

## MEMORANDUM

TO: State-Provincial Steering Committee  
FROM: Thomas Carr  
DATE: February 8, 2010  
RE: Summary of 2010 Study Requests to WECC

This memorandum summarizes the 2010 study requests submitted to the Western Electricity Coordinating Council's (WECC) Transmission Expansion Planning Policy Committee (TEPPC) at the close of the open season period on January 31, 2010. The complete package of [2010 study requests](#) is posted on the WECC website.

TEPPC will begin the process of reviewing the study requests and developing a plan that consolidates and prioritizes the different requests into a feasible schedule to model for 2010. The first step will be at the Studies Work Group meeting in Portland on February 11, 2010. Next, the Technical Advisory Subcommittee (TAS) will develop a draft study plan at its meeting in Salt Lake City on February 24. TEPPC will hold a meeting on March 25 in Salt Lake City to review the draft plan and shape the priorities for the study plan. The new WECC Scenario Planning Steering Group will hold its first meeting the following day on March 26 in Salt Lake City.

WECC received study requests from 20 parties<sup>1</sup> including the State-Provincial Steering Committee. Since some parties submitted multiple scenarios in their request, the total number of requested scenarios is about 45 depending how one count scenarios. Table 1 below presents the complete list of all parties submitting requests. Table 2 distinguishes the parties in five categories: (1) government, (2) subregional planning group (SPG); (3) utility transmission providers; (4) independent project developers; and (5) other. Table 3 summarizes the key elements of each party's request.

The Steering Committee's study request contains four elements – a Reference Case, the high DSM scenario, the carbon reduction scenario, and the breakthrough technology scenario. The three scenarios contain multiple elements. The Steering Committee should probably identify priorities among the four parts of the request. The Steering Committee's representatives will be engaged in discussions to integrate the entire package of requests into the draft study plan. A brief summary of the remaining study requests is provided below.

Of all the study requests, the Western Grid Group (WGG) study request has the most overlap with the Steering Committee's request with policies to reduce carbon emissions. The Western Grid Group calls for a 2020 case and a 2030 case with specific carbon reduction targets. The 2020 case specifies 10% coal retirements, 20% energy efficiency, and 20% renewable

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<sup>1</sup> 19 parties assuming the ECG and SIRP requests are the same and initially double counted by WECC staff.

energy. The 2030 case increases these targets to 20% coal retirements, 30% energy efficiency, and 33% renewable energy.

Three SPGs submitted study requests in 2010. SPG requests have a special role given the three tier WECC transmission planning process as defined in the TEPPC Protocol, and the mechanism for transmission providers to meet transmission planning requirements pursuant to FERC Order 890.

- The Northern Tier Transmission Group (NTTG) submitted a series of cases based on economic study requests from NorthWestern Energy and PPL Energy. NTTG's summary identifies seven resource cases, six transmission alternatives, and an analysis of the sub-hourly 10-minute operational implication of integrating variable generation during a spring high-water period. NTTG's transmission alternatives explicitly identify a number of the major proposed projects.
- WestConnect asks for the modeling and analysis of a renewable resource mix among the SPGs in WECC. California renewable energy would be 60% in-state resources and 40% imports from out-of-state resources. Of California's 40% imports, 20% would come from WestConnect, 10% from ColumbiaGrid, and 10% from NTTG. The ColumbiaGrid and NTTG resources will all be wind. The mix of WestConnect resources would be 15% wind / 5% solar in one case and 10% wind / 10% solar in a second case.
- The Sierra SPG calls for the modeling of a trans-Sierra transmission lines(s). The request calls for two levels (230 kV and 500 kV) that would deliver Nevada renewables into California.

PG&E is the first major load serving entity and transmission provider to submit a request to TEPPC. PG&E seeks to model three alternatives for California may meet its 33% RPS requirement in 2020. First, California relies 100% on in-state resources based on the RETI/CTPG analyses. Second, California shifts its solar resources to the Desert Southwest (AZ/NM) and southern Nevada. Third, California expands renewable imports from the Canada, the Pacific Northwest, and possibly Wyoming. BCTC submitted a complementary request endorsing the modeling of renewable energy from BC to Northern California, and evaluation of load shaping and firming capabilities.

Seven transmission project developer parties submitted requests to TEPPC. Grasslands RE, ITS-Santa Fe, Sea Breeze, Sun Zia, TransCanda (3 projects include Zepher, Chinook, Northern Lights), TransWest Express, and Tres Amigas all requested modeling of their respective projects. Sea Breeze, Sun Zia, TransCanada and TransWest Express are well known announced transmission projects. Grassland RE proposes to develop multiple wind resources and storage projects across Montana, North Dakota, Alberta and Saskatchewan. Startrans requested analysis of congestion in the San Francisco Bay area and the Desert Southwest.

Tres Amigas and ITS-Santa Fe are relatively new projects that propose to create links to the Eastern Interconnection and the Southwest Power Pool (SPP), and facilitate renewable development between the two interconnections. SPP submitted a study request endorsing the concept of large HVDC ties between SPP and WECC to facilitate renewable develop across the respective footprints. This concept was also supported through requests by SIRPP/ECG and Keres Consulting.

Finally, the National Renewable Energy Laboratory (NREL) and the Pacific Northwest National Laboratory (PNNL) submitted a study request that calls for two high wind penetration scenarios of 20% and 30%. This proposal would build upon the work off of WECC’s Variable Generation Subcommittee, the WREZ project, and data from the Western Wind and Solar Integration Study.

**Table 1. List of Parties Submitting Study Requests**

	<b>Requestor</b>
1	British Columbia Transmission Corp. (BCTC)
2	Energy Consulting Group LLC (ECG) / SIRPP
3	Grasslands Renewable Energy, LLC
4	Integrated Transmission Solutions (ITC)-Santa Fe
5	Keres Consulting, Inc., Jack Lundberg
6	NREL-PNNL
7	Northern Tier Transmission Group (NTTG)
8	Pacific Gas & Electric (PG&E)
9	Sea Breeze Pacific
10	Sierra SPG
11	Southeast Inter-Regional Participation Process (SIRPP) / (ECG)
12	Southwest Power Pool (SPP)
13	State-Provincial Steering Committee (SPSC)
14	Starwood/Startrans-IO
15	Sun Zia
16	TransCanada
17	TransWest Express
18	Tres Amigas
19	WestConnect
20	Western Grid Group (WGG)

**Table 2. Categories of Parties Submitting Study Requests**

	<b>Government</b>	<b>Subregional Planning Group</b>	<b>Utility/ Transmission Provider</b>	<b>Independent Project Sponsors</b>	<b>Other/Unknown</b>
	SPSC	NTTG	BCTC	Grasslands RE	ECG/ SIRPP
		Sierra SPG	PG&E	ITS-Santa Fe	Keres Consulting
		WestConnect		Sea Breeze	NREL-PNNL
				Sun Zia	SPP
				TransCanada	Startrans IO
				TransWest	WGG
				Tres Amigas	

**Table 3. Short Description of Study Request by Each Party**

	Party	Description of study request
1	BCTC	Requests scenario to deliver renewable energy from BC to Northern CA to meet state's long-term RPS.
2	ECG/SIRPP	Request study the benefits and costs of enhanced ties with the Eastern Interconnection for the purpose of exchanges of wind resources.
3	Grasslands RE	<ul style="list-style-type: none"> <li>• Scenario 1 – Existing RPS (5-10 yr): add 3000 MW of wind in MT</li> <li>• Scenario 1P – Same as (1) except add 400 MW pumped storage project btw Broadview and Garrison</li> <li>• Scenario 2 – 33% RPS WI(10-20 yrs): 6000 MW of wind in MT</li> <li>• Scenario 2P – Same as (2) except add 400 MW pumped storage project btw Broadview and Garrison</li> </ul>
4	ITS-Santa Fe	Submitting the Santa Fe Transmission Project into the TEPPC tool box for the upcoming TEPPC 2010 study
5	Keres Consulting	Requests the following be assessed as part of the 2010 study process: <ol style="list-style-type: none"> <li>1. Coordinated development of EHV projects now contemplated to move renewable energy from the high-plains states to major mid-west and east coast markets.</li> <li>2. Consideration of 765 kV as the standard voltage class in lieu of 500 kV for future inter-regional backbone projects</li> <li>3. AC closure of the Eastern and Western grids</li> <li>4. Maximization of the benefit cost ratio of all inter-regional EHV projects now under consideration</li> </ol>
6	NREL-PNNL	Request two high wind-penetration scenarios that represent 20% and 30% penetration. Use WREZ to select wind locations. Use NREL/3-Tier wind data at 10 minute time steps over 3 years (2004, 2005, 2006).
7	NTTG	<ul style="list-style-type: none"> <li>• Regional resource scenarios – <ul style="list-style-type: none"> <li>○ Additions above 2019 RPS level: <ul style="list-style-type: none"> <li>▪ 3000 MW in Wyoming</li> <li>▪ 3000 MW in Montana</li> <li>▪ 3000 MW in Canadian Western province</li> <li>▪ 6000 MW in Wyoming</li> </ul> </li> <li>○ Additions above 2029 RPS level: <ul style="list-style-type: none"> <li>▪ 6000 MW in Montana WREZ zones</li> <li>▪ 12000 MW in Wyoming</li> <li>▪ 1500 to 3000 MW in coastal Northwest</li> </ul> </li> </ul> </li> <li>• Regional transmission alternative <ul style="list-style-type: none"> <li>○ Pumped storage in Garrison</li> <li>○ Montana 500 k export lines to NW by upgrades into Mid C</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>○ Montana 500 kV system augmentations by collector system and upgrades</li> <li>○ Major HVDC additions delivering from NW resources to southern NV (TransCanada projects, TransWest Express)</li> <li>○ HVDC Light and underwater cable projects from north coast locations into WA, OR and CA.</li> <li>○ Collection, storage and firming transmission and technology to facilitate NW renewables to CA and neighboring states</li> <li>● Miscellaneous <ul style="list-style-type: none"> <li>○ Analysis of the sub-hourly 10-minute operational implication of integrating variable generation during a spring high-water period</li> </ul> </li> </ul>
8	PG&E	<ul style="list-style-type: none"> <li>● Scenario 1 – High CA in-state build-out. Incorporate work from RETI/CTPG to meet 33% RPS in CA.</li> <li>● Scenario 2 – Solar build-out of Desert SW/Southern NV. Portion of CA in-state solar shifted to desert SW and southern NV regions.</li> <li>● Scenario 3 – Bring renewables from Canada, PNW and possibly WY and MT. Consider potential benefits of increasing line utilization through load shaping and firming capabilities.</li> </ul>
9	Sea Breeze	<ol style="list-style-type: none"> <li>1. Study Path 3 Interface using HVDC VSC technology between Pike Substation on the Olympic Peninsula and Port Angeles</li> <li>2. Study benefits of increasing WECC footprint by interconnecting with Alaska and integrating renewable resources and storage and using underwater cable to connect to WA and CA.</li> <li>3. Study increasing I-5 Corridor through BPA’s proposed reinforcements and SBP-RTS West Coast cable proposed to connect WA and CA.</li> </ol>
10	Sierra	<p>Request an economic study of a trans-Sierra transmission line(s) that shows benefits of:</p> <ul style="list-style-type: none"> <li>● A generic project at two different levels (1000 MW at 230 kV or 3000 MW at 500 kV.</li> <li>● Increasing CA imports</li> <li>● Increased renewable generation in NV.</li> </ul>
11	SIRPP/ECG	<p>Request study the benefits and costs of enhanced ties with the Eastern Interconnection for the purpose of exchanges of wind resources.</p>
12	SPP	<p>Recommends consideration of economic and reliability benefits from one or more large HVDC ties between SPP and WECC to facilitate renewable development and deliveries across the existing seams between the interconnections. Identify the potential benefits of proposed merchant projects like Tres Amigas and Santa Fe.</p>
13	SPSC	<p>State-Provincial Steering Committee four part requests:</p> <ul style="list-style-type: none"> <li>● Reference case based on IRPs and utility plans</li> </ul>

		<ul style="list-style-type: none"> <li>• High DSM case</li> <li>• Carbon reduction scenario that applies high DSM, higher RE penetration, and carbon adders.</li> <li>• Breakthrough technology scenarios</li> </ul>
14	Starwood IO	Proposes two areas for inclusion and evaluation in the 2010 study plan: <ol style="list-style-type: none"> <li>1. San Francisco Bay area congestion</li> <li>2. Desert Southwest congestion</li> </ol>
15	Sun Zia	Submitted data on the SunZia project for inclusion in the 2010 study plan. Proposed 500 kV double circuit line from Corona, NM to Pinal Central Substation, AZ.
16	TransCanada	Request economic studies of the Zepher, Chinook, and NorthernLights HVDC projects for the 2010 program.
17	TransWest	Requested analysis of transmission needs under two resource scenarios: <ul style="list-style-type: none"> <li>• Scenario 1 – Case 5-10 years out, with existing RPS targets, add 6000 MW of wind in WY.</li> <li>• Scenario 2 – Case 10-20 years out, assume 33% RPS across the WI, add 12,000 MW of wind in WY</li> </ul>
18	TresAmigas	Request study of Tres Amigas superstation DC hub in NM that would link the three Interconnections: Western, Eastern and ERCOT. Project would enable transmission service across all 3 interconnections and facilitate renewable development.
19	WestConnect	Requests an economic study that models CA renewable resource requirements as follows: <ol style="list-style-type: none"> <li>(1) CA meets 60% of RE by in-state resources</li> <li>(2) CA relies on 40% RE imports from out-of-state resources.</li> <li>(3) Of the 40% imports, 20% WestConnect, 10% from ColumbiaGrid, and 10% from NTTG.</li> <li>(4) The 20% from ColumbiaGrid and NTTG are all wind.</li> <li>(5) The 20% from WestConnect resources would be 15% wind / 5% solar in one case and 10% wind / 10% solar in a second case</li> <li>(6) ColumbiaGrid, NTTG and WestConnect will meet their RE needs internally</li> </ol>
20	WGG	Scenario 1 – 2020 case to reduce carbon emissions by 30% of 2005 levels assuming: 10% coal retirements, 20% energy efficiency, and 20% renewable energy. Scenario 2 – 2030 case to reduce carbon emissions by 40% of 2005 levels assuming: 20% coal retirements, 30% energy efficiency, and 33% renewable energy.