

▶ **FUTURE GRID**

Using Clean Energy to Reshape the Way We Generate, Distribute, and Consume Electricity

Presented by:

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May 15, 2003

Midwest CHP Initiative

Midwest Application Center

Overview

- **What is Clean Energy?**
- **Why Clean Energy?**
- **How?**
 - **Energy Planning**
 - **Optimize Tariff Design**
 - **DOE Andrew Card Study**

Clean Energy Options - Tools

- **Renewable**
 - Solar
 - Wind
 - Bio Energy
- **Cooling, Heating, and Power (CHP)**
 - For Buildings (BCHP)
 - For Industrial (ICHP)
- **Energy Efficiency**
 - Lighting
 - HVAC
- **Demand Side Management**
 - Curtailment
- **CCCT's, Coal Gasification**

Renewable
Community

CHP
Community

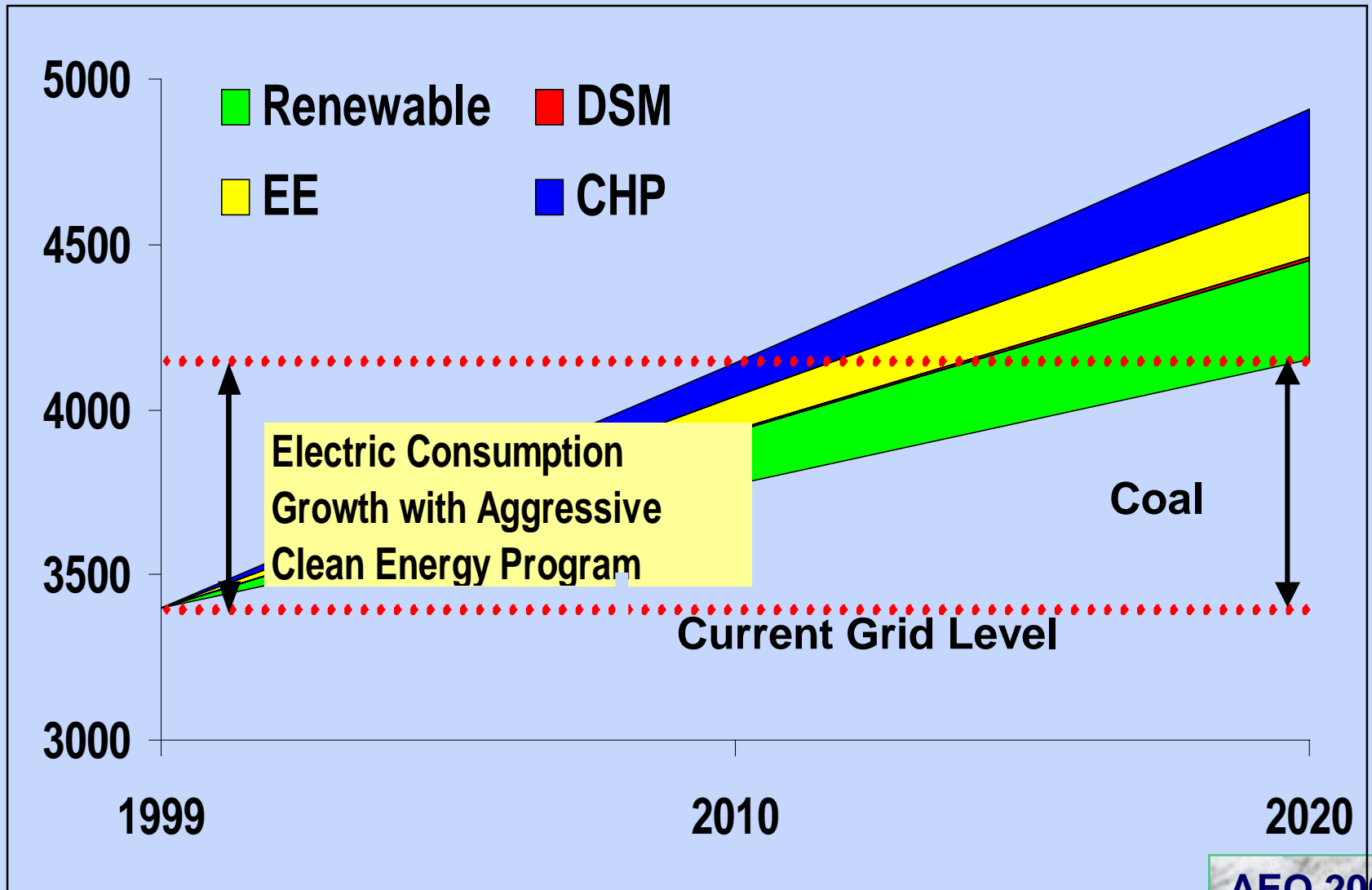
Energy
Efficiency
Community

Electric
Utility
Community

Why Foster Clean Energy?

- **Manage Growth and Relieve Constraints**
 - Avoid T&D Expansion – Capital expenditures
 - Avoid another generation crisis
 - Lower overall cost to generate, transmit, & distribute electricity
- **Economic Development**
 - Job and local industry creation
- **Environmental Improvement**
 - Conserve Resources

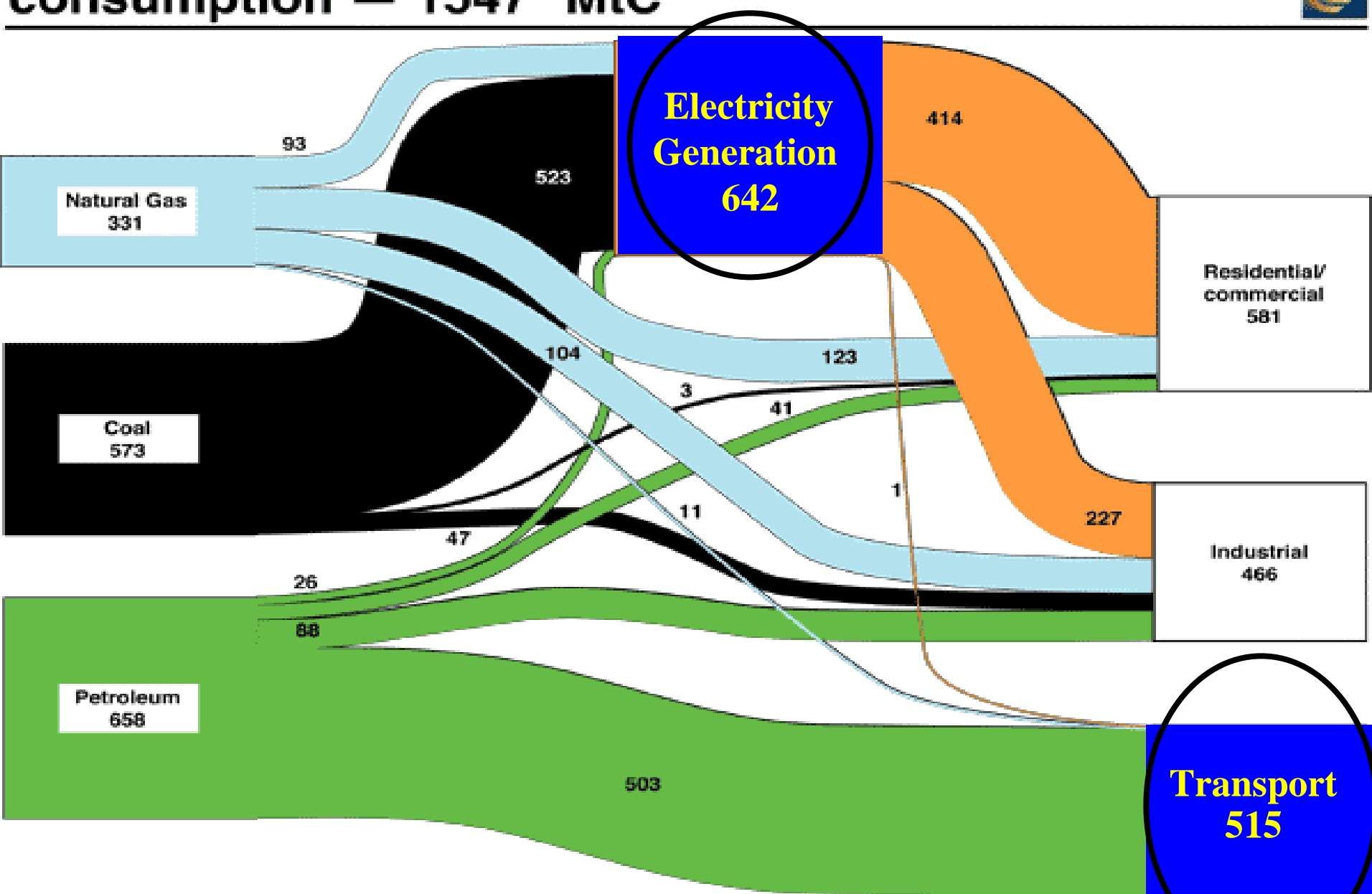
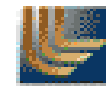
Manage Growth (billion kWh)



Economic Development

- **Job Jolt - Impact of Midwest Clean Energy Plan**
 - 200,000 new jobs
 - 20 Billion in new economic activity
 - Diversify regions over dependence on coal
- **Michigan Study**
 - 70 cents of each dollar spent on energy goes out of State

US 2000 carbon emissions from energy consumption — 1547* MtC

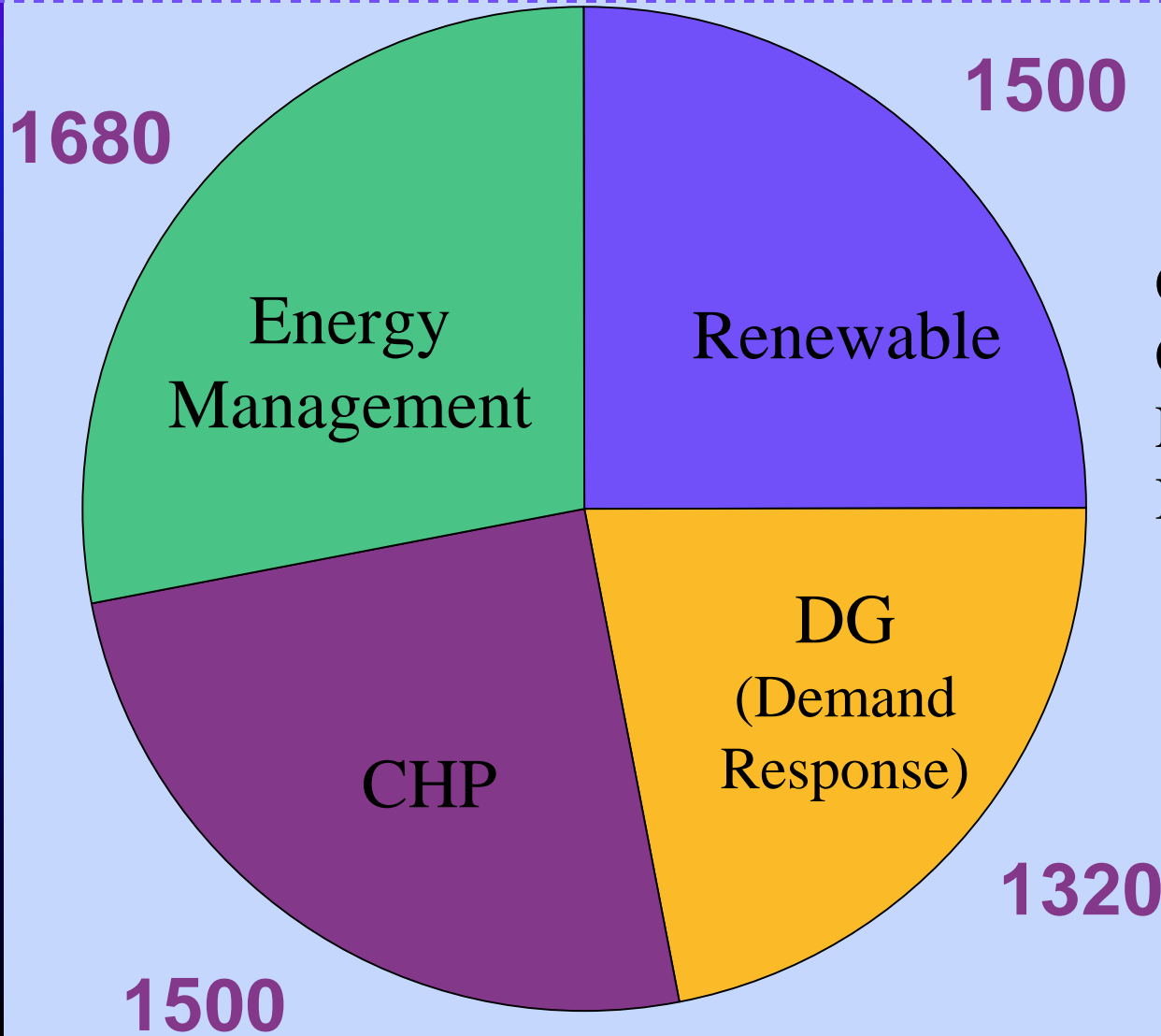


Source: Energy Information Administration
 *Includes adjustments of 14 million metric tons of carbon from U.S. territories. Less 28 MtC from bunker fuels

Change Drivers?

- **Exelon announces vision to reduce capital costs by 40%**
 - Not banking on cost recovery via rate increases
- **State Clean Energy Trust Funds and DOE**
 - California \$60 million PIER Program
 - Illinois Trust Fund
 - Michigan Trust Fund
 - New York
 - Connecticut
 - Massachusetts
- **Regional Energy Plans**
 - Sustainable Cities Program Emerging
 - Establish Goals and Framework for Change

Chicago to Meet All Growth with Clean Energy



Commissions
Could Lead
Energy Plan
Development

Change Tariffs?

- **Optimize “On-Peak” rates to encourage investment**
 - Reflect low cost of off peak energy and delivery
- **Waive Standby Rates on selected circuits**
- **Streamline interconnect**
- **Allow Cities to offset electric bills with renewables and CHP at remote sites**
- **Renewable or recycled energy purchase programs**
- **Allow & Encourage utilities to consider alternatives to grid expansion to remote areas**

Card Study Background

- **Andrew Card Commissioned a Study to Review the Economics of CHP**
- **Included a review of the impact of DG and CHP on an actual electric circuit**
- **Selected a feeder in Michigan**
- **Created an assumptions bible for economic analysis**
 - **Technology costs**
 - **Improved Business Rules**
 - **New tariffs**

Analysis Team

Analysts

- Customer Perspective
 - Gas Technology Institute
- Utility Perspective
 - Distributed Utility Associates
- Coordination&Integration
 - Energetics, Inc.

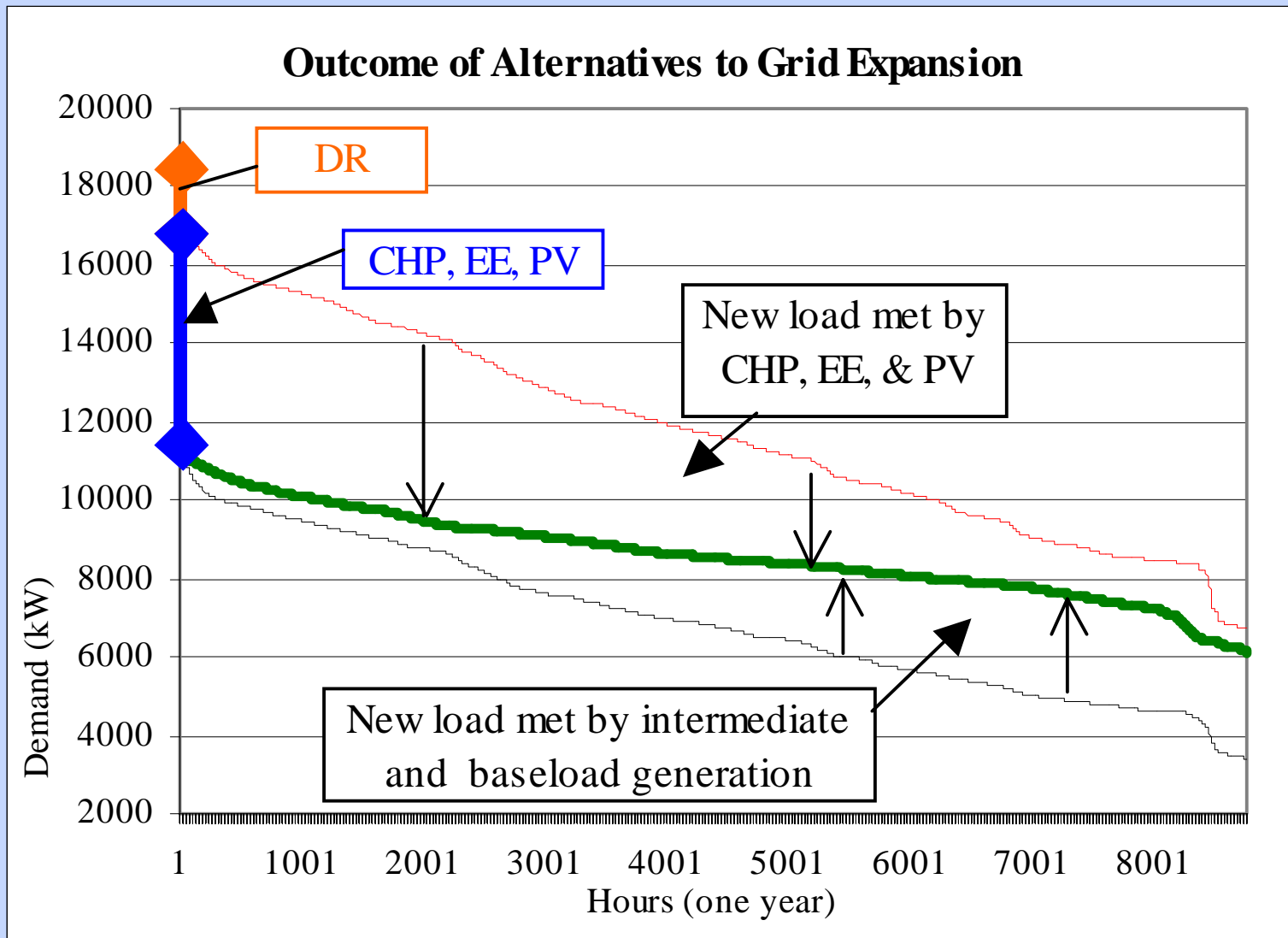
Technical Advisors

- American Electric Power
- DTE Technology
- EEA, Inc.

Detroit Edison – Key Characteristics

- **Supply Mix: 15+GW coal; 1GW nuclear; 1GW pumped storage**
- **2.3 cents/kWh on-peak; 2.0 cents/kWh off-peak**
- **\$13.08/kW/month demand charge**
 - **11am to 7pm peak rate period**
- **\$403/kW for T&D upgrades**

Potential to Avoid Upgrades



Next Steps

- **Apply methodology to other locations**
- **Assess “innovative” rate designs**
- **Develop estimates for monetizing non-economic factors**
- **Raise need for regulatory framework to support both utility and customer DER business cases**

Actions for Reshaping Grid

- **PSC leadership role in developing regional clean energy plans**
- **Investigate tariff structures and business rules that encourage utility and private investment in Clean Energy**
 - **Card study confirms that Clean Energy Technology can be used to reshape grid**