

DRAFT PRELIMINARY
Western Renewable Energy Zones
Qualified Resource Area (QRA)
Renewable Energy Resource Summary Table
February 2, 2009

This table quantifies the following in each QRA: wind, solar, conventional discovered geothermal energy resources, small and large hydropower resources for Canada and incremental hydropower resources for the US. Undiscovered geothermal resources are quantified in each state for which data are available, but are not quantified in the QRA totals. Biomass resources are not quantified. The final WREZ analysis will quantify biomass resources available to each QRA.

Exclusions

Areas that by law or regulation are precluded from renewable energy development have been excluded. For example, renewable energy resources located inside national parks that lie inside QRA boundaries are not quantified here. Areas that fail to meet a number of technical criteria, such as terrain slope, have also been excluded from this analysis. The analysis has taken into account all avoid/exclude areas for which the E&L had data at the time of its completion. It has NOT taken into account the effect of wildlife sensitivity areas, which will be assessed by the WREZ process in April, 2009.

Developability Discounts

In addition to the environmental and land use exclusions mentioned above, various constraints, such as land ownership, the presence of structures, local zoning restrictions or other factors will limit the “developability” of renewable energy resources. For this reason, developability discounts were applied to total resource potential in the US to account for the likelihood that within any area, only a portion of the total resource potential is developable. After all other filters and exclusions have been applied, the remaining wind and solar resource potential are discounted to 25 and 3.5 percent of their total potential respectively. These discounts were not applied to Canadian resources, as the Canadian data had already taken similar factors into account.

QRA Size Criteria

Areas must meet minimum and maximum size criteria in order to be considered QRAs. A QRA must be an area with a radius no greater than 100 miles and contain at least 1,500 MW of wind, solar or large hydropower after all exclusion criteria and developability discounts have been applied. QRAs that are composed largely of geothermal resources can be as small as 500 MW. A different methodology was used to quantify resource potential in Canada, so Canadian QRAs can be less than 1,500 MW.

QRA Labels

QRAs are labeled based on their state and the region of the state in which the majority of their area is located. Many QRAs overlap state boundaries. As a result, the totals for each state in the table below do not correspond exactly with the total MW quantified in that state in QRAs in the WREZ process.

NOTES:

- ^a In the US, only the best classes of wind and solar resources in each state are quantified. In each state, only wind resources of that state’s minimum wind power class and higher and solar

resources of that state's minimum direct normal insolation level and higher are quantified. In Canada, renewable energy resources were quantified using a different methodology, which assessed resources on the site level, rather than using raw resource data so "best in state" criteria were not applied and Canadian resources were not discounted. For more information, please visit the public comment package Zone Identification and Technology Analysis working group web page.

- ^b Undiscovered geothermal resources are believed to exist in certain areas because of the presence of geologic systems that have been correlated with geothermal resource potential in other areas. This undiscovered potential has not yet been quantified at specific locations where a geothermal plant could be built, but it can be estimated on the state level at different confidence intervals. As a result, these resources are not quantified at the QRA level or included in the economic modeling of QRAs. When undiscovered geothermal potential is believed to exist in a QRA, it will be noted even though it will not be quantified. The mean estimated potential from these resources by state is quantified in this table by state. It is not captured in the QRA MW total, because these resources are not being quantified at the QRA level.
- ^c Data on undiscovered geothermal resources were not available for Baja California Norte, Texas, British Columbia or Alberta.
- ^d Small and large hydropower was quantified in Canada. Incremental additions to powered or non-powered dams were quantified in the US.
- ^e These resources may exist, but they were not quantified in this study.
- ^f As noted above, a different resource assessment methodology was used to quantify the MW of renewable energy resources available in Canada. Data on the wind power class in British Columbia and Alberta were not available from this assessment. As a result, only the total MW of wind resource is shown here, and these resources are not broken down into different wind class categories.

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QRA state/ prov	QRA Name	Solar thermal MW by DNI level (kWh/sqmtr/day) ^a						Wind MW by wind power class ^a				Geothermal MW		Hydro MW ^d	Total MW
		6.5 - 6.75	6.75 - 7.0	7.0 - 7.25	7.25 - 7.5	7.5 +	SOLAR TOTAL	3	4	5 +	WIND TOTAL	Discove red	Undiscov ered ^{b,c}		
AZ	AZ_NE	e	e	e	412	0	412	3,316	140	59	3,516	0	e	0	3,928
AZ	AZ_NW	e	e	e	2,791	701	3,492	30	3	1	34	0	e	0	3,526
AZ	AZ_SO	e	e	e	7,029	0	7,029	4	2	0	5	0	e	0	7,034
AZ	AZ_WE	e	e	e	8,900	2,276	11,176	4	0	0	4	0	e	0	11,181
AZ Total		e	e	e	19,132	2,977	22,109	3,354	145	61	3,560	0	1,043	0	25,669
BJ	BJ_NO	e	e	2,874	923	11	3,808	e	592	688	1,280	0	e	0	5,088
BJ	BJ_SO	e	e	415	496	51	963	e	463	475	938	0	e	0	1,900
BJ Total		e	e	3,289	1,419	62	4,770	e	1,054	1,163	2,218	0	e	0	6,988
CA	CA_CT	e	e	558	1,040	998	2,597	1,097	205	42	1,345	0	e	0	3,941
CA	CA_EA	e	e	1,031	1,796	73	2,900	218	21	5	244	0	e	0	3,143
CA	CA_NE	e	e	1,458	3,208	651	5,316	697	80	4	781	0	e	0	6,098
CA	CA_SO	e	e	3,219	436	41	3,696	480	140	131	752	1,434	e	0	5,882
CA	CA_WE	e	e	548	1,606	1,466	3,620	1,460	901	1,045	3,406	0	e	1	7,028
CA Total		e	e	6,815	8,087	3,228	18,129	3,952	1,347	1,228	6,527	1,434	11,340	1	26,092
CO	CO_EA	e	e	0	0	0	0	e	2,470	0	2,470	0	e	0	2,470
CO	CO_NE	e	e	0	0	0	0	e	4,067	203	4,270	0	e	0	4,270
CO	CO_SE	e	e	0	0	0	0	e	8,884	34	8,918	0	e	0	8,918
CO	CO_SO	e	e	2,463	174	0	2,636	e	125	114	239	0	e	0	2,875
CO Total		e	e	2,463	174	0	2,636	e	15,545	352	15,897	0	1,105	0	18,533
ID	ID_EA	e	e	e	e	e	e	1,784	219	97	2,100	310	e	4	2,414
ID	ID_SW	e	e	e	e	e	e	3,904	236	46	4,185	230	e	270	4,685
ID Total		e	e	e	e	e	e	5,688	455	143	6,285	540	1,872	274	7,098
MT	MT_CT	e	e	e	e	e	e	e	e	2,391	2,391	0	e	0	2,391
MT	MT_NE	e	e	e	e	e	e	e	e	2,037	2,037	0	e	3	2,040
MT	MT_NW	e	e	e	e	e	e	e	e	6,007	6,007	0	e	17	6,023
MT Total		e	e	e	e	e	e	e	e	10,434	10,434	0	771	20	10,454

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NM	NM_CT	^e	^e	3,188	553	0	3,741	^e	9	5	14	0	^e	0	3,755
NM	NM_EA	^e	^e	191	0	0	191	^e	9,871	1,446	11,317	0	^e	0	11,509
NM	NM_SE	^e	^e	0	0	0	0	^e	1,299	577	1,877	0	^e	0	1,877
NM	NM_SO	^e	^e	4,046	1,497	0	5,542	^e	3	1	4	0	^e	0	5,546
NM	NM_SW	^e	^e	2,189	5,562	0	7,751	^e	12	5	17	0	^e	0	7,768
NM Total		^e	^e	9,614	7,612	0	17,226	^e	11,194	2,034	13,229	0	1,484	0	30,455
NV	NV_EA	^e	^e	4,437	3,576	461	8,474	23	4	0	27	16	^e	0	8,517
NV	NV_NO	^e	^e	0	0	0	0	9	1	1	12	1,123	^e	0	1,134
NV	NV_SW	^e	^e	396	1,312	1,952	3,660	210	17	7	234	0	^e	0	3,894
NV	NV_WE	^e	^e	2,313	4,593	1,005	7,911	170	31	18	220	296	^e	0	8,427
NV Total		^e	^e	7,147	9,481	3,418	20,046	413	53	26	491	1,435	4,364	0	21,972
OR	OR_SE	^e	^e	^e	^e	^e	^e	1,777	213	65	2,055	48	^e	0	2,103
OR	OR_SO	^e	^e	^e	^e	^e	^e	1,136	219	85	1,440	64	^e	0	1,504
OR	OR_WE	^e	^e	^e	^e	^e	^e	357	151	125	633	331	^e	1,105	2,069
OR Total		^e	^e	^e	^e	^e	^e	3,270	583	276	4,128	443	1,893	1,105	5,677
TX	TX	555	4,672	6	0	0	5,233	^e	380	2	382	0	^e	0	5,615
TX Total		555	4,672	6	0	0	5,233	^e	380	2	382	0	^e	0	5,615
UT	UT_WE	5,571	2,559	273	0	0	8,403	1,512	136	36	1,684	300	^e	0	10,387
UT Total		5,571	2,559	273	0	0	8,403	1,512	136	36	1,684	300	1,464	0	10,387
WA	WA_SE	^e	^e	^e	^e	^e	^e	2,143	627	140	2,910	0	^e	55	2,965
WA	WA_SO	^e	^e	^e	^e	^e	^e	3,711	826	135	4,672	0	^e	699	5,371
WA Total		^e	^e	^e	^e	^e	^e	5,854	1,454	275	7,583	0	300	754	8,337
WY	WY_EA	^e	^e	^e	^e	^e	^e	^e	^e	8,046	8,046	0	^e	17	8,063
WY	WY_EC	^e	^e	^e	^e	^e	^e	^e	^e	3,911	3,911	0	^e	0	3,911
WY	WY_NO	^e	^e	^e	^e	^e	^e	^e	^e	3,090	3,090	0	^e	0	3,090
WY	WY_SO	^e	^e	^e	^e	^e	^e	^e	^e	1,533	1,533	0	^e	0	1,533

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WY	WY_WE	e	e	e	e	e	e	e	e	8,393	8,393	0	e	168	8,561
WY Total		e	e	e	e	e	e	e	e	24,973	24,973	0	174	185	25,158
AB	AB_EA	e	e	e	e	e	e	f	f	f	1,139	0	e	0	1,139
AB	AB_EC	e	e	e	e	e	e	f	f	f	700	0	e	0	700
AB	AB_NO	e	e	e	e	e	e	f	f	f	0	0	e	1,800	1,800
AB	AB_SE	e	e	e	e	e	e	f	f	f	2,250	0	e	0	2,250
AB Total		e	e	e	e	e	e	f	f	f	4,089	0	e	1,800	5,889
BC	BC_CT	e	e	e	e	e	e	f	f	f	895	0	e	6	901
BC	BC_EA	e	e	e	e	e	e	f	f	f	0	0	e	2,012	2,012
BC	BC_NE	e	e	e	e	e	e	f	f	f	3,997	0	e	936	4,932
BC	BC_NO	e	e	e	e	e	e	f	f	f	2,116	0	e	115	2,231
BC	BC_NW	e	e	e	e	e	e	f	f	f	3,413	0	e	23	3,436
BC	BC_SE	e	e	e	e	e	e	f	f	f	345	16	e	73	434
BC	BC_SO	e	e	e	e	e	e	f	f	f	2,608	32	e	68	2,708
BC	BC_SW	e	e	e	e	e	e	f	f	f	2,498	16	e	1,047	3,561
BC	BC_WC	e	e	e	e	e	e	f	f	f	0	180	e	4,801	4,981
BC	BC_WE	e	e	e	e	e	e	f	f	f	1,439	0	e	47	1,485
BC Total		e	e	e	e	e	e	f	f	f	17,310	244	e	9,127	26,681
Grand Total		6,126	7,231	29,606	45,904	9,686	120,662	24,043	32,344	41,003	118,790	4,396	25,810	13,266	235,004