An ENGO perspective on Phase 1 results of the Western Renewable Energy Zones (WREZ) Initiative

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Renewable Energy Zones

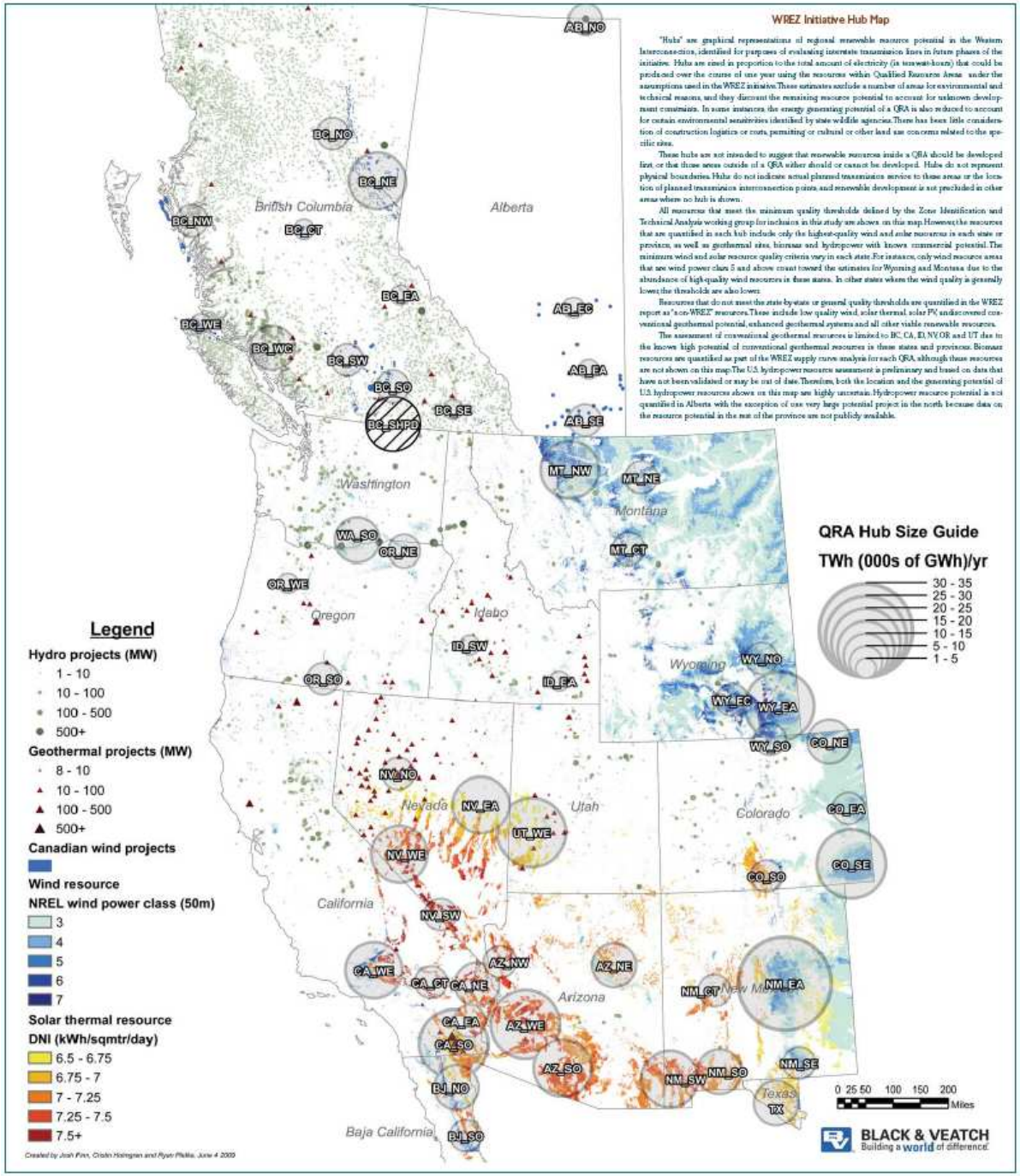
- REZ is an innovation from Southwest U.S. states in response to Renewable Portfolio Standards.

- RE generation must be sited where the resource is.
- It takes longer to build transmission than to build power plants.
- “You have to know where the puck is going to be.”

- US REZ methodology: identify and prioritize high-energy, low-environmental-impact areas for staged development, in order to make efficient investments in transmission infrastructure.

WREZ Methodology

- Identify all lands with high RE potential
- Identify all environmentally sensitive lands (e.g. parks, critical endangered species habitat, roadless area)
- Lands with high RE potential not excluded from development (e.g. parks) are potential REZ areas
- Calculate electricity production from each REZ, excluding or discounting production within environmentally sensitive areas
- Evaluate the total per MWh cost of generating power from each REZ, and prioritize development accordingly


AB_NO
BC_NO
BC_NE
BC_NW
BC_CT
BC_EA
AB_EC
BC_WE
BC_WC
BC_SW
AB_EA
BC_SO
BC_SE
BC_SHPD
AB_SE
British Columbia
Alberta
Washington
MT_NW
MT_NE
Montana
WA_SO
OR_NE
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OR_WE
Oregon
Idaho
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Wyoming
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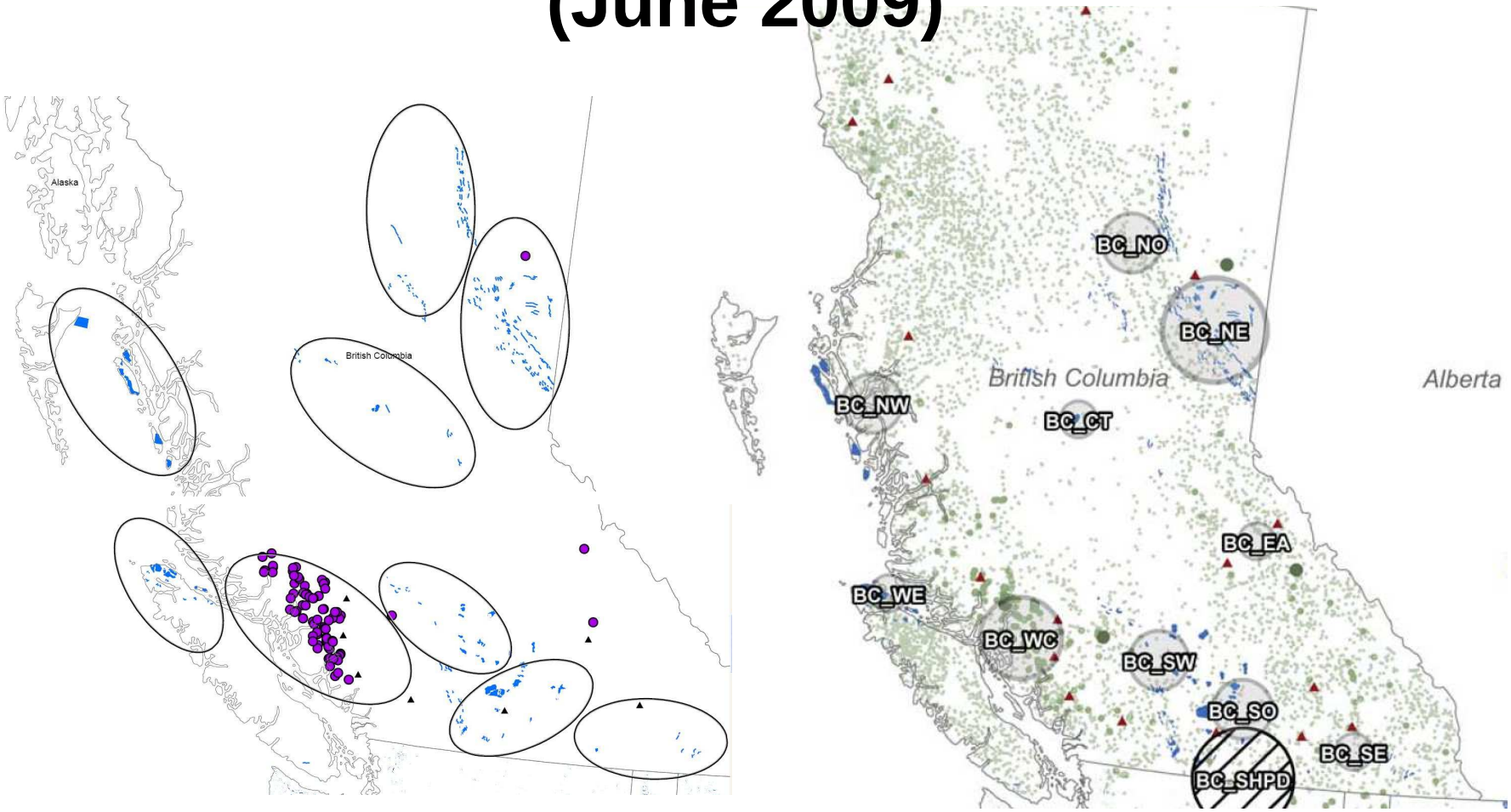
CO_NE
NV_NO
Nevada
NV_EA
Utah
Colorado
CO_EA
UT_WE
NV_WE
CO_SE
CO_SO
California
NV_SW
AZ_NW
AZ_NE
CA_WE
CA_CT
CA_NE
NM_CT
New Mexico
NM_EA
Arizona
CA_EA
AZ_WE
CA_SO
AZ_SO
NM_SW
NM_SO
NM_SE
BJ_NO
Texas
TX
Baja California
BJ_SO
Legend
Hydro projects (MW)
1 - 10
10 - 100
100 - 500
500+
Geothermal projects (MW)
8 - 10
10 - 100
100 - 500
500+
Canadian wind projects
Wind resource
NREL wind power class (50m)
3
4
5
6
7
Solar thermal resource
DNI (kWh/sqmtr/day)
6.5 - 6.75
6.75 - 7
7 - 7.25
7.25 - 7.5
7.5+
Created by Josh Finn, Cristin Holmgren and Ryan Pletka, June 4 2009
WREZ Initiative Hub Map
"Hubs" are graphical representations of regional renewable resource potential in the Western Interconnection, identified for purposes of evaluating interstate transmission lines in future phases of the initiative. Hubs are sized in proportion to the total amount of electricity (in terawatt-hours) that could be produced over the course of one year using the resources within Qualified Resource Areas under the assumptions used in the WREZ initiative. These estimates exclude a number of areas for environmental and technical reasons, and they discount the remaining resource potential to account for unknown development constraints. In some instances, the energy generating potential of a QRA is also reduced to account for certain environmental sensitivities identified by state wildlife agencies. There has been little consideration of construction logistics or costs, permitting or cultural or other land use concerns related to the specific sites.
These hubs are not intended to suggest that renewable resources inside a QRA should be developed first, or that those areas outside of a QRA either should or cannot be developed. Hubs do not represent physical boundaries. Hubs do not indicate actual planned transmission service to those areas or the location of planned transmission interconnection points, and renewable development is not precluded in other areas where no hub is shown.
All resources that meet the minimum quality thresholds defined by the Zone Identification and Technical Analysis working group for inclusion in this study are shown on this map. However, the resources that are quantified in each hub include only the highest-quality wind and solar resources in each state or province, as well as geothermal sites, biomass and hydropower with known commercial potential. The minimum wind and solar resource quality criteria vary in each state. For instance, only wind resource areas that are wind power class 5 and above count toward the estimates for Wyoming and Montana due to the abundance of high quality wind resources in these states. In other states where the wind quality is generally lower, the thresholds are also lower.
Resources that do not meet the state-by-state or general quality thresholds are quantified in the WREZ report as "non-WREZ" resources. These include low quality wind, solar thermal, solar PV, undiscovered conventional geothermal potential, enhanced geothermal systems and all other viable renewable resources.
The assessment of conventional geothermal resources is limited to BC, CA, ID, NV, OR and UT due to the known high potential of conventional geothermal resources in these states and provinces. Biomass resources are quantified as part of the WREZ supply curve analysis for each QRA, although these resources are not shown on this map. The U.S. hydropower resource assessment is preliminary and based on data that have not been validated or may be out of date. Therefore, both the location and the generating potential of U.S. hydropower resources shown on this map are highly uncertain. Hydropower resource potential is not quantified in Alberta with the exception of one very large potential project in the north because data on the resource potential in the rest of the province are not publicly available.
QRA Hub Size Guide
TWh (000s of GWh)/yr
30 - 35
25 - 30
20 - 25
15 - 20
10 - 15
5 - 10
1 - 5
0 25 50 100 150 200
Miles
BLACK & VEATCH
Building a world of difference.

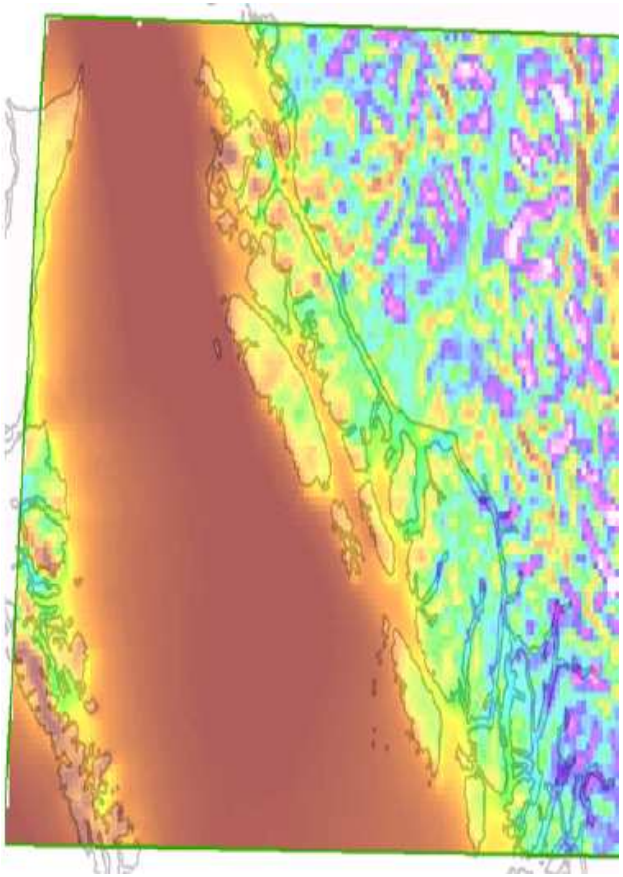
Comparison of draft “QRA” Map (February 2009) and Phase 1 WREZ Map (June 2009)

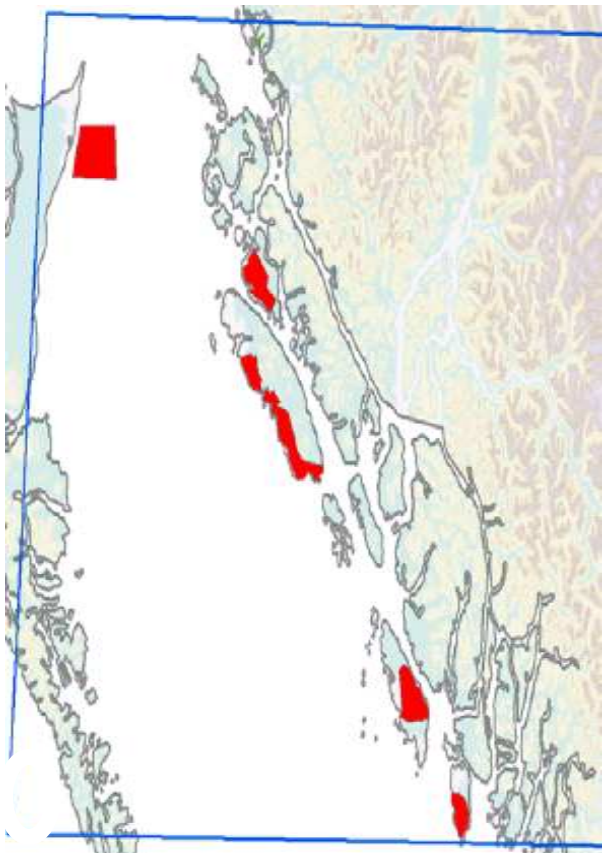


Concerns with B.C. Renewable Energy resource assessment:

- The sources of datasets on renewable energy resources potential have not been sufficiently transparent;
- The analysis of these datasets is **not compatible with the stated WREZ Methodology, and differs from that used in other WREZ jurisdictions;**
- The resulting **renewable energy resources** shown on the Draft QRA Map **are underrepresented** relative to other jurisdictions; and
- The renewable energy resources that are displayed are **strongly biased towards already-proposed energy developments**.

The WREZ map identifies wind developers, not wind resources





Other problems with the WREZ B.C. Renewable Energy assessment

- Hydro: Data on QRA map restricted to cost-effective resources
- Geothermal: data used came from California consultant, not CanGEA
- Biomass: sustainable resources are limited (not shown on map)

Environmental lands assessment for B.C.

Avoidance Areas:

- Wildlife Habitat Areas
- Ungulate Winter Range
- Endangered Species and Ecosystems – mapped occurrences
- Old Growth Management Areas - Legal – Current

High Sensitivity:

- Fisheries Sensitive Watersheds
- Species Inventory Wildlife Observations
- BC Community Watersheds
- Grasslands data
- Roadless Areas
- Pacific Salmon Conservation Unit data

Concerns with environmental lands assessment

- Virtually no resources provided from MoE, ILMB, MoF, DFO, etc.
- Crucial data sets that were to be included in the environmental lands screen were left out because of lack of resources (i.e. LRMP land use areas)

- **BC elected not to include “high sensitivity” and “inadequate information” areas (a.k.a. “significant areas of consideration”) when calculating energy generation from REZ areas**

- **WREZ Environment and Lands Task Group backed down on reducing power production estimates for “high sensitivity” or “inadequate information” areas.**

Recommendation

- **Use summer 2009 to re-do WREZ work for submission to BCUC process in September 2009**
- Use / adapt existing information to re-do the B.C. energy resource assessment
- Complete work on the B.C. environmental screen
- Discount energy production in “high sensitivity” portions of REZ areas
- Follow REZ methodology per U.S. best practices and WREZ Charter

- Any questions?

ENGO goals for an environmental lands screen:

- Protect the habitats of species at risk
- Protect ecosystems at risk and BEC zones of conservation concern

- Protect areas of high biodiversity value
- Protect wilderness values
- Protect remaining intact and primary forest

- Protect habitat requirements for wide-ranging species
- Protect areas for climate-change induced species range shifts and wilderness migration corridors

- Maintain ecological processes and avoid placing further pressures on species and ecosystems in areas of permitted human use

Government and ENGO representatives agreed that the following land areas can serve as useful interim proxies for multiple environmental goals, given time/resource constraints:

- LRMP land use areas that prohibit resource development / protect wildnerness values
- Roadless areas (data from Hectares BC website)