Michigan Electric Capacity Need Forum

April 22, 2005

Agenda

- Capital markets and electric generation investment
  - Ellen Lapson, Managing Director Fitch Rating's U.S. Global Power Group
  - Jonathan Cho, Director Fitch Rating's U.S. Global Power Group
- Work group updates
  - Work group chairs
    - Demand/Forecast
    - Central Station
    - Transmission/Distribution
    - Renewable/other generation
    - Integration
- Preliminary reliability numbers
  - Rao Konidena, MISO
- Next meeting

Comments of Fitch Ratings Michigan Electric Capacity Need Forum

Ellen Lapson, Managing Director Fitch Rating's U.S. Global Power Group

Jonathan Cho, Director Fitch Rating's U.S. Global Power Group

Demand Forecast

Chairman Eric Baker, Wolverine Power

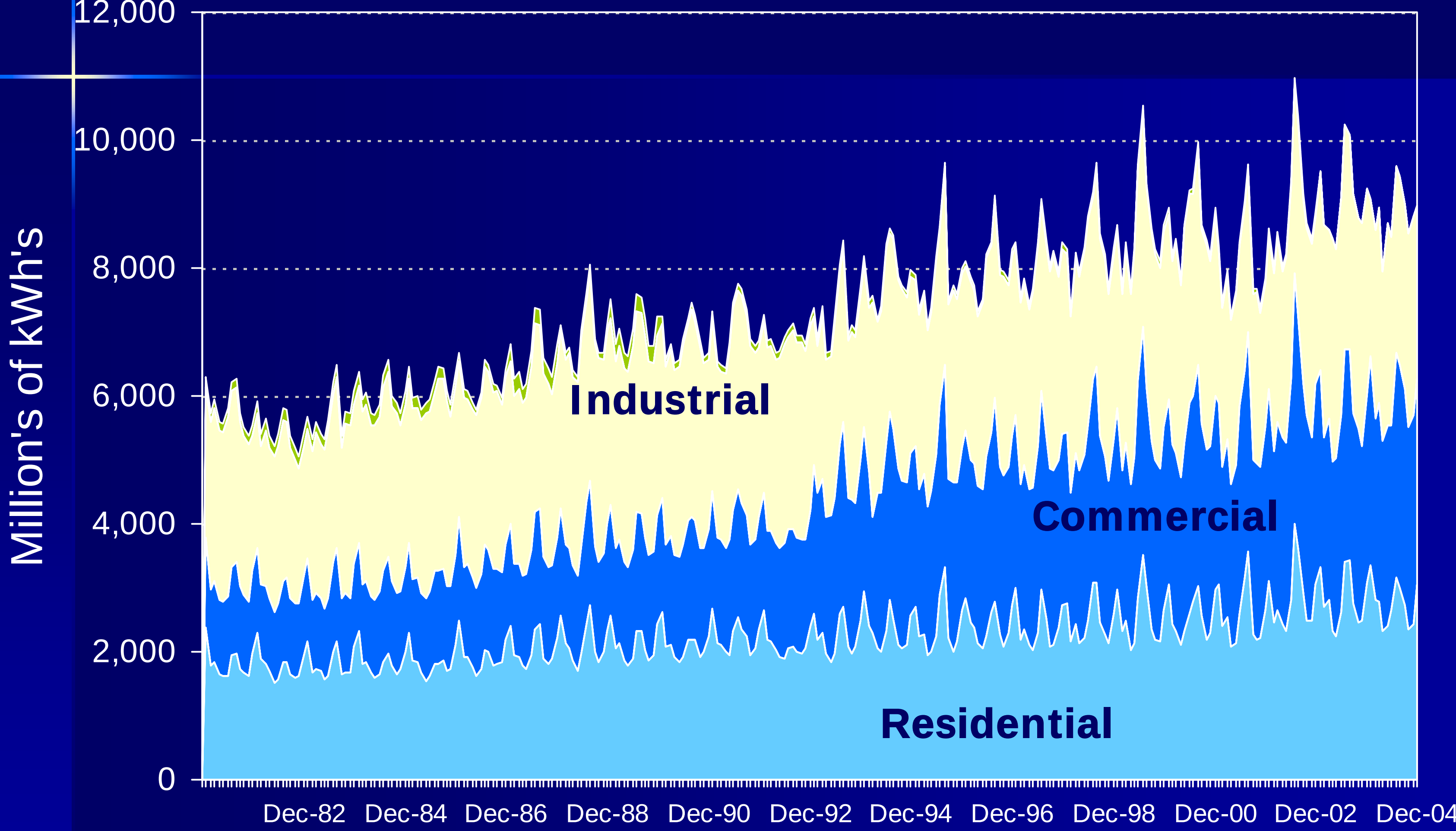
Staff Co-chair Don Mazuchowski, MPSC Staff

Demand and Energy Forecast

- Three geographic regions – Southeast Michigan, balance of Lower Peninsula, and Upper Peninsula
- Forecast period 2005 to 2025
- Forecast based on individual participants' forecasts
- Base forecast made along with low and high scenarios

Michigan Monthly Electricity Sales

1982 to 2004

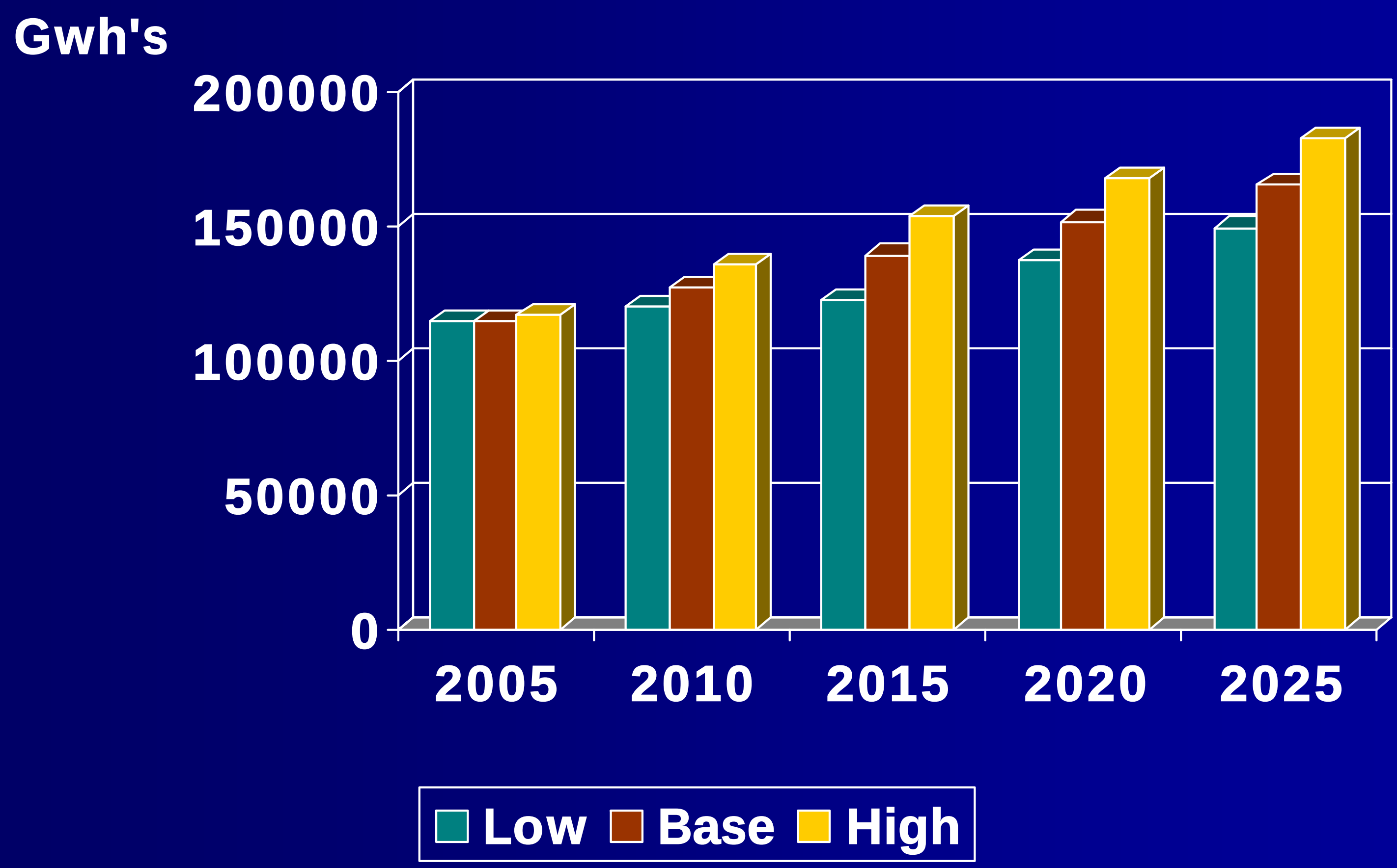


Source: Energy Information Administration, Electric Power Monthly, prepared by MPSC Staff
http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html

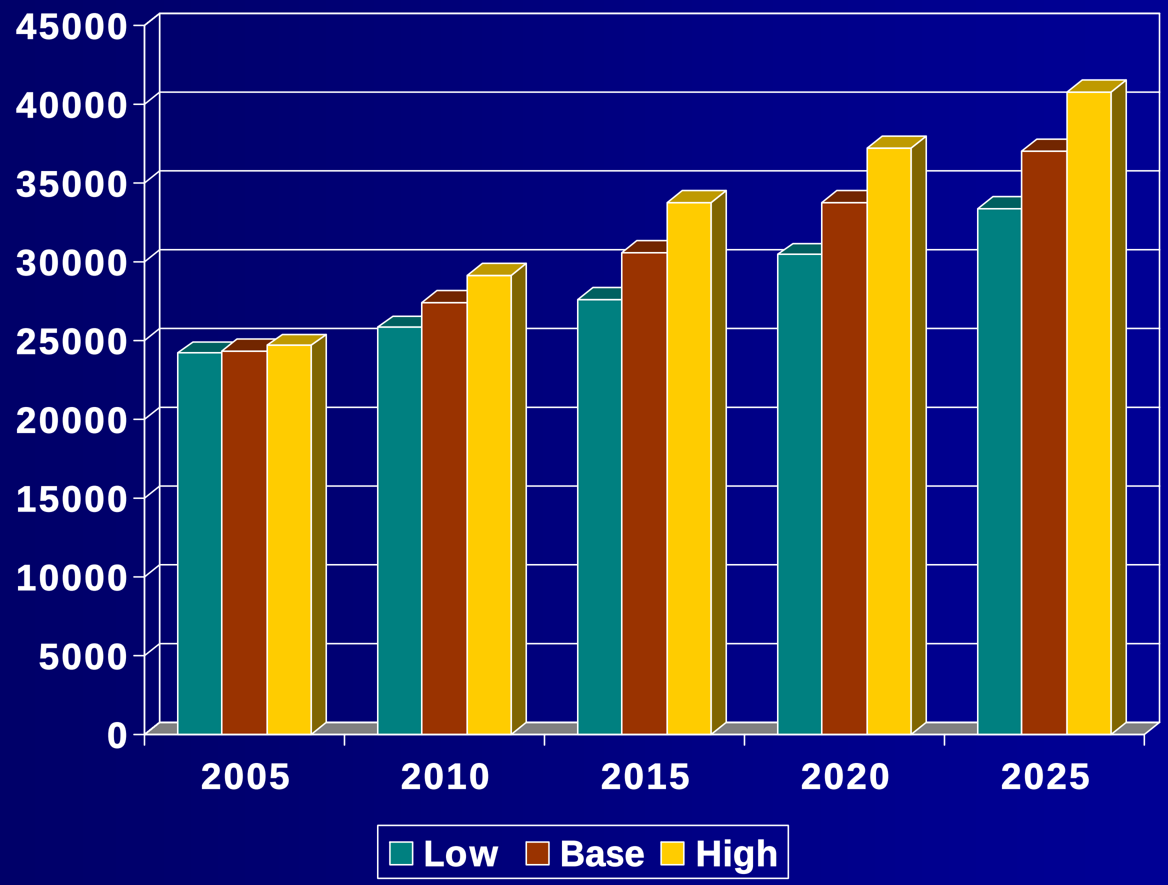
Michigan Electric Demand and Energy Forecast

- Total energy sales growth 1.8%
  - Southeast Michigan energy growth 1.8%
  - Balance of Lower Peninsula growth 1.9%
  - Upper Peninsula growth .9%
- Total electric demand growth 2.1%
  - Southeast Michigan growth 1.7%
  - Balance of Lower Peninsula growth 2.7%
  - Upper Peninsula growth .9%

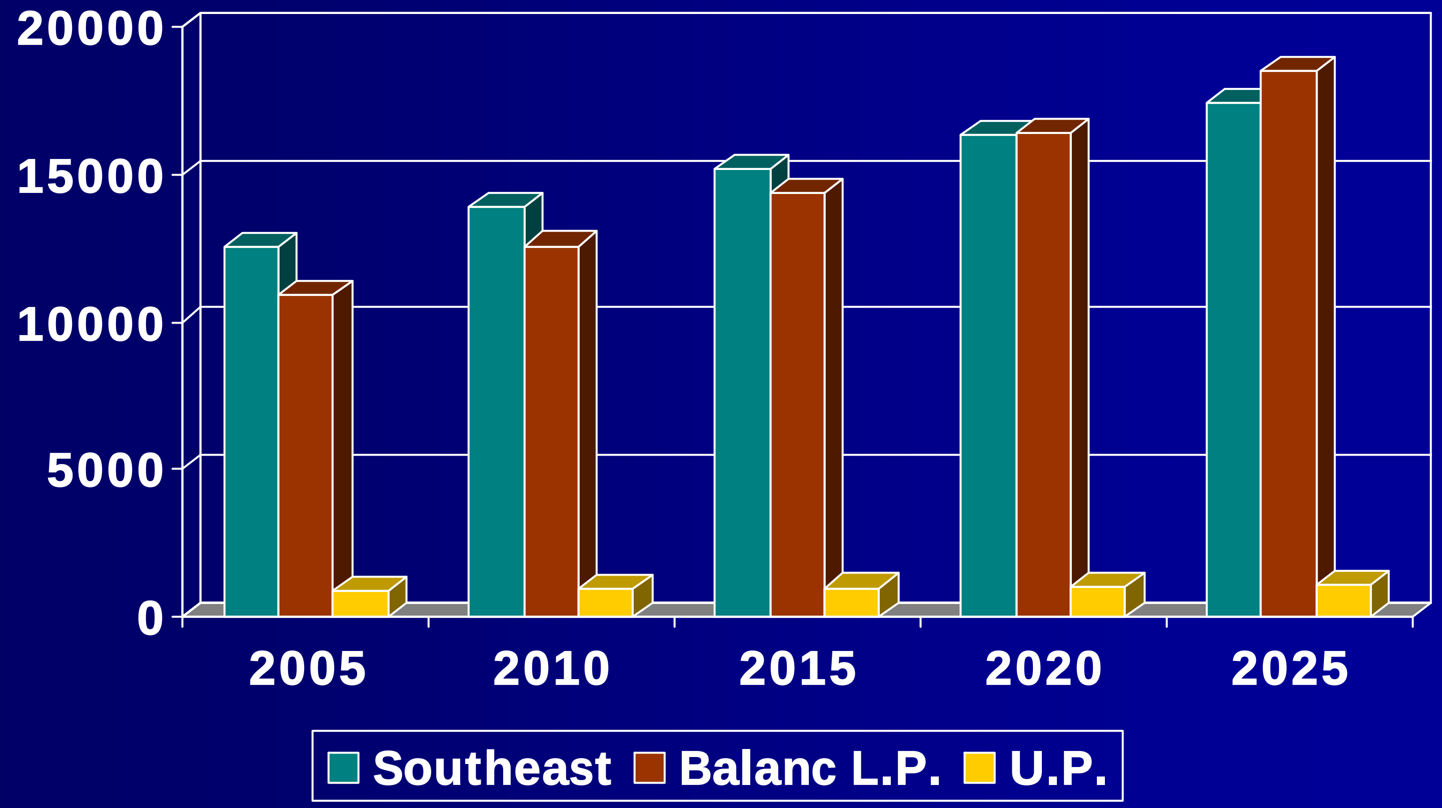
Michigan Electric Sales Forecasts



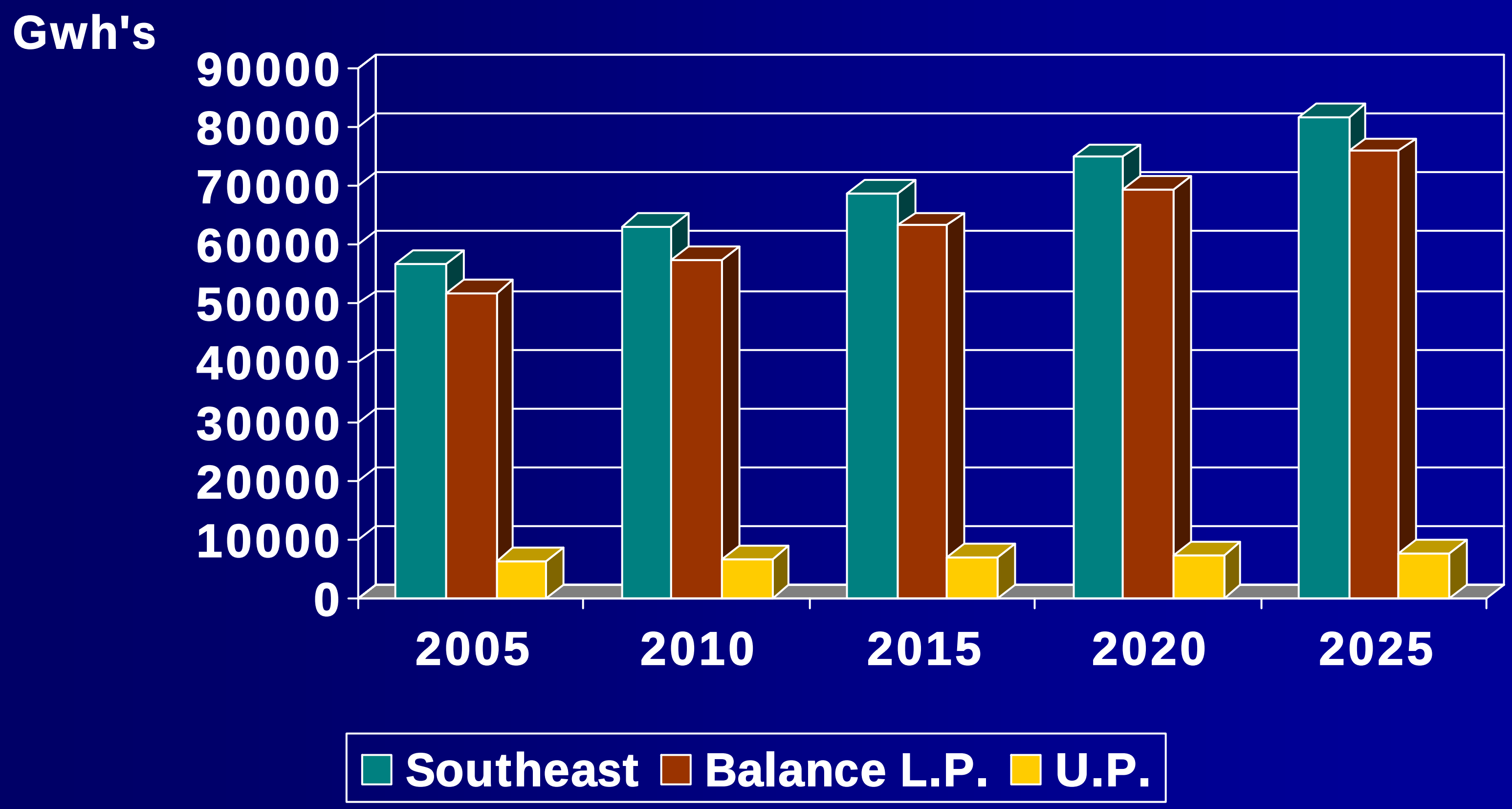
Michigan Demand Forecasts

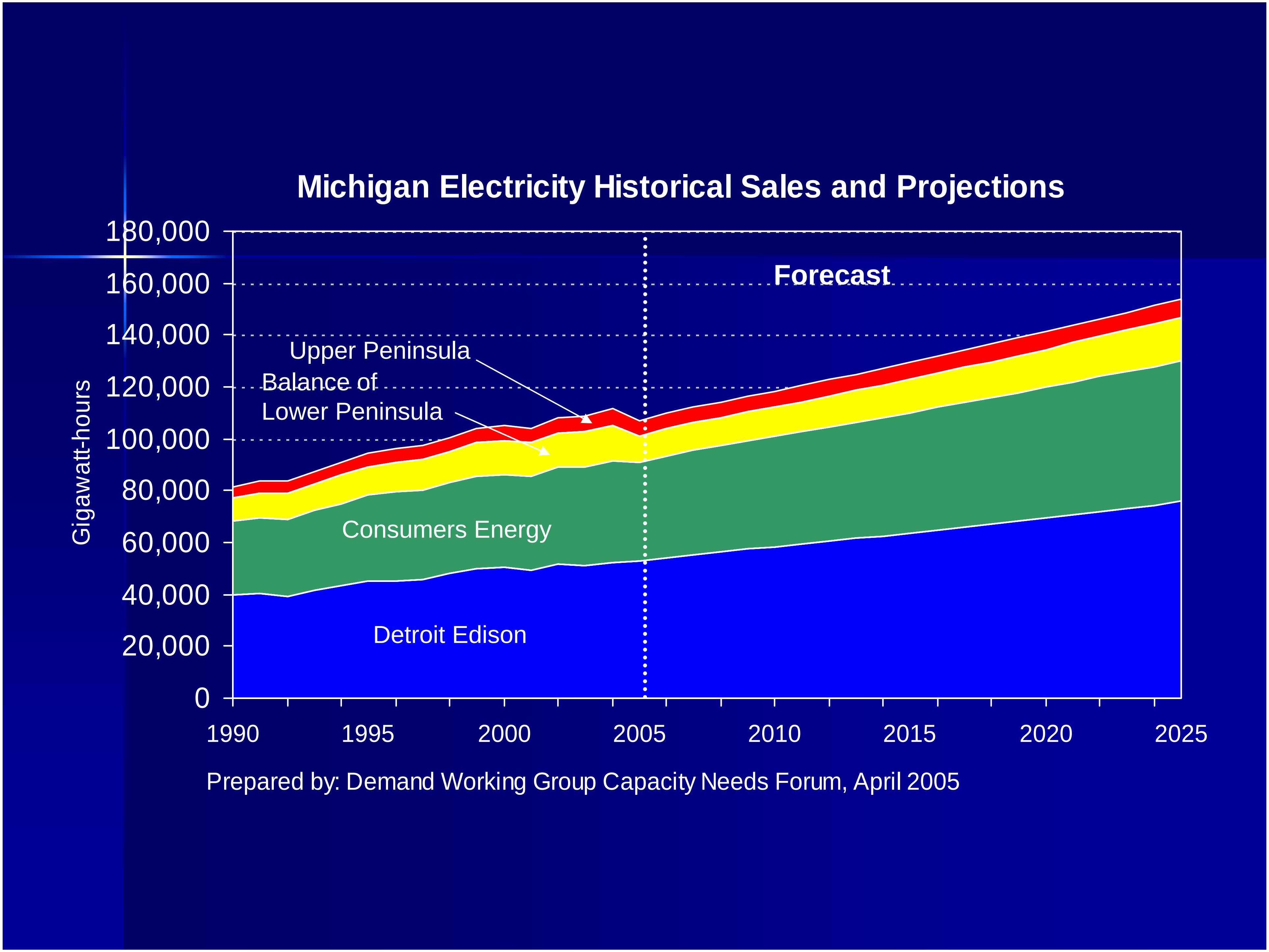


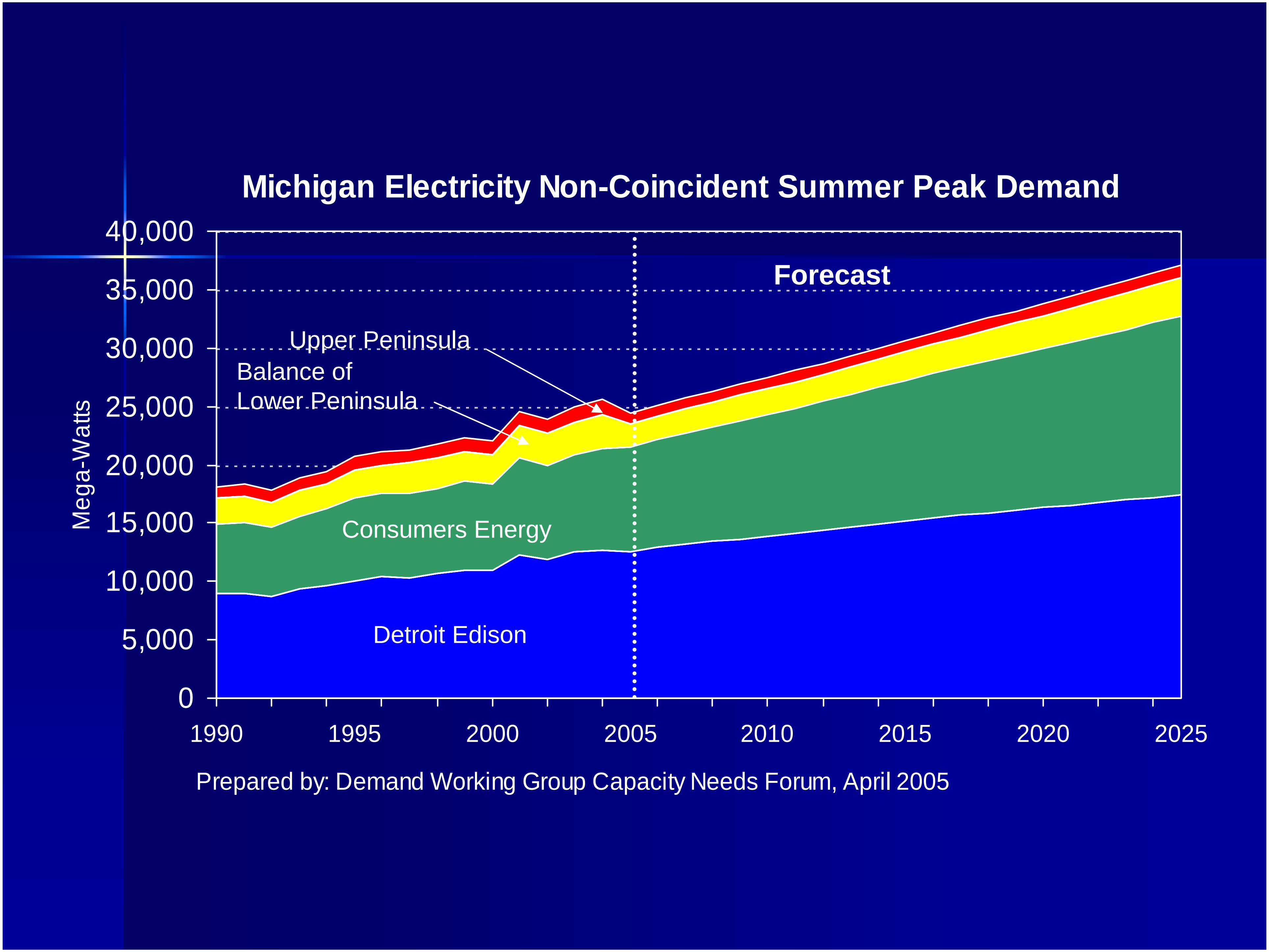
Michigan Electric Demand by Geographic Region



Michigan Forecast Electric sales by Geographic Region

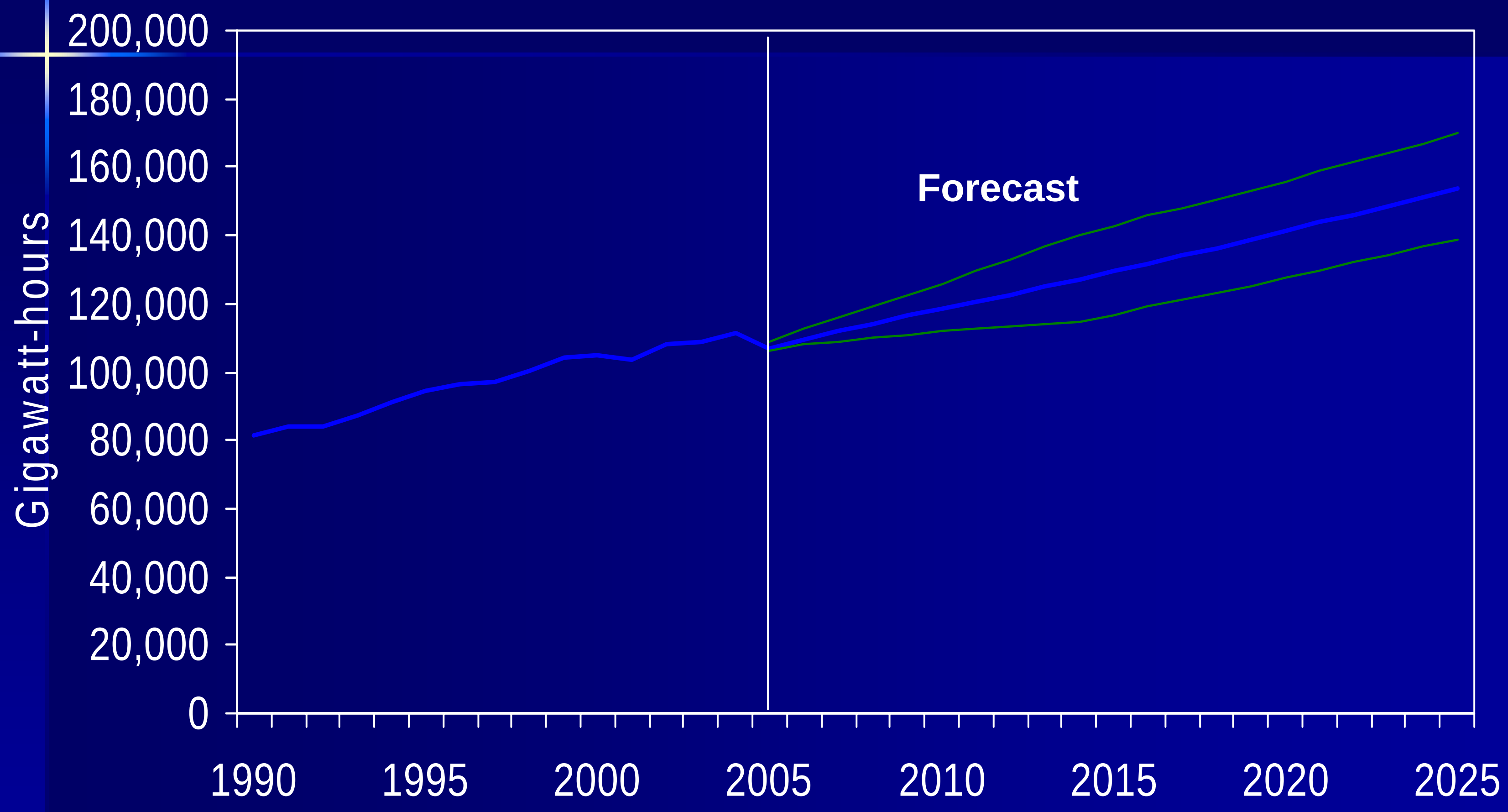



Michigan Electricity Historical Sales and Projections
Forecast
Upper Peninsula
Balance of
Lower Peninsula
Consumers Energy
Detroit Edison
Gigawatt-hours
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1990
1995
2000
2005
2010
2015
2020
2025
Prepared by: Demand Working Group Capacity Needs Forum, April 2005


Michigan Electricity Non-Coincident Summer Peak Demand
Forecast
Upper Peninsula
Balance of Lower Peninsula
Consumers Energy
Detroit Edison
Mega-Watts
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1990
1995
2000
2005
2010
2015
2020
2025
Prepared by: Demand Working Group Capacity Needs Forum, April 2005

Michigan Electricity Sales Forcast Range

Base Case + & - 10%

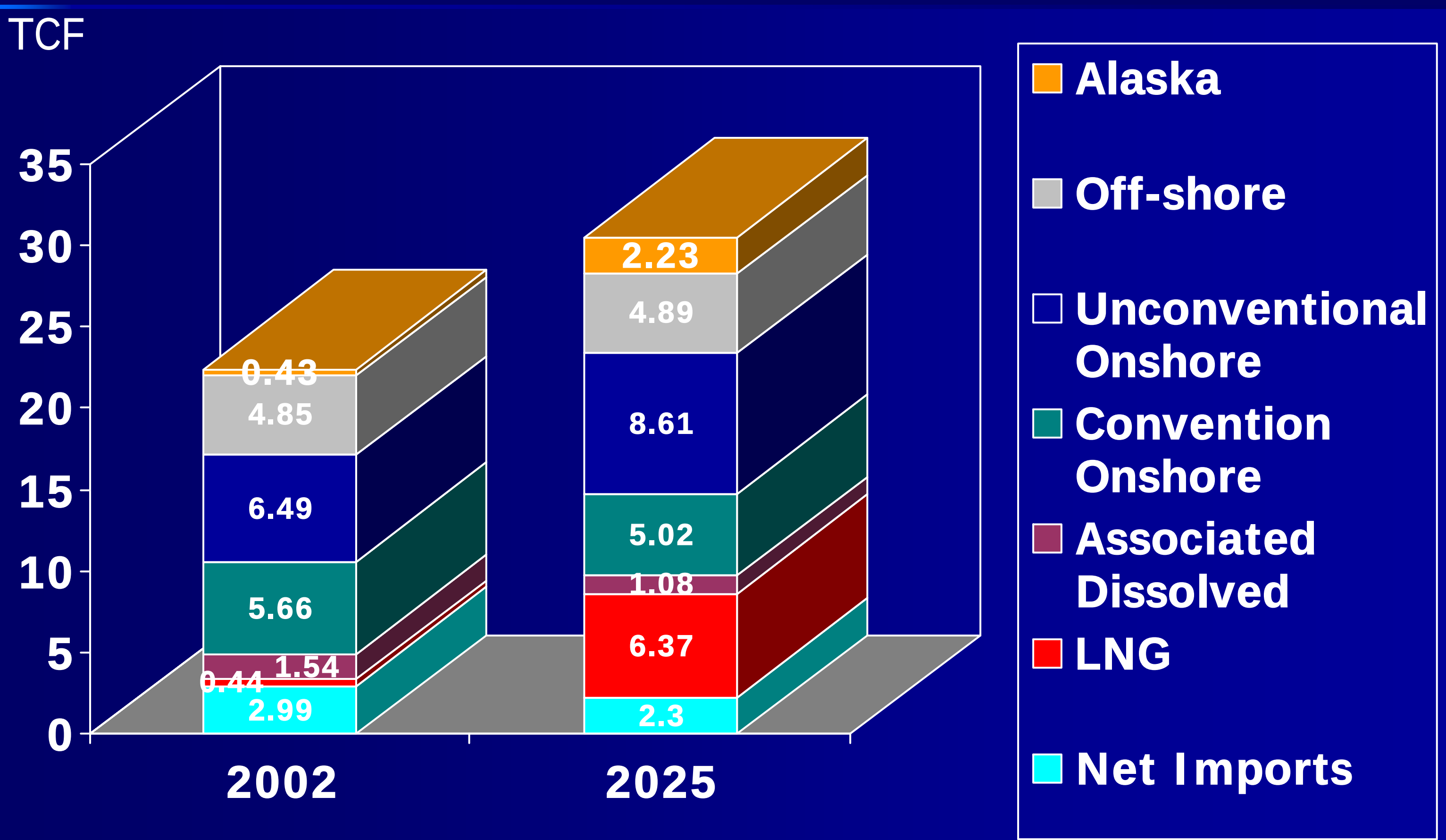


Prepared by: Demand Working Group Capacity Needs Forum, April 2005

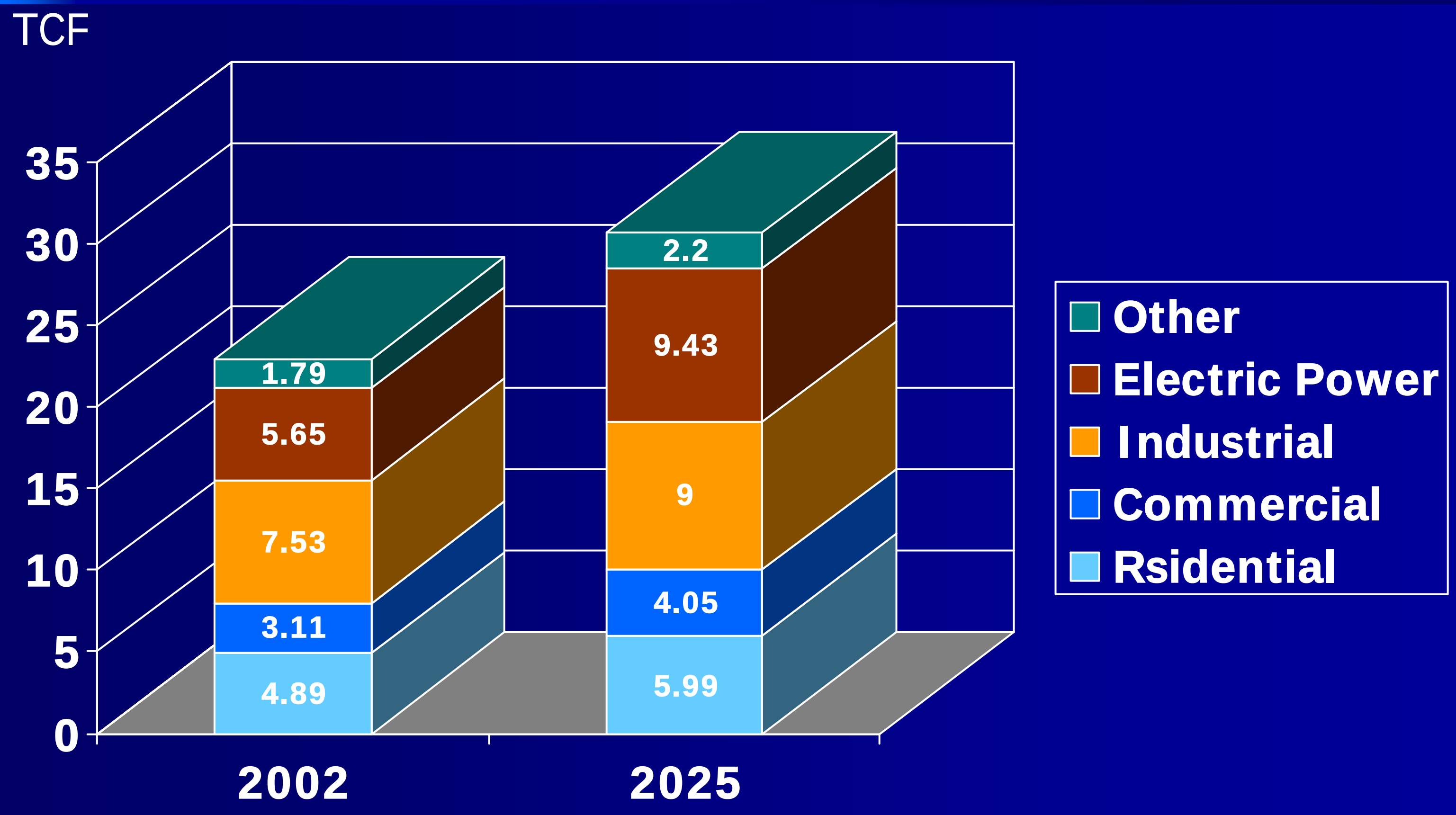
Fuel Price Forecasts

- Department of Energy's Energy Information Agency's (EIA's) Annual Energy Outlook 2005
- Global Insights long-term forecast
- Other studies

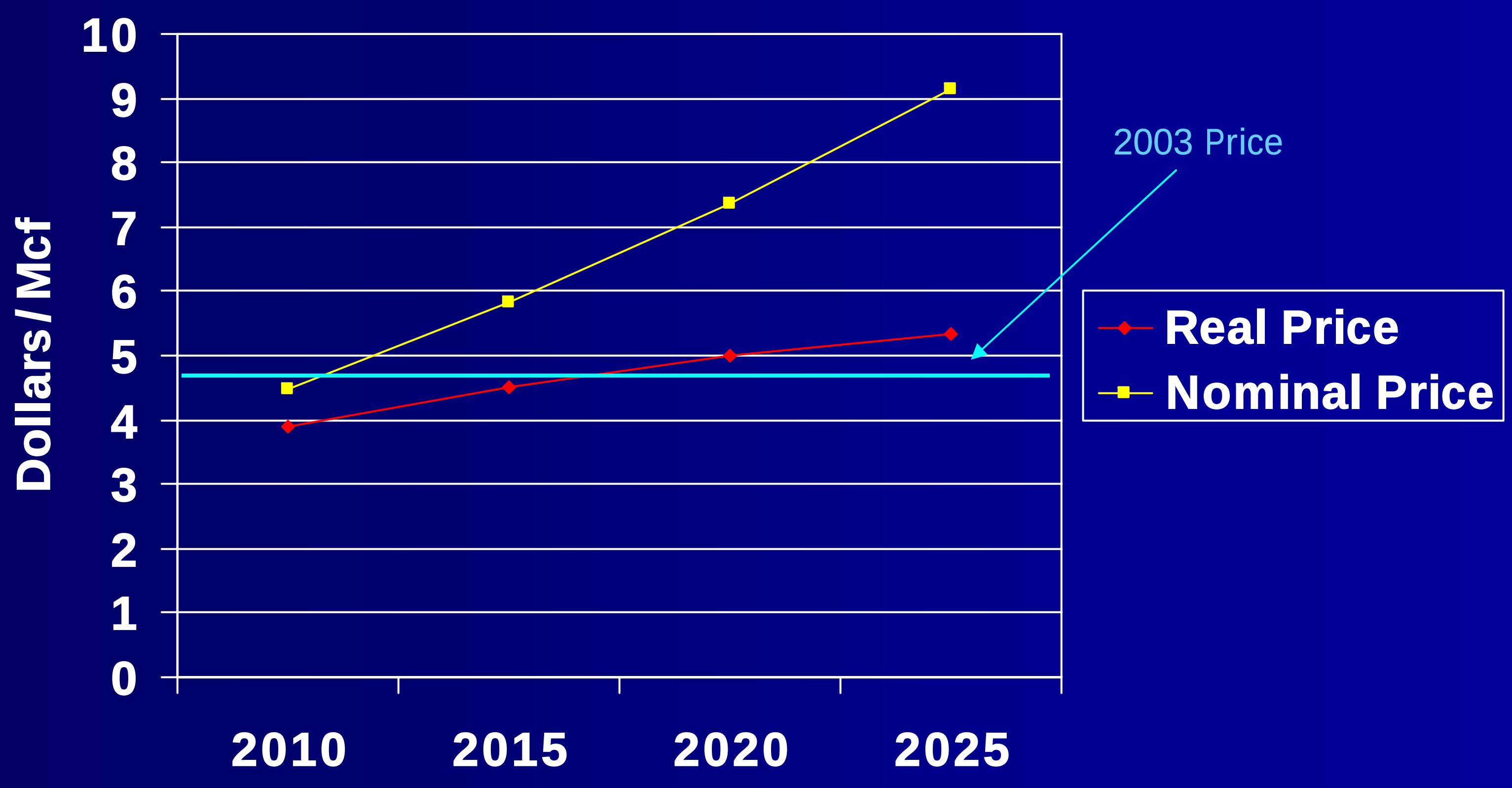
United States Natural Gas Supply



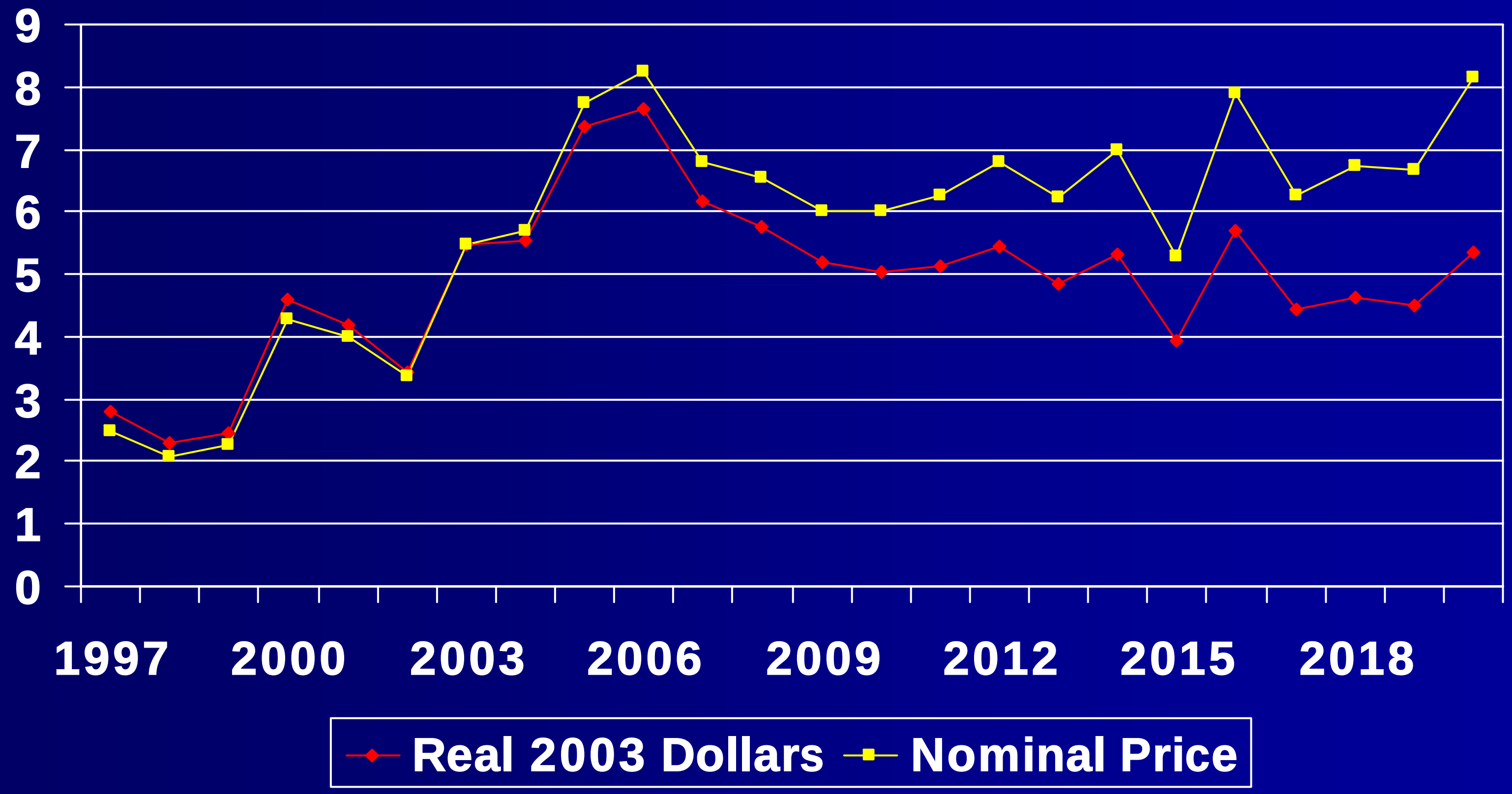
United States Natural Gas Consumption by Sector



Energy Information Agency Long-Term Natural Gas Price Forecast

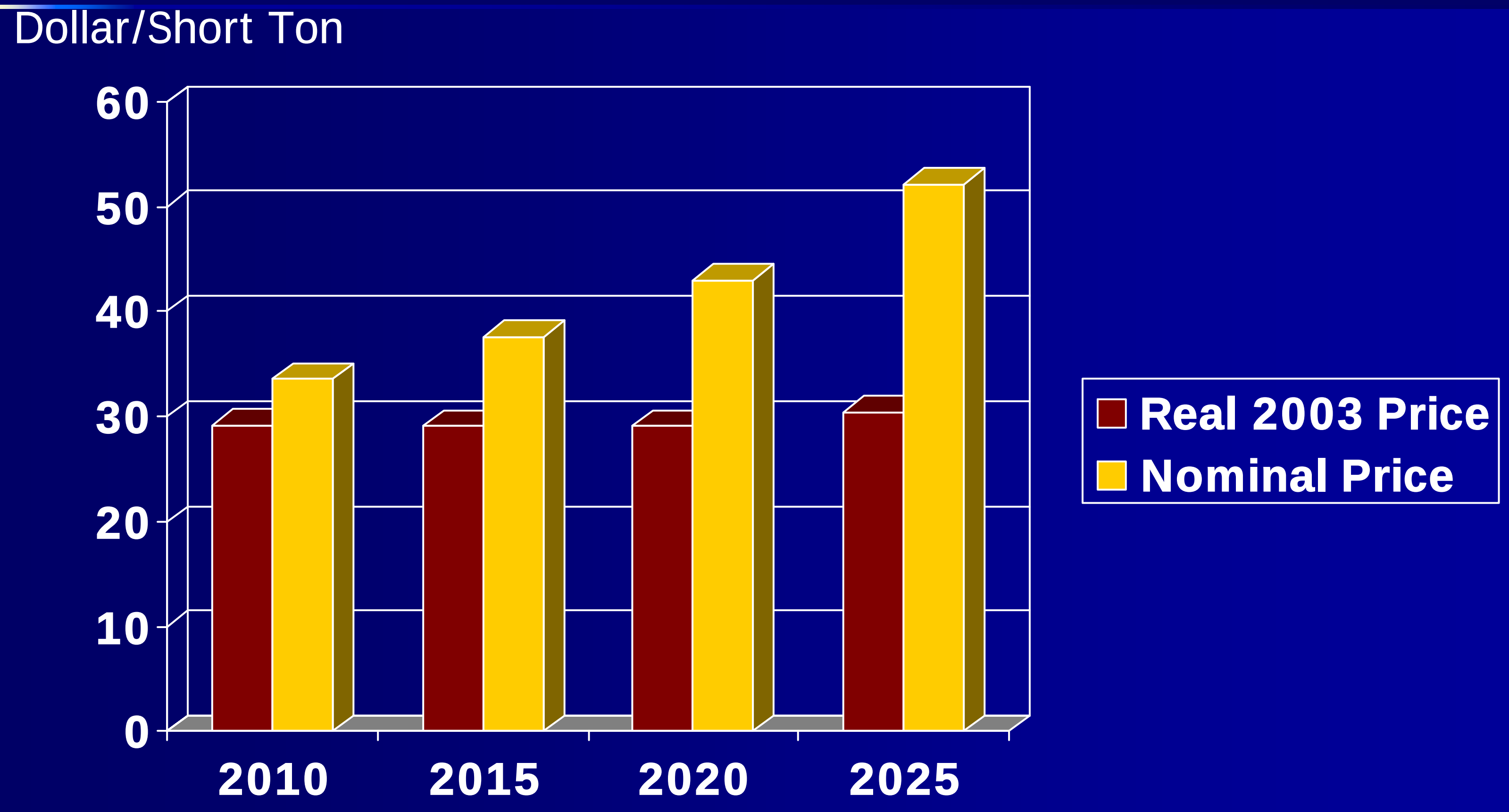


Natural Gas Price Forecast



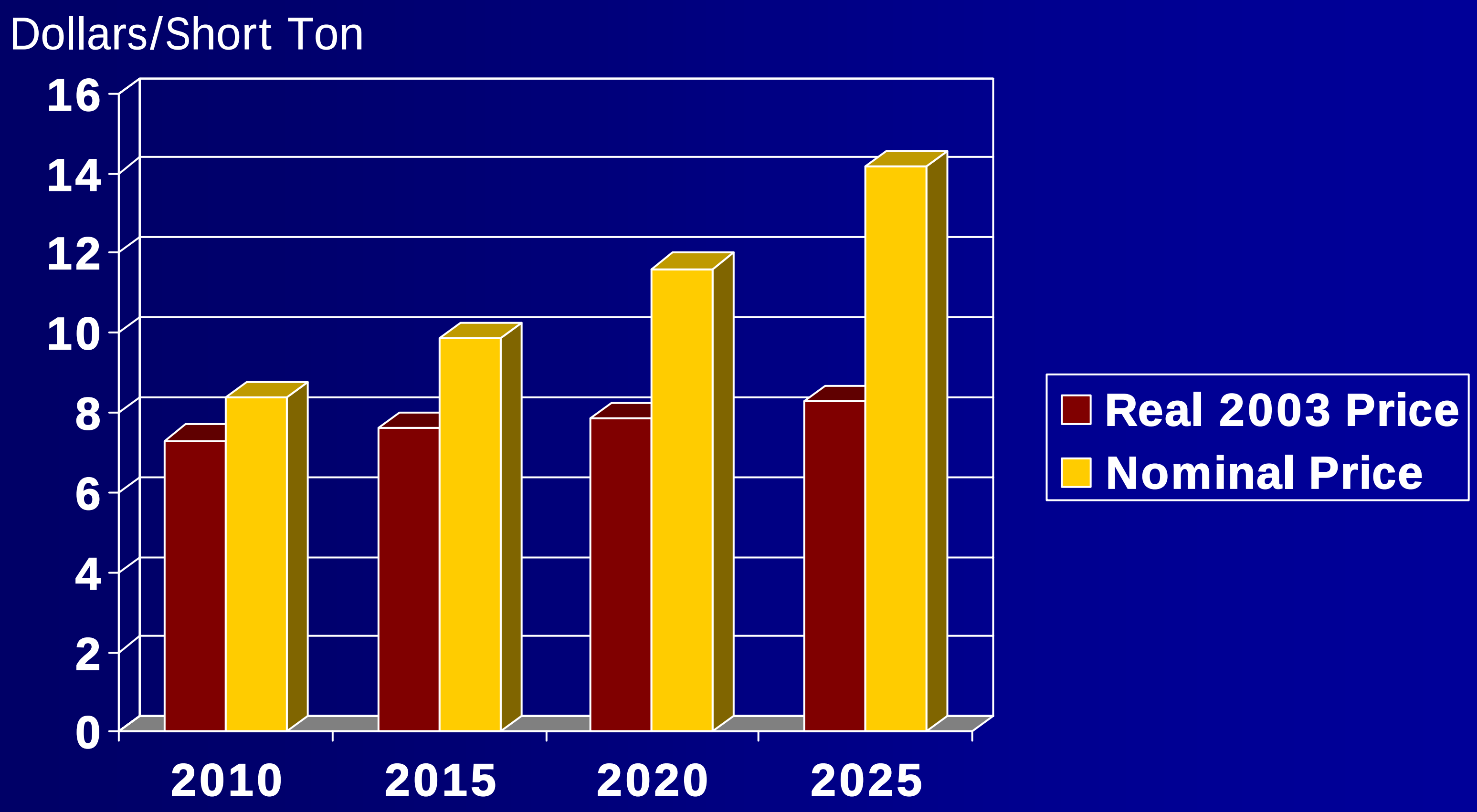
Source: American Gas Foundations

Forecast Price of Central Appalachia Bituminous Coal



Source: EIA

Forecast Price of Powder River Basin Low Sulfur Coal



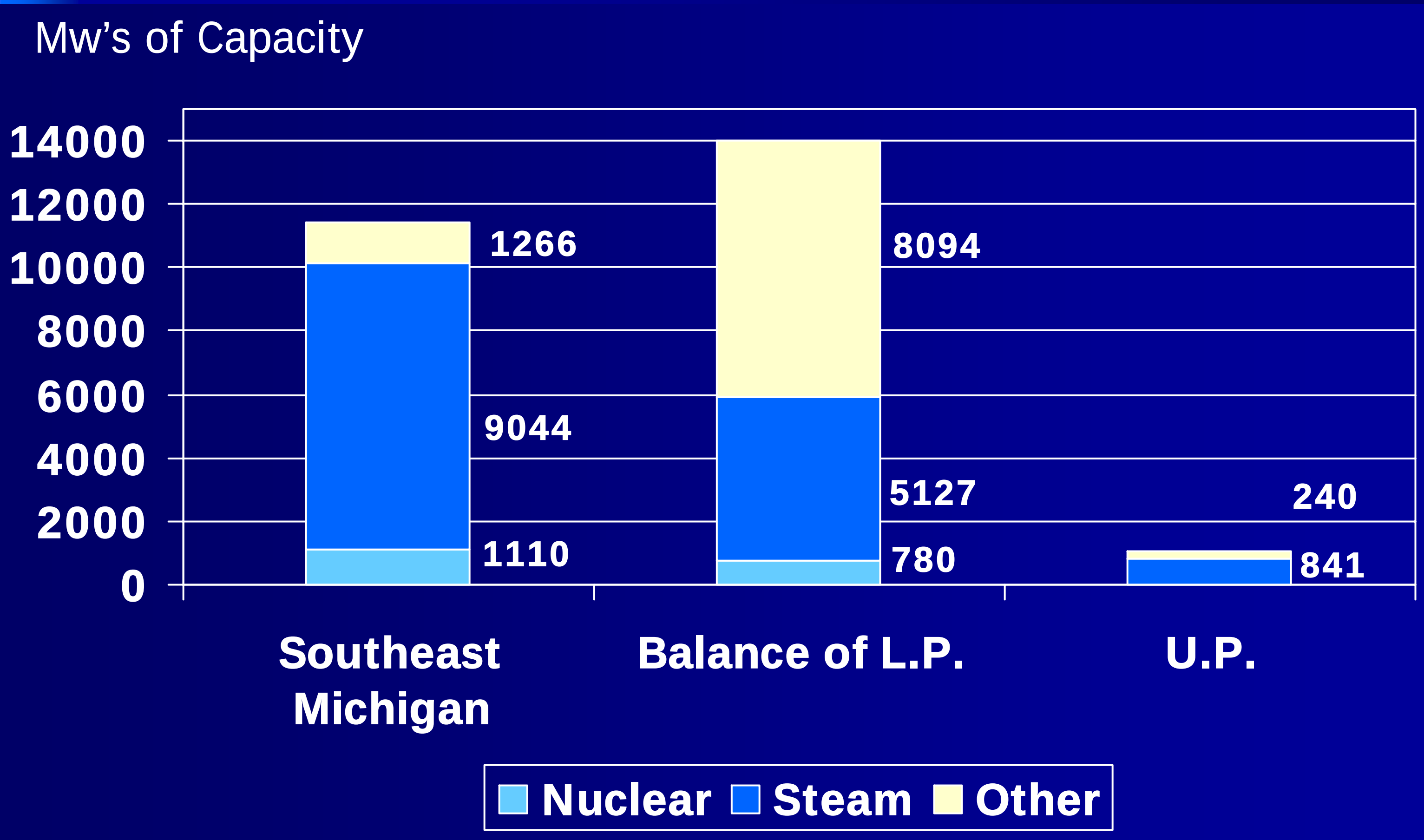
Source: EIA

Central Station Generation

Chairman Robert Palmer, Detroit Edison Company

Staff Co-chair, John King, Commission Staff

Michigan's Current Generation Capacity by Region



Central Station Generation Technologies

- Pulverized Coal – supercritical and subcritical
- Circulating Fluidized Bed
- Integrated Gasification Combined Cycle
- Nuclear
- Natural Gas Combined Cycle
- Combustion Turbine

Generating Plant Cost Assumptions

- Greenfield site
- Transmission cost associated with switchyard included
- Overnight costs included
- New pulverized coal would require scrubber, baghouse, and SCR system
- Service life assumed to be sixty years

Production Plant Estimated Costs

Technology	Size (Mw's)	Construction Cost $/Kw	Fixed O&M $/Kw	Variable O&M $/Mwh	Heat Rate BTU/kwh
Pulverized Coal Sub-critical	600	1,350	27.58	4.56	8,800
Pulverized Coal Supercritical	750	1,400	27.58	4.56	8,600
Fluidized Bed	300	1,650	28.00	4.00	9,500
IGCC	550	1,899	38.72	2.92	7,200
Nuclear	1,000	2,200	67.90	.53	10,400
Combined Cycle	250	500	12.73	2.12	6,800
Combustion Turbine	160	350	3.71	3.71	10,450

Estimated Busbar Cost

Technology	Fuel Cost $/MMBTU	Capacity Factor	Dispatch Cost $/Mwh	Fixed Costs (Cap+O&M)	Busbar Cost ($/Mwh)
Pulverized Coal Sub-critical	1.25	85%	16	25	41
Pulverized Coal Supercirtical	1.25	85%	15	26	42
Fluidized Bed	1.25	85%	16	30	46
IGCC	2.75	80%	23	38	61
Nuclear	.50	90%	6	42	48
Combined Cycle	6.00	85%	43	10	53
Combustion Turbine	6.00	5%	66	104	171

Estimated Emissions by Technology (# / MMBTU)

Technology	SO2	NOx	Particulates	Hg	CO2
Pulverized Coal Sub-critical	.10	.03	.015		200
Pulverized Coal Supercritical	.10	.03	.015		200
Fluidized Bed	.02	.10	.015		
IGCC	.05	.05	.01		
Nuclear	0	0	0	0	0
Combined Cycle	.001	.03	0	0	120
Combustion Turbine	.001	.03	0	0	0

Other Generation

Chairman Donald Johns, Michigan Independent Power Producers

Staff Co-chair Mark Nida, MPSC Staff

Other Generation Resources Work Group

Primary Objective:

Develop a series of supply curves or other representations that can be used to model the non traditional technologies deemed capable of providing significant generation resources over the next decade or less.

Expected Deliverables:

A set of equations and/or projections of supply that can realistically be expected to be made available I an economically feasible fashion at a given price or prices along with output and emissions characteristics

Other Generation Resources Work Group

General Principals:

- Roughly Right approach
- Commercially Available
- Significant Impact
- Aggregate Averages for Modeling Purposes
- Use whatever data is practically available

eneration Resources Work Group

Technologies Chosen to be Modeled:

- Landfill Gas
- Anerobic Digestion
- Onshore Wind
- Industrial/large commercial cogeneration at existing sites
- Other emerging technologies to be addressed in a narrative and purhaps included as an annual (small) increment to be added.

Other Generation Resources Work Group

- Preliminary Results:
- Landfill Gas: 79 MW existing with 70 MW current potential growing at 5% per year@ 7 cents per kWh.
- . 95% capacity factor must run generation Farm Digestion: 56 MW potential @ 7 cents per kWh. 96% capacity factor must run generation.
- Wind: 420 MW potential @ 7 cents per kWh or $1200 per kW. 25% average capacity factor.Assumes 50% of all h class 4 or greater.
- Cogeneration: Sites greater 100 MLbs per

Transmission

Chairman Tom Vitez, International Transmission Company

Staff Co-chair Peter Derkos

Integration

Chairman John Dellas, Consumers Energy Company

Staff Co-chair Paul Proudfoot, MPSC Staff

Function And Responsibility

- Oversee integration function(modeling).
- Review other workgroup products for input into the integration model.
- Selection of sensitivities and scenarios.
- Make sure data used is comparable.
- Select/approve fuel and other economic data.

Function And Responsibility

- Review model output

Proposed Integration Methodology

- Use MISO's modeling capability to quantify capacity needs.
- Use ITC's power flow modeling to determine import capacity.
- Use New Energy's Strategist to select a resource additions plan.
- Use Scenarios to quantify Energy Conservation and Emissions issues.
- Regional modeling to reflect constraint issues.

Scenarios

- Traditional power sources
- Emissions
- Energy conservation
- Non-Traditional sources

Sensitivities

- High Load
- Low Load
- High Gas Cost
- Max Import