
	SMD1	SMUD01	CaptainJack	TRY500	SMUD		No
	WASN	SMUD01	TRY500	TRY500	SMUD		No
	SMD1	SMUD01	TRY500	TRY230	SMUD		No
	WASN	SMUD01	TRY230	HUR230	SMUD		No
	SMD1	SMUD01	HUR230	SMUD.System	SMUD		No
SMUD		SMUD01	Sink:	SMUDSYS			Yes

Misc. Info	
Token	Value
RPS_ID	60697A

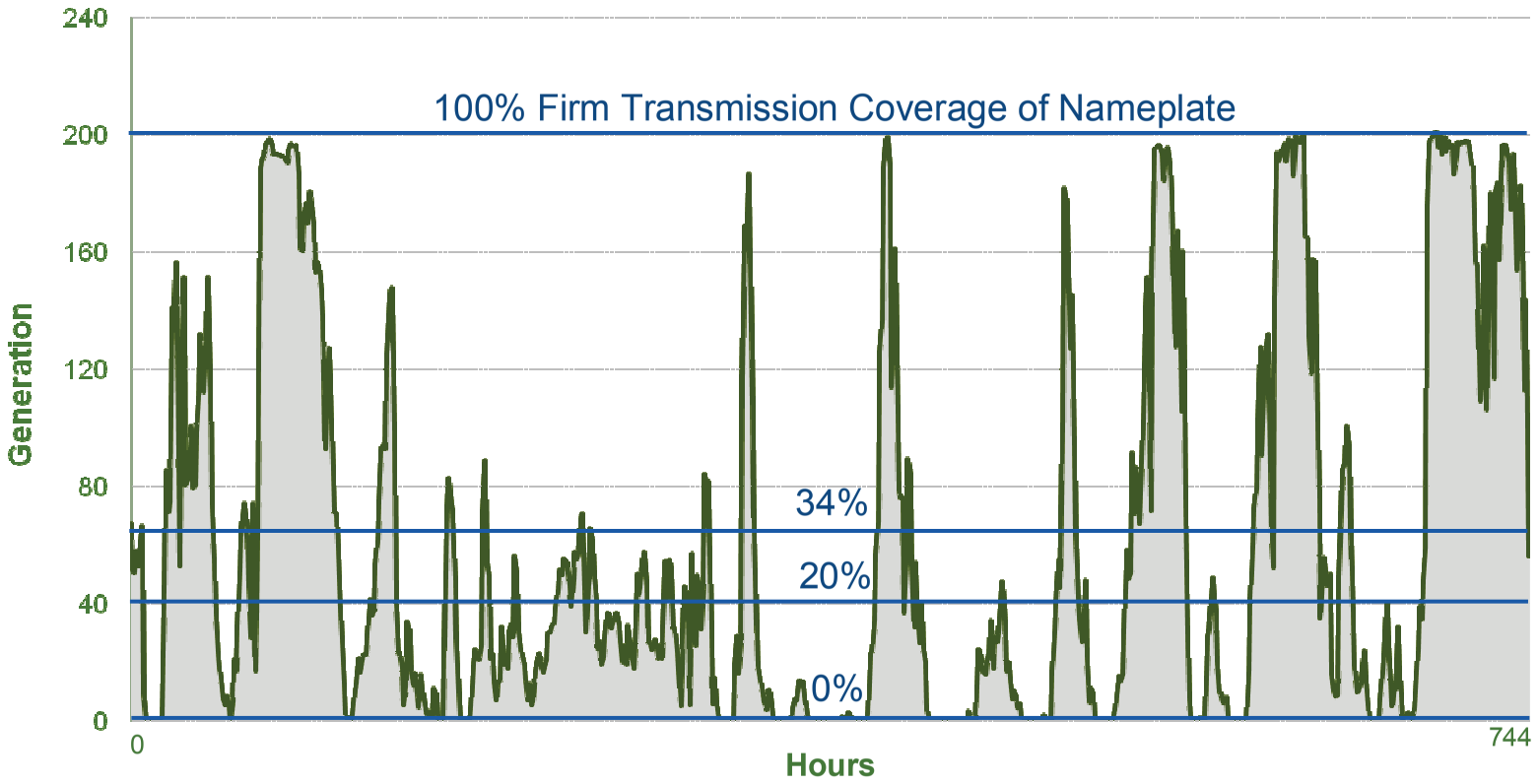
Firmed and Shaped Deliveries from Intermittent Resources

- **What?**
  - Our product delivers incremental energy resources to California
  - Smoothes out the over- and under-generation of intermittent resources
- **Why?**
  - Customer knows what it will get
  - LSE can more easily integrate into resource portfolio
  - Efficient use of scarce transmission
  - Predictable long-term renewable product more easily displaces high cost conventional resources

Big Horn Wind Project – Washington
Actual Hourly Output, October 2009



Firm Transmission Alternatives
Using Same Big Horn Example



34% = Project Average Annual Capacity Factor

20% = Iberdrola Proposed Firm Transmission Threshold

0% = All Non-Firm Transmission

Iberdrola Delivery Requirement
Using Same Big Horn Example

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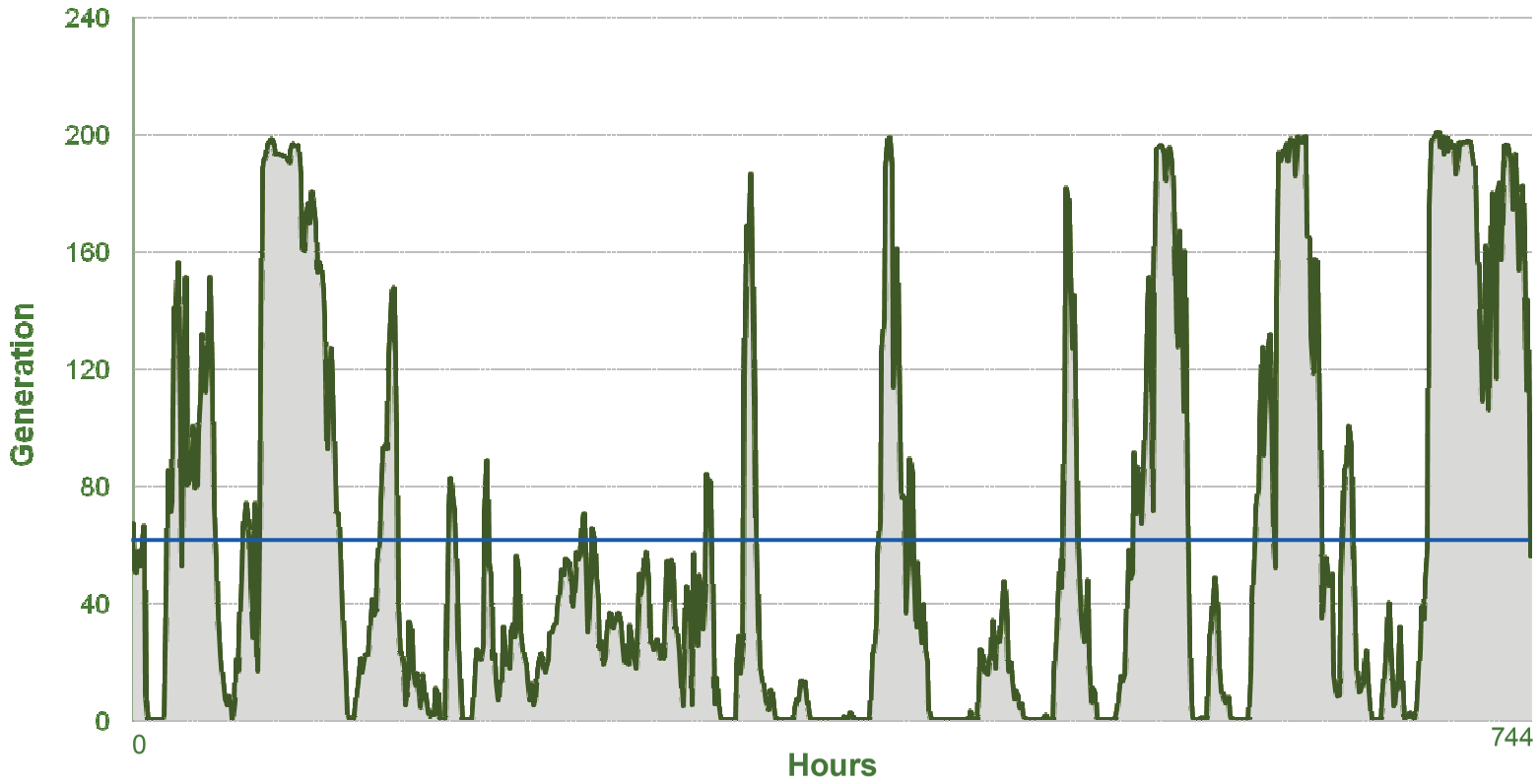
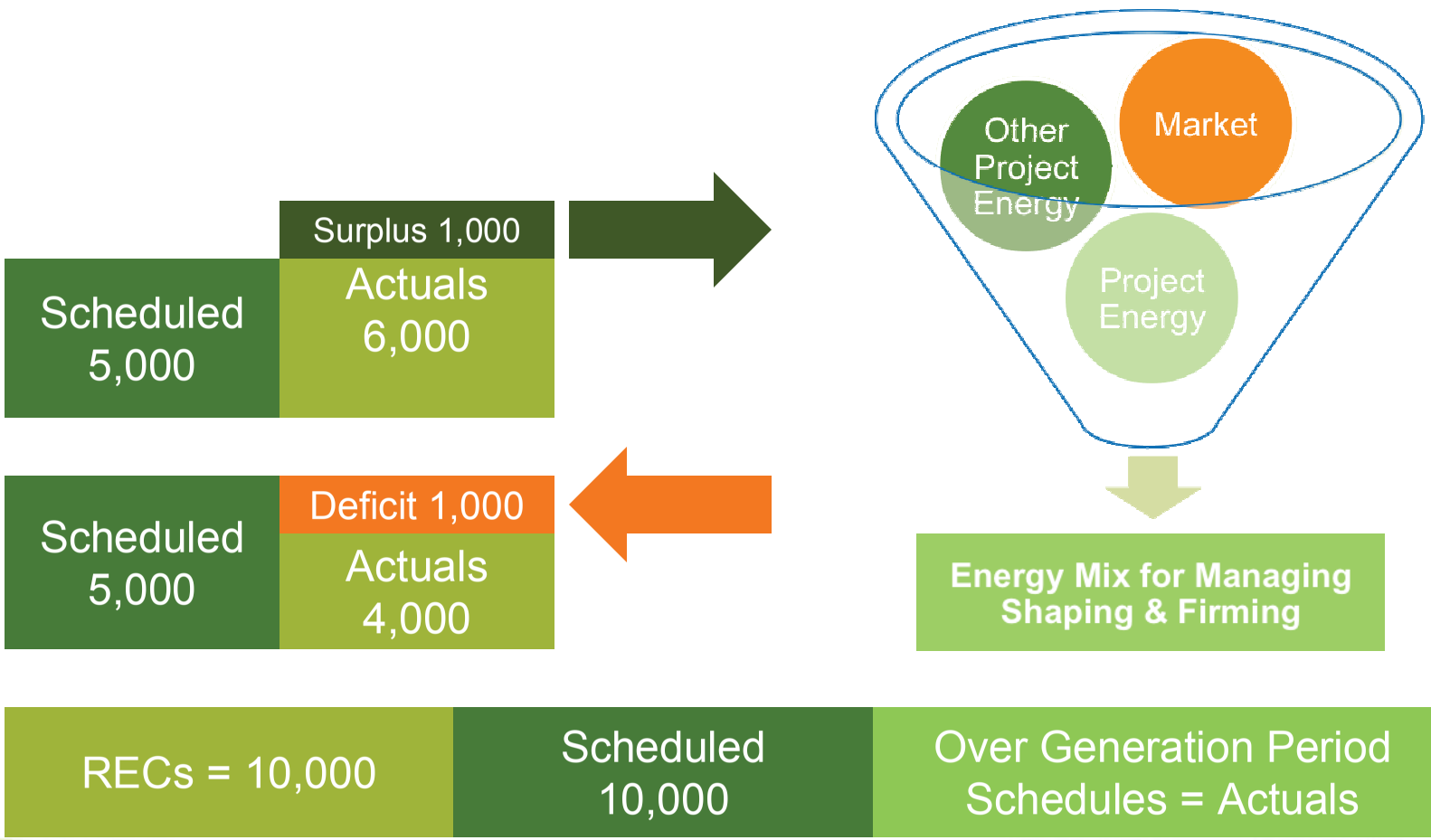
- Under the Big Horn arrangement, Iberdrola provides flat delivery across the month based on expected monthly energy and using like amount of firm transmission



October 2009 Results

- Iberdrola delivered expected monthly energy flat across the month (approx 30.6% CF, 61 MW, 45,484 MWh)
- In this month, actual wind production = 29.7% CF (44,154 MWh)
- Customer RECs, verified by WREGIS = 44,154

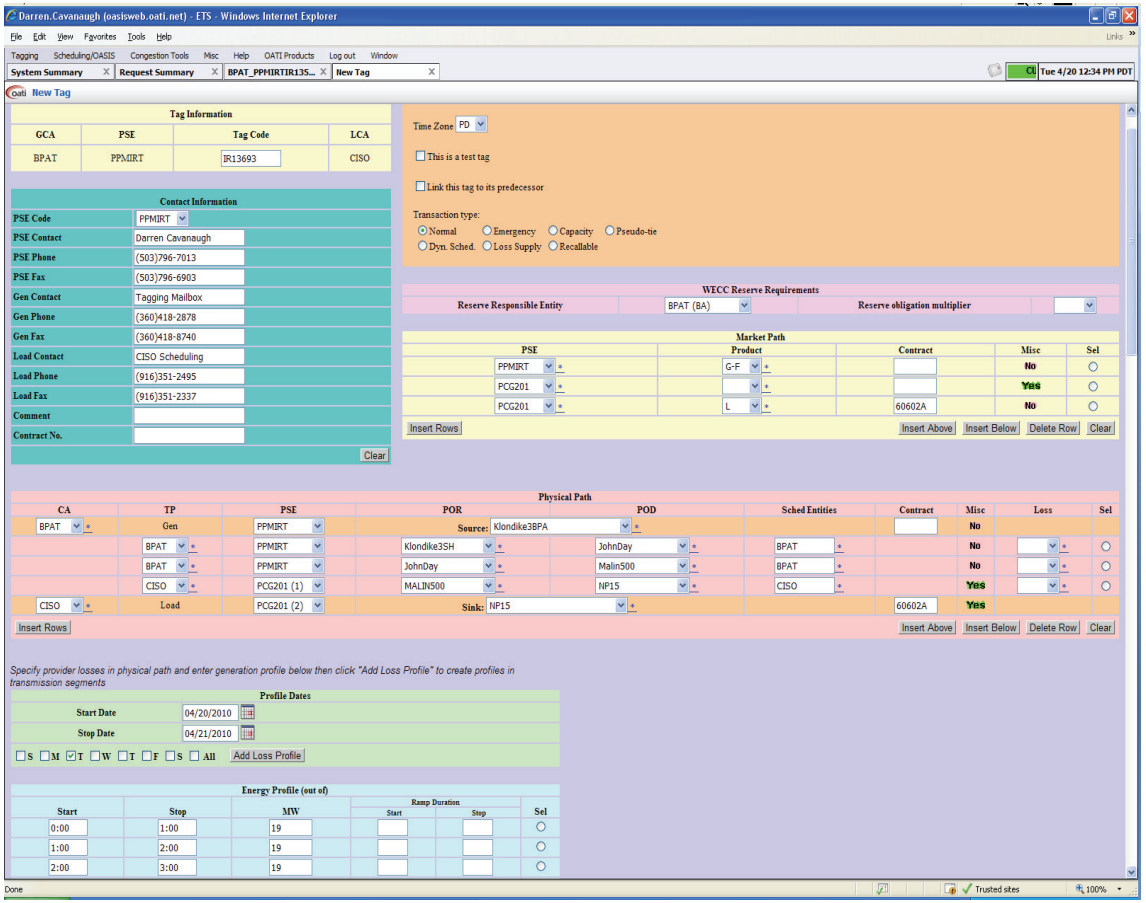
Firming and Shaping Balances Actuals and Delivered MWhs

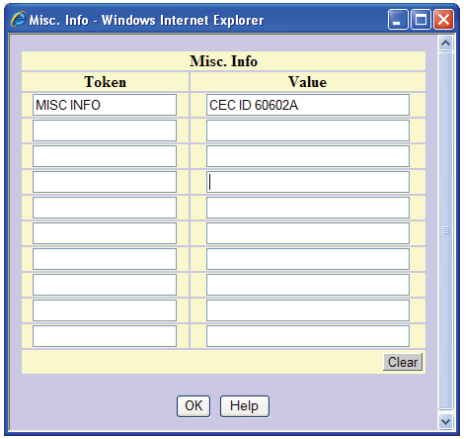


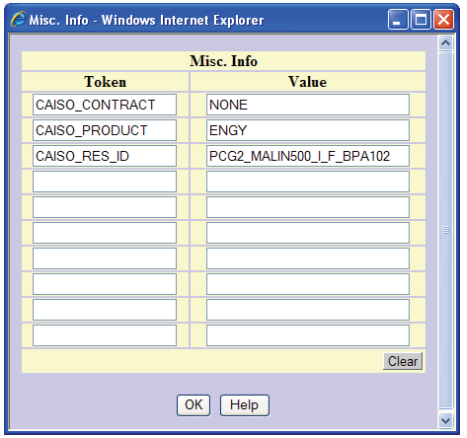
Firmed and Shaped Delivery of Intermittent Renewable Generation

- Iberdrola Renewables (IBR) project LLC and California LSE enter into a 15-year PPA to acquire the output of a 100 MW wind power project with a 33% Capacity Factor.
- IBR and California LSE enter into firming and shaping contracts for IBR to deliver 33 MW every hour at COB, for 15 years.
- IBR has firm transmission from John Day to COB for 33 MW.
- IBR schedules day-ahead and hour-ahead based on forecasts, and secures resources to ensure the firm obligation will be met.
- Firming resources may come from other IBR renewable facilities, IBR thermal (Klamath gas), or system generation.
- When the facility generates at or above the firm obligation, 33 MW is delivered to COB from the facility and the firming resources. Excess generation is sold in the market.
- When the facility under-generates, IBR will deliver 33 MW from the facility and firming resources to COB.
- RECs from the period of over-generation are assigned to the power delivered from the period of under-generation in a periodic true-up.
- REC credit is always the lesser of renewable power generated or energy delivered.

NERC E-Tag: Klondike 3 to PG&E







Verification: Klondike 3 to PG&E NERC E-Tag and CEC RPS Certification

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Physical Path							
CA	TP	PSE	POR	POD	Sched Entities	Contract	Misc
BPAT		PPMIRT	Source: Klondike3BPA				No
	BPAT	PPMIRT	Klondike3SH	JohnDay	BPAT		No
	BPAT	PPMIRT	JohnDay	Malin500	BPAT		No
	CISO	PCG201 (1)	MALIN500	NP15	CISO		Yes
CISO		PCG201 (2)	Sink: NP15			60602A	Yes

Misc. Info	
Token	Value
RPS_ID	60602A

Verification: NERC E-Tag for Klondike 3 Firming Power with CEC RPS Certification

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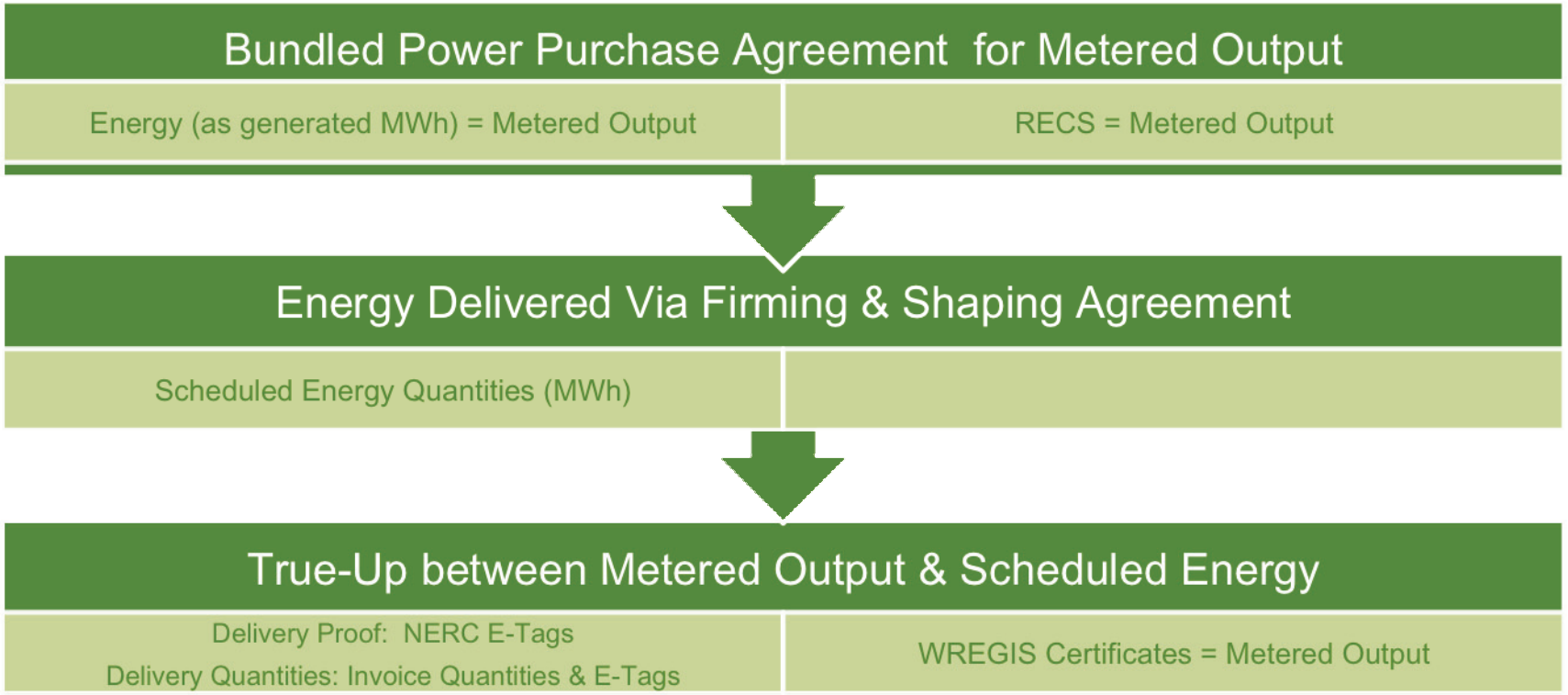
Physical Path							
CA	TP	PSE	POR	POD	Sched Entities	Contract	Misc
TPWR		TPWPPM	Source: TPWR				No
	BPAT	PPMIRT	BPAT.TPU	JohnDay	BPAT		No
	BPAT	PPMIRT	JohnDay	Malin500	BPAT		No
	CISO	PCG201 (1)	MALIN500	NP15	CISO		Yes
CISO		PCG201 (2)	Sink: NP15			60602A	Yes

Misc. Info	
Token	Value
RPS_ID	60602A

Metered vs. Delivered: the Audit Trail



RECs retired are lesser of Scheduled or Metered Output for the generation period

Benefits to California of Firmed and Shaped Delivered Intermittent Renewables

- California gets renewable generation, displacing conventional generation
- California LSEs get portfolio diversity
  - Technology diversity
  - Locational diversity
- California LSEs get more procurement choices to meet least-cost objectives
- Intermittency is managed outside California – CBAAs are relieved of this requirement when firmed and shaped renewables are delivered

Recommendations

- Re-define “bundled transaction” to include firm deliveries and firmed and firmed and shaped deliveries from eligible renewable facilities that do not have a first point of interconnection with a CBAA:
  - Demonstrate Delivery
  - *Use NERC E-tags and WREGIS certificates as audit trail*
  - Require a threshold level of transmission availability
  - *Suggest 75 percent of expected average delivery or 20 percent of nameplate capacity to allow for flexibility*
  - *Place requirement on the last leg of multiple wheels*
  - Narrow true-up window
  - *Rolling quarterly instead of calendar-based annual window*

Thank You

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