

Western Renewable Energy Zones Initiative

Renewable Energy Generating Capacity Summary

Hub state/prov	Hub Name	Solar thermal MW by DNI level (kWh/sqmr/day) ^a						Wind MW by wind power class ^a				Geothermal MW		Hydro MW ^d	Biomass MW	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	Discov-ered	Undis-covered ^{b,c}			WREZ-only
AZ	AZ NE	°	°	°	309	0	309	3,305	137	57	3,499	0	°	0	256	4,064
AZ	AZ NW	°	°	36	2,841	648	3,525	209	7	2	217	0	°	0	17	3,760
AZ	AZ SO	°	°	°	6,623	0	6,623	°	°	°	°	0	°	0	8	6,631
AZ	AZ WE	°	°	°	7,766	1,556	9,322	°	°	°	°	0	°	0	47	9,369
AZ Total		0	0	36,324,947	17,539	2,204	19,780	3,514	144	59	3,717	0	1,043	0	327	23,824
CA	CA CT	°	°	500	891	868	2,259	1,162	207	41	1,410	0	°	0	11	3,680
CA	CA EA	°	°	1,035	1,575	69	2,679	213	20	5	237	0	°	0	11	2,927
CA	CA NE	°	°	1,213	2,862	602	4,676	489	74	2	565	0	°	0	0	5,241
CA	CA SO	°	°	2,977	392	36	3,405	477	139	129	744	1,434	°	2	19	5,604
CA	CA WE	°	°	508	1,331	1,212	3,050	1,261	825	1,000	3,085	0	°	0	106	6,241
CA Total		0	0	6,232	7,051	2,786	16,069	3,602	1,264	1,176	6,042	1,434	11,340	2	147	23,693
CO	CO EA	°	°	0	0	0	0	°	2,445	0	2,445	0	°	0	7	2,452
CO	CO NE	°	°	0	0	0	0	°	4,016	203	4,218	0	°	0	13	4,231
CO	CO SE	°	°	0	0	0	0	°	8,777	36	8,813	0	°	0	16	8,829
CO	CO SO	°	°	2,151	152	0	2,303	°	112	92	203	0	°	0	118	2,624
CO Total		0	0	2,151	152	0	2,303	0	15,350	330	15,679	0	1,105	0	153	18,135
ID	ID EA	°	°	°	°	°	0	618	67	12	696	125	°	0	260	1,081
ID	ID SW	°	°	°	°	°	0	893	13	1	907	154	°	8	98	1,167
ID Total		0	0	0	0	0	0	1,510	80	13	1,603	279	1,872	8	358	2,249
MT	MT CT	°	°	°	°	°	0	°	°	2,527	2,527	0	°	0	77	2,604
MT	MT NE	°	°	°	°	°	0	°	°	2,337	2,337	0	°	0	4	2,341
MT	MT NW	°	°	°	°	°	0	°	°	5,194	5,194	0	°	0	66	5,261
MT Total		0	0	0	0	0	0	0	0	10,059	10,059	0	771	0	147	10,206
NM	NM CT	°	°	2,679	459	0	3,138	°	°	°	°	0	°	0	110	3,249
NM	NM EA	°	°	83	0	0	83	°	9,857	1,433	11,290	0	°	0	44	11,418
NM	NM SE	°	°	0	0	0	0	°	1,338	557	1,894	0	°	0	22	1,916
NM	NM SO	°	°	3,128	1,219	0	4,347	°	°	°	°	0	°	0	12	4,359
NM	NM SW	°	°	1,784	4,365	0	6,149	°	°	°	°	0	°	0	34	6,183
NM Total		0	0	7,675	6,042	0	13,718	0	11,195	1,989	13,184	0	1,484	0	223	27,124
NV	NV EA	°	°	4,079	3,305	428	7,812	°	°	°	°	24	°	0	134	7,970
NV	NV NO	°	°	°	°	°	°	°	°	°	°	1,048	°	2	133	1,183
NV	NV SW	°	°	369	1,212	1,895	3,475	212	16	6	233	0	°	0	12	3,720
NV	NV WE	°	°	2,142	4,207	946	7,294	160	27	12	198	296	°	0	22	7,810
NV Total		0	0	6,590	8,724	3,268	18,582	371	42	18	431	1,368	4,364	2	300	20,683
OR	OR NE	°	°	°	°	°	°	1,476	464	104	2,043	0	°	0	388	2,431
OR	OR SO	°	°	°	°	°	°	388	69	54	511	501	°	0	118	1,130
OR	OR WE	°	°	°	°	°	°	196	90	57	343	331	°	3	140	817
OR Total		0	0	0	0	0	0	2,059	623	215	2,897	832	1,893	3	646	4,378
TX	TX	461	3,809	7	0	0	4,277	208	235	64	507	0	°	0	3	4,787
TX Total		461	3,809	7	0	0	4,277	208	235	64	507	0	0	0	3	4,787
UT	UT WE	4,786	2,178	237	0	0	7,202	1,516	133	29	1,678	225	°	0	91	9,196
UT Total		4,786	2,178	237	0	0	7,202	1,516	133	29	1,678	225	1,464	0	91	9,196
WA	WA SO	°	°	°	°	°	0	2,566	602	92	3,260	0	°	544	101	3,905
WA Total		0	0	0	0	0	0	2,566	602	92	3,260	0	300	544	101	3,905
WY	WY EA	°	°	°	°	°	0	°	°	7,257	7,257	0	°	0	5	7,262
WY	WY EC	°	°	°	°	°	0	°	°	2,594	2,594	0	°	0	0	2,594
WY	WY NO	°	°	°	°	°	0	°	°	3,063	3,063	0	°	0	5	3,069
WY	WY SO	°	°	°	°	°	0	°	615	1,324	1,939	0	°	0	6	1,945
WY Total		0	0	0	0	0	0	0	615	14,239	14,854	0	174	0	16	14,869
AB	AB EA	°	°	°	°	°	0	f	f	f	1,319	0	°	0	96	1,415
AB	AB EC	°	°	°	°	°	0	f	f	f	700	0	°	0	122	822
AB	AB NO	°	°	°	°	°	0	f	f	f	0	0	°	1,800	0	1,800
AB	AB SE	°	°	°	°	°	0	f	f	f	2,410	0	°	0	51	2,461
AB Total		0	0	0	0	0	0	0	0	0	4,429	0	0	1,800	268	6,497
BC	BC CT	°	°	°	°	°	0	f	f	f	902	0	°	4	122	1,027
BC	BC EA	°	°	°	°	°	0	f	f	f	0	32	°	1,076	34	1,142
BC	BC NE	°	°	°	°	°	0	f	f	f	4,081	16	°	1,006	109	5,212
BC	BC NO	°	°	°	°	°	0	f	f	f	2,176	0	°	87	79	2,342
BC	BC NW	°	°	°	°	°	0	f	f	f	1,285	32	°	572	85	1,974
BC	BC SE	°	°	°	°	°	0	f	f	f	138	32	°	165	60	396
BC	BC SHF	g	g	g	g	g	g	g	g	g	g	g	g	g	g	21,600 ^g
BC	BC SO	°	°	°	°	°	0	f	f	f	2,300	32	°	196	109	2,638
BC	BC SW	°	°	°	°	°	0	f	f	f	1,744	16	°	198	162	2,119
BC	BC WC	°	°	°	°	°	0	f	f	f	0	180	°	2,737	127	3,044
BC	BC WE	°	°	°	°	°	0	f	f	f	1,318	0	°	50	53	1,421
BC Total		0	0	0	0	0	0	0	0	0	13,943	340	0	6,092	939	21,315
BJ	BJ NO	°	°	3,015	952	13	3,980	°	758	925	1,684	0	°	°	°	5,664
BJ	BJ SO	°	°	439	523	50	1,012	°	614	639	1,253	0	°	°	°	2,264
BJ Total		0	0	3,454	1,475	63	4,991	0	1,372	1,564	2,937	0	0	0	0	7,928
Grand Total		5,247	5,988	26,382	40,982	8,322	86,921	15,347	31,654	29,846	95,219	4,478	25,810	8,452	3,720	198,789

CAPACITY (MW)

Western Renewable Energy Zones Initiative

Renewable Energy Generation Summary

Hub state/prov	Hub Name	Solar thermal GWh/yr by DNI level (kWh/sqmt/day)*						Wind GWh/yr by wind power class*				Geothermal GWh/yr		Hydro GWh/yr ^d	Biomass GWh/yr	Total GWh/yr
		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	Discov-ered	Undis-covered ^{b,c}			WREZ-only
AZ	AZ NE	*	*	*	696	0	696	8,107	371	182	8,661	0	*	0	1,903	11,260
AZ	AZ NW	*	*	84	6,595	1,505	8,184	512	19	5	536	0	*	0	127	8,847
AZ	AZ SO	*	*	*	15,607	0	15,607	*	*	*	*	0	*	0	59	15,665
AZ	AZ WE	*	*	*	18,912	3,790	22,702	*	*	*	*	0	*	0	350	23,051
AZ Total		0	0	84,32473	41,809	5,295	47,188	8,619	390	188	9,197	0	7,309	0	2,438	58,824
CA	CA CT	*	*	1,191	2,123	2,069	5,383	2,850	561	134	3,545	0	*	0	83	9,011
CA	CA EA	*	*	2,375	3,615	158	6,148	522	53	14	589	0	*	0	83	6,821
CA	CA NE	*	*	2,836	6,693	1,407	10,937	1,199	202	7	1,407	0	*	0		12,344
CA	CA SO	*	*	6,937	915	83	7,934	1,170	376	429	1,976	11,074	*	8	142	21,134
CA	CA WE	*	*	1,139	2,984	2,717	6,840	3,093	2,239	3,282	8,615	0	*	0	786	16,241
CA Total		0	0	14,477	16,330	6,434	37,241	8,834	3,432	3,867	16,132	11,074	79,471	8	1,095	65,550
CO	CO EA	*	*	0	0	0	0	*	6,640	0	6,640	0	*	0	50	6,689
CO	CO NE	*	*	0	0	0	0	*	10,904	623	11,527	0	*	0	94	11,621
CO	CO SE	*	*	0	0	0	0	*	23,836	109	23,944	0	*	0	120	24,065
CO	CO SO	*	*	4,617	326	0	4,943	*	303	299	602	0	*	0	875	6,421
CO Total		0	0	4,617	326	0	4,943	0	41,683	1,031	42,714	0	7,744	0	1,139	48,796
ID	ID EA	*	*	*	*	*	0	1,515	182	38	1,735	1,034	*	0	1,936	4,704.756
ID	ID SW	*	*	*	*	*	0	2,189	36	4	2,229	1,079	*	0	728	4,036.080
ID Total		0	0	0	0	0	0	3,705	217	43	3,965	2,113	13,119	0	2,663	8,741
MT	MT CT	*	*	*	*	*	0	*	*	8,224	8,224	0	*	0	570	8,794
MT	MT NE	*	*	*	*	*	0	*	*	7,429	7,429	0	*	0	32	7,461
MT	MT NW	*	*	*	*	*	0	*	*	16,932	16,932	0	*	0	494	17,427
MT Total		0	0	0	0	0	0	0	0	32,585	32,585	0	5,403	0	1,097	33,682
NM	NM CT	*	*	6,126	1,049	0	7,175	*	*	*	*	0	*	0	823	7,998
NM	NM EA	*	*	183	0	0	183	*	26,768	4,427	31,196	0	*	0	330	31,708
NM	NM SE	*	*	0	0	0	0	*	3,632	1,748	5,381	0	*	0	162	5,542
NM	NM SO	*	*	7,317	2,850	0	10,167	*	*	*	*	0	*	0	92	10,258
NM	NM SW	*	*	4,298	10,515	0	14,814	*	*	*	*	0	*	0	254	15,067
NM Total		0	0	17,924	14,414	0	32,338	0	30,400	6,176	36,576	0	10,400	0	1,659	70,573
NV	NV EA	*	*	9,076	7,354	952	17,382	*	*	*	*	168	*	0	995	18,546
NV	NV NO	*	*	*	*	*	*	*	*	*	*	7,799	*	9	991	8,799
NV	NV SW	*	*	840	2,760	4,316	7,916	520	42	19	581	0	*	0	88	8,584
NV	NV WE	*	*	4,916	9,655	2,170	16,741	391	73	39	503	2,074	*	0	161	19,479
NV Total		0	0	14,832	19,769	7,438	42,039	911	115	58	1,083	10,041	30,583	9	2,235	55,408
OR	OR NE	*	*	*	*	*	*	3,619	1,259	325	5,204	0	*	0	2,892	8,095
OR	OR SO	*	*	*	*	*	*	951	188	181	1,320	3,550	*	0	876	5,747
OR	OR WE	*	*	*	*	*	*	481	244	191	916	2,596	*	16	1,040	4,567
OR Total		0	0	0	0	0	0	5,051	1,691	698	7,439	6,146	13,266	16	4,808	18,409
TX	TX	1,001	8,275	15	0	0	9,291	510	639	197	1,346	0	*	0	26	10,663
TX Total		1,001	8,275	15	0	0	9,291	510	639	197	1,346	0	0	0	26	10,663
UT	UT WE	10,147	4,618	503	0	0	15,268	3,718	361	95	4,174	1,594	*	0	674	21,711
UT Total		10,147	4,618	503	0	0	15,268	3,718	361	95	4,174	1,594	10,260	0	674	21,711
WA	WA SO	*	*	*	*	*	0	6,295	1,635	295	8,225	0	*	2,531	754	11,509
WA Total		0	0	0	0	0	0	6,295	1,635	295	8,225	0	2,102	2,531	754	11,509
WY	WY EA	*	*	*	*	*	0	*	*	24,570	24,570	0	*	0	35	24,605
WY	WY EC	*	*	*	*	*	0	*	*	8,801	8,801	0	*	0	0	8,801
WY	WY NO	*	*	*	*	*	0	*	*	9,606	9,606	0	*	0	41	9,647
WY	WY SO	*	*	*	*	*	0	*	1,670	4,457	6,126	0	*	0	41	6,168
WY Total		0	0	0	0	0	0	0	1,670	47,434	49,104	0	1,219	0	117	49,221
AB	AB EA	*	*	*	*	*	0	f	f	f	4,044	0	*	0	713	4,757
AB	AB EC	*	*	*	*	*	0	f	f	f	2,146	0	*	0	907	3,053
AB	AB NO	*	*	*	*	*	0	f	f	f	0	0	*	6,307	1	6,308
AB	AB SE	*	*	*	*	*	0	f	f	f	7,389	0	*	0	376	7,765
AB Total		0	0	0	0	0	0	0	0	0	13,579	0	0	6,307	1,997	21,883
BC	BC CT	*	*	*	*	*	0	f	f	f	1,953	0	*	10	905	2,868
BC	BC EA	*	*	*	*	*	0	f	f	f	0	224	*	437	250	911
BC	BC NE	*	*	*	*	*	0	f	f	f	11,389	112	*	4,953	811	17,265
BC	BC NO	*	*	*	*	*	0	f	f	f	5,730	0	*	420	588	6,738
BC	BC NW	*	*	*	*	*	0	f	f	f	3,159	224	*	1,984	632	5,999
BC	BC SE	*	*	*	*	*	0	f	f	f	252	224	*	508	447	1,432
BC	BC SHPD	g	g	g	g	g	g	g	g	g	g	g	g	g	g	15,797 ^g
BC	BC SO	*	*	*	*	*	0	f	f	f	4,786	224	*	630	815	6,455
BC	BC SW	*	*	*	*	*	0	f	f	f	3,630	112	*	717	1,204	5,663
BC	BC WC	*	*	*	*	*	0	f	f	f	0	1,419	*	12,546	949	14,914
BC	BC WE	*	*	*	*	*	0	f	f	f	3,205	0	*	167	393	3,766
BC Total		0	0	0	0	0	0	0	0	0	34,104	2,540	0	22,372	6,994	66,010
BJ	BJ NO	*	*	7,026	2,218	30	9,274	*	2,058	3,110	5,169	0	*	*	*	14,443
BJ	BJ SO	*	*	1,022	1,218	117	2,357	*	1,668	2,078	3,745	0	*	*	*	6,102
BJ Total		0	0	8,048	3,436	146	11,631	0	3,726	5,188	8,915	0	0	0	0	20,545
Grand Total		11,147	12,893	60,500	96,085	19,313	199,939	37,642	85,959	97,853	269,138	33,509	180,876	31,243	27,698	561,527

Endnotes Supporting Tables 1 and 2

- ^a Only the best classes of wind and solar resources in each state were quantified. Quantifications for wind resources represent each state's minimum wind power class and higher, and for solar resources each state's minimum direct normal insolation level and higher. In Canada, renewable energy resources were quantified using a different methodology. It assessed resources at the site level as opposed to using raw resource data, therefore, the "best in state" criteria are not applied and Canadian resources are not discounted. Wind potential was not quantified in QRAs with less than 100 MW of total wind resource potential. Additional information is available on the Web at: <http://www.westgov.org/wga/initiatives/wrez/zita/index.htm>.
- ^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 at the state level with different levels of confidence. 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 and province. It is not captured in the QRA MW total, because these resources are not being quantified at the QRA level. U.S. estimates are from the U.S. Geological Survey, and Canadian estimates are from the Canadian Geothermal Energy Association.
- ^c Data on undiscovered geothermal resources were not available for Baja California Norte and Texas at the time of publication.
- ^d Small and large hydropower are quantified in Canada. Incremental additions to powered or non-powered dams are quantified in the US.
- ^e These resources may exist, but they are not quantified in this study.
- ^f As noted above, a different resource assessment methodology is used to quantify the MW of renewable energy resources available in Canada. Data on the wind power class in British Columbia and Alberta are not available from this assessment. As a result, only the total potential of wind resources is shown here and are not broken down into different wind class categories.
- ^g British Columbia voluntarily provided a hub on the British Columbia-Washington border to the WREZ process. This represents a 16,000 gigawatt-hour per year shaped energy product that British Columbia could provide to load serving entities (LSEs) at the border. The intention of this additional hub and associated cost curve is not to represent a specific product offered to LSEs at the border, but to illustrate the benefits of a shaped and firmed decarbonized energy product to encourage further discussion. This hub and its energy and production profile will be selectable when using the Generation and Transmission Modeling tool. The energy resources that make up this cost curve are not specified, therefore, they are not broken down by resource type or class. The generation available from this additional QRA is not included in the B.C. subtotal or the grand total on this table.