



Michigan 21<sup>st</sup> Century Energy Plan  
MPSC Staff Report to Chairman J. Peter Lark

D-R-A-F-T

OUTLINE OF REPORT (ALL Version 1.0)

September 29, 2006

## **1. EXECUTIVE SUMMARY**

## **2. INTRODUCTION**

### **2.1. GENESIS OF THE PROJECT**

#### **2.1.1. Summary Review of The Governor's Executive Directive.**

Defining Terms in the Governor's Executive Directive: Affordable, Clean, Reliable, Safe. See Appendix A for the Executive Directive.

#### **2.1.2. The Major Drivers**

Electricity Demand Growth, aging infrastructure, Michigan's hybrid market, fuel price volatility, affordable prices, environmental and homeland security concerns & risks.

### **2.2. PROCESS DESCRIPTION (HOW DID THE 21<sup>ST</sup> CENTURY ENERGY PLAN PROCESS WORK? WHO PARTICIPATED?)**

### **2.3. MAJOR OUTCOMES/FINDINGS**

#### **2.3.1. Future Electric Power Resource Needs.**

#### **2.3.2. Limits Imposed by Current State Policy and Commission Authority.**

#### **2.3.3. Big Picture Summary of Policy Initiatives Proposed.**

### **2.4. REPORT ORGANIZATION**

How is this report organized? Review general outline of report and describe what can be found where.

### **3. RESOURCE ASSESSMENT**

#### **3.1. INTRODUCTION**

#### **3.2. CNF WORKGROUP**

##### **3.2.1. Introduction:**

##### **3.2.2. Central Station Generation Options**

###### Technology Options:

- Pulverized Coal
  - Sub-Critical
  - Super-Critical
  - Ultra Super-Critical
  - Circulating Fluidized Bed
  - Integrated Gasification Combined Cycle
  - Integrated Gasification Combined Cycle, PRB Coal
- Nuclear
- Natural Gas
  - Simple Cycle Combustion Turbine
  - Combined Cycle Combustion Turbine

###### Technology Costs:

###### Technology Emission Characteristics:

###### Air Quality and Electric Energy Planning:

###### Natural Gas Infrastructure:

##### **3.2.3. Transmission**

###### Overview:

###### CNF Transmission Modeling Results:

Recent Developments:

Michigan Exploratory Study:

**3.2.4. Electric Reliability Assessment**

**3.2.5. Electric Sale and Peak Demand Forecast**

Introduction:

Generation Requirements and Peak Demand Projection:

Comparison with CNF Study Projection:

Methodology

- Southeastern Michiga
- Balance of Lower Peninsula
- Upper Peninsula
- Scenario for Risk Analysis

Discussion: Risk and Risk Assessment

**3.3. ENERGY EFFICIENCY WORKGROUP**

**3.3.1. Introduction: Methodology and Approach, Overview**

- Definition of energy efficiency.
- Appliance standards and building code updates (separate from utility funded energy efficiency programming.)
- Why is energy efficiency important?
- Modeling of achievable potential of an energy efficiency program.
  - What achievable potential means.
  - Validation study

**3.3.2. Energy Efficiency Resource Assessment**

- Energy Efficiency
  - Development of a Michigan Potential Study via Translation and scaling of the 2005 Wisconsin EE Program Achievable Study: Modeling by the Energy Center of Wisconsin
  - Markets included in study
  - Five-year and ten-year demand and energy savings
  - Levelized cost per kWh
  - Comparison to national experience for statewide EE programs
  - Discount rate and utility avoided cost

- Benefit cost tests
- Statewide Utility Load-Response
  - Active load control
  - Impact of time-of-use rates not modeled
- State Appliance Efficiency Standards
  - Electric energy efficiency savings from products not covered by Federal Standards
  - Modification of ASAP/ACEEE study results
- Commercial Building Code Update
  - Commercial code update produces greater impact on electric consumption vis-à-vis residential code
- Commercial sector technical potential
  - Validation study: lighting and AC
  - Building types analyzed
  - Michigan total square footage by building type
- Customer located renewable energy that gets modeled as demand-reduction (e.g. solar water heaters, geothermal, plus PV)

### **3.4. RENEWABLE ENERGY WORKGROUP**

#### **3.4.1. Introduction: Methodology and Approach, Overview**

#### **3.4.2. Resource Assessment**

- Definition of renewable resource.
- Availability (or Amount) of Resources in Michigan
- Renewable Energy Cost
- Biomass Energy
  - Biomass Resource Assessment
    - from Forestry and Wood Residues
    - from Agricultural Residues and Specialty Crops
    - from Animal Wastes
    - from Wastewater Treatment Plants
  - Biomass used to fuel CHP
  - Biomass co-firing in coal-burning plants
  - Competing or conflicting values and markets for biomass
- By-products and co-products
  - Importance of Blending Wastes to Achieve Highest Productivity
  - Economics of Biomass Electricity Production & Assumptions for Modeling
  - Biomass Location of resource & opportunity, vis a vis Michigan Grid?
  - Summary/Conclusion
- Wind Energy
  - Potential used in modeling
  - Cost
- Other Issues
  - Wind energy capacity values research (separate publication)
  - Offshore wind potential (very brief explanation of current status & next steps)
  - Transmission concerns regarding integrating wind with grid

- Operational concerns integrating wind with utility operations: separating fact from fiction.
- Solar & Geothermal – included only as a decrement to demand, captured by high-energy-efficiency scenarios.
  - DOE Solar “Roadmaps” – Solar America Initiative
- Other – not counted, but some possible small contributions (hydroelectric, other potential for alternative technologies)

### **3.5. ALTERNATIVE TECHNOLOGIES WORKGROUP**

#### **3.5.1. Introduction: Methodology and Approach, Overview**

- Introduction - Position Statements for CHP and Emerging Technologies Teams
- Methodology and Approach
- Overview

#### **3.5.2. Resource Assessment**

- Technologies Defined and Described
  - Current State of Technologies
  - Outlook for 2010
  - Outlook for 2024
- Potential Impacts on Michigan’s Energy Future
  - Energy Prices
  - Reliability, Safety, Security and Compatibility
  - Jobs and Economic Impacts
  - Environmental Impacts

#### **3.5.3. Smart Power Grid Technologies**

- Grid Modernization Concept
  - Background
  - Current Initiatives
  - Smart Power Grid Characteristics
- Grid Modernization Benefits
  - Service Reliability
  - Outage Recovery
  - Power Quality
  - Grid Efficiency
- Grid Modernization Technologies and Matrix
  - Advanced Grid Operations

- Monitoring and Load Management
- Architecture and Communication Standards
- Modeling and Simulation
- Michigan Grid Modernization Projects
  - DTE Modernization Activities (DG, AMR, etc.)
  - Consumers Energy Modernization Activities (EMS/SCADA, BPL, etc.)
  - Indiana Michigan Power AMR
  - WE Energy AMR
  - Great Lakes Energy Cooperative AMR (TWACS)
  - Cloverland Cooperative AMR
  - Alger Delta Cooperative AMR
  - Midwest Cooperative AMR
  - Cherryland Cooperative AMR
- MPSC Modernization Projects
  - Distributed Generation Interconnection Standards
  - Net Metering Program (5 yrs.)
  - Grid Modernization Challenges
  - Stakeholder Involvement
  - Regulatory Impacts
  - Human Resources and Training
  - Siting for Grid Expansion
  - Financing for Grid Modernization Projects
- Grid Modernization Recommendations
  - Introduction
  - Collaborative Concept
  - Pilot Project Concept

## **4. MODELING**

### **4.1. INTRODUCTION**

### **4.2. APPROACH TO PLANNING: OVERVIEW OF SCENARIOS MODELED**

#### **4.2.1. Philosophy**

#### **4.2.2. Description of the Scenarios**

#### **4.2.3. Relationship to Capacity Need Forum Modeling**

### **4.3. RESULTS**

#### **4.3.1. Explanation of Each Scenario & Sensitivity Analysis**

#### **4.3.2. Jobs & Economic Impacts Study Results – EDGE2**

## **5. POLICY ASPECTS**

### **5.1. INTRODUCTION**

#### **5.1.1. Principles Guiding Michigan Energy Policy Proposals**

Summary of principles drawn from Governor's Executive Directive:

1. The state's short-term and long-term electric needs for residential, industrial, commercial, and governmental customers shall be met in an optimum manner that assures a reliable, safe, clean, and affordable supply.
2. The future development of Michigan's electric infrastructure shall further the state's competitive business climate, grow jobs, and provide affordable rates for all customers.
3. The appropriate use and application of energy efficiency, alternative energy technology, and renewable energy technologies shall be consistent with the goal of assuring reliable, safe, clean and affordable energy.
4. This state's natural resources and the environment shall be protected from pollution, physical or visual impairment, or destruction, and future risks associated with fossil fuels shall be mitigated.
5. A renewable portfolio standard shall be created that establishes targets for the share of this state's energy consumption derived from renewable energy sources.
6. New technology options to generate, transmit, or distribute energy more cleanly or more efficiently shall be identified.
7. The state's economic interest in ensuring development of the intellectual capital, financing, infrastructure, and other resources necessary for continued growth of alternative and renewable energy technologies within the state shall be fostered.
8. The plan shall identify any legislative or regulatory changes necessary to its implementation, together with any financial, funding, or incentive mechanisms needed to best position the state to meet the energy challenges of the future.
9. Global climate change & Peak Oil as drivers...

#### **5.1.2. Major Issues**

Differences in policy positions. Pros and cons of different approaches. Consensus where reached.

## 5.2. POLICY PROPOSALS/CONCEPTS

### 5.2.1. Introduction & Process Description

### 5.2.2. CNF Update Workgroup

- Resource Acquisition Policy

### 5.2.3. Energy Efficiency Workgroup

- Importance of energy efficiency policy
  - National action plan for energy efficiency
- Barriers to greater energy efficiency
  - Barriers in current rates/tariffs
    - Current time of use rates [see Appendix for survey of current Time-of-Use rates in Michigan]
    - Declining block rates (that promote electric heating)
    - Often no value for location or time of demand-response
  - Decoupling issues associated with traditional regulation and utility EE programs
  - Other kinds of barriers....
- Options for consideration
  - Legislative
  - MPSC rates/tariffs/other
  - Financing, funding sources, incentives...
  - Third-Party administration vs. utility administration
- Recommendations for legislation
  - Recommendations for Energy Efficiency Programming
    - Recommended policy/legislation
      - Administration
      - Utility participation
      - Funding mechanism
      - Oversight
    - Evaluation of review process
      - Benefit & cost perspectives
    - Customer participation
    - Revenue decoupling
    - Funding distribution
    - Revenue sources
    - Process for public input
    - Low-income customers
    - Customer financing programs such as Pay as You Save
  - Energy Efficiency Program Elements
    - Program scope
- Load Response Programs
  - Pilot programs
  - Advanced metering
  - Time-of-use rates
  - Intelligent appliances

- Commercial building code
- Michigan Appliance Efficiency Standards
  - Products not covered by federal standards
  - Products included in recommended legislation
- Economic Development issues
  - Michigan energy workforce development
  - Energy Efficiency technology and training center

#### **5.2.4. Renewable Energy and Alternative Technologies Workgroups**

- Role of renewable and alternative technologies?
  - Fuel and Technology Diversity
  - Economic and Employment benefits
  - Risk Management
- Barriers to renewable and alternative technology adoption:
  - sometimes higher costs
  - Technology Risks (newer, less proven technologies)
    - Manufacturing Capability
    - Technology obsolescence
  - variable output
  - distributed resource (smaller capacity per location & need for more local systems... both a barrier but can also be a benefit)
  - Interconnection costs & process
  - Policy Barriers
    - Regulatory MPSC
      - Bidding processes
      - Average pricing in rates.
        - No locational value?
        - No time of day value?
    - Regulatory Non-MPSC
      - on-again off-again policies (e.g. federal PTC)
      - MDEQ:
        - MDEQ fees for land-application of biosolids?
        - DEQ rules preventing commingling?
        - CAFO policies?
  - Legislative
    - MPSC Authority regarding renewable energy, fuel diversity, fuel risks?
    - “Self-Service Power” provisions of 2000 PA 141?
    - 1984 PA 304?
- RPS and Alternatives Policy Proposals:
  - RPS Proposal
    - 10 major qualities/issues/topics with RPSs
    - RECs Proposal in conjunction with RPS
    - RECs handling for pre-existing renewable energy systems in Michigan
  - Alternative: Clean Energy Portfolio Standard
  - Alternative: Voluntary RPS combined with mandatory financing, funding, and incentives.
- Distributed Resources Regulatory Policies
  - Changes to MPSC Rates/Tariffs and Other
    - EPACT 2005 net metering provisions
    - EPACT 2005 provisions affecting renewable resources

- Non-MPSC Regulatory Policies
  - MDEQ/Environmental
  - Siting/Zoning
  - Other
- Smart Power Grid Technologies Policy Proposals
  - EPACT 2005 impacts on Smart Grid issues
  - Proposal for pilot project(s)
- Financing, Funding, Incentives:
  - Review of existing state programs:
    - Special funds for wastewater treatment plant upgrades
    - Existing state incentives
    - Renewable energy grant applications with 21<sup>st</sup> Century Jobs Fund....
    - Other...

## **6. APPENDIXES**

### **6.1. APPENDIX A: GOVERNOR'S EXECUTIVE DIRECTIVE 2006-2**

### **6.2. APPENDIX B: <OTHER APPENDIXES TO BE DETERMINED BY WORKGROUP LEADERS>**