

**FOA Project Narrative – Topic B
Western Governors’ Association
Revised Submission – February 5, 2010**

**U.S. DOE Funding Opportunity Number
DE-FOA-0000068
Recovery Act Resource Assessment and Interconnection
Level Transmission Analysis and Planning**

**Topic B: Cooperation Among States on Electric
Resource Planning and Priorities
Western Interconnection**

FOA Response – Topic B

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This revised submission contains the following changes from the original.

- An updated budget based on the proposed award amount
- A revised schedule based on the three-month extension of the original due date for preliminary plans
- Revision of the work plans for the tasks based on the expectation that additional funding for laboratory support will not be available
- Additional information in support of National Laboratory funding to complete specific analyses

With the exception of the CCS mapping task, the revised proposal maintains the deliverable products as specified in the original submission.

Topics to be addressed by all awardees in revised budget proposals

Institutional/Procedural

1. Show how value will be added through work done under awards – going beyond benefits from existing processes.
 - **Task 1a: The WREZ 3 project for the first time will seek to coordinate the schedules for LSE procurement of renewable generation from renewable energy zones of common interest. Coordinating procurement schedules will create the conditions that will foster the development of a critical mass of transmission needs in the same time frame to support construction of transmission to preferred renewable energy areas. In the Western Interconnection, transmission will not be constructed unless there are sufficient buyers who want to access generation at the end of a proposed transmission line. Transmission development has significant economies of scale. By synchronizing the procurement of renewable generation by LSEs interested in the same renewable energy area, a critical mass can be created to justify construction of a properly sized line.**
 - **Task 1b: The WREZ Phase 4 activities will create two unique products. The stakeholder based reports on siting are intended to supplement the work of the WECC to produce transmission plans. The siting information will allow policy makers to evaluate the viability of transmission plans by creating an understanding of how success and failure have occurred in the past. The second product will be an analysis of cost allocation options. Because policy makers have not agreed on a cost allocation scheme, many potential high capacity transmission lines have been removed from consideration. This will once again provide critical information in assessing the viability of transmission plans.**
 - **Tasks 4-6: The work of the State-Provincial Steering Committee will add significant value to transmission planning in the Western Interconnection by ensuring that transmission planning reflects state and provincial policies and by ensuring that transmission analyses are adequate to use in state and provincial policy making. Presently, state and provincial input into interconnection-wide transmission planning is limited to a few individuals in a few states which have dedicated resources to participate in such planning. The Steering Committee’s work will substantially expand participation in transmission planning to all states and provinces thereby promoting a common view of transmission needs based on robust analysis that reflects and informs state and provincial policies.**
2. Explain your concept of an “interconnection-level plan” and how it will add value.
 - **Task 4-6: An interconnection-wide plan will identify electricity transfer flows needed between different points in the interconnection under different electricity scenarios. Such a plan will be more robust with the inclusion of water, wildlife and air emissions information. A more robust plan will provide a basis for more informed policy discussions.**

3. Present plan for self-sustaining operations after Recovery Act funds run out. [An issue probably still not resolved: Who will pay the cost of state participation in planning processes once Recovery Act funds run out? Industry? Can states live with that, or do they need some obviously neutral source of funds?]
 - **Task 1a: WREZ Phase 3 will be completed before ARRA funds expire.**
 - **Task 1b: WREZ Phase 4 will be completed before ARRA funds expire.**
 - **Task 3: The Wildlife work will continue and be funded through state wildlife agencies once Recovery Act funds have been spent.**
 - **Tasks 4-6: State/provincial travel funds for the Input into Topic A tasks are gradually phased out over five years and travel costs will increasingly be picked up by state/provincial agencies. The goal over the next five years is to build participation in regional transmission planning into the normal tasks undertaken by PUCs and energy agencies. Some central staff support related to reliability activities under Section 215 of the Federal Power Act may be executed in conjunction with the Western Interconnection Regional Advisory Body.**
 - **Task 7: The Water-Energy work will continue through the Western States Water Council. Much of the continuing work on water supply and demand will be part of the continuing work of the WSWC and will be available for future transmission planning efforts. However, future ad-hoc analyses may require securing additional outside funding.**

4. Schedules for interim deliverables, not just the big interconnection plans.
 - **Task 1a: Identification of draft preferred renewable energy zones (2nd quarter 2010, assuming timely National Lab support); draft paper on barriers to coordinated procurement (3rd quarter 2010); progress reports on LSE/PUC discussion (every six months beginning the 1st quarter of 2011); final report on agreements among LSEs and PUCs (4th quarter 2013).**
 - **Tasks 4-6: 2010 study request submitted to WECC by the State-Provincial Steering Committee (January 2010); state nominations to WECC Scenario Planning Steering Group (February 2010); quantification of RPS requirements in 2020 (September 2010); recommended reforms to better enable the integration of variable generation (April 2011); scoping of a study of a potential energy imbalance service (September 2010); assessment of applicable DSM resource potential in western states/provinces (December 2010); summaries of Steering Committee meetings (February 2010, April 2010 and as needed thereafter); development of a common calendar with Topic A participants (June 2010); and informational webinars for the Steering Committee (at least three in 2010).**
 - **All tasks are addressed in the attached Microsoft Project schedule.**

5. Multi-constituency steering group: Size? Composition? How are members to be selected? How would turnover be handled? Do members have an obligation to represent the views of other organizations from “their” constituency? How are such other organizations to be identified?
 - **See section ‘Roles of Participants’**

6. Provide details about plans for NGO participation, roles, and how funded. What linkages are anticipated between the Topic A steering group (and NGO stakeholders included there) and obtaining environmental and other stakeholder inputs into Topic B? Will environmental NGOs participate both in Topic A steering group and separate processes in Topic B?

- **See Roles of Participants section.**

There are opportunities for NGOs and other stakeholders to provide input at all Task 4-6 Steering Committee meetings. Additionally, there are opportunities for NGOs to participate in the WREZ Phase 3 and 4 tasks (Task 1), the development of wildlife decision support systems (Task 3), and the water/energy nexus task (Task 7). Work under these other tasks will provide useful input to the State-Provincial Steering Committee's work.

7. Be explicit about mechanics of working relationship between Topic A and Topic B teams. [This is less critical for ERCOT because ERCOT is already a hybrid state-industry entity.] Show plans for synchronizing some meetings to facilitate interaction between A&B groups.
 - **Task 1a: The information on LSE renewable energy zone preferences gathered in the WREZ 3 task will provide insights to Topic A work on the location, quantity and timing of assumed new renewable energy generation and interstate transmission lines.**
 - **Tasks 4-6: Western Interconnection Topic A and B activities are tightly linked. Topic B inputs are timed to match the Topic A schedule. The Topic B team will recommend scenarios to be studied under Topic A, participate in technical work under Topic A (e.g., WECC Scenario Planning Steering Group, TEPPC Technical Advisory Committee, Studies Work Group, Historical Analysis Work Group, Modeling Work Group, Variable Generation Subcommittee, Seams Issues Subcommittee, Subregional Planning Groups) and review transmission studies and plans that are prepared under Topic A. In addition, analyses related to water and wildlife will be incorporated into the scenario analyses.**
 - **Information developed under Tasks 3 and 7 will be provided to Topic A groups and committees.**
8. Show how you will ensure an appropriate role for Native-American tribes in interconnection-wide planning.
 - **WGA has committed to (1) briefing tribal associations or individual tribes regularly and as necessary, (2) include invitations to the tribal associations and tribes to attend public meetings, and (3) extend invitations to the tribal associations and tribes to be part of the stakeholder processes under the WREZ tasks. WGA has a documented history of tribal involvement in stakeholder-based projects.**
9. Propose regime for determining what information (re inputs to and results of analyses) can be made public without restrictions, and providing access for qualified parties to more sensitive information. [See related action item for DOE in Section I.]
 - **It is the intent of the WGA to make all documents not containing proprietary data or processes public. All results of analyses will also be made public. Input data that is not**

considered proprietary will be made public upon request. It will be the responsibility of entities providing input data to request confidential status of anything they believe to be proprietary or with the potential to cause harm to the business. Such information will remain confidential until such time as an outside request is made for the information. At that time WGA will respond to any requests for information for which confidential status has been requested by making a confidentiality decision based on WGA policy and the conditions specified in the DOE award document.

- **All public documents will be posted on the project web site. This will include meeting minutes.**
 - **Task 4-6: The Topic B Steering Committee maintains a listserv of parties interested in its work.**
10. Present your plan for ongoing outreach to public, newspapers, and universities re your activities. (This work is a potential gold mine for graduate students and can get them interested in careers in this area.)
- **WGA has a Communications Director that actively promotes WGA initiatives to a large list of constituents, via media releases and email blasts. WGA will maintain a website and distribution network that will promote and elaborate on all activities.**
 - **All information not identified as proprietary by participants will be made publicly available in accordance with what has been outlined above.**
11. It appears that over the long term the electric and transportation infrastructures are likely to become more convergent and integrated. This suggests that LT planning for the two sectors should, at a minimum, be coordinated increasingly over time. How will awardees deal with this concern?
- **The WGA has already included staff experts in both electricity and transportation as part of the project team. We believe this will inherently create a platform for coordination.**
 - **Task 4-6: The Steering Committee will be proposing high demand growth scenarios for study which will account for the deployment of plug-in vehicles.**

Long-Term Analyses

1. Be more detailed about what environmental information will be collected as input for planning process in both Topics A and B, and why; show how your results and impacts will be affected. If these decisions have not been made, show process by which the subject will be addressed.
- **Task 1a: The environmental screening of renewable energy areas in WREZ Phase 1 and any new information from Tasks 3 and 7 will be made known to LSEs and PUCs participating in discussions of particular zones.**
 - **Task 3: The Western Governors' Wildlife Council has documented broad participation from environmental groups. All information and analyses generated by the WGWC will have been vetted through a comprehensive group of stakeholders.**

- **Task 4-6: The State-Provincial Steering Committee has added representatives from the Western States' Water Council and the Western Governors' Wildlife Council as ex-officio members of the Committee for the purpose of creating a liaison with work under Task 3 (wildlife decision support system) and Task 7 (water/energy nexus). This linkage will inform the Steering Committee of key wildlife and water constraints and inform the wildlife and water groups of environmental information needed in transmission planning work. Wildlife and water information will also become part of the deliberations of the WECC Studies Work Group where future generation and transmission assumptions are developed as inputs into production cost modeling.**
2. Prepare shopping lists of information requirements re scenario building, model inputs, etc. (Note: These are not needed for final grant agreements, but DOE needs them as soon as practical to be able to assist you.)
- **Task 1a: The WREZ Phase 3 work will rely on information found in LSE IRPs, and other information available from LSEs and Balancing Authorities, and from the WREZ model inputs and outputs. (See discussion below about the need for National Laboratory support on these items.)**
 - **Task 1b: The WREZ Phase 4 work will use both existing analytical documents and project specific analysis. It will also include heavy and comprehensive stakeholder input.**
 - **Task 4-6: Information needed in transmission planning includes: current and future technology costs, fuel costs, water consumption, wildlife constraints, topology and utilization of the current transmission system; renewable generation profiles, variable generation integration costs, renewable generation resource locations, utility resource plans, etc. (See discussion below on how national laboratories can assist in providing timely and credible information.)**
 - **Task 7: Information for this task will come primarily from states and municipal water districts. However, there is a critical analytical need for the availability of water modeling. This modeling would both allow for a clear investigation of the impacts of various energy development scenarios on water supply and demand, and seamlessly integrate with the PROMOD modeling to better understand the energy-water nexus. The inability to complete such modeling will call into question the reliability and applicability of using more general data from studies completed for purposes other than assessing specific transmission plans, and may affect the ability of policy makers to confidently design programs and policies to manage water and energy goals.**
3. In your revised submissions, please describe what current and possible supply resources you expect to consider, including those that are not currently economic but could become economic in coming decades. These should include additional energy efficiency, demand response, CHP, clean coal/CCS, advanced nuclear, renewables such as wind, central solar, rooftop solar, geothermal (hydrothermal, geopressured, co-production/low-temp, enhanced geothermal systems), biopower, water (incremental and new hydro, ocean, hydrokinetics, pumped storage), and other storage technologies.

- **Task 1a: All resources identified in the WREZ Phase 1 “hubs” will be considered.**
 - **Tasks 4-6: The Steering Committee will consider all available supply side resources presently available or likely to be available within the study period.**
4. Discuss the planning horizons (10, 15, 20 years, etc.) to be used in your analyses. Will information about interim dates be generated as part of the output?
 - **All Tasks will support 10 and 20 year analyses.**
 5. LT interconnection plans are to show how they relate to Admin’s carbon goals for 2030 and 2050.
 - **Tasks 4-6: On January 31, the Steering Committee requested that WECC study a low carbon emissions scenario for 2030 based in part on proposed federal legislation. Additionally, the Steering Committee hopes to tap technology cost numbers being developed as part of DOE’s study of 80 percent renewable by 2050 that is underway.**
 6. DOE is required by law to publish triennial transmission congestion studies covering the U.S. portions of the Eastern and Western Interconnections. (The law excludes ERCOT from these studies.) DOE expects to request that some analytic outputs prepared by the awardees be structured so as to produce information relevant to the congestion studies.
 - **Tasks 4-6: The State-Provincial Steering Committee will review WECC-developed information on transmission congestion and provide its input into DOE triennial transmission congestion studies.**

Project Narrative

This proposal is being submitted by the Western Governors’ Association (WGA), but incorporates recommendations from several entities throughout the Western Interconnection. They include public utility commissions, state and provincial energy agencies, the Western States Water Council, and members of the Western Governors’ Wildlife Council. The interrelated work proposed in this application includes the following: complete Phases 3 and 4 of the Western Renewable Energy Zones (WREZ) Project as outlined in this submittal; assist states in developing decision support systems related to wildlife for later use in evaluating transmission plans; scope a study to show how additional carbon sequestration mapping can be useful in identifying the best areas to include fossil fuel sources to firm renewable resources; examine the water and energy nexus with the potential outcome integrating water considerations into evaluating transmission plans; and provide input for transmission planning under Topic A, including economic and environmental factors and integration of variable generation.

The proposed work will enhance the states’ capacity to effectively participate in transmission planning and development, and substantially improve the quality of information available to state and federal policy makers and regulators, as well as industry planners. The proposal builds upon the WGA Clean and Diversified Energy Initiative and WREZ processes. It addresses issues that have arisen in this earlier work and in the work of state energy planning and regulatory agencies, including:

- Identifying electricity supply futures to be studied by regional transmission planning bodies, such as the Western Electricity Coordinating Council (WECC);
- Examining the environmental implications of resource and transmission development, including an analysis of how water resources will affect the ability of the Western Interconnection to implement potential scenarios generated under Topic A of the FOA;
- Addressing wildlife sensitivities, which is a key issue in constructing energy generation and transmission facilities;
- Promoting effective use of the existing transmission system;
- Integrating variable generation; and
- Allocating the cost of new transmission.

Project Objectives

The project will increase regional, interregional, and Interconnection-level coordination among states/provinces and electric industry organizations and key stakeholder groups. In addition, it will:

- Encourage load-serving entities (LSEs) that are interested in the same renewable energy zones to coordinate the timing of the procurement of renewable generation from such zones.
- Foster and facilitate interstate cooperation for renewable energy generation and transmission.
- Scope a study that would analyze potential carbon sequestration in renewable energy zones in order to evaluate the potential integration of near-zero emission fossil fuel resources into the renewable energy zones.
- Aid individual states in developing their own decision support systems that are capable of compiling all wildlife data relevant to the development of renewable and other generation capacity and associated transmission facilities.
- Provide a forum for Governors to communicate regularly with national, regional and local stakeholder groups on renewable energy transmission and policy development.
- Develop information and the analytical capability to integrate water supply and demand considerations into the evaluation of transmission plans.
- Enhance state and provincial collaboration and participation in a broader Western Interconnection transmission analysis and planning process:
 - Facilitate dialogue and collaboration among the states and provinces of the Western Interconnection, thereby enabling more consistent and coordinated state and provincial input and guidance in the regional and Interconnection-level analyses and planning under Topic A. By developing and institutionalizing discussions between PUC commissioners, governors' energy staff and WECC members, new and guiding principles will be established to ensure continuation of the
 - Ensure that state and federal policies to develop renewable energy, promote energy efficiency and demand response, and reduce greenhouse gas emissions are represented and evaluated in Topic A analyses and planning in a manner that informs and guides policy makers, regulators and industry.
 - Provide insight into the economic and environmental implications of the alternative electricity supply futures and associated transmission requirements developed for the Western Interconnection under Topic A. This would include evaluation of how lands, natural resources and water issues will affect the location and distribution of renewable energy and transmission facilities.
 - Promote the efficient development of a robust transmission system in the Western Interconnection that will support the development, integration and delivery of new

- renewable and other low-carbon resources, and the use of low-carbon electricity to displace petroleum-based fuels in the transportation sector well into the future.
- Engage state and provincial decision makers on issues and opportunities regarding resource adequacy and the integration of variable generation.

National Laboratory Requests to Support Topic B activities

The WGA believes that there is no reprogrammable funding for external analytical work in the current award amount. While the WGA has made every effort to provide deliverables in line with the original submission to DOE, the absence of analytical capacity from the National Laboratories has created potential issues.

We have included a discussion under the pertinent task descriptions of how National Laboratory support will improve the work products. There are two overriding concerns we were attempting to address with the inclusion of National Laboratory support in our original submittal. First, is to ensure that all analyses have the most current, critical, and specific information. Second, is to ensure that all information and analyses are consistent, especially with respect to basic assumptions. It may or may not be possible to credibly adapt other research or analysis that is less current or not specifically based on conditions in the Western Interconnection. Since one of the primary objectives of the project is to provide decision-makers with credible information on which to develop policies and programs, it is critical to have fully defensible data and analyses.

The following are critical areas for external support from National Laboratories:

- Task 1a (WREZ 3) – Review of IRPs; use of the WREZ model
- Tasks 4-6 (Input into Topic A) – Energy efficiency/demand response/distributed generation; use and improvement of the WREZ model; IRP reviews; future technology costs; analysis of grid reforms to integrate variable generation; integration of new sources of demand, including plug-in electric vehicles;
- Task 7 (Water/energy nexus) – Customized data collection, model development, and coordination with the WECC PROMOD transmission model.

Merit Review Criteria

This Section remains unchanged since the original submittal.

Near Term Action Plan

- Task 3 pilot projects will be reviewed to make awards to the states. Contracts and subawards will be signed.
- Tasks 4-6 (Input into Topic A): A second meeting of the State-Provincial Steering Committee was held on January 28-29 at which the Committee approved a charter, approved a “living” work plan, elected a vice chair, nominated six state members of the WECC Scenario Planning Guidance Committee, approved a study request to WECC, assigned issues related to the integration of variable generation to the Grid Utilization Work Group, directed the development of a common calendar of the Steering Committee, WECC, and subregional planning group meetings and actions.

- A temporary calendar has been posted to the Steering Committee web page at <http://www.westgov.org/sptsdc/index.htm>. Project staff has begun discussions with WECC on an ongoing common calendar. Below are priority meetings and webinars that are known at this time:
- Steering Committee representatives will participate in: the February 11 meeting of the WECC Studies Work Group (SWG); the February 24 meeting of the WECC Technical Advisory Subcommittee (TAS) to review 2010 study requests received as part of WECC's open season for study requests per FERC Order 890; the March 25-26 meeting of WECC's Scenario Planning Steering Committee and the Transmission Expansion Planning Policy Committee; the April 2 SWG meeting; and the April 16 TAS conference call.
- Four webinars have been scheduled on the WestConnect/NREL Western Wind and Solar Integration Study (WWSIS) results (February 4, February 18, March 4, March 23). Steering Committee representatives will participate in the February 9 WWSIS stakeholder meeting and the WECC Variable Generation Subcommittee (VGS) work group meetings on February 22-24 and the VGS meeting on March 30.
- In support of the Steering Committee's work on grid utilization, Committee representatives will participate in the February 8-9 meeting of the WECC Seams Issues Subcommittee and the March 10-12 meeting of the WECC Market Interface Committee.
- A Steering Committee webinar is being planned with WECC to examine the draft amendments to the WECC Transmission Expansion Planning Policy Committee protocol. The webinar may be scheduled for February 12.
- The next meeting of the State-Provincial Steering Committee will be held the week of April 19.
- WGA staff will work with subregional transmission planning groups to develop a manual for understanding transmission planning process in Western Interconnection process. This document will serve as a basis for developing work plan for WREZ Phase 4 tasks.

Project Management and Planning

The project management plan responds directly to the requirements listed in the FOA. In this plan we explain how we will complete the request work under Topic B, including:

- WREZ Phase 3 completion;
- WREZ Phase 4 completion;
- Wildlife Pilot Projects;
- Carbon sequestration mapping project scope related to variability of renewable energy;
- Providing input into Topic A of the FOA; and
- Analyzing impacts of water supply and demand on the ability of the West to meet future energy demand.

The goal of this project is to provide the Western Governors, legislators, and PUC Commissioners with information that will allow them to fully understand how the Western Interconnection can achieve a clean, secure, reliable and reasonably priced electricity generation and transmission system, while facilitating state participation in the transmission planning process. This will be accomplished by identifying various demand scenarios that may include among others, high energy efficiency, RPS

requirements, demand response, the essential characteristics of the future generation and transmission system (including transmission efficiency enhancements), and developing generation/transmission scenarios that will meet demand and achieve those characteristics. This will provide the governors and the PUC commissioners with the information to understand the advantages and disadvantages of any respective scenario, and the impacts that scenario will have on the economies, natural resources, and landscapes of the West. The methodology created under this process will lay a foundation for all future analytical work beyond the initial work under the original project. This will allow the governors, PUCs and other Western stakeholders to develop comprehensive, integrated, and effective plans for achieving Western energy goals. The process will facilitate participation by Western state and provincial public utility commissions and energy officials in the Western Interconnection in both the scenario analysis and transmission planning activities pursued in Topic A. The encompassing stakeholder process will greatly improve the quality of information available and lead to increased interconnection-level coordination on all levels. We will rely heavily on the diverse stakeholders who are part of the energy picture, including PUCs and utilities; NGOs and other citizen organizations; elected officials at all levels of government; and state, local and federal agencies.

In our response we have laid out the specific process and activities that will allow us to complete the work. At the end of this process, we will have an unprecedented level of regional information and analysis that can be used by stakeholders and decision-makers to influence future policy on energy development.

Finally, we have clearly listed all the specific reports and analyses that will be associated with the project and the dates for their completion.

Relevance and Outcomes/Impacts

This project meets the FOA objective to facilitate and strengthen the capabilities of the Western Interconnection to prepare analyses of transmission requirements under a broad range of alternative futures and develop long-term, Interconnection-wide transmission expansion plans. The project promotes Western state and provincial public policy input into transmission planning, analysis and integration of variable generation. This input will ensure that the analyses consider alternative futures, including scenarios of high energy efficiency and demand response, future renewable portfolio targets, and carbon reduction targets. The process will inform decision-makers of the need for transmission expansion identified by Interconnection-wide transmission planning, options for improving transmission siting and cost allocation decisions by states and provinces, and policy steps to facilitate the integration of higher levels of variable generation.

The project will supplement Interconnection-wide transmission planning studies with information on factors important in shaping the electricity future of the Western Interconnection, including:

- The identification of preferred renewable resource areas and coordinated utility procurement schedules for generation from those areas;
- Processes to address the siting of interstate transmission lines and the allocation of the cost of such lines;
- Wildlife values that affect the location of generation and transmission; and
- Water availability that will be critical in shaping electricity generation options.

The outcome from this project will be a transmission expansion planning process that is fully informed of public policy requirements and values and will serve as a template for future analysis. Transmission planning in the absence of adequate input on public policy values will not contribute to the

construction of needed transmission. For instance, the development of integrated fish and wildlife decision support systems (DSSs) will jump-start the ground data collection and mapping, focusing on issues that will be encountered during multi-state coordination, to maximize the value that pilot efforts will bring to fast-track development of a DSS in each Western state. Speedy development of state DSSs will benefit input into Topic A as well as the work during WREZ Phase 4, as it will provide mapped locations for crucial habitats and wildlife corridors, those areas that states may prioritize for protection against development. DSS development will assist states in responding to proposals for renewable energy and transmission development in the Western Interconnection in a proactive way. Crucial information on water needs related to renewable energy development and generation will guide energy development in a realistic and pragmatic manner.

Transmission planning informed by public policy requirements will ensure that critical issues are addressed at the planning stage rather than at the project stage where disagreements can delay projects, increase costs to consumers and potentially undermine the ability to meet the demand for an adequate and reliable electric power system in the Western Interconnection. The beneficiaries of this project include: state and provincial policy makers including Governors, Premiers and legislatures; state and provincial agencies responsible for regulation, energy planning, facility siting, water and wildlife; the federal government; generation and transmission developers; load-serving entities; and the public, including non-governmental organizations.

Roles of Participants

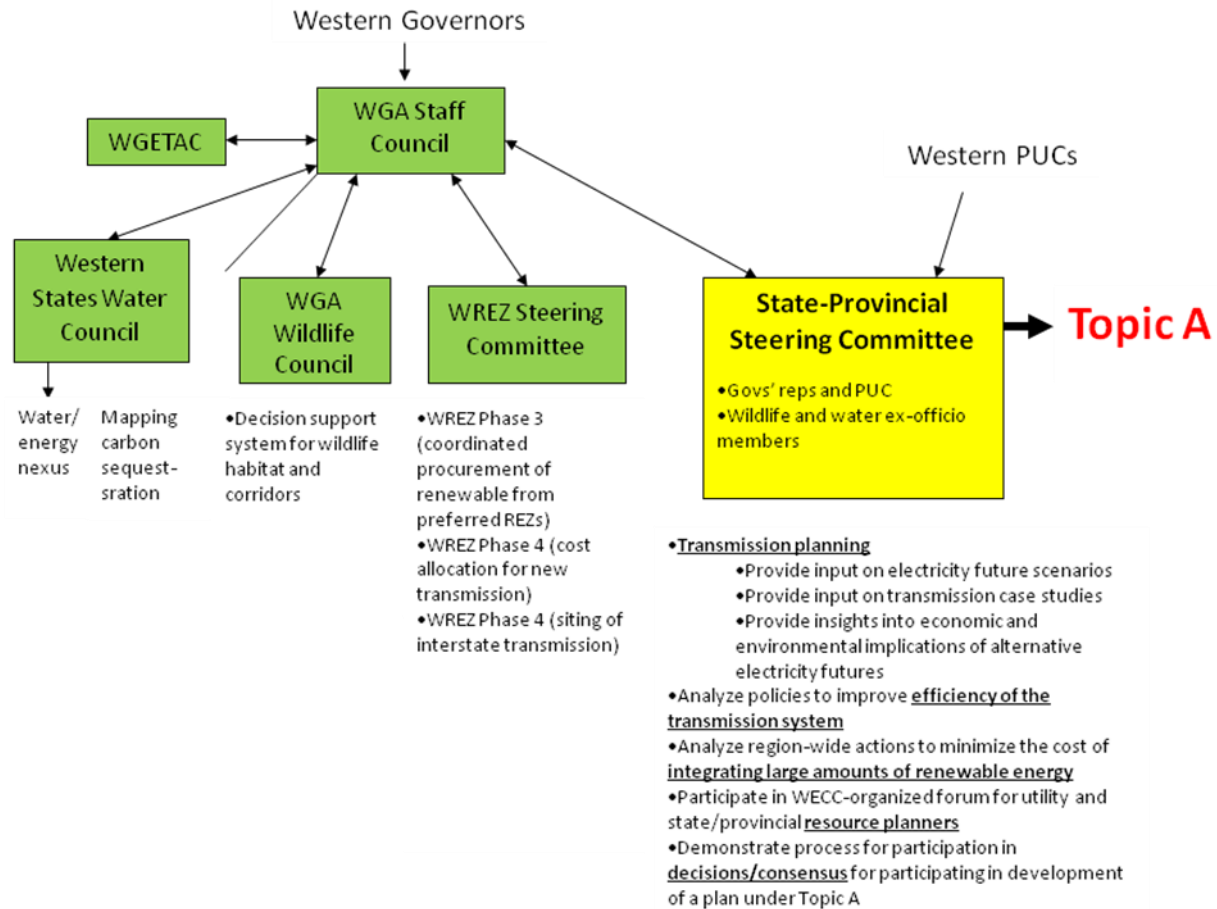
WGA and the Western Interstate Energy Board (the energy affiliate of WGA) are responsible for incorporating into the process a variety of Western organizations that have been instrumental to the WREZ project, as well as other organizations that can provide specialized expertise. This has included a wide range of NGOs, tribes, academics and vested businesses and state, federal and local governments. WGA has a long history of including these groups in stakeholder processes and this will continue under this project. Requirements related to the completion of WREZ Phases 3 and 4 would be overseen by the State – Provincial Steering Committee and the WGA Staff Advisory Council (representatives of the individual Western Governors). WIEB staff is primarily responsible for managing the implementation of Phase 3, and WGA staff will manage the implementation of Phase 4. Requirements related to wildlife decision support systems will be overseen by the WGA Wildlife Council with approval from the WGA Staff Council and will be integrated with the work of the WECC Scenario Planning Steering Group and Transmission Expansion Planning Policy Committee. Requirements related to input into Topic A will be overseen by the new State-Provincial Steering Committee consisting of appointees of the Governors and PUCs in each state. The Steering Committee includes representatives from Alberta and British Columbia and ex-officio members from the Western States' Water Council and the Western Governors' Wildlife Council. Implementation of tasks related to input into Topic A, including integration of variable generation, would be managed by WIEB staff, with the participation of WGA staff. The WGA and WIEB have begun regular meetings with WECC to update activities under the required revised Project Management Plans. This will entail coordinating work plan roles and implementation.

Furthermore, the execution of Topic B requirements related to carbon sequestration would be overseen by the WGA Staff Council. To assist in fulfilling the requirement that the states provide insights into the environmental implications of alternative electricity futures, WGA Staff Council would oversee the task on water and energy. The Western States Water Council will offer insight into the energy water needs under Task 7. WGA will engage the Council of State Governments –West (CSG-West) in all phases of the project to ensure all aspects of state governments are briefed on recommendations and project outcomes. All water-energy analysis will be integrated with the work of the SPSG.

The Western Governors' Electricity Transmission Advisory Council (WGETAC) would be created to ensure that WGA maintains and strengthens the regional partnerships that have been established and coordinates with existing efforts to address transmission expansion barriers. Through WGETAC, WGA would regularly convene senior level executives, non-profit leaders and locally elected officials to advise the Governors on pertinent policy issues. Membership of the WGETAC would be limited to approximately 30 individuals selected by the Governors to ensure geographic, sectoral and representative diversity. Following is a depiction of the organizational structure for activities under the FOA.

All work under Topic B will be guided by the following organizational chart.

Organization of Tasks Under Topic B



Multiple Principal Investigators

This section remains unchanged from the previous submittal.

Facilities and Other Resources

This section remains unchanged from the previous submittal.

Equipment

This section remains unchanged from the previous submittal.

Bibliography

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- Western Governors' Association, *Wildlife Corridors Initiative*, June 2008.
- Western Governors' Association, *Western Renewable Energy Zones Phase 1 Report*, June 2009.

Statement of Project Objectives

A. Objectives

- Inventory the currently proposed transmission projects in the interconnection and determine how these projects can be incorporated into an integrated, Interconnection-wide transmission plan.
- Encourage load-serving entities (LSEs) that are interested in the same renewable energy zones to coordinate the timing of the procurement of renewable generation from such zones.
- Foster and facilitate interstate cooperation for renewable energy generation and transmission.
- Scope a study that will analyze potential carbon sequestration opportunities in order to evaluate the use of resources to firm renewable energy.
- Aid the development by each Western state of its own decision support system that is capable of compiling all data on wildlife relevant to the development of renewable and other generation capacity and associated transmission facilities for subsequent use in the evaluation of transmission plans.
- Provide a forum for regular and consistent communication between Governors and regional stakeholders on renewable energy transmission and policy development.
- Examine the water and energy nexus with the potential outcome integrating water considerations into evaluating transmission plans
- Enhance state and provincial collaboration and participation in a broader Western Interconnection transmission analysis and planning process:
 - Facilitate dialogue and collaboration among the states and provinces of the Western Interconnection, thereby enabling more consistent and coordinated state and provincial input and guidance in the regional and Interconnection-level analyses and planning under Topic A.
 - Ensure state and federal policies to develop renewable energy, promote energy efficiency and demand response, and reduce GHG emissions are represented and evaluated in Topic A analyses and planning in a way that informs and guides policy makers, regulators and industry.
 - Provide insight into the economic and environmental implications of alternative electricity supply futures and associated transmission requirements developed for the Western Interconnection under Topic A. This would include an evaluation of how issues related to lands and natural resources, including water, will affect the location and distribution of renewable energy and transmission facilities.
 - Promote the efficient, long-run development of a robust transmission system in the Western Interconnection that will support the development, integration and delivery of new renewable and other low-carbon resources, and the use of low-carbon electricity to displace petroleum-based fuels in the transportation sector.
 - Engage state and provincial decision makers on issues and opportunities regarding resource adequacy and the integration of variable generation.

B. Scope of Work

This proposal is being submitted by the Western Governors' Association. It incorporates input from the public utility commissions and state energy agencies within the Western Interconnection. This application describes interrelated work in the following areas: completion of the Western Renewable Energy Zones Project Phases 3 and 4; support for the development of state wildlife decision support systems; analysis relating the energy-water nexus; a project scope for carbon sequestration mapping; and

input into transmission planning under Topic A including economic and environmental factors and integration of variable generation

The proposed work in these areas will enhance the capacity of the states to effectively participate in transmission planning and development. The proposal builds upon the WGA Clean and Diversified Energy Initiative and WREZ processes. It also addresses issues that arose in this earlier work and in the work of Western state energy planning and regulatory agencies, such as:

- Identifying electricity supply futures to be studied by regional transmission planning bodies, such as the Western Electricity Coordinating Council (WECC);
- Examining the environmental implications of resource and transmission development, including the analysis of how water resources will affect the ability of the Western Interconnection to implement any of the potential scenarios generated under Topic A of the FOA;
- Accounting for wildlife sensitivities, which have been identified as a key hurdle for the development of renewable and transmission facilities;
- Examining the water and energy nexus to understand the implications for the viability of any respective transmission plan;
- Promoting effective use of the existing transmission system;
- Integrating variable generation; and
- Allocating the cost of new transmission.

C. Tasks

1. Completion of WREZ Phase 3 and Phase 4 activities

a. WREZ Phase 3 – Coordinating energy purchases from WREZs

Three major tasks will be undertaken: (1) identification of load-serving entities' (LSEs) preferred renewable energy zones, (2) review of resource plans and procurement schedules and identification of any obstacles to coordinated procurement among LSEs interested in renewable energy from the same zones and options to overcome such barriers; and (3) discussions among LSEs (and their regulators) that have interest in the same zones in order to foster the development of coordinated generation procurement schedules.

Tasks to be performed:

- Identification of preferred zones – LSEs will be asked to identify preferred renewable energy zones. Where such preferences are not specified, the WREZ delivered cost model and other renewable resource assessments of similar or greater detail and credibility will be used to indicate likely preferred zones. LSEs will then be asked if the zones identified by the model comport with company resource plans. A draft list of renewable resource areas of interest will be posted on the WGA web site.
- Review Integrated Resource Plans (IRPs) and interview LSEs –LSE resource plans will be reviewed to identify the likely location of desired renewable generation. LSEs and the PUC staff will be interviewed to determine current procurement schedules.
- Identify procurement schedules – Information will be developed from IRPs and interviews will be assembled to provide a picture of current procurement schedules across the Interconnection.
- Identify any barriers to coordinated procurement and approaches to overcome such barriers – In the process of interviewing LSEs, barriers and potential solutions to coordinated procurement schedules will be identified. Public utility commission staff will be interviewed to identify

regulatory barriers and potential solutions. The results will be documented in a draft paper prepared by the consultant and reviewed by LSEs and PUCs. The paper will also identify potential ways such barriers can be overcome. The findings in the paper will be a starting point for discussions among LSEs and their regulators which have interest in the same zones.

- Discussions among LSEs and their regulators interested in the same zones – A list of potential discussion groups organized around renewable resource areas of common interest will be drafted. The list will be posted for comment and modification. A consultant experienced in multi-state discussions among PUCs and companies will organize and execute approximately four specific renewable energy zone discussion groups of interested LSEs and PUCs focusing on zones that involve LSEs in multiple states. The goal of the discussions is to reach agreements on addressing barriers to joint procurement and to develop common schedules for procuring resources from the preferred zone. Information in addition to that developed in WREZ Phases 1 and 2 can be used to inform these discussions. Any agreements will be reported as part of the final report. These agreements do not require approval of any parties other than the participants in the discussion.
- Monitor procurement schedules – LSE procurement schedules will be monitored by project staff throughout the project in order to identify future opportunities for collaboration.

High Priority Support from Work by National Laboratories

National Laboratory support is needed to conduct a consistent review of LSE IRPs and IRP updates across the interconnection to begin the process of identifying renewable energy zones of common interest to multiple LSEs. Data collected from such reviews would include planned renewable resource acquisitions (e.g., amounts of megawatts and megawatt hours, procurement schedules, resource type, locations including by renewable energy zone, related transmission projects). The review would examine and reconcile utility data submitted to WECC and IRP/RFP data and fill information gaps where there are no IRPs. Data on planned renewable resource acquisitions would be presented in tabular format by renewable energy zone, state, year, utility, resource type. (This information would also be useful in the execution of Tasks 4-6 discussed below.)

To assist in identifying renewable energy zones of interest to multiple LSEs and the formation geographically specific LSE/PUC discussion groups, National Laboratory support is needed to utilize the WREZ delivered cost model for LSE/PUC discussion groups. Additionally, support from Labs on electronic mapping of WREZ hubs, load areas, and procurement plans would accelerate and make more transparent the LSE/PUC discussions.

Support in the review of IRPs and application of the WREZ model would be needed beginning late in the first quarter of 2010 or the beginning of the second quarter.

With support from National Laboratories, the methodology developed in the Western Interconnection for linking individual LSE plans for renewable resource acquisitions and application of the WREZ cost model to regional discussions by PUCs and LSEs can be a model and provide lessons learned for similar work in the Eastern Interconnection.

Without support from National Laboratories, it will be much more difficult to effectively identify groupings of LSEs and PUCs with a common interest in particular renewable energy zones and to make the necessary link back to needed changes in IRPs to accommodate coordinated procurement among multiple LSEs. A failure to detect synergies among LSE resource plans or to identify where LSEs should have an economic interest in the same renewable energy zones will result in missed opportunities for

coordination of procurement schedules and the potential failure in developing transmission to high priority renewable energy areas.

b. WREZ Phase 4 – Fostering interstate cooperation for renewable energy generation and transmission

Phase 4 of the WREZ process is divided into two areas. The first is concerned with transmission siting, specifically the facilitation of interstate and intergovernmental coordination in the review of transmission siting permit applications for electrical transmission. The second is concerned with the development of cost allocation options related to high voltage transmission lines from geographically constrained renewable resource areas to load centers. An important outcome will be to identify ways to inventory and facilitate the currently proposed transmission projects throughout the Interconnection.

Tasks to be performed:

- Transmission Siting - The Western Governors will play a key role in the implementation of initiatives related to regional transmission siting and in promoting a regional viewpoint on how to improve permitting processes. The Governors intend to engage regional stakeholders throughout these efforts in order to be inclusive of their concerns and as a means of achieving their support. The essential elements in the transmission siting part of Phase 4 of the WREZ are as follows:
 - Document and analyze case studies of recent permitting successes and failures from across the region. For successful processes, describe the approaches that led to success. This will be done through the use of a consultant. Applicants, permitting agencies and stakeholders will be engaged to review and respond to a request for information in compiling the case studies and best practices.
 - Coordinate and communicate a regional response to implementing any new federal transmission laws or procedures and regional views on implementation. WGA will design and run a facilitated 150 – 200 person workshop for key stakeholders to coordinate their views on federal law and provide recommendations on implementation needs. The report will be provided to the participating stakeholders, including permitting entities for review and comment. The workshop report will be forwarded to the Governors for review and approval.
 - Coordinate and communicate a regional response to any transmission corridor reviews or designations. WGA will host Webcasts to brief stakeholders and solicit feedback on any transmission corridor reviews or designations. This feedback will help inform any response or actions by the Governors.
 - Organize a series of public forums for state, local, tribal and federal permitting entities to identify actions to improve coordination of permit reviews and to respond to federal legislation. The Western Governors' Wildlife Council will provide information on how the state Decision Support Systems (DSS) can inform transmission permit reviews. WGA would conduct two or three day-long public forums in different locations and produce a report highlighting permitting challenges and solutions, including recommendations on the implementation of any federal legislation. The report will be

provided to the participating stakeholders, including permitting entities for review and comment.

- Work with Western Governors to implement recommendations from the forums.

The work on siting will be informed by work products under task 3 (wildlife decision support system) and the results of transmission studies conducted under Topic A.

- Cost Allocation Options - Allocation of the cost of new transmission is an issue that has been regularly flagged by the Western Governors. Given the potential expansion of the transmission system related to adding new facilities to meet renewable portfolio standards, cost allocation has become a highly debated topic. The lack of acceptable cost allocation standards impedes the spending of capital for new transmission projects. The following are the essential elements in the cost allocation part of Phase 4 of the WREZ:
 - Determine the cost allocation options related to high voltage interstate transmission lines from geographically constrained areas to load centers. Utilizing work under Phase 3 of the WREZ identifying preferred zones and synchronized procurement schedules and WECC transmission planning work, communicate cost allocation options to PUCs and Governors, including asking for comments or feedback.
 - Evaluate and seek input regarding what constitutes right sizing of transmission additions and determine cost allocation options for right sizing new transmission lines. WGA would use a technical consultant to perform a study on how right sizing could impact cost allocation.
 - Develop a stakeholder process that leads to an Interconnection-wide policy on cost allocation. This would include states, PUCs and other key stakeholders. Hold two to three stakeholder meetings to coordinate a recommendation for PUCs and Governors.
 - Encourage interstate negotiations on cost allocation for specific projects.

This task includes completion of a stakeholder-driven study that outlines the methodologies for determining the beneficiaries of new transmission and appropriate cost allocation schemes.

2. Integration of variable and non-variable generation and CCS mapping

Integration of variable and non-variable renewable

The analysis of issues related to the reliable integration of variable and non-variable renewables in the Western Interconnection will be completed as part of the activities conducted pursuant to Tasks 4 through 6, which address input into work conducted under FOA Topic A.

Carbon sequestration resource mapping

In 2008, the Department of Energy's Office of Fossil Energy National Energy Technology Laboratory (NETL) released the second edition of the *Carbon Sequestration Atlas of the United States and Canada (Atlas II)*. Of the seven Regional Carbon Sequestration Partnerships, four include Western Interconnection states and provinces that have assisted in identifying and mapping the carbon storage potential within the Western Interconnection. The Western Governors' Association has assisted the partnerships with outreach efforts and convened stakeholders to examine the region's potential for storing carbon, as well as the related policies and regulations.

Because the variability of many renewable resources does not allow them to supply energy on a 24/7 basis, the Interconnection will inevitably have to rely on power generated from dispatchable resources, some of which may be non-renewable. One of the ways the use of available renewable energy can be maximized while simultaneously maintaining grid reliability is by using dispatchable resources to firm the variability of renewable resources. This task will scope a project designed to produce two deliverables: a map that identifies carbon storage potential that exists in areas that would be useful for locating non-variable sources that can be used to firm variable renewable energy, and a report that outlines how such a symbiosis could be accomplished. The WGA will consult with the four carbon sequestration partnerships in developing the scope for this project.

Support for Analytical Work from Carbon Sequestration Partnerships or National Laboratories

WGA does not have the internal expertise to perform the kind of GIS mapping and analytical work contemplated in the original submission. In the absence of having outside contractor assistance available, WGA intends to consult with the Carbon Sequestration Partnerships and the National Laboratories to develop an appropriate project scope for completing such mapping and analyses.

3. Wildlife decision support system

Consistent with the *Memorandum of Understanding on coordination among federal agencies and states in identification and uniform mapping of wildlife corridors and crucial habitat* agreed to on June 15, 2009 by the Western Governors and the Secretaries of Energy, Interior and Agriculture the Funding Opportunity Announcement includes a requirement that the applicant propose and perform studies in coordination with state and federal wildlife officials on the identification and uniform mapping of crucial wildlife habitats and wildlife corridors to assist the development of a decision support structure for wildlife data.

Based on this requirement, along with a separate recommendation from a Western Governors' Wildlife Council subcommittee to undertake pilot efforts, the Council approved the development of pilot studies at their July 2009 meeting. The DOE resources available in this FOA will be used to fund these pilot efforts. Over 90 percent of the funding requested under this task will be used by states and WGA to hire or retain wildlife and GIS expertise to implement and support the pilot projects. At the end of this project, the wildlife agencies will have a foundation for maintaining and updating their state's DSS systems. The consistency established through this process will make analysis of generation and transmission projects uniform throughout the Western Interconnection.

Council members have considered how best to partner with their colleagues and others to maximize the value that pilot efforts will bring to the future development of a DSS in their states and within the region. Examples of pilots being discussed are: a project between Colorado and New Mexico to study wildlife data across their shared border with consideration of energy development issues; and a pilot project between Idaho and Montana to develop consistent definitions and data consistency for cross-border species and to map multi-jurisdictional data for consideration in energy transmission planning projects and renewable energy development. A full list of the preliminary pilot projects being considered by the states is available to the U.S. Department of Energy upon request.

Tasks to be performed:

- WGA and the WGWC will establish criteria for selecting appropriate pilot projects. A number of criteria and other factors are currently being considered by the WGWC to develop pilot proposals. These include the following criteria:

- Pilots should be multi-state or multi-jurisdictional.
 - Pilots should utilize or help develop the best available science in a GIS format.
 - Pilot areas should be geographically located so that an energy nexus linkage can be made. This nexus could be focused on renewable energy, fossil fuels, transmission of energy, carbon sequestration or related activities.
 - Pilots should be designed to invite and integrate federal government and non-governmental participation. Formal partnerships with these entities are also encouraged.
 - Pilots should build from known multi-jurisdictional issues already identified in the Wildlife Corridors Initiative report (WGA, June 2008) and the Western Renewable Energy Zones Phase 1 report (WGA, June 2009). States should focus their efforts to address issues that include the following:
 - a) Develop a site-specific suite of consistent protocols (e.g., standards for defining and collecting data for shared use) that help guide future state- and regional-level investments in DSS by highlighting areas that are important for wildlife habitat and connectivity conservation;
 - b) Develop site-specific standards and desired future condition of wildlife habitat or corridors on the ground;
 - c) Help demonstrate how each state's DSS could ultimately compile information, assure data quality, and make the data, models and analyses available at useful scales to analyze proposed energy, transportation and other land use projects in terms of on-site impacts, regional context and a changing climate; and
 - d) Advance planning efforts to map site-specific wildlife corridor adaptation to climate change.
 - Pilots must be able to be completed within 6-12 months of WGA's award of a contract for resources to states.
 - All interested Western states must have the opportunity to develop a pilot. WGA staff will work with Council members in a transparent fashion to determine substantively diverse and region-wide pilots.
- WGA and the WGWC will select final pilots after public input is received on October 5 – 6, in Helena, Montana and once a DOE grant is awarded. Contracts between WGA and the states will be issued during the first quarter of 2010.
 - Each state will provide periodic updates of pilot progress to WGA and the Council and a final public report of findings. These updates and findings should include the following:
 - Discussion on the state's view of the DSS framework and major components that would require multi-state coordination;
 - Identification of major costs/obstacles for development of the state's DSS; and
 - Explanation of the state's process for developing and coordinating its DSS.
 - A technical contractor will be retained to ensure compatible platforms and consistent data protocols are used within individual pilot studies and that these efforts are then consistent among all of the pilot studies being conducted by WGA states. This "Circuit Rider" will help ensure future state-level investments in DSS will lead to a regionally compatible network of systems that will provide information related to sensitive wildlife habitat early in the energy generation and transmission-siting processes.

4. Input into Topic A (Tasks 4 – 6)

Establish and Operate the State and Province Steering Committee

Western states and provinces have established the State-Provincial Steering Committee to oversee the implementation of Topic B activities to provide input into Topic A work. The State/Provincial Steering Committee (Steering Committee) has 25 members consisting of a Governor's representative for each major state in the Interconnection, a public utility commission representative from each state, and representatives from Alberta and British Columbia. The Steering Committee has established decision rules, established procedures for public input, adopted a charter, established three work groups (Demand-Side Work Group, Scenarios Work Group, Grid Utilization Work Group), nominated state representatives to the Scenario Planning Steering Group established under Topic A, and adopted a "living" work plan.

State Input to Topic A

The identified tasks below may change based on the work undertaken pursuant to Topic A and the ongoing work of the State/Provincial Steering Committee and its work groups. In the execution of its work, at a minimum, the Steering Committee will take into consideration: future demand, including potential demand from plug-in vehicles; demand reduction options; currently proposed transmission projects; economic and environmental implications, including greenhouse gas impacts from the electricity sector and related sectors, such as transportation; water and wildlife constraints; reliability and security needs; state and consumer interests; and effective integration of variable generation. The Committee's deliberations will be open to all supply- and demand-side technology and policy options and reflect individual state/provincial energy policies.

Tasks to be performed:

- Input to scenario development -- States and provinces will provide proposed scenarios and input to the scenario development process in Topic A and identify emerging policy drivers that impact the electric system. States and provinces will have two primary tasks as input to Topic A: (i) identify relevant policy-based input to be incorporated into the scenarios to be studied, such as future carbon policies, high energy efficiency and demand-response policies, and future technological innovations; and (ii) inform the Topic A process about the economic and environmental implications of alternative electricity supply futures and their associated transmission needs. These insights will include water impacts identified under Task 7 and wildlife impacts identified under Task 3.
- Participation in Topic A technical work -- States and provinces will participate in the technical work performed in Topic A's transmission planning process and the integration of variable generation. The participation task applies to: (i) the Scenario Planning Steering Group established under Topic A; (ii) WECC's Transmission Expansion Planning Policy Committee (TEPPC), (iii) TEPPC's Technical Analysis Subcommittee (TAS) and TAS work groups, including the Data Work Group, Modeling Work Group, Historical Analysis Work Group, Studies Work Group and a new DSM task force; and (iv) other existing and future planning processes.
- Review of study results and development of transmission plans -- The State-Provincial Steering Committee will have two feedback tasks in the Topic A process: (i) review initial study results that emerge from the Topic A transmission analysis and modeling, and make recommendations on whether the initial results are sufficiently complete or additional analysis is required to

resolve outstanding issues or new problems; and (ii) review final studies and consider recommendations for transmission plans.

- Participation in subregional planning groups -- State and provincial representatives will participate and provide public policy input to subregional planning groups including: (i) Southwest Area Transmission Group; (ii) Colorado Coordinating Planning Group; (iii) Northern Tier Transmission Group; (iv) Columbia Grid; (v) California subregional planning groups; and (vi) future groups.
- Integration of variable generation -- State and provincial representatives will participate and provide public policy input to: (i) WECC's Variable Generation Subcommittee; (ii) subregional and regional wind and solar integration projects; (iii) forums on wind integration issues; and (iv) processes developing market innovations to integrate variable generation. These tasks address item 2 of Topic B in the FOA regarding the integration of variable and non-variable renewables into the Western Interconnection.
- Efficient use of the existing transmission -- State and provincial input into Topic A planning will monitor and promote the efficient use of the transmission system. States and provinces will participate in: (i) the WECC's Historical Work Group analyses of historical transmission flows, schedules and Available Transfer Capacity; (ii) the Market Interface Committee's discussions of new approaches to addressing transmission congestion; and (iii) subregional planning group discussions of reforms to improve the efficiency of the existing transmission system.
- Resource planner forum -- Participate in a continuation of the discussions among load serving entities and state and provincial resource planners, which began at an ad hoc meeting sponsored by the WGA, CREPC and WECC on February 24-25, 2009. States and provinces will participate in twice yearly meetings of resource planners. States and provinces will: (i) provide input to agenda topics for meetings; (ii) assist in the organization, execution and follow-up of such meetings; and (iii) inform the State/Provincial Steering Committee and state/provincial agencies of findings from such meetings of resource planners.

High Priority Support for Work by National Laboratories

Energy efficiency / demand response/ distributed generation (Tasks 4-6): The Steering Committee seeks to significantly improve the knowledge base and modeling capabilities of demand-side resources for purposes of transmission planning, and to guide policy makers and regulators in resource assessments. National laboratory support is needed to accurately estimate the demand-side resource technical and economic potential in the power system. In particular, national laboratory expertise would serve to: quantify the embedded demand-side impacts for existing policies in current load forecasts; estimate the incremental economic and market-achievable potential of energy efficiency in 10-year load forecasts; estimate the technical potential of energy efficiency for 20-year load forecasts; apply and update the Federal Energy Regulatory Commission's *A National Assessment of Demand Response Potential* for derivation of demand response resource potential in load forecasts 10-years and 20-years in the future as resource options; assess combined heat and power resources; and evaluate distribution system efficiency upgrades. Technical assistance is needed to assemble and evaluate existing studies on demand-side resources. Such studies would be harmonized and aggregated or extrapolated as necessary to cover data gaps across the Western Interconnection. The emphasis will be on identifying studies that are of high quality and that have been completed recently enough to capture key changes in federal (and state) appliance and lighting efficiency standards.

In each of these areas, the work performed in the Western Interconnection can be a building block for nationwide work. Many of these tasks will be performed in close coordination with WECC's work on improving the understanding of demand side issues and improving the quality of demand side information submitted to WECC by Balancing Authorities. The table below shows near-term needs to address a 2010 study request submitted to WECC on January 31, 2010. To be timely, lab support on these topics is needed immediately.

The desire to treat demand-side resources on par with supply-side resources would be undermined without a thorough analysis from national laboratories. The inability to address demand side opportunities will undercut the credibility of transmission expansion study work and the value of such work in formulating state and provincial policies.

Table 1. Approach to treatment of DSM resources for Reference Case and Alternative Scenarios*

	Reference Case	Carbon Reduction		Technological Breakthrough	High DSM (EE-DR)
Year(s) Covered	Through 2020	Through 2020	Through 2030	Through 2030	Through 2020
Study Year	2011	2011	2011	2011	2011
Energy Efficiency (EE)	Utility IRP with review from state regulatory body	Economic Potential (provided by DSM WG)	Technical Potential (provided by DSM WG)	Technical Potential (provided by DSM WG)	Economic Potential (provided by DSM WG)
Demand Response (DR)¹	Utility IRP with review from state regulatory body	Same as Reference Case	Extrapolated from Reference Case	Technical Potential (provided by DSM WG)	FERC DR National Potential study (Use “Expanded Business as Usual” scenario as default. States may opt to craft unique scenario. CA will use FERC’s “Achievable Participation” scenario ⁴ .)
Combined Heat & Power (CHP)²	Utility IRP with review from state regulatory body	Same as Reference Case	Extrapolated from Reference Case	Same as Reference Case	Same as Reference Case for 2010 (expand in 2011 revision)
Distribution System Upgrades³	Utility IRP with review from state regulatory body	Placeholder (under consideration by DSM WG)	Placeholder (under consideration by DSM WG)	Placeholder (under consideration by DSM WG)	Placeholder (under consideration by DSM WG)

NOTES:

* Scenario Input comparison summarizes proposed approaches for treatment of different types of DSM resources for the 2010 and 2011 WECC TEPPC Study cycle. We assume that Reference Case and High-DSM case will be conducted in both 2011 and 2013. We assume that Carbon Reduction and Technological Breakthrough Scenario are conducted in 2011.

1. DR resources include multiple types of programs and pricing options, some of which require significant investment in enabling infrastructure (e.g. advanced meter rollout to facilitate critical peak pricing or real time pricing for residential and small commercial/industrial customers)

2. CHP – Subject to determination based on availability of suitable economic potential estimates of CHP across region. Due to time and resource constraints, DSM Work Group does not propose significant additional work on characterizing CHP potential for the 2010 study period for alternative scenarios. CHP will be address in more detail in 2013 Study period.

3. Distribution System Upgrades – DSM Work Group will investigate applicability of existing studies done for the Pacific Northwest to other states in the West and consider applying the results of Distribution System upgrade potential from the Pacific Northwest to other states in the West.

4. California scenario is different from default scenario. It is credible that by 2020 in California, universal AMI deployment is followed by dynamic pricing as default service for IOUs

WREZ Model

The model developed to derive the delivered cost of power from renewable energy zones in the Western Renewable Energy Zone project (WREZ Model) can be a unique and valuable tool for interconnection-wide transmission planning. An enhancement of the model developed by Lawrence Berkeley National Laboratory in late 2009 built upon the original WREZ model to derive the least cost solution for allocating renewable resources from zones to the 20 major load zones. This enhancement of the WREZ model enabled the user to evaluate many different assumptions and policy scenarios and derive the resource mix and transmission implications. The potential value of this tool has not been fully explored. Continued model enhancements, including updated information on resource costs and characteristics, and the effective deployment of the model in the work of the State-Provincial Steering Committee and WECC will add significant value and credibility to transmission expansion planning.

The analytic capabilities of this model have general application to other regions with national importance. The application of the WREZ model to transmission planning in the Western Interconnection and enhancements to the model to address questions that arise in transmission planning can be building blocks for the national application of such tools. Support from National Laboratories on the use and enhancement of the WREZ model is needed beginning in the second or third quarters of 2010.

Failure to support the continued work on the development and enhancement of the WREZ model would be a major setback for developing a promising tool with vital insight for policy makers and transmission planners. This model provides a rational basis to link the development of future renewable resources with the demand for associated transmission. A decision not to support additional enhancements to the model will diminish the technical basis for renewable generation assumptions in interconnection-wide transmission modeling. Reduced confidence in transmission modeling will limit the usefulness of study results in state and provincial policy making and the value of transmission planning in private sector investment decisions.

Building the WECC Reference Case: Review of IRPs, Utility Plans, and State Laws and Policies

The starting point for the WECC analysis and future transmission expansion plans is a foundation/reference case. The Steering Committee has specifically requested that WECC construct a reference case based on collective IRP and utility plan assumptions, with review by state regulatory authorities, for transmission planning. This reference case would reflect the resource priorities and requirements in the West. National Laboratory support is essential to collect, process, and synthesize the large amount of information that is embodied in the combined work of western IRPs, utility plans, and state policies and laws. National Laboratory support would also be needed to fill in the limited gaps where IRPs do not exist. National Laboratory support in the evaluation of IRPs is needed beginning in the second quarter of 2010.

Failure to support the analysis of IRPs, utility plans, and relevant state policies and laws across the Interconnection would undermine the foundation for building a reference case envisioned by the Steering Committee. There would be lower confidence in the input assumptions and resource selections that serve as the reference point for alternative scenarios.

Future technology costs

Technological innovation and the corresponding costs of different technologies will influence the future development of competing resources. The Steering Committee has requested that WECC study the long run transmission implications of different potential breakthrough technological innovations. National Laboratory support is needed to develop reasonable assumptions about innovation and costs of

power from different resource technologies. Information on future generation technology costs is also needed to effectively use the WREZ model when identifying economically preferred areas for renewable development across the interconnection. The Steering Committee is looking for special expertise to guide the analysis of future power costs and the probability of different breakthrough innovations. National Laboratory information on future generation technologies is needed by June 2010.

The National Laboratory support for identifying innovation and future costs of different technologies is applicable and useful for analyses in other interconnections.

If National Laboratory support is not available to provide recommendations on future technology and costs, the evaluation of transmission needs associated with breakthrough technologies will lack foundational support. The proposed long term scenario analysis will have less credibility and value to guide transmission planning or developing complementary state and provincial policies.

Analysis of Grid Reforms to Integrate Variable Generation

Future expansion of the transmission grid to develop large amounts of renewable generation must also account for the integration of variable generation. The Steering Committee desires to facilitate cooperative efforts in developing transmission plans that address variable generation integration and efficient use of the existing grid. National laboratory support is needed to provide essential analysis about these two objectives. The Steering Committee seeks National Laboratory support to conduct an interconnection-wide study that would evaluate the implications of (1) actual or virtual consolidation of balancing authorities, (2) intra-hour scheduling of transmission and demand-side resources, and (3) real-time energy market service that would enhance the capability to utilize redispatch to manage grid reliability under existing systems in the Western Interconnection. The Steering Committee will coordinate with WECC's Seams Issues Subcommittee and the Variable Generation Subcommittee to scope the costs and benefits of a real-time energy imbalance market and congestion management capability, balancing area coordination, and reforms to scheduling.

The proposed study has general application towards the integration of variable generation on a national level, particularly in areas outside of RTOs.

The proposed study is essential to better understand the upper bounds of renewable penetration and the potential gains from efficient utilization of the grid. A decision to forego the study would undermine the technical basis for grid expansion due to concerns over reliability and the technical feasibility of integrating high levels of renewable integration.

Integration of New Sources of Demand

As part of an examination of potentially higher than expected demand, there is a need to consider new sources of demand, such as plug-in vehicles. Some of these new sources of demand will create new challenges to the planning and operation of the transmission (and distribution) systems. With the assistance of national laboratories, these challenges can be quantified and incorporated into transmission expansion modeling and the Steering Committee's work on grid utilization.

National studies of plug-in vehicle penetration and charging patterns can be a useful foundation for work in the Western Interconnection. However, national studies need to produce outputs relevant to the work of the Steering Committee (e.g., assumed increased demand in 2020 and 2030 by geographic location and vehicle charging patterns). This information needs to be available in a timely manner. To be incorporated into the Western Interconnection 2011 plan, information needs to be available beginning in the third quarter of 2010.

Task 7. Energy and Water Nexus

Energy use accounts for 40 percent of water withdrawals in the U.S. and 3 to 4 percent of the total consumptive use of water. Water managers in the West are preparing for increased conflicts over and competition for the region's limited and geographically variable water supplies due to the region's rapid growth, a dearth of new supplies, and the looming impacts of climate change. The siting and transmission of new and mixed energy supplies will be influenced, and sometimes dictated, by the availability of water. At the same time, the siting of new energy supplies will influence the ability of agricultural, municipal, environmental and recreational users of water to meet their needs. In its 2007 report to Congress, Sandia National Laboratory stated that:

Consumption by the electric sector alone could equal the entire country's 1995 domestic water consumption. Consumption of water for extraction and production of transportation fuels from domestic sources also has the potential to grow substantially. Meanwhile, climate concerns and declines in groundwater levels suggest that less freshwater, not more, may be available in the future.

These conflicts are expected to become more prevalent as the competition for water increases over time, and we need to make sure that our resources are not double counted as policy decisions on future sources of energy are made. Even where energy developers are able to pay top dollar to secure water supplies, the impacts to other water users, including agriculture, cities and recreation, will be of keen interest to water managers, Governors and premiers in the Western Interconnection. In addition, water use for energy development could exacerbate endangered species problems in Western rivers, increasing water management challenges for all water users in a basin.

WGA proposes to work with state and provincial water managers and other agencies or regional authorities with responsibility for water supply management as well as experts on water requirements of electric generation technologies to evaluate water resource issues associated with the siting, transmission and mix of energy supplies in the Western Interconnection. The goal will be to anticipate challenges associated with water supply and energy development utilizing a lifecycle framework. The information generated by this task will be important in the development and evaluation of scenarios generated under Topic A to ensure that the energy development scenarios can be accommodated within the existing and future water resource constraints of the West.

Tasks to be performed:

- **Water Availability Assessment:** Compile existing assessments from Western states and provinces regarding water supply availability, current water use, and projected water demands for municipal/industrial, agricultural, and recreational/environmental uses. Assess the current and projected degree of water scarcity by large river basin or aquifer systems in the West. Consider drought and the potential implications of climate change and how they may affect river flows and water supply availability for energy development. This assessment will also seek to identify non-potable water resources.

- **Energy-Water Model:** Identify existing models for integrated energy-water planning and engage expertise from the national labs to examine the water consumption patterns of different generation and transmission scenarios. Models should include data on the lifecycle water requirements of various energy resources and technologies and should allow stakeholders to interactively investigate alternative energy development scenarios and their impacts on water supply. The model will need to be updated with the most recent and geographically specific data from the states on water supply, as developed in Task 1.

Additionally, stakeholder input may be needed on model inputs such as water consumption by specific electric generation technologies and the ability to use non-potable water.

- **Scenario Analysis:** Support state and provincial input into Topic A by evaluating electricity generation scenarios for the Western Interconnection and their implications for water supply. We would accomplish this by:

- Overlaying the water supply data and the energy-water model with the mix and siting of electricity generation facilities generated under the Topic A scenarios.
- Identifying areas where water supply availability may constrain electric generation options and basins where water supplies will be adequate to meet electricity generation scenarios.
- Identifying electricity generation scenarios that may be more practicable given water availability constraints.
- Holding up to three workshops to engage water resource managers, electricity generators, policy makers, and/or regulators to review the projected electricity generation scenarios and their implications on water management and allocation, including other sectors, such as agriculture, municipal, recreational and environmental.
- Scenario results will be published in a report to provide an overview of each scenario and its implications for water consumption and availability.

- **Policy Development:** Given the water supply impacts of proposed electricity scenarios, this task will seek to develop policies and/or programs to facilitate sustainable energy development by:
 - Identifying policies to promote water-efficient energy technologies such as dry cooling, and incentives to direct energy development toward places with a sustainable supply of water.
 - Considering likely impacts to other water users and ways to mitigate those impacts.
 - Convening water managers and electricity generators and regulators to make recommendations to the Governors and premiers for how energy and water providers can better coordinate to ensure compatible development of these important resources.

High Priority Support for Work from National Laboratories

The most critical analytical need is for the availability of water modeling. This modeling would both allow for a clear investigation of the impacts of various energy development scenarios on water supply and demand, and seamlessly integrate with the PROMOD modeling to better understand the energy-water nexus. The inability to complete such modeling will call into question the reliability and applicability of using more general data from studies completed for purposes other than assessing specific transmission plans, and may affect the ability of policy makers to confidently design programs and policies to manage water and energy goals.