CTPG Phase 4
Scenario Development

RETI RTWG Meeting
Regional Transmission Working Group
September 23, 2010
Rich Ferguson, RETI Coordinator

Presentation Caveats

- The suggested SW import scenario development outline in this presentation is intended for discussion purposes only.
- The goal of this presentation is to begin discussion of the key decisions that must be made.
- Additional data is being sought by CTPG and RETI.
- A final RETI scenario must be approved by the RETI SSC.

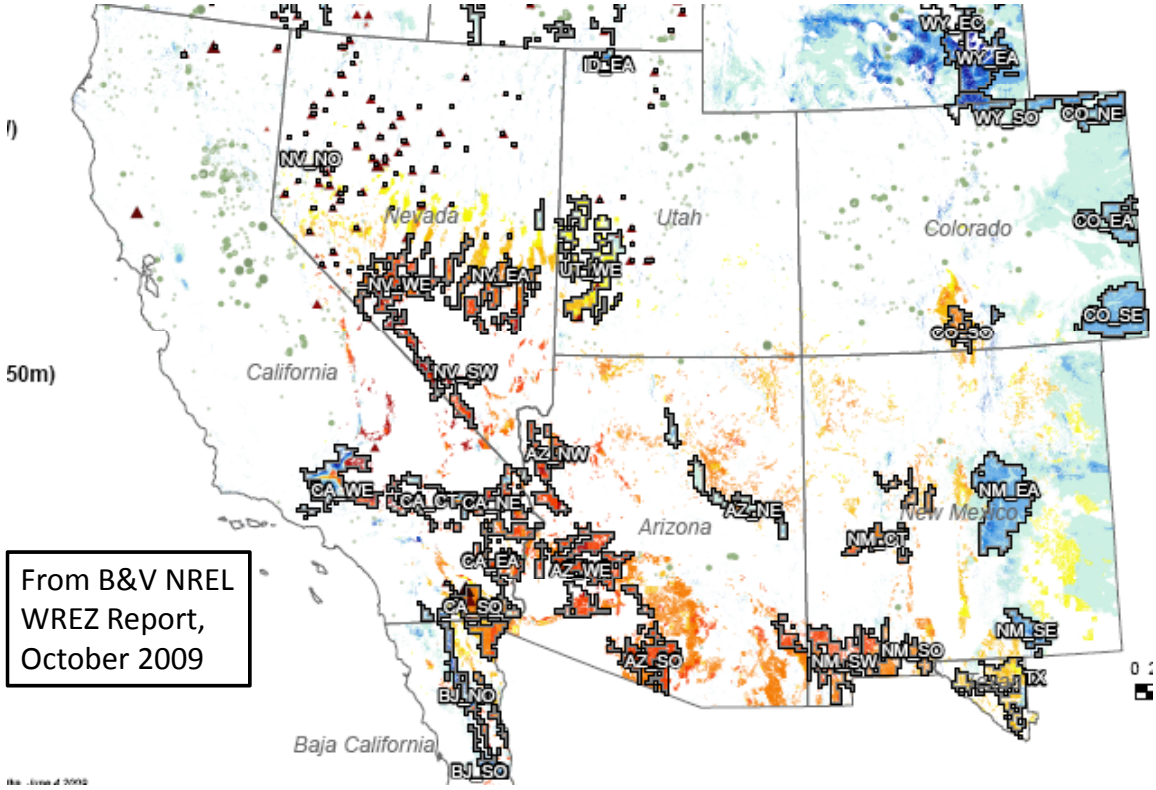
Renewable Generation Choices

- California
  - Percentage of Net Short
  - Include “Discounted Core”?
  - Other CA resources?
  - Use CA resources from earlier RETI scenarios?
- Other WECC Regions (OOS)
  - Percentage of Net Short
  - Resources “likely” available for import by 2020
  - Proxy projects for locations and TOD profiles?

Choice of Likely OOS Resources

- Potential criteria for which some data is available
  - RETI B&V Phase 2B WREZ cost comparison
  - OOS utility queue positions
  - CA utility PPAs
  - OOS transmission plans

SW WREZ

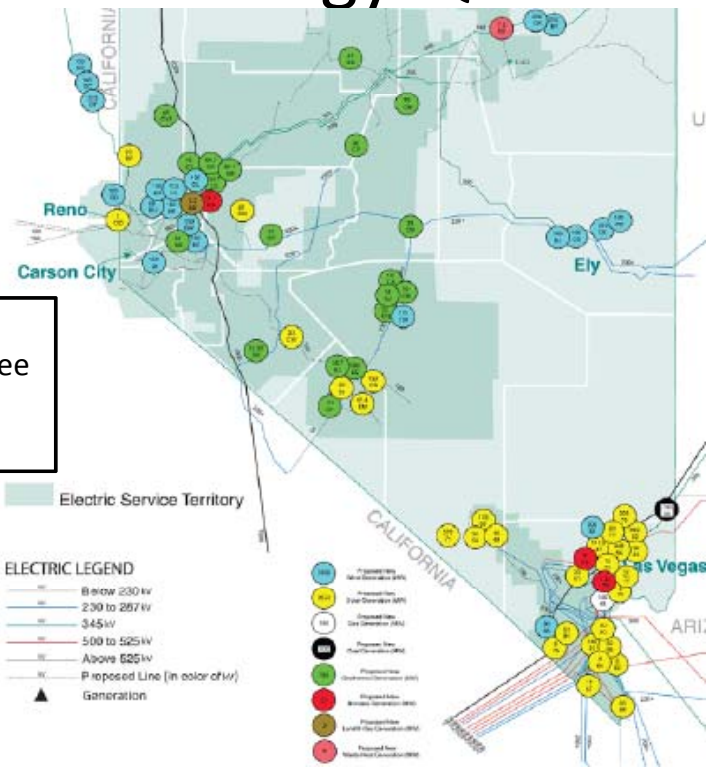


From B&V NREL WREZ Report, October 2009

B&V WREZ Comparison

CREZ Name	Net Capacity (MW)	Annual Energy (GWh/yr)*	Weighted Average Rank Cost ($/MWh)	Capacity Factor
UT_WE	2,144	7,595	20	40%
AZ_NE	4,063	11,694	46	33%
NV_SW	5,042	12,501	49	28%
AZ_NW	3,758	9,168	58	28%
NM_EA	11,292	31,626	58	32%
AZ_WE	9,373	23,130	58	28%
NV_WE	7,836	20,109	61	29%
NM_SE	1,894	5,376	65	32%
NV_EA	7,974	19,332	73	28%
AZ_SO	6,631	16,265	76	28%

NVEnergy Queue



From SWAT RTFF Technical Committee Report
August 17, 2010

NVEnergy Queue 9/14/10

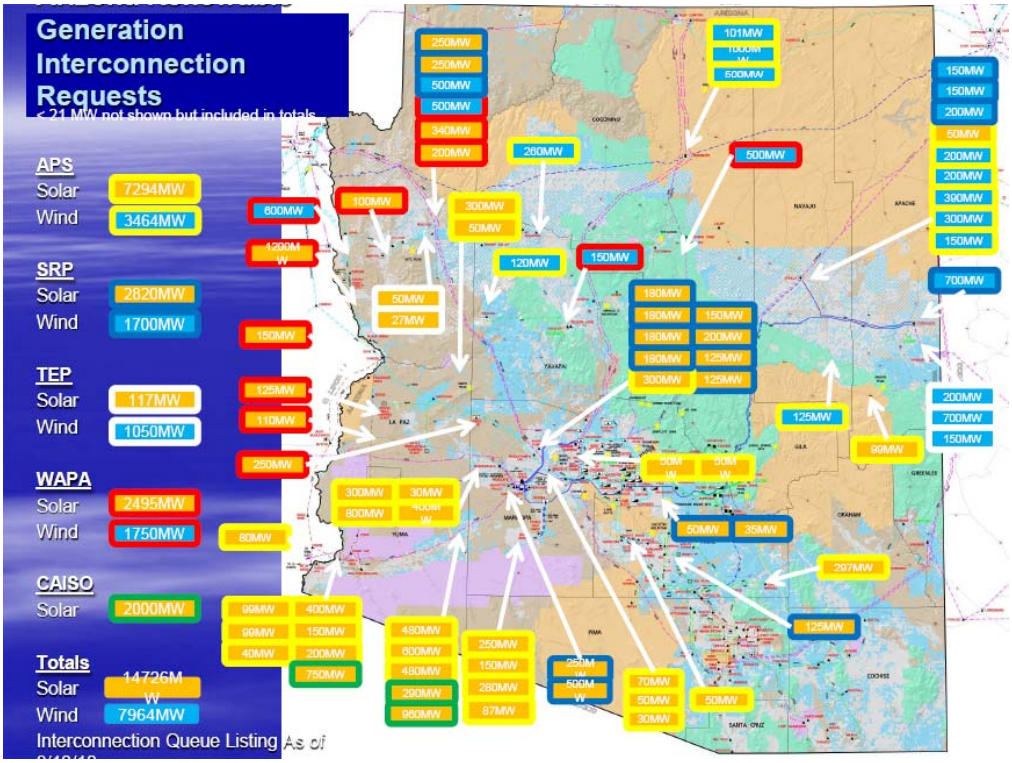
- Nevada Power

Capacity (MW)	2548.5	solar
	700	wind
	9.34	biomass
Projects	30	solar
	2	wind
	2	biomass

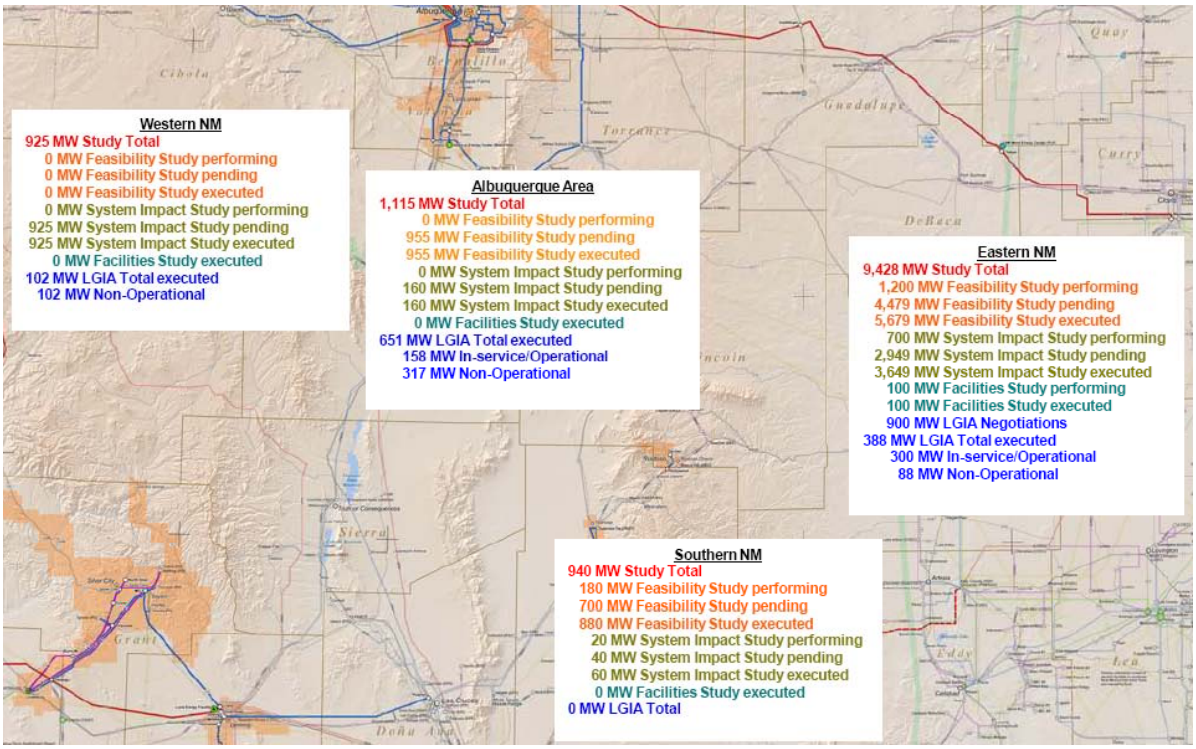
- Sierra Pacific

Capacity (MW)	1004.25	geothermal
	3431	wind
	372.4	solar
	14.1	biomass
Projects	24	geothermal
	20	wind
	7	solar
	1	biomass

AZ Queues


Generation Interconnection Requests
< 21 MW not shown but included in totals
APS
Solar 7294MW
Wind 3464MW
SRP
Solar 2820MW
Wind 1700MW
TEP
Solar 117MW
Wind 1050MW
WAPA
Solar 2495MW
Wind 1750MW
CAISO
Solar 2000MW
Totals
Solar 14726MW
Wind 7964MW
Interconnection Queue Listing As of

NM Queues


Western NM
925 MW Study Total
0 MW Feasibility Study performing
0 MW Feasibility Study pending
0 MW Feasibility Study executed
0 MW System Impact Study performing
925 MW System Impact Study pending
925 MW System Impact Study executed
0 MW Facilities Study executed
102 MW LGIA Total executed
102 MW Non-Operational
Albuquerque Area
1,115 MW Study Total
0 MW Feasibility Study performing
955 MW Feasibility Study pending
955 MW Feasibility Study executed
0 MW System Impact Study performing
160 MW System Impact Study pending
160 MW System Impact Study executed
0 MW Facilities Study executed
651 MW LGIA Total executed
158 MW In-service/Operational
317 MW Non-Operational
Eastern NM
9,428 MW Study Total
1,200 MW Feasibility Study performing
4,479 MW Feasibility Study pending
5,679 MW Feasibility Study executed
700 MW System Impact Study performing
2,949 MW System Impact Study pending
3,649 MW System Impact Study executed
100 MW Facilities Study performing
100 MW Facilities Study executed
900 MW LGIA Negotiations
388 MW LGIA Total executed
300 MW In-service/Operational
88 MW Non-Operational
Southern NM
940 MW Study Total
180 MW Feasibility Study performing
700 MW Feasibility Study pending
880 MW Feasibility Study executed
20 MW System Impact Study performing
40 MW System Impact Study pending
60 MW System Impact Study executed
0 MW Facilities Study executed
0 MW LGIA Total

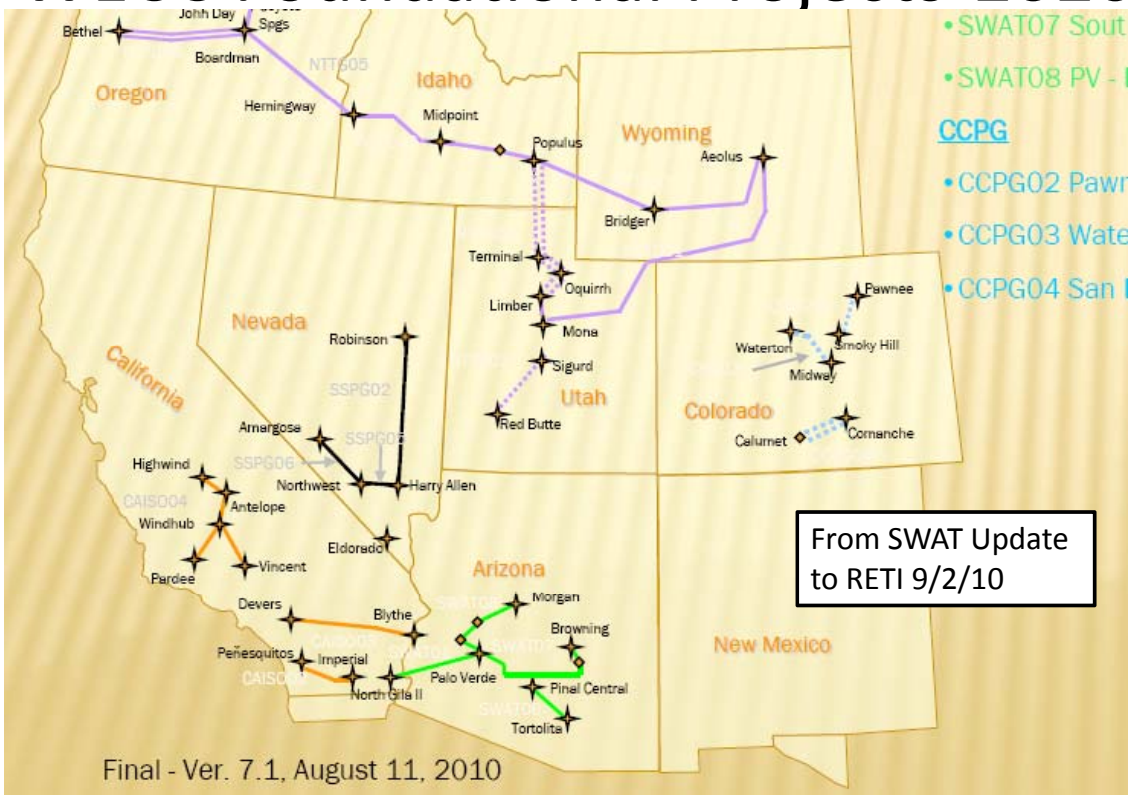
WREZ Capacity in Queue

CREZ Nam	Capacity Facto	Q Total (MW)	Q Energy (GWh/y	Q1	BA1	Q2	BA2	Q3	BA3	Q4	BA4
UT_WE	40%										
AZ_NE	33%	4541	13,070	2841	APS	500	WAPA	1200	SRP		
NV_SW	28%	2759	6,841	2759	NVE						
AZ_NW	28%	4277	10,434	260	APS	2940	WAPA	1000	SRP	77	TEP
NM_EA	32%	9428	26,405	9428	PNM						
AZ_WE	28%	12208	30,126	8823	APS	635	WAPA	750	SRP	2000	CAISO
NV_WE	29%	1793	4,601	1793	NVE						
NM_SE	32%	940	2,668	940	PNM						
NV_EA	28%	630	1,527	630	NVE						
AZ_SO	28%	0	0								

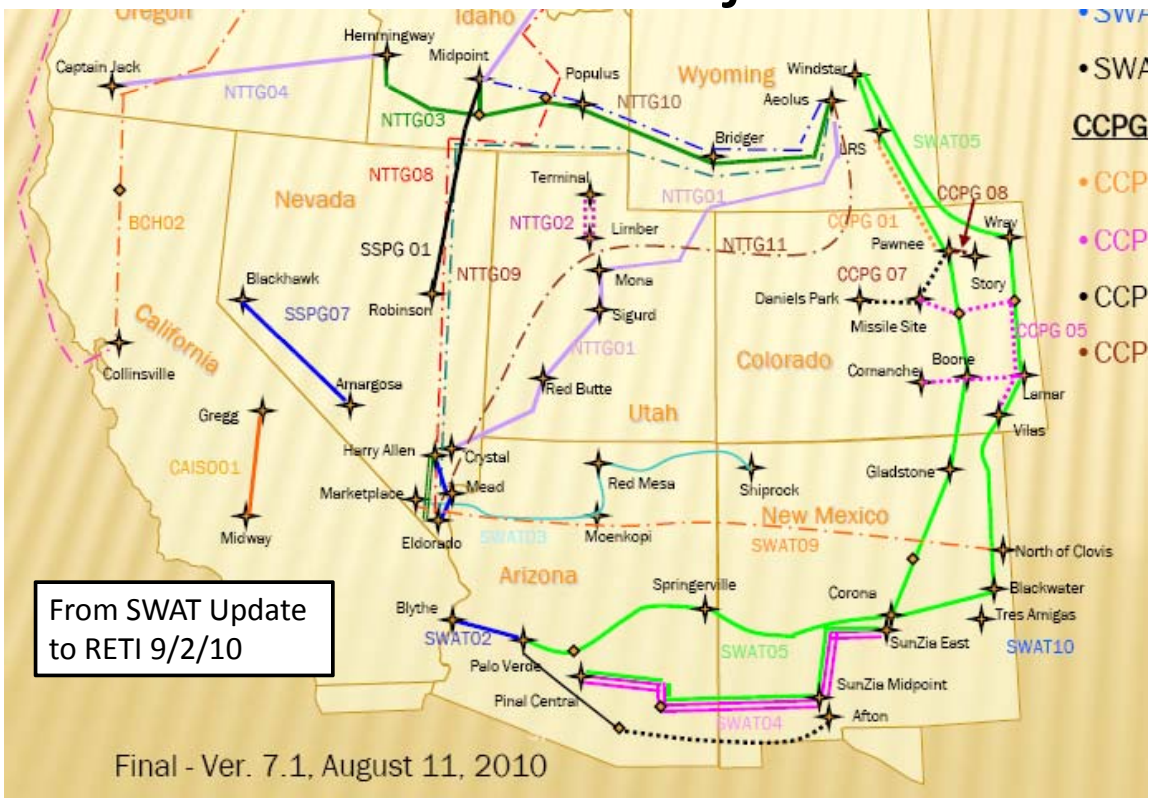
CA IOU PPA Status

Status	IOU	Min M	Min Expected GWh/y	Technology	Contract Term (years	Location
On schedule	SCE	90	245	wind	20	Southeast ID
On schedule	SCE	104	321	wind	20	Harney County, OR
On schedule	SDG&E	300	1054	wind	15	Glacier County, MT
On schedule	PG&E	90	277	wind	15	Kittitas County, WA
On schedule	PG&E	48	100	solar pv	20	Boulder City, NV
On schedule	SCE	800	662	wind	20	Arlington, OR
On schedule	PG&E	290	688	solar pv	25	Yuma, AZ
On schedule	PG&E	1000	2865	solar thermal	25	Coyote Springs, NV(III/IV)/TBD (V-VII)
Pending approval	SCE	386	640	wind	4	Columbia/Kittitas Counties, WA
Pending approval	PG&E	70	100	wind	1	Bickleton, WA
Pending approval	PG&E	62	163	wind	2	Milton-Freewater, OR
Pending approval	PG&E	96.6	256	wind	2	Arlington, OR
Pending approval	PG&E	various	330	multiple	4.5	Various within WECC
Pending approval	PG&E	100	250	wind	1.5	Moro, Sherman County, OR
Pending approval	PG&E	204.7	171	wind	2	Roosevelt, WA
Pending approval	PG&E	98.9	73	wind	2	Roosevelt, WA
Pending approval	PG&E	98.9	40	wind	1	Roosevelt, WA
Pending approval	PG&E	204.7	66	wind	2	Roosevelt, WA
Pending approval	SCE	32	252	biomass	20	Estancia Valley, Torrance County, NM
Pending approval	SCE	66	195	wind	4	Fort MacLeod, Alberta, Canada
Pending approval	PG&E	150	484	wind	20	Stettler, Alberta, Canada
Pending approval	PG&E	150	445	wind	20	Lethbridge, Alberta, Canada
Pending approval	PG&E	150	445	wind	20	Lethbridge, Alberta, Canada
Pending approval	PG&E	32.2	33	wind	2	Nine Canyon, Kennewick, WA

WECC Foundational Projects-2020

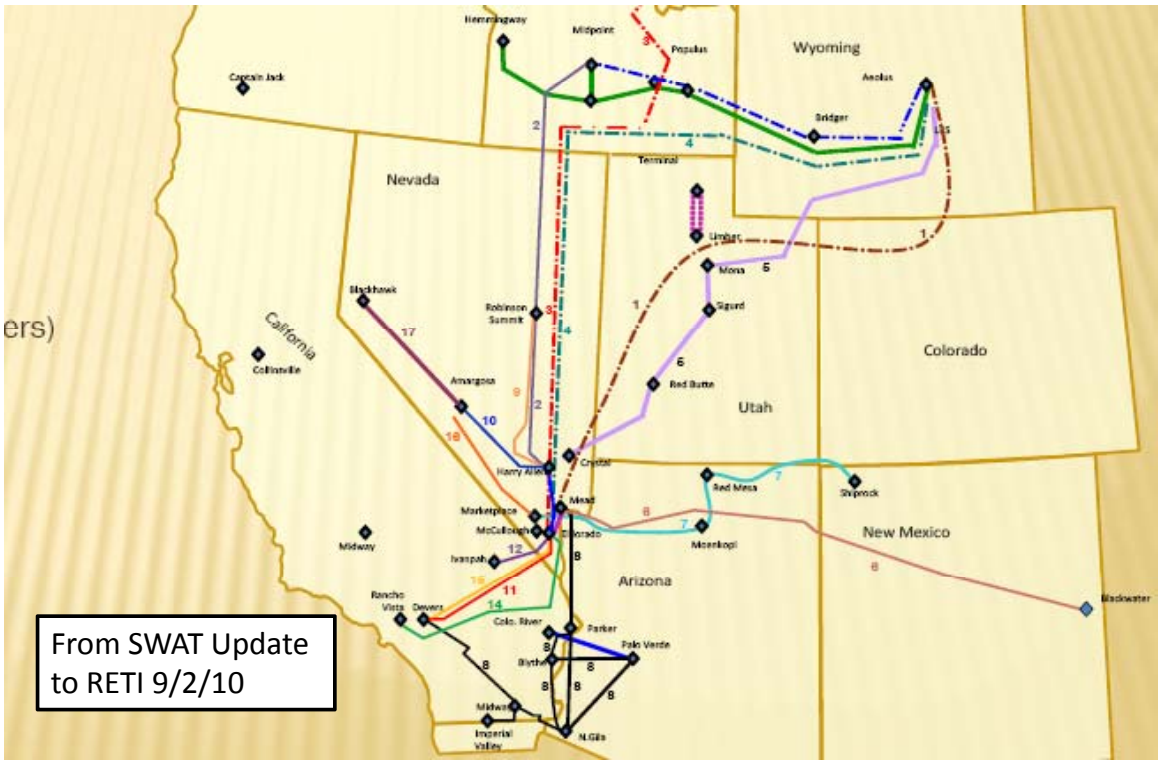


WECC Potential Projects-2020



From SWAT Update to RETI 9/2/10

Eldorado Valley SG Projects



SW Imports @ 40% of Net Short

- Net short = 52,764 GWh/yr in 2020
  - 40% = 21,106 GWh/yr
  - 60% = 31,658 GWh/yr
- First RETI/CTPG scenario
  - CA total = 36,717 GWh/yr
  - DiscoCore = 16,598 GWh/yr

SW Import Straw Proposal

- Notes
  - Resource choices are for purposes of scenario development only and are not intended to represent actual development patterns.
  - Resource "likelihood" for purposes of this scenario is based on OOS utility interconnection requests requiring minimal transmission expansion in order to be delivered to the CA border.

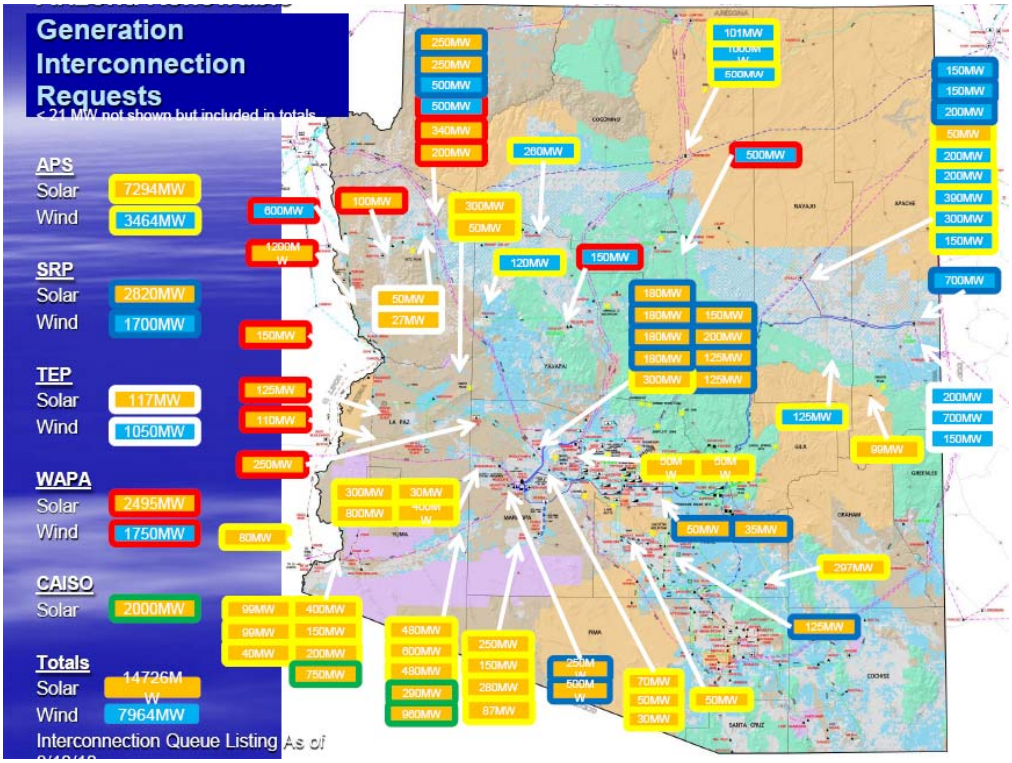
SW Import Straw Proposal

- Queue positions-
  - Get updates from utilities
  - Consider all renewable resources near SW CA border
    - NV_SW extended southward to include S. NV
    - AZ_NW
    - AZ_WE

SW Import Straw Proposal
(from preliminary data)

- Wind total in nearby WREZ queues
  - ≈ 3600 MW, ≈ 9400 GWh/yr @ 30% cf
- Proposal - Include all wind in these WREZ

AZ Queues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Interconnection Queue Listing As of

SW Import Straw Proposal (cont.)

- Solar in queues
  - NV_SW ≈ 2550 MW, ≈ 5600 GWh/yr @ 25% cf
  - AZ_NW ≈ 2400 MW, ≈ 5300 GWh/yr
  - AZ_WE > 9000 MW
- Proposal for solar
  - Half of remaining net short is solar in NV_SW and AZ_NW, half is solar in AZ_WE
    - NV_SW ≈ 3000 GWh/yr
    - AZ_NW ≈ 3000 GWh/yr
    - AZ_WE ≈ 6000 GWh/yr

SW Import Straw Proposal (cont.)

- California Resources in Scenario
  - 60% of net short = 31,658 GWh/yr
  - DiscoCore = 16,598 GWh/yr
  - Non-core = 15,060 GWh/yr
  - First RETI/CTPG non-core 20,120 GWh/yr
  - CA proposal – include entire DiscoCore and reduce non-core to 15,060 (25% reduction.)

Outstanding SW Questions for CTPG

- Does CTPG need:
  - Project interconnection locations?
  - Generation time of day profiles?
  - Are generic locations and profiles sufficient?
  - Do CA portals need to be identified?
  - How will OOS transmission needs be handled in models?
  - How will conventional resource redispatch be handled?

RTWG Discussion Issues

- Use of 3 nearby WREZ as proxy location of likely resource development for CA imports?
- 40%/60% SW/CA split?
- Inclusion of all near WREZ wind in scenario?
- Include central NV geothermal?
- Allocation of solar between WREZ?