

**Overview of the Renewable Electricity
and Advanced Coal with Carbon
Capture and Storage Advisory Group
(RE/AC/CCS)**

MGA



Midwestern Governors Association

Renewable Electricity Measurable Goals

- By 2015: 10 percent of electricity consumed in the region (equivalent to 103 million MWh of retail sales) will be from renewable resources.
- By 2020: 20 percent
- By 2025: 25 percent
- By 2030: 30 percent
- *electric power generated from wind, biomass, solar and geothermal energy sources, from new hydroelectric facilities and new hydroelectric capacity obtained through re-powering of existing facilities, and from hydrogen produced from the preceding renewable energy sources.*

Renewable Electricity Objectives

- Maximize cost-effective renewable electricity production in the region and its integration on the grid.
- Make most efficient use of the existing transmission infrastructure and develop new infrastructure, as necessary, to accommodate the region's economical renewable electricity.
- Ensure retention of local economic benefits from wind and other renewable power development.
- Expand the region's domestic production of wind turbines, towers and blades, solar technologies, and other renewable energy technologies to provide high-paying manufacturing and operational support jobs.
- Create a stable regulatory environment for renewable energy development.

RE-1 Stimulate the Development of New Renewable Electricity Generation

- Develop and implement a stable regulatory environment for renewable energy production and consumption. (Consistent, long-term federal policies and financial support that recognize MGA regional needs.)
- Enhance renewable energy standards or objectives in the MGA region. Promote coordination among all jurisdictions regarding meeting goals.
- Promote the federal PTC and clean renewable energy bonds.
- Quantification is still in process

RE-2 Expand Collaborative Regional Transmission Planning and Siting

- Develop regional electric transmission capacity sufficient to accommodate the substantial increases in renewable electricity.
- Transmission Adequacy Subgroup is helping to inform the Advisory Group on regional transmission cost sharing and cost recovery mechanisms for the build-out of resource transmission.
- A number of studies and surveys are ongoing that will also inform efforts.

RE-3 Incorporate transmission development requirements into existing state renewable energy objectives and standards.

- Adequate transmission needs to be coordinated with jurisdictional renewable energy objectives.
- Transmission planning framework needs to be linked to existing or future renewable energy requirements to overcome transmission capacity constraints in the MGA region.
- Regulatory enhancement and a cost allocation framework are needed improvements.

RE-4 Pursue a Multi-State Transmission Initiative

- Make efficient use of existing transmission infrastructure and develop new infrastructure to accommodate the region's economical renewable electricity.
- A new initiative has been started by MISO, MGA and governors of 5 states called the Upper Midwest Transmission Development Initiative (UMTDI) to reach agreement on how to approach transmission planning, siting, approval and cost sharing at sub-regional level.

RE-5 Encourage Orderly Development of Wind Resources

- Comprehensive siting principles and policies for wind farms must be developed and implemented to encourage orderly development of the resource
- Guidelines and a toolkit of resources incorporating best practices and principles need to be readied for: (1) optimal/maximum siting approach of wind farms, turbines, and ancillary facilities; (2) siting ordinances; and (3) land easements/contracts.
- Develop a model rule specifying state of the art siting principles, guidelines and requirements for wind farms (ecological, social and wind rights) and providing improved planning and coordination of macro and micro-siting of wind farms and turbines and of FAA, archeology and wildlife studies

RE-6 Encourage a Diversity of Approaches to Renewable Electricity Development

- Encouraged projects with local and community ownership.
- Biomass tends to be developed on a smaller scale with smaller developers, and has similar development issues to wind power.

RE-7 Maximize Electricity Generation from the Region's Wind Resources through Demonstration Efforts

- Develop a list of ongoing projects that deal with the intermittency issues including at least storage, wind to hydrogen or other innovative efforts.
- Review and/or promote development of efforts to provide better software for system wind load forecasting and load following for use by operations centers in estimating the next hours/days expected wind generation.

RE-8 Attract Renewable Energy Component Manufacturers and Service Providers to the Region

- Develop and implement economic incentives and workforce development policies to attract renewable energy equipment manufacturers and service providers to the region.
- Inter-jurisdictional competition should be conducted in a manner that does not interfere with regional success. The Midwestern Region must seek recognition as one of the world's premier locations for advanced energy technology research and development and manufacturing.

ISSUES FOR RENEWABLE ENERGY GROWTH WITHIN MGA TERRITORY

- Consensus around regional energy policy to support continued growth of wind and transmission beyond current renewable mandates
- Will bordering Regional Transmission Operators be willing to build transmission to accept Midwest ISO wind
- Will 500/765 kV AC or 800 DC transmission become viable in Midwest ISO footprint
- Will possible Federal intervention on transmission overlay incent states to work together on cost sharing for regional transmission projects
- Can regional tariffs be developed by Midwest ISO members to match who benefits with who pays over time and supports cost recovery mechanisms that reduce financial risk?

Transmission Studies For Information on Meeting The MGA Renewable Energy Goals

Transmission Study	Potential MW of wind sited in MGA region	Timeline	MGA States in Study Region
Regional Generator Outlet Study (RGOS)	16,000 MW	April, 2009	ND/SD/MN/IO/WIS
MTEP08 Study- Renewable Option	40,000 MW	Complete (Indicative Results)	Midwest ISO states
Joint Coordinated System Plan (JCSP)	90,000 to 120,000 MW	February, 2009	Midwest ISO/PJM/TVA/SPP/NY/ New England
Southwest Power Pool (SPP) Regional Transmission Study	2,000 to 12,000 MW	2009/2010	Kansas, Nebraska Missouri for MGA region
RGOS II	26,000 MW	Spring 2010	Midwest ISO states with RPS mandates

Regional Transmission Cost Sharing Issues

- Will Upper Midwest Transmission Development Initiative (UMTDI) result in a 5 state cost sharing proposal useful for Midwest ISO region and MGA?
- Will Midwest ISO RECB III work group be able to come up with a regional tariff that matches who benefits with who pays over time and allows cost recovery mechanisms that reduce financial risk to transmission project investors?
- Can a “bundled portfolio” approach to regional transmission projects (similar to Southwest Power Pool) be useful to Midwest ISO members for equitable cost sharing?

MGA Transmission Adequacy Subgroup Deliverables Update

- Deliverable #1-State survey of wind power developers completed for MN/IOWA/WIS/ILL. Other Midwest ISO states with mandates will be done in 2nd Quarter, 2009. SPP will provide results for Kansas and Nebraska
- Deliverable #2-Survey of regulatory commissions was sent out in November, 2008. Four states and province of Manitoba have replied to date. Organization of MISO states will also provide MGA with their survey results when compiled. ***Results and recommendations from survey for subgroup review should be complete by March, 2009***
- Deliverable #3- Regional transmission plans for MGA platform goals:
 - Transmission study results for MGA renewable energy goals of 10% should be available for review by subgroup in 2nd Quarter, 2009.
 - Regional overlay study results for 30% goal should be available for review by subgroup in 2nd quarter of 2009 depending on results of JCSP study and decision on JCSP Phase II study and EWITS.
 - Transmission study results for 20% goal will probably not be done until 2010 when Midwest ISO RGOS Phase II and MTEP09 studies are complete.

MGA Transmission Adequacy Subgroup Deliverables Update

Key Elements of Cost Share and Cost Recovery Mechanism:

- Issues include:
 - A robust business case for regional transmission projects that provides basis for cost recovery mechanisms that reduce financial risk for investors and support multi-state cost recovery mechanisms
 - A regional tariff that matches who benefits and who pays over time
 - Recognition of costs such as ancillary services around load following for wind and local/regional wind farm siting
- Need participation by subgroup in cost sharing work groups now being formed in early 2009:
 - Upper Midwest Transmission Development Initiative (UMTDI) for 5 state cost sharing agreement based on RGOS study results
 - Organization of Midwest ISO States (OMS) cost allocation initiative work group. First meeting in St. Paul January 28/29
 - Midwest ISO RECB III task force- first meeting February 25th, Carmel, Ind.
 - ***Recommendations for review by subgroup from first round of cost sharing study groups should be available by late 2nd quarter, 2009***

AC/CCS Measurable Goals

- BY 2010 : A regional regulatory framework for carbon capture and storage will have been implemented that enables permanent geologic storage of CO₂, provides regulators and industry clear direction with regards to CO₂ capture, injection, monitoring, verification and compliance, and addresses ultimate liability for stored CO₂.
- BY 2012 : A multi-jurisdiction pipeline will have been sited and permitted to transport CO₂ captured from one or more new advanced coal plants and potentially biofuels plants to an appropriate reservoir for use in enhanced oil and gas recovery (EOR).
- BY 2012 : The region will have operating at least one commercial-scale integrated gasification-combined cycle (IGCC) power plant with CCS that uses bituminous coal.

AC/CCS Measurable Goals

- BY 2015 : The region will have:
 - Three or more commercial-scale IGCC plants with CCS operating with bituminous coals;
 - Operating at commercial scale at least two IGCC plants with CCS that use sub-bituminous and lignite coals, respectively;
 - Commercial scale post-combustion capture of CO₂ emissions at one or more pulverized coal plants; and

BY 2020: All new coal gasification and coal combustion plants will capture and store CO₂ emissions.

BY 2050: The region's fleet of coal plants will have transitioned to CCS.

AC/CCS Objectives

- Support development of a CO₂ management infrastructure and demonstration and commercialization of large-scale geologic carbon storage projects that take advantage of our region's EOR potential.
- Support research, development, demonstration and deployment of carbon capture technologies at existing plants and re-powering of existing facilities, where appropriate, and at biorefineries to increase efficiency and reduce CO₂ emissions.
- Create a policy and regulatory environment that advances new coal plants with CCS.
- Develop the commercial manufacturing, technical and operational expertise in our region to operate and export these technologies globally.
- Support the development and eventual deployment of technologies that enable effective commercial utilization of captured CO₂ as a feedstock for energy and for the manufacture of advanced materials and other useful products.

AC/CCS-1 Promote the Establishment of a Regional Carbon Capture and Storage Infrastructure

- A number of reports, inventories and frameworks are recommended and are being developed through the MGA “Carbon Management Infrastructure Partnership” resolution to address key uncertainties.
- A regional regulatory framework for CCS along with a multi-jurisdiction pipeline to transport CO₂ is in the process of being quantified along with AC/CCS-2.

AC/CCS-2 Advanced Coal Technology Incentives, Support or Requirements

- Create a regulatory environment that advances CCS technologies for coal-based generation and biorefineries
- Provide state support for front-end engineering and design (FEED).
- Provide direct state financial incentives.
- Allow regulated utilities cost recovery for appropriate commercial projects.
- Enhance integrated resource planning (IRP) policies
- Modify state policies and regulatory programs to favor advanced CO₂-limiting generation technologies with CCS over conventional pulverized coal units.
- Quantification of the measurable goals is ongoing.

CO2 Infrastructure Management Resolution Deliverables

- Deliverable 1: report on costs and benefits of CO2 enhanced oil recovery.
 - Advisory group discussions on study design
 - Staff exploring partners for data analysis
- Deliverables 2 and 7: expand geologic assessment of reservoirs and large-scale, non-EOR CO2 storage tests/coordinated regional federal funding request for FY2010.
 - Staff discussions with individuals involved in federal CCS appropriations issues (action pending outcome of stimulus discussions)

CO2 Infrastructure Management Resolution Deliverables

- Deliverable 3: inventory of jurisdictions on existing statutes and regulations related to CO2 management.
 - Interim Report in final editing; final MGA report to be released in January 2009 from advisory group
- Deliverable 4: Development of uniform model jurisdictional statutory and regulatory framework.
 - Interim Report in final editing; final MGA reports to be released in January 2009 from advisory group

CO2 Infrastructure Management Resolution Deliverables

- Deliverable 5: Identify and site inter-jurisdictional CO2 pipeline.
 - Phase I CO2 pipeline model development underway around a scenario for a Midwest pipeline to Gulf Coast
 - Phase II CO2 pipeline modeling would present options for a regional network consistent with governors/premier's 2015-2050 GHG reduction and technology commercialization targets
- Deliverable 6: Region-wide commercial plan for CO2 management.
 - Package proposal under development for 2012-15 deployment of CO2 capture projects, and a pipeline solution and key policy incentives and regulatory measures to support them.

Questions

- Any questions/suggestions about process?