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# 2009 Integrated Resource Plan Report

## Executive Summary

Prepared for:

**Midwest Energy Incorporated**

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## EXECUTIVE SUMMARY

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Over the next couple of years, the bulk of Midwest Energy's ("MWE") energy supply must be replaced, as its Purchase Power Agreements ("PPAs") with the current supplier will expire in 2010 and 2013. Since MWE has limited amounts of its own generation, much of this supply will have to be negotiated in new or renegotiated power supply contracts. In this 2009 Long Range Resource Plan ("LRRP"), MWE identifies its preferred plan for satisfying its future electric power requirements. The plan consists of its existing generating units, the expansion of the Goodman Energy Center ("GMEC"), new peaking capacity similar to GMEC, additional wind capacity, and two types of contracts: unit-contingent baseload coal and Units Most Likely<sup>1</sup> ("UML") PPAs over the next twenty years. This Preferred Resource Plan best satisfies the multiple objectives of meeting MWE's long term electricity needs in a reliable, cost competitive, flexible, and environmentally conscious manner under a wide variety of market, regulatory, and economic conditions.

The Preferred Long Range Resource Plan updates MWE's 2005 LRRP and was designed to answer a number of critical questions:

1. What is the proper mix of baseload (coal-fired) generation to have in the energy supply portfolio?
2. What is the best term (length) of PPAs for baseload and UML power contracts?
3. How much wind or other renewable generation is economic beyond that required to meet Federal and Statewide Renewable Portfolio Standards?
4. Is expansion of the GMEC part of the preferred portfolio, and if so, when should expansion occur?
5. Should MWE build additional peaking capacity of the GMEC type, and if so, when?
6. How much Demand Response ("DR") is cost effective?
7. PPAs may carry restrictions with them that are related to requiring high load factors and resale limitations. How important are these factors in the decision of the amount of baseload and UML capacity to acquire?

The 2009 LRRP resulted from a structured, two-stage process. Phase I consisted of the screening of several technology (peaking, solar, and wind) options, and two types of PPAs. It evaluated the optimal mix of baseload versus UML contracts ranging from 0 to 100 percent, and evaluated over 100 portfolios, representing combinations of these technology additions and contract options over the planning horizon. The number of uncertainties considered in the Phase II "risk" stage of the process is measured in the thousands, as uncertainty in load, coal and gas prices, dispatch for technology choices, carbon prices, capital costs for technologies, and power prices for net purchases and sales were quantified and considered. Twenty portfolios were explicitly considered in the risk analysis. This not only included a representative range of baseload and UML PPAs, but also considered combinations of incremental peaking generation, expanding GMEC, as well as wind and solar additions in excess of those needed to comply with RPS.

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<sup>1</sup> This type of contract is priced based on the marginal resource used to serve MWE's load. The capacity cost component is based on the supplier's estimate of the fixed costs associated with the units most likely to serve the contract throughout the year.

Pace also completed a high-level analysis of the cost-effective potential of DR options in the MWE service territory. The purpose of the analysis was to identify the amount of load reduction that is possible at a cost lower than a new peaking resource. The results presented in this report are focused on the recommended amount of peaking capacity compared to baseload and renewables. It is important to recognize, however, that the successful implementation of DR programs can substitute the need for some peaking capacity.

Quantum scenarios representing regulatory uncertainty regarding carbon legislation were also explicitly considered. The Phase II “risk analysis” reveals the strengths and risks associated with each portfolio by exposing them to a wide range of conditions. This allows for the evaluation of portfolios across a range of outcomes and under extreme conditions.

## **PREFERRED RESOURCE PLAN**

The Preferred Resource Plan represents a slight reconfiguration of MWE’s existing electricity portfolio over the next 20 years. The Preferred Resource Plan consists of enough wind resources to meet existing and planned RPS requirements and also includes 50 MW of additional economic wind generation between 2020 and 2025. The plan includes the expansion of the Goodman Energy Center by 25 MW around 2015 and 75 MW from a new local gas-fired peaking capacity similar to GMEC in the 2015-2020 time frame. The implementation of DR programs, however, could delay the need for new peaking capacity by a few years. The preferred contract mix is initially a roughly equal split between baseload and UML, although new peaking additions or DR programs would significantly reduce UML capacity amounts in the intermediate to longer term. Flexibility is inherent in this generation mix since there is little difference in expected costs between 45 and 60 percent of baseload capacity, though higher baseload capacity carries higher market risk and more exposure to carbon price volatility. Exceeding 60 percent baseload generation is uneconomic, particularly if there are restrictions on load factor or restrictions on resale that would restrict MWE’s ability to sell excess baseload power in the SPP market.

Long term contracts for baseload generation are warranted, particularly if some flexibility (reopener provision) is built in over the course of the term to address carbon risk and the desire to add new renewable resources when economic. Through time, volatility of carbon related costs is expected to grow. On one hand, if carbon prices do not alter the overall cost-effectiveness of coal-based generation longer term contracts are clearly preferred. If allowance prices for carbon are highly volatile, however, pass-through mechanisms could make baseload contracts very expensive. Contractually, mechanisms that either limit cost pass-through, or at least require prudent carbon risk management, will limit the risk of a long-term PPA for baseload power. In addition, wind power is expected to become economic after 2020. Hence, reopeners should be considered in the baseload contract to reduce the generation level over time to accommodate economic wind purchases.

The minimum viable contract terms for both baseload and UML contracts is 5 years in order to ensure Midwest retains its so-called “rollover” rights to extend the transmission service as required to deliver the resource. By 2015, expanding GMEC, building additional peaking generation capacity, and implementing some DR programs are all economic options. Hence, MWE needs to either negotiate a series of five-year contracts or have a longer term contract

with a reopener that will allow MWE as much flexibility as needed to reduce its volume of UML purchases and avoid unnecessarily high demand charges.

Key elements of the incremental changes to MWE's current portfolio in the Preferred Resource Plan include:

- **Renewable Energy Additions:** The Preferred Resource Plan adds 50 MW of wind generation after 2020, beyond the 50 MW required for meeting its RPS obligations by 2030.
- **New Owned Generation:** The Preferred Resource Plan adds a new 50 MW gas-fired peaking capacity similar to Goodman around 2015 and an additional 25 MW around 2020.
- **Upgrades of Existing Generation:** A 25 MW expansion of the GMEC is added around 2015.
- **Demand Response Programs:** Around 16 MW of load reduction are possible at a cost lower than a new peaker. If implemented successfully, this can reduce the need for new peaking capacity by 16 MW or delay the construction by a few years. It may also replace existing owned generating resources that are later determined to be candidates for retirement.

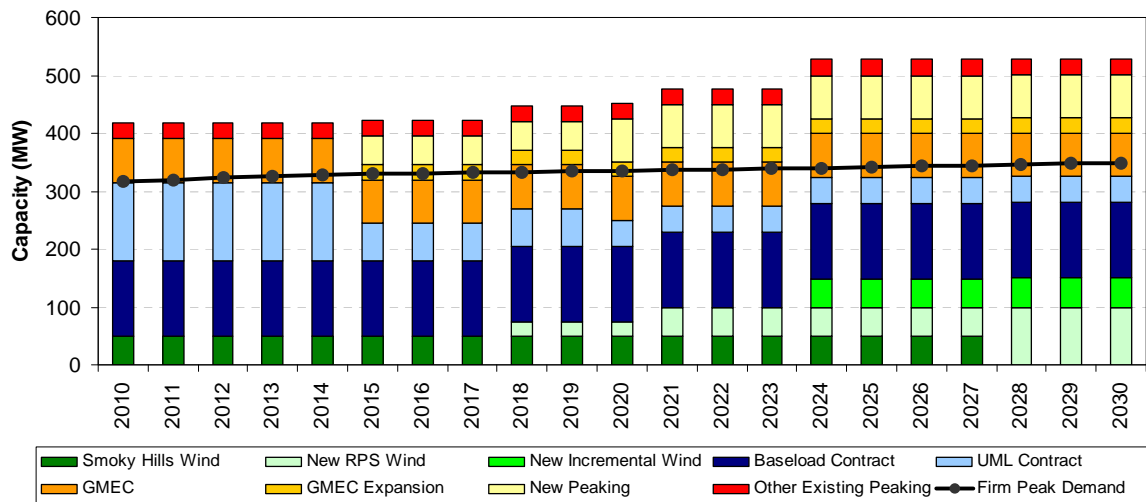
It is explicitly recognized that financing and permitting requirements, as well as the success of DR programs may impact the development schedule for the expansion at GMEC and/or the development of a new generating facility if it is determined that simultaneous development is not the most prudent course of action.

Exhibit 1 provides a summary of the Preferred Resource Plan as it is expected to evolve over time, with unit additions relative to the existing portfolio shown by installation date. The changes summarized in the table are incremental to the existing portfolio. This Exhibit 1 also shows the expected peak firm loads for the study period relative to the total resources expected to be available, including the non-dispatchable wind resources. As shown in Exhibit 2, cost-effective DR programs can substitute for peaking requirements.

Exhibit 3 illustrates the expected resource generation mix for MWE in 2016 and 2030 under the Preferred Resource Plan. No assumptions were included regarding the substitution of DR programs for new peaking resources. Exhibit 4 displays the generation mix in 2030 if the DR is included.

**Exhibit 1: Summary of Preferred Resource Plan**

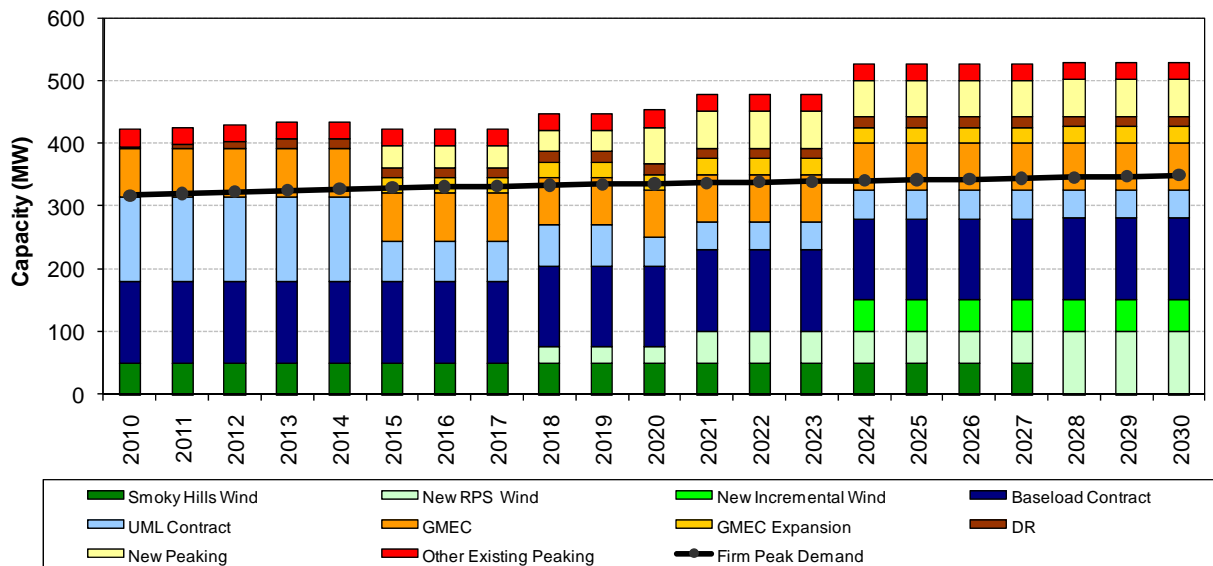
Portfolio Item	2010-2014	2015-2019	2020-2024	2025-2030
Baseload Contract	130 (20 years)			
UML	135 (5 years)	65 (5 years)	45 (10 years)	
GMEC Expansion		25		
New Peaking		50	25	
RPS Wind		25	25	50
Incremental Wind			50	



Baseload contract should consider reopeners for maximum volume flexibility  
 Source: Pace

**Exhibit 2: Summary of Preferred Resource Plan Including DR**

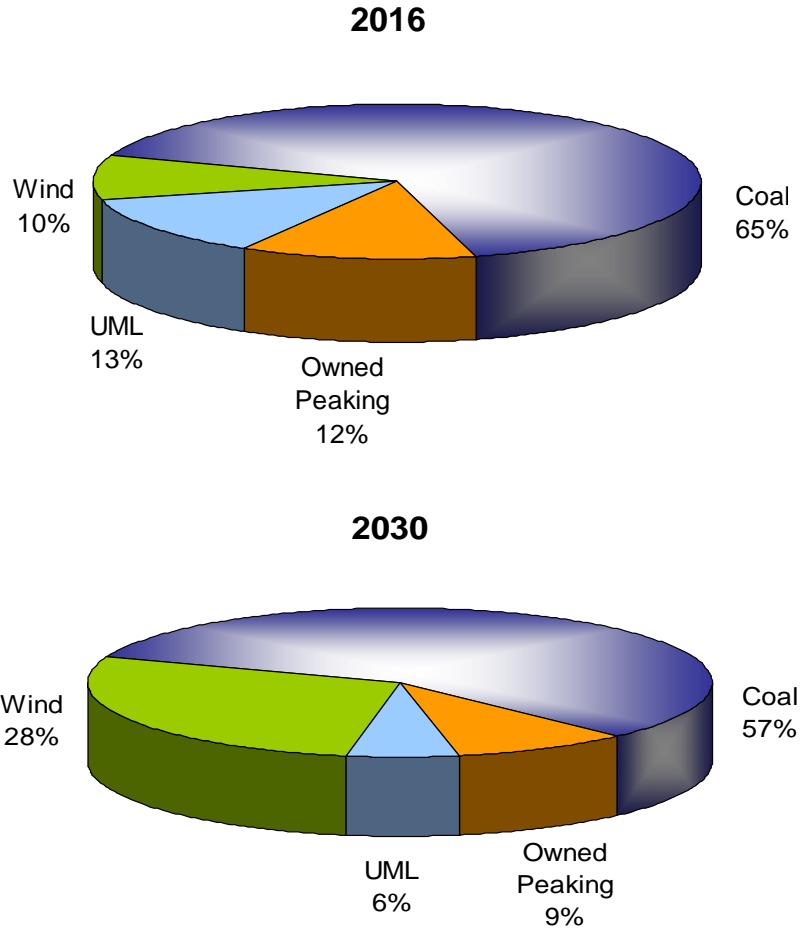
Portfolio Item	2010-2014	2015-2019	2020-2024	2025-2030
Baseload Contract	130 (20 years)			
UML	135 (5 years)	65 (5 years)	45 (10 years)	
GMEC Expansion		25		
DR	16			
New Peaking		35	25	
RPS Wind		25	25	50
Incremental Wind			50	



Baseload contract should consider reopeners for maximum volume flexibility  
 Source: Pace

**Exhibit 3: Energy Mix of the Preferred Resource Plan (2016 and 2030)**

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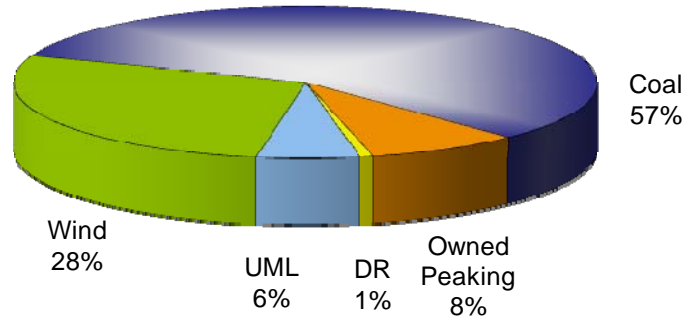


Source: MWE and Pace

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#### Exhibit 4: Energy Mix of the Preferred Resource Plan Including DR (2030)

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Source: MWE and Pace

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### IRP POLICIES AND ACTION PLAN

Development of the Preferred Resource Plan considered a wide range of potential options and was evaluated against two main criteria:

- Competitive Rates (measured in lowest present value of revenue requirements and levelized resource costs)
- Rate Stability (measured as the standard deviation in the range of costs)

The Preferred Resource Plan consists of a range of generation additions through PPAs, owned peaking capacity, and renewable wind generation. The recommended contract and resource mix:

- Will result in the lowest achievable cost;
- Achieves maximum flexibility to adapt to market and regulatory conditions and preserve negotiation leverage;
- Exceeds the expected goals for renewable generation and moderates exposure to carbon allowance prices, a risk that can be managed through contractual provisions.

The Preferred Resource Plan calls for several action items to meet the planning objectives. These can be summarized as follows:

- **Negotiate PPAs:** By the beginning of 2010, finalize negotiations of new PPAs for baseload and UML type contracts with the preferred supplier. Due to the attractiveness of owned peaking resources, UML contracts should be negotiated with the shortest lengths possible. The baseload contract should be negotiated for at least fifteen years but should include reopeners for maximum volume flexibility.
- **Implement Pilot Demand Response Programs:** Initiate further exploration of the cost-effectiveness of DR programs, particularly in the form of agricultural load shedding and interruptible rates, to better assess the potential of DR programs as a feasible substitute for new peaking capacity.

- **New Local Gas-Fired Generation:** By approximately 2015, expand GMEC and build 50 MW of new peaking capacity. Build an additional 25 MW by approximately 2020.
- **Renewable Energy:** Beyond 2015, increase the proportion of MWE's energy mix provided by renewable energy sources. By around 2018, a total of 50 MW of new wind is needed to meet RPS. In 2024 and beyond, add economic additional wind capacity on the order of 50 MW and replace the Smoky Hills contract when it expires. Throughout the planning horizon, continue to track the cost and efficiencies of wind and solar and take advantage of economic opportunities as they arise.
- **GHG Emissions Reductions:** Protect MWE as much as possible against imprudent risk management of carbon and fuel cost exposures. Prudent management language should be included in new contractual arrangements.