

EIPC Stakeholder Steering Committee Meeting

October 12 - 14, 2010
Crystal City, VA

EIPC

Eastern Interconnection Planning Collaborative

Eastern Interconnection Planning Collaborative



Agenda

Objectives:

- **Establish the Leadership and Governance of the SSC**
- **Share Work Group progress and next steps with SSC**
- **Further understanding of the Regional Transmission Plans Roll-up**
- **Begin discussion of SSC and EISPC Futures development**

Agenda (Day 1)

- **1:00 – 1:30: Introductions and Overview**
- **1:30 – 2:30: Governance Task Force report**
- **2:30 – 3:00: Action Item -- Consensus Decision on Charter and Vote for Chair and Vice-Chair**
- **3:00 – 3:30: Break**
- **3:30 – 5:00: Roll-up Report Presentation, Q&A**
- **5:00 – 6:00: Review of Work Group Charges, Q&A, Discuss Coordination of WGs**

Agenda (Day 2)

- 8:30 – 9:15: Action Item – Consensus Decision on WG Charges
- 9:15 – 9:45: Roll-up Work Group Report
- 9:45 – 10:30: Scenario Planning Work Group Report
- 10:30 – 11:00: Break
- 11:00 – 12:00: EISPC Presentation
- 12:00 – 1:00: Working Lunch in Sector Caucus Breakout Groups
- 1:00 – 3:00: SSC SPWG Futures Overview
- 3:00 – 3:30: Break
- 3:30 – 4:30: Modeling Work Group Report
- 4:30 – 5:00: Information Needs to Support Work Groups
- 5:00 – 5:30: Recap and Review

Agenda (Day 3)

- **8:00 – 10:00: Working Breakfast in Work Group Breakout Groups**
- **10:00 – 10:30: Break**
- **10:30 – 12:00: Review of Decisions Made and Next Steps**

Name, Company, and Question

- What would you like everyone to keep in mind during this meeting?

Or

- What is the one thing that you personally want to accomplish?

Governance/Charter Task Force

Key Changes and
Recommendations



SSC Meetings

Page 1, lines 22-23:

- “There may be up to four 2-day SSC meetings each year, **as well as** conference calls and/or webinars on a monthly basis between these meetings.”

Page 6, lines 21-24:

- “In the interim between in-person SSC meetings, the **SSC will hold regular (up to once per month) conference calls and/or webinars**, in order to hear reports from the WGs, receive status and progress updates, and make any necessary process- or substance-related decisions.”

Responsibilities of the SSC

Page 2, lines 7-22:

- “Review with EIPC the development of the “roll-up” case, and provide feedback.
- Provide information to all stakeholders on the **macroeconomic Futures, transmission build-out Scenarios, and related sensitivities**.
- **Work with the Eastern Interconnection States Planning Council (EISPC)** to develop the eight (8) macroeconomic Futures (as outlined in the May 14th SSC Decision document)[1] and related sensitivities, with input from other stakeholders **and the recommendations of relevant Work Groups**, consistent with DOE-approved project schedules.

Responsibilities of the SSC (cont'd)

- Develop criteria to determine the choice of the eight (8) **macroeconomic Futures and three (3) transmission build-out Scenarios.**
- Work with EISPC to develop the three (3) transmission build-out Scenarios to be submitted for detailed transmission expansion and reliability analysis (as outlined in May 14th SSC Decision document), with **input from other stakeholders and the recommendations of relevant Work Groups.**
- **Within the bounds of the FOA and EIPC's proposal,** review the analyses and reports of the EIPC Analysis Team and provide consensus direction and input.
The EIPC Analysis Team shall follow and incorporate such SSC strategic guidance on the macroeconomic and transmission analysis of the eight (8) macroeconomic Futures and three (3) transmission build-out Scenarios.”

Policy on Alternates

Page 4, lines 5-11:

- “**Alternates:** It is very important for the development of consensus that the designated members of the SSC participate consistently. Every effort will be made to provide adequate notice of SSC member meetings and events so that the SSC member can participate.
- The Sector or Subsector Caucus representatives as is appropriate **may designate one alternate to represent the SSC member** at specific meetings and events if he/she is unable to attend.
- The **SSC member must notify the Chair and Vice-Chair** in the event he/she wishes to send the alternate. However, **absence from two or more in-person SSC meetings in a year** will be cause for the member to be replaced by the Sector or Subsector Caucus.”

Chair & Vice-Chair Selection Process

Page 4, lines 13-21:

- “**Leadership:** The SSC, at its second meeting, will select two individuals to serve as Chair and Vice-Chair. In the event that there are more than two candidates, the selection process will be as follows:
- A single voting round will be held, in which each SSC member shall vote for the two (2) candidates they prefer. The votes will be submitted privately, on-paper. The top vote-getter will be named as the SSC’s first Chair, and the second-highest vote getter will be named Vice-Chair.
- After six (6) months, the Chair and Vice-Chair will swap roles – with the Chair moving into the role of Vice-Chair, and the Vice-Chair being the new Chair – and serve in these roles for the subsequent six (6) months.
- Approximately ten (10) months after the initial Chair and Vice-Chair is selected, the SSC will determine how to select the Chair and the Vice Chair for the following year. “

Chair & Vice-Chair Duties

Page 4, lines 23-31:

- “The Chair and Vice-Chair, in cooperation with the EIPC project manager and the Facilitator, will have the following duties:
 - 1) serve as a point of contact for EIPC, while ensuring that the entire SSC is engaged in discussions relating to critical administrative matters and substantive issues;
 - 2) serve as a point of contact for Work Groups (WGs) and help facilitate coordination and communication among the WGs;
 - 3) serve as an internal monitor of the progress of the SSC and WGs, and help ensure tasks/goals/objectives are met on deadline;

Chair & Vice-Chair Roles (cont'd)

- 4) encourage cooperation and support consensus-building in an open and transparent manner;
- 5) help develop meeting agendas and locations, with input from the SSC;
- 6) assist with administrative matters, and help SSC stay on task during SSC meetings. The Chair and Vice Chair will determine how these duties will be shared, and will communicate this information to the SSC.”

Page 4, lines 33-34:

- “Any concern with the performance of the Chair or the Vice Chair by five or more SSC members will be addressed by the Steering Committee.

Alternative to Consensus

Page 5, lines 18-28:

- “**Alternative to Consensus**: After significant discussion and debate, **if at least 19 of members present** at a meeting (either in-person, electronically, via telephone, or through their alternates) **decide that it is impossible to reach an agreement where no one objects** to the proposal moving forward, then the SSC will strive to reach an agreement that is **supported by at least 23 members**.
- **In the case of the states voting as a block with 10 votes**, the SSC will have reached an agreement when a proposal is supported by **at least 19 members**. **No one sector shall be able to unilaterally initiate this voting process or block agreement on a proposal.**

SSC Consensus

Page 5, lines xx-xx

- The SSC members will make decisions based on consensus. Consensus will be defined **as none of the 29 members objecting to a proposal moving forward**. Unanimity and complete agreement are not required to achieve consensus – consensus means that **all the parties can live with a particular decision** and the ultimate outcomes of the SSC process

Page 6, lines 16-20:

- **“Each sector (or subsector) will define for itself how its SSC members will take positions in the SSC consensus process. Additionally, each sector will have the opportunity to caucus in real-time to establish its position(s) on the issue at hand.”**

Agendas & Materials for SSC Meetings

Page 8, lines 18-21:

- “Draft agendas for all meetings and all materials and presentations **related to proposed action/decision items**, including materials submitted by Work Groups to the SSC, should be distributed **two weeks in advance**.
- This requirement may be waived, under extraordinary circumstances, by the consensus of the SSC. All such materials must be distributed **no later than one week in advance.**”

Continued on next slide

Agendas & Materials for SSC Meetings

Page 8, lines 23-25:

- “While any non-member of a sector may suggest agenda items, **the final agenda will be established by the SSC Chair(s) and in consultation with SSC members, the EIPC and the Facilitators.**
- Any additional agenda items **supported by five or more SSC members** shall be added to the agenda.”

Stakeholder Work Groups (WGs)

Page 9, lines 17-22:

- “The SSC may create and populate one or more stakeholder Work Groups to facilitate the completion of SSC responsibilities.
- To achieve balanced representation on the WGs, SSC members, working with their Sector Caucus and Table Representatives, **will appoint no more than three official members to each WG.**
- These official WG members **may be SSC members, Regional or Sector Caucus Representatives, or other qualified non-Caucus individuals**, as determined by the SSC members from each sector.
- The SSC **may also name additional participants** (e.g. technical experts) to be involved in WGs, as appropriate.”

Communication

Page 10, lines 16-35:

- Draft agendas for all meetings and all materials and presentations **related to proposed action/decision items**, including materials submitted by Work Groups to the SSC, **should be distributed two weeks in advance**.
- This requirement **may be waived**, under extraordinary circumstances, by the consensus of the SSC. All such materials must be distributed **no later than one week in advance**.
- “Formal communication of deliberations or decisions by the SSC will be represented publically as SSC positions only. **Without prior approval, no SSC member will characterize the position of any other member** in public statements or in discussions with the press, even if that party withdraws from the SSC.”

Action Item

- Consensus Decision on Charter
- Vote for Chair and Vice-Chair



2020 ROLL-UP POWERFLOW MODEL REPORT

Steady-State Modeling Load-Flow Working Group

Stakeholder Steering Committee Meeting
October 12, 2010

Topics

- Model Definitions
- Assumptions
 - Load Forecasts
 - Energy Efficiency / Demand Response
 - Interchange or Firm Transmission Service
 - Future Projects
 - Generation Dispatch
- Status of Analysis

Introduction

- Responsibilities of Steady-State Modeling Load-Flow Working Group (SSMLFWG) :
 - Develop procedure manual for group
 - Modify/create steady-state load-flow models
 - 2020 summer peak model developed
 - Prepared 2020 plan roll-up documentation by PA
 - Conduct steady-state load-flow analysis (gap analysis), identify enhancements, and transfer analysis
 - Prepare 2020 roll-up report

Powerflow Model Definitions

- 2020 Summer Peak Load System
 - “Snapshot” of summer peak system conditions for each PA
 - Single demand level and generation dispatch
 - Based on ERAG MMWG powerflow case
 - Established annual case development process
 - Models all existing and approved transmission elements above 100kV
 - Proposed facilities may be added by PAs

Load Forecast & Growth Rates

- Based on a 50/50 load forecast by each PA
 - 50% chance of being lower/higher than actual
- Average annual growth rates for 2010 to 2020
- Rates range from -0.7%/year to 2.6%/year
- Economic growth and conservation level varies across Eastern Interconnection (EI)
- We would not expect consistency across EI

Energy Efficiency / Demand Response

- Impact of Energy Efficiency and Demand Response
 - Energy Efficiency is generally included in load forecasts, per each PA
 - Controllable demand-side management (interruptible loads) is generally not included in load forecasts
 - Uncontrolled demand-side management (peak shaving) is reflected where applicable

Area Interchange

- Area Interchange is net sale or purchase of power between Balancing Authorities
- Long-term firm transmission service is modeled
- Long-term is >1 year from transmission service perspective
- Interchanges generally consistent with ERAG MMWG

Future Transmission

- Approved, Budgeted and Committed projects are included by all Planning Authorities
- Planned projects are included by most.
- Conceptual projects are included by half PAs; either proposed or likely to be implemented
- PAs have different Tariffs and planning approaches, but all produce transmission plans to be implemented

Planned vs. Proposed

- What are Proposed (Conceptual) projects?
 - NERC definition: Projects not included in Planned facilities, but identified and/or announced through:
 - Corporate announcement
 - Early stages of approval process
 - Interconnection Queue
 - Projects to support NERC TPL analysis
 - PAs that include Proposed projects will test those over time to see which ones are ultimately justified to become Planned/Approved. Those that do not include Proposed projects will be testing the systems to see what additional projects are needed over time.

New & Upgraded Transmission Facilities

- Many new and upgraded facilities in the 2020 model > 160 kV
 - Approximately 530 line projects
 - Approximately 120 transformer projects
 - Approximately 60 equipment projects

Generation Assumptions

- All Planning Authorities included “approved” future generators in models
 - Approved means they have completed tariff process for interconnection and/or transmission service
 - A few include generation plans (capacity plans)
 - Some include generation to meet RPS requirements
- Generation Retirements
 - Publicly known generation retirements are included
 - Commercial sensitivity and confidentiality concerns are considered in modeling of potential retirements

Resource Planning

- Reliability margins and resource assumptions will be maintained through the individual analysis performed by each PA.
 - PAs are Transmission Planners, and most do not engage in resource planning or forecasting.
- In planning regional transmission systems most PAs plan based on resource requirements provided by others (e.g., via interconnection queue processes)
- Transmission plans typically respond to resource commitments to ensure system is secure and reliable.

Generation Dispatch

- Base case generation dispatch is set according to the internal assumptions and procedures of each PA
 - All use economic dispatch or typical market dispatch for peak conditions

Gap Analysis

- PA analyzing their system to determine if the coordinated plan had any gaps such as:
 - Pre-existing system conditions
 - Adverse impacts due to neighboring PA plans
- No gaps reported to date. Still underway
 - No issues associated with neighbor plans
 - Any issues identified are internal to PAs and can be addressed through system adjustments or proposed projects.

Inter-Area Enhancements

- PAs examine projects near their borders and coordinate with neighbors on combined system enhancements
 - Avoid duplication of projects
- Some potential enhancements are presently under study (identified pre-EIPC) via existing coordination processes
- No enhancements identified to date

Linear Transfer Analysis

- Linear transfer power flow analysis was performed to determine the ability of areas/regions to export and import power with the existing plans, and to demonstrate strength of grid
- Results are still under review by PAs

Next Steps

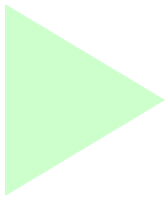
- Complete Gap Analysis
- Document any Inter-Area enhancements
- Complete Linear Transfer Analysis
- Update report with stakeholder feedback
- Target completion in December

Review of Work Group Charges

Update to EIPC
Stakeholder Steering Committee
Oct 12 – 14, 2010

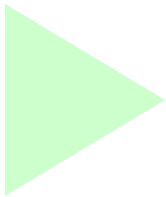
3 Workgroups Support the SSC

Roll-up Workgroup



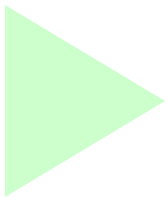
Integration of Regional Plans

Scenario Planning
Workgroup



Selection of Futures/Scenarios

Modeling
Workgroup



Macro-economic and
Production cost modeling

Review of Workgroup Charges

- Rollup WG, Scenario Planning WG, Modeling WG
 - Coordination / Handoffs between workgroups
 - Ensuring all tasks are covered (eg GE MAPs)
 - Establishing Baseline/Reference case and Scenarios
- Achieve clear timing & sequencing of workgroup activity to support SSC schedule
 - maximize use of resources and effectiveness of workgroups
- Ongoing Coordination
 - Review workplans
 - Identify Joint sessions between workgroups
 - Share results

Appendix -Workgroup Charges

Roll-up Workgroup

Purpose of the RUWG

- The RUWG is dedicated to liaising with and providing feedback to EIPC as EIPC develops the integration of the existing regional transmission plans and addresses potential enhancements identified through a gap analysis, of the EI-wide 10-year Roll-up Case. These activities are identified as Task 2 in the Statement of Project Objectives; however, the group expects that its charge will extend to other tasks if the roll-up plan affects either the economics or reliability of scenarios.
- The RUWG will establish a close interface and coordination with the Scenario Planning Work Group so that the conclusions and results of the Roll-up study effort are factored into the scenario planning consideration of a 20 year reference case and the other expansion studies in an appropriate and workable manner.

Roll-up WorkGroup, cont.

Work Group Objectives

- Review and comment on the Steady State Modeling Load Flow Working Group Procedure Manual (the Study Guide) for assumptions that have critical implications for the 10-year Roll-up Case.
- Review and comment on the different assumptions used by the Planning Authorities (PA) to develop their transmission models. Assess compatibility among the regional plans, which are developed to meet all current state, provincial, and federal regulatory and reliability requirements, and which will identify potential opportunities to enhance the regional plans across regions.
- Review and comment on the judgments and key assumptions that were applied in developing the Roll-up Case with particular focus on any enhancements that were made.
 - Potential transmission conflicts/opportunities among regional plans; e.g., gap analysis.
 - Transmission options that were selected to address reliability impacts associated with potential conflicts among regional plans.
 - Selection of flow gates.
- Report out to the SSC on concerns or issues raised from examination of the Study Guide and the Roll-up Case Report.
- Schedule a working session with the Scenario Planning Work Group to “hand-off” the Roll-up Case, and to see so that the conclusions and results of the Roll-up study effort are factored into the scenario planning consideration of a 20 year reference case and the other expansion studies in an appropriate and workable manner.

Scenario Planning Workgroup

Purpose of the SPWG

- Recommend to the EIPC Stakeholder Steering Committee (SSC) a set of diverse macroeconomic futures for selection, and if so directed by the SSC, make recommendations as to the eight futures to be employed and up to nine sensitivities to be used within each.
- Fully develop the eight macroeconomic futures and the sensitivities selected by the SSC, so that they meet CRA's needs.
- Recommend to the SSC which three scenarios should be assessed in reliability studies.

Scenario Planning Workgroup, cont.

Work Group Objectives

- The portfolio of eight macroeconomic futures will represent a wide range of forecasts.
- The portfolio will consider factors such as state and federal public policy objectives, reliability mandates, and economic considerations.
- The WG will effectively coordinate with the Modeling Work Group as the purposes of these groups are interrelated and outputs will be informative to one another.
- The portfolio of macroeconomic resource futures will be recommended to SSC as the consensus position of the working group. If the working group is unable to reach consensus on eight recommended macroeconomic futures, a range of opinions or additional futures may be presented.
- The WG will inform and receive input from the SSC throughout the process such that the SSC endorses the portfolio proposed by the WG, or alternatively, will find that the WG has helped the SSC to substantially narrow the range of issues to be debated by the SSC in sufficient time to meet the overall EIPC schedule.
- The WG will fully coordinate and collaborate with EISPC, since EISPC ultimately can decide four of the macroeconomic futures and one of the transmission expansion scenarios.
- The SPWG will coordinate with the Roll-up WG as needed.

Modeling Workgroup

Purpose of the MWG

- Develop a better understanding of the capabilities, inputs and assumptions, and outputs of the CRA MRN/NEEM (macroeconomic) model that will be used to evaluate the 8 Macroeconomic Futures and the GE MAPS (production cost) model that will be used to analyze the Roll-Up Plan and the final 3 Transmission Build out Scenarios.
 - Identify concerns or issues, seek answers, make recommendations and report to EIPC Stakeholder Steering Committee (SSC) regarding the MRN/NEEM and GE MAPS modeling to be performed.
- Identify with CRA the matrix of specific required inputs for MRN/NEEM to be provided by SSC and advise the SSC and Scenario Planning Work Group (SPWG) on model inputs, outputs, processes and limitations to assist them in the development of the 8 Macroeconomic Futures
 - Coordinate with the Roll-Up Work Group (RWG) to identify any issues that could impact model inputs, assumptions, modeling, or results.
- In coordination with the SPWG, make recommendations to the SSC on the inputs and assumptions to be used for modeling the 8 Macroeconomic Futures.
 - Identify as appropriate data or analyses needs
 - Work with resources (e.g. DOE / National Laboratories)
 - Collaborate with CRA to ensure model consistency
- Review outputs and results of MRN/NEEM and GE MAPS modeling and provide a report on the interpretations to SSC

Modeling Workgroup, cont.

Work Group Objectives

- The MWG will work to achieve the purpose of the MWG and in sufficient time to meet the overall EIPC schedule.
- The MWG will effectively coordinate with the SPWG and RWG as the purposes of these groups are interrelated and outputs will be informative to one another.
- The inputs/assumptions will be recommended to SSC as the consensus position of the working group. If the working group is unable to reach consensus, a range of views will be presented.
- The MWG will inform and receive input from the SSC throughout the process such that the SSC endorses the inputs and assumptions, or alternatively, will find that the MWG has helped the SSC to substantially narrow the range of issues to be debated by SSC in sufficient time to meet the overall EIPC schedule.

Action Item

- Consensus Decision on WG Charges

Scenario Planning Work Group

Report to the SSC –
Part 1

October 13, 2010



Overview

- The Scenario Planning WG has begun its work
- Discuss the progress of this WG
- Get SSC input and general feedback on this WG's direction

Scenario Planning WG Charge

Purpose of the SPWG

- Recommend to the EIPC Stakeholder Steering Committee (SSC) a set of diverse macroeconomic futures for selection, and if so directed by the SSC, make recommendations as to the eight futures to be employed and up to nine sensitivities to be used within each.
- Fully develop the eight macroeconomic futures and the sensitivities selected by the SSC, so that they meet CRA's needs.
- Recommend to the SSC which three scenarios should be assessed in reliability studies.

Scenario Planning WG Charge

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- The portfolio of eight macroeconomic futures will represent a wide range of forecasts.
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Scenario Planning WG Charge

Work Group Objectives

- The WG will inform and receive input from the SSC throughout the process such that the SSC endorses the portfolio proposed by the WG, or alternatively, will find that the WG has helped the SSC to substantially narrow the range of issues to be debated by the SSC in sufficient time to meet the overall EIPC schedule.
- The WG will fully coordinate and collaborate with EISPC, since EISPC ultimately can decide four of the macroeconomic futures and one of the transmission expansion scenarios.
- The SPWG will coordinate with the Roll-up WG as needed.

Futures development process (1)

- Began with discussions of different scenario development approaches
 - Two approaches (Shell and Deloitte) started with the drivers and built the scenario up using the drivers
 - Third approach started with existing futures and adapted them
 - Fourth approach involved brainstorming ideas for futures and then describing in more detail
- Through weekly WG meetings, group members discussed these approaches and began circulating ideas for drivers and scenarios

Futures development process (2)

- Work Group members chose hybrid approach
- Group met face to face last week
 - Began with brief discussion of drivers – those already submitted, and those brainstormed during the meeting
 - Moved to discussing Futures – those already submitted by WG members, and those brainstormed during the meeting
 - Prioritized list of Futures and worked to describe them in more detail
 - Iterative discussions of drivers and scenarios until definitions of Futures emerge
 - Described six futures thus far

Range of Results from Futures Brainstorm

- Business As Usual (BAU)
- Carbon capture
- National RPS
- Nuclear resurgence
- Transportation electrification
- Aggressive EE
- Distributed Generation
- Canadian imports
- Commercial storage
- High coal retirements
- Regional implementation of RPS & CC
- National RPS + Imported Hydro
- Rapid tech development and offshore wind
- Shale gas works – low-cost natural gas, high availability
- Balanced/diversified/economic fuel mix + regional RPS + EE/DR proliferation+ DG + Storage
- Commercial storage + aggressive EE/DR/smart grid + National RPS
- Aggressive EE/DR/smart grid + accelerated penetration of small DG near customer load
- Nuclear resurgence + regional implementation of RPS and carbon reductions + increased imports of Canadian low carbon power
- National RPS + accelerated retirements and no new builds of coal + transportations electrification
- Carbon constrained + national RPS + nuclear resurgence + increased Canadian low carbon power

Possible Futures discussed so far

1	Business as Usual (BAU)
2	Federal carbon constraint – national implementation
3	Federal carbon constraint – state and regional implementation
4	Aggressive EE/DR/DG/Smart Grid
5	National RPS with top-down implementation
6	National RPS with regional implementation

Next steps – today

This afternoon

- Present Futures to SSC
- Receive SSC input on scope of proposed Futures defined at Scenario Planning WG meeting
 - Not asking for SSC consensus on Futures at this point
 - Not asking for SSC to engage in Futures development or definition today
 - Thoughts about Futures that have already been defined, as well as any additional Futures ideas, will be recorded

Next steps – going forward

- Incorporate SSC input and direction
- Further develop and flesh out Futures
- Develop coordination plan with modeling WG
- Receive further clarification on CRA model

Working Lunch

- Sector Caucus Breakout opportunity to prepare for afternoon Futures Discussion



Scenario Planning Work Group

Report to the SSC – Part 2
October 13, 2010

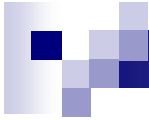


Objectives

- Present Futures to SSC
- Receive SSC input on scope of proposed Futures defined at Scenario Planning WG meeting
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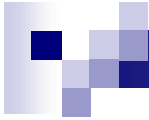
Title of Future 1	Business as Usual (BAU)
Brief description	Trending the present forward based on historical indices
Narrative <ul style="list-style-type: none">•What will the world look like in 2030?•What are the 3 -5 most defining characteristics of this Future?•What are the greatest uncertainties ?	This scenario is characterized by a continuation of current trends and indices related to most key drivers, including technology, the economy, fuel availability and pricing, and load growth. Only policies currently in place are considered in this Future.



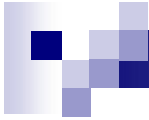
Key drivers	Driver Behavior (e.g. low/med/high input values, technology developments, National/State policy description)
1. Policy	Fixing policies as they are today. No policy related sensitivities.
2. Technology	Incremental technological advances (no major breakthroughs).
3. Fuel	No major finds or innovations. The same general mix of availability that currently exists. Historic price trends continue. (Shale gas existing, nuclear licenses extended.) Possible sensitivity on pricing.
4. Economy	Average historical levels (average for a period of time and sensitivities around it). Average GDP growth rates (average/historical with regional variation).
5. Demand/load growth	Historic patterns continue. (can run sensitivities around this).
Additional information	<ul style="list-style-type: none">• Yrs 1-5 of roll-up included --Yrs 6-10 ?• What about policies that expire? (renew or discontinue at the end of currently authorized period)

Title of Future 3	Carbon Constrained – “Pushing the Envelope”
Brief description	Achieving a significant carbon emission reduction in the electric industry by 2030, through federal policy that includes a goal of 80 percent reduction in the nationwide economy by 2050.
Narrative <ul style="list-style-type: none"> •What will the world look like in 2030? •What are the 3 -5 most defining characteristics of this Future? •What are the greatest uncertainties? 	<p>Ways to get there:</p> <p>This future scenario depends on a national policy with a focus on carbon emissions reductions, potentially accompanied by:</p> <ul style="list-style-type: none"> -National RPS Standards -Emphasis on the energy sector, with efforts throughout the country, -A plan for replacement generation and retirement of coal generation, -Strong emphasis on all other sources: natural gas, renewables, nuclear, Canadian hydro; -Demand reduction, energy efficiency, vehicle fleet efficiencies, and -Addressing financial needs of new construction, including relative costs. <p>The greatest uncertainties: Politics and policy; the economy; science; possible catastrophic events or conditions.</p> <p>Is it affordable to accomplish what is to be implemented</p>

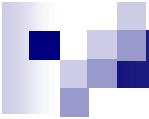
Key drivers	Driver Behavior (e.g. low/med/high input values, technology developments, National/State policy description)
1. Policy	Lower carbon emissions
2. Energy Demand	Aggressive pursuit of energy management and efficient reductions in energy usage
3. Price of all fuels for generation	Natural gas costs is a major factor, especially in the transition phase
4. New technologies	For example, energy storage and CCS. Whether these technologies develop or not, is a major issue
5. Capital cost for new generation	Best guess
6. Energy Efficiency	Energy efficiency is a major option
7. DemandResponse	Peak demand reduction continues to be a goal
8. Cost of capital	Best guess
Additional information	Sensitivities: Vehicle efficiencies and electric Incentives for conversion to cleaner technologies National RPS / RES Carbon reduction Wind and renewables penetration New technologies – effect if they exist or not *Comparability issue – should this Future and the previous one (regional RPS) have same carbon reduction targets



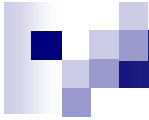
Title of Future 2	National policy for reducing GHG emissions through state and regional implementation and choice
Brief description	Nuclear Resurgence, Increased imports of low-carbon electricity from Canada, and regional implementation of RPS/CO2 constraints
Narrative <ul style="list-style-type: none">•What will the world look like in 2030?•What are the 3 -5 most defining characteristics of this Future?•What are the greatest uncertainties ?	<p>The national carbon policy establishes a framework for RPS and other low-carbon options, leaving fundamental resource decisions and policy at the state and regional level. National energy strategy that recognizes the need for federal and state collaboration No national RPS; start with existing state RPS and potential expansion of state/regional RPS; variations in definition of qualifying RPS persists</p> <p>Electricity sector: Aggressive EPA policies drive older coal retirements CO2 prices will be high leading to a decline in coal generation. There will be substantially less dependence on foreign oil and substantially more dependent on electricity for the transportation sector. Significant switching to natural gas and wind for electricity generation.</p>



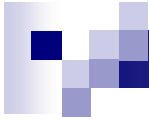
<p>Narrative</p> <ul style="list-style-type: none">•What will the world look like in 2030?•What are the 3 -5 most defining characteristics of this Future?•What are the greatest uncertainties ?	<p>Nuclear will an increase to meet carbon constraints. No new nuclear builds completed until 2020 and new builds will be primarily at existing sites. Upgrades at existing units will start earlier; primarily in the South (7,000 – 8,000 MW). Modular nuclear design becomes feasible. Canadian hydro imported from Eastern Canada (Quebec) (4000 MW) and Manitoba (2000 MW)</p> <p>New high capacity transmission connections are in place with Eastern and mid-west Canadian Hydro; Imports may serve as load following generation to maximize wind energy capacity during high production hours and produce power during low production periods.</p> <p>Midwest and SPP predominantly wind expansion</p> <p>Other:</p> <p>Energy consumption grows despite increased efficiency and resistance to higher electricity</p> <p>Federal policy continues to incent transmission</p>
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Key drivers	Driver Behavior (e.g. low/med/high input values, technology developments, National/State policy description)
1. Canadian Imports of Hydro	High imports, transmission in place
2. Electricity Demand	Continues to grow (moderate to high)
3. Nuclear technology	Moderate growth
4. Coal Generation	Low Coal
5. National Carbon Policy	?
6. Local/regional RPS	Existing as a start but could expand to meet carbon constraints Regional renewable expansion; renewable defined regionally
7. EPA Air regulations	Stringent; drive down coal generation
8. Natural gas	High availability
Additional information	Need to know what is in the queue today.



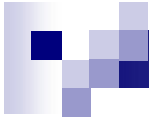
Title of Future 4	Aggressive EE/DR/DG Driven By End User Behavior
Brief description	This future relies on federal policy and incentives, new end user smart grid and interoperability technology development, State policy/standards and rate programs and distributed end user backup generation. The end result is an aggressive reduction or elimination of load growth. This future envisions on a robust economy.
Narrative <ul style="list-style-type: none">•What will the world look like in 2030?•What are the 3 -5 most defining characteristics of this Future?•What are the greatest uncertainties ?	The future endpoint of this scenario is a demand peak and energy result that greatly reduces the need for traditional resource expansion. Aggressive state implementation suggests that at least 1 point reduction in the annual energy growth is feasible. Additional significant impact on peak demand growth is also achieved.



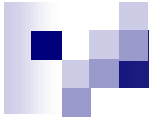
Drivers	Driver Behavior (e.g. low/med/high input values, technology developments, National/State policy description)
1. Federal Policy	Aggressive building codes, appliance, standards, EERS
2. Technology	Smart Grid, Interoperability (increased ability of grid to communicate with appliances), CHP. Resource neutral.
3. Removal of Market Barriers	Technology, price/market signals, Resource Comparability
4. State Policy	See above
5. Economy	Moderate to healthy
6. Regional policy	
Additional information	Impact of Distributed Generation on Demand Workforce development {DG, DR, EE} Better define "Aggressive" (1% annual or greater?) Better define demand response Regional policy variations in real-time pricing/integral pricing List of policy/market barriers to implementation {federal/state} Operational reliability issues



Title of Future 5	National RPS with top-down implementation
Brief description	Aggressive national RPS with large separation between load and generation locations.
Narrative <ul style="list-style-type: none">•What will the world look like in 2030?•What are the 3 -5 most defining characteristics of this Future?•What are the greatest uncertainties ?	30% RPS by 2030. Renewable resources selected based on lowest bus bar cost, ignoring the cost of transmission. May result in need for more load-following and peak capacity. Definition of renewables needs further definition.



Key drivers	Driver Behavior (e.g. low/med/high input values, technology developments, National/State policy description)
1. Demand/load growth	Medium/moderate*
2. Economy	Medium/moderate*
3. Policy	Federal RPS – 30% by 2030 Tax credits – extensions of federal tax credits for renewables
4. Technology	Increased capacity factors Increased development of storage technology Reduced capital costs for renewables Electrification of transportation (high/low sensitivities)*
5. Fuel	Fuel prices may be lower
Additional information	<ul style="list-style-type: none">•Run sensitivities*•Studies on reliability/operability issue•Identification of components of RPS (wind, solar, hydro, etc.)•All in delivered costs?



Title of Future 6	National RPS with regional implementation
Brief description	Aggressive national RPS solved regionally
Narrative <ul style="list-style-type: none">•What will the world look like in 2030?•What are the 3 -5 most defining characteristics of this Future?•What are the greatest uncertainties ?	30% RPS by 2030. Renewable resources selected based on satisfying RPS targets primarily with regional resources. May result in need for more load-following and peak capacity. Definition of renewables needs further definition.



Key drivers	Driver Behavior (e.g. low/med/high input values, technology developments, National/State policy description)
1. Demand/load growth	Medium/moderate*
2. Economy	Medium/moderate*
3. Policy	Federal RPS – 30% by 2030 Tax credits – extensions of federal tax credits for renewables
4. Technology	Increased capacity factors Increased development of storage technology Reduced capital costs for renewables Electrification of transportation (high/low sensitivities)*
5. Fuel	Fuel prices may be lower
Additional information	<ul style="list-style-type: none"> •Run sensitivities* •Studies on reliability/operability issue •Identification of components of RPS (wind, solar, hydro, etc.) •How should regions be defined? Regions=states? •How are Canadian imports treated? •All-in delivered costs?

Modeling Workgroup

Update to EIPC
Stakeholder Steering Committee

Oct 12 – 14, 2010

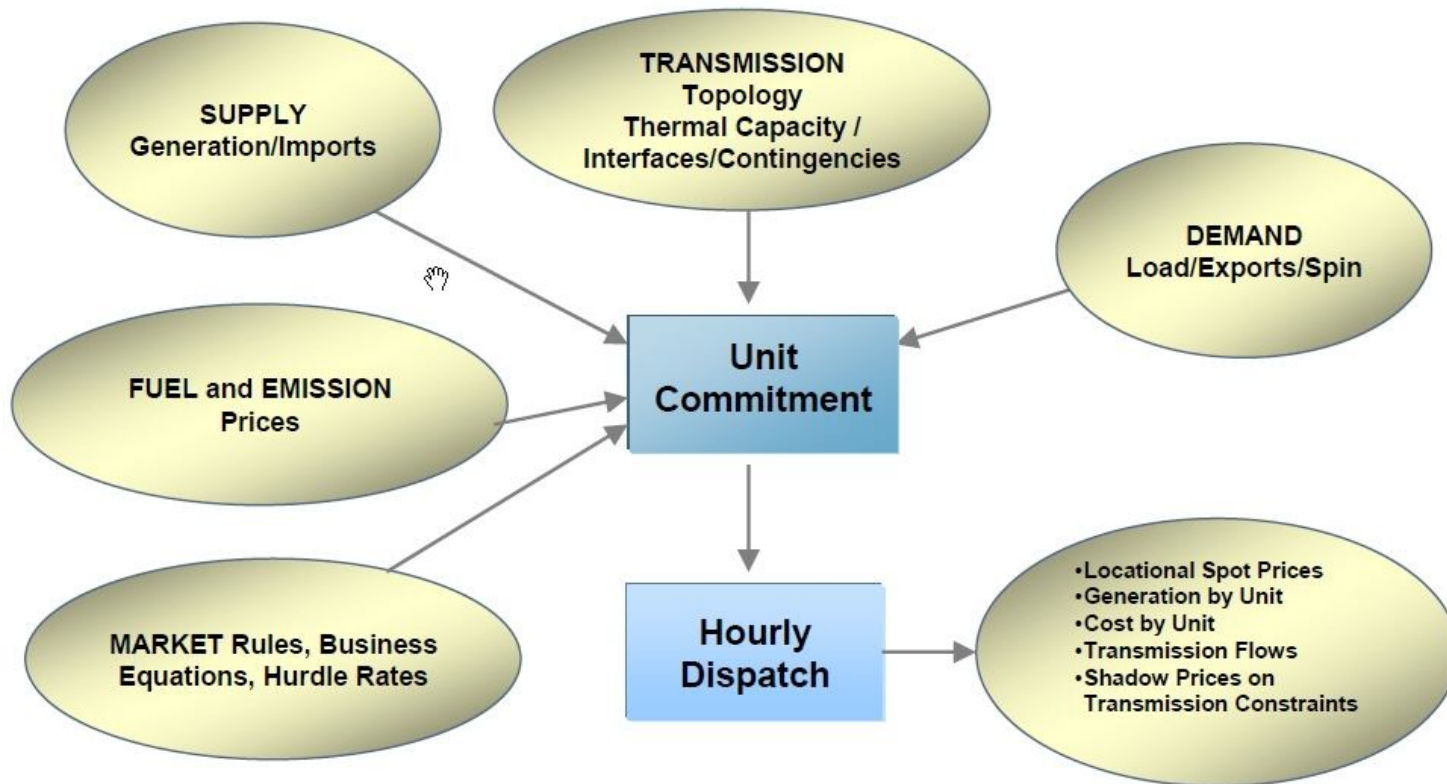
Modeling Workgroup - Charter

Purpose of the MWG

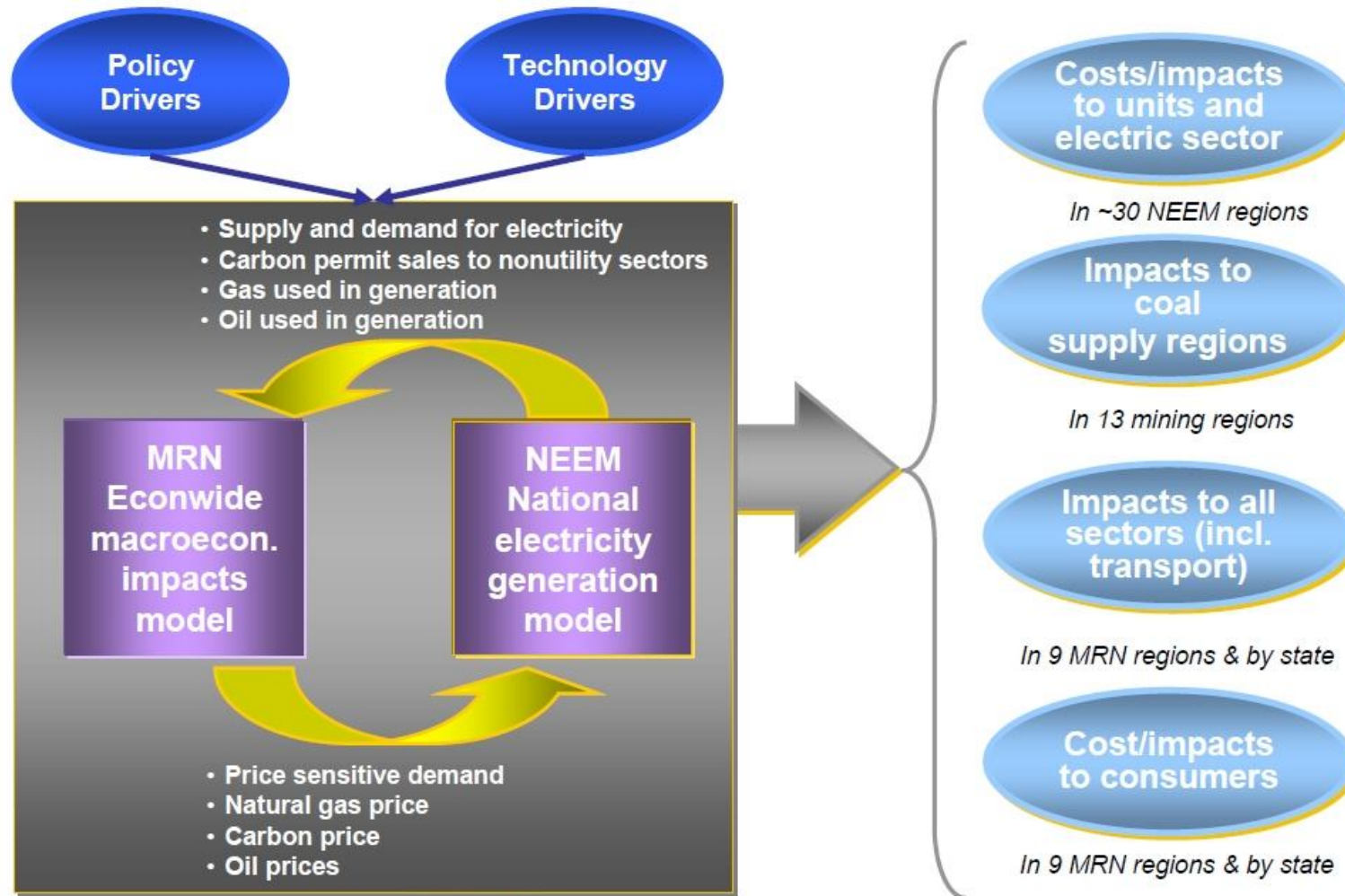
- Develop a better understanding of the capabilities, inputs and assumptions, and outputs of the CRA MRN/NEEM (macroeconomic) model that will be used to evaluate the 8 Macroeconomic Futures and the GE MAPS (production cost) model that will be used to analyze the Roll-Up Plan and the final 3 Transmission Build out Scenarios.
 - Identify concerns or issues, seek answers, make recommendations and report to EIPC Stakeholder Steering Committee (SSC) regarding the MRN/NEEM and GE MAPS modeling to be performed.
- Identify with CRA the matrix of specific required inputs for MRN/NEEM to be provided by SSC and advise the SSC and Scenario Planning Work Group (SPWG) on model inputs, outputs, processes and limitations to assist them in the development of the 8 Macroeconomic Futures
 - Coordinate with the Roll-Up Work Group (RWG) to identify any issues that could impact model inputs, assumptions, modeling, or results.
- In coordination with the SPWG, make recommendations to the SSC on the inputs and assumptions to be used for modeling the 8 Macroeconomic Futures.
 - Identify as appropriate data or analyses needs
 - Work with resources (e.g. DOE / National Laboratories)
 - Collaborate with CRA to ensure model consistency
- Review outputs and results of MRN/NEEM and GE MAPS modeling and provide a report on the interpretations to SSC

Production Cost Analysis – Tasks 3, 9

GE MAPS Overview



Macroeconomic Analysis – Tasks 4, 5



EIPC Modeling Workgroup Work Plan

EIPC Task	EIPC Task Timing	MWG Tasks to Support	MWG Task Timing	SSC milestone
Task 3 Production Cost Analysis of Regional Plans	Sept 2010 – Mar 2011	- Understand GE Maps Model	Sep - Dec	Dec SSC
		- Review Inputs and Assumptions to GE Maps model	Oct - Dec	Dec SSC
		- Review Production Cost Analysis and give report/recommendations to SSC	Dec - Mar	Mar SSC
Task 4 Futures Definition	Oct 2010 – Mar 2011	- Understand Futures Definitions as developed by SWG and provide advice to SWG on capabilities/limits of CRA Model	Oct - Mar	Dec SSC Mar SSC
Task 5 Macro- Economic Analysis	Dec 2010 – July 2011	- Understand CRA Model	Sep - Oct	Dec SSC
		- Review Matrix of inputs and Assumptions of CRA Model including range of values	Sep - Oct	Dec SSC
		- Formulate initial/partial set of inputs and assumptions	Nov - Dec	Dec SSC
		- Complete set of inputs assumptions	Jan - Mar	Mar SSC
		- Review results of Macroeconomic analysis and give report/recommendations to SSC	Feb - Aug	May SSC
Task 9 Production Cost Analysis of Expansion Scenarios	Feb 2012 – Aug 2012	- Review Production Cost Analysis and give report/recommendations to SSC	tbd	tbd

CRA MRN-NEEM Inputs Matrix

- Fuel Prices
- Generation Metrics
 - Capital Costs, Emissions, Heat Rate, Capacity Factors, Fixed and Variable Costs, etc.
- Regional Metrics
 - Demand, Reserve Margins, Regional Cost Multipliers, Intermittent Generation Penetration Limits, etc.
- Other Metrics
 - GDP Growth, Emission factors, Vehicle Penetration, Carbon Policy

Modeling Workgroup Discussion Areas

- Near-term review of CRA inputs matrix
 - Potential need for taskforces (eg. environmental, economic, etc)
 - Consider range of values to inform scenario development
- Understanding how regions are delineated and modeled
 - US, Canada
- What are modeling assumptions for 20-year baseline model, for each scenario
- How are costs factored into exercise (eg transmission, other costs)

EIPC Modeling WG

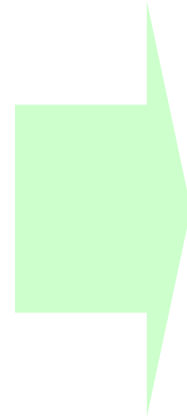
Preliminary

Inventory and Status of Modeling Issues

No.	Relevant Model	Description	Modeling WG Status	Present to SSC	Direction from SSC	Implementation
1	MAPS /MRN/ NEEM	Canadian economy modeling	Initiated Discussions, Developing Details of Concern	Dec SSC	TBD	TBD
2	NEEM	Lack of transmission costs in generation optimization	Initiated Discussions, Developing Details of Concern	Dec SSC Meeting	TBD	TBD
3	MAPS /MRN /NEEM	2006 Load Profile does not capture Energy Security Act 2007 standards	Initiated discussions, developing details of concerns	TBD	TBD	TBD
4	MRN	Valuation of potential environmental impacts	Has not been thoroughly discussed, no direction at this time	Draft Environmental Data Task Force description sent to SSC via email Sept 2010	TBD	TBD
5	MAPS /MRN/ NEEM	Regional approaches for data (eg. energy efficiency, demand response, load growth, transmission infrastructure, generation infrastructure)	Has not been thoroughly discussed, no direction at this time	TBD	TBD	TBD
6	MRN/ NEEM	Definition of regions	Has not been thoroughly discussed, no direction at this time	TBD	TBD	TBD

Next Steps

- Understand 20-Year base/reference case
- Work through Inventory of Modeling Issues
- Begin to identify CRA MRN/NEEM inputs for Scenarios
- Production cost / GE Maps



- Coordination between RWG, SWG, MWG
- Share results

Information Needs

- Identification of further information needs to support Modeling and Futures Planning WGs, e.g. National Lab Support
- Q&A

Working Breakfast

- Work Groups meeting to further develop Work plans and Coordination of WGs



Review of Decisions Made





Next Steps

