

# **Southeast Clean Energy Resource Team**

## **Electric Vehicle Forum**

**Cascade Meadow Wetlands & Environmental Science Center**  
**Rochester, Minnesota**



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**Xcel Energy**  
**April 26, 2011**

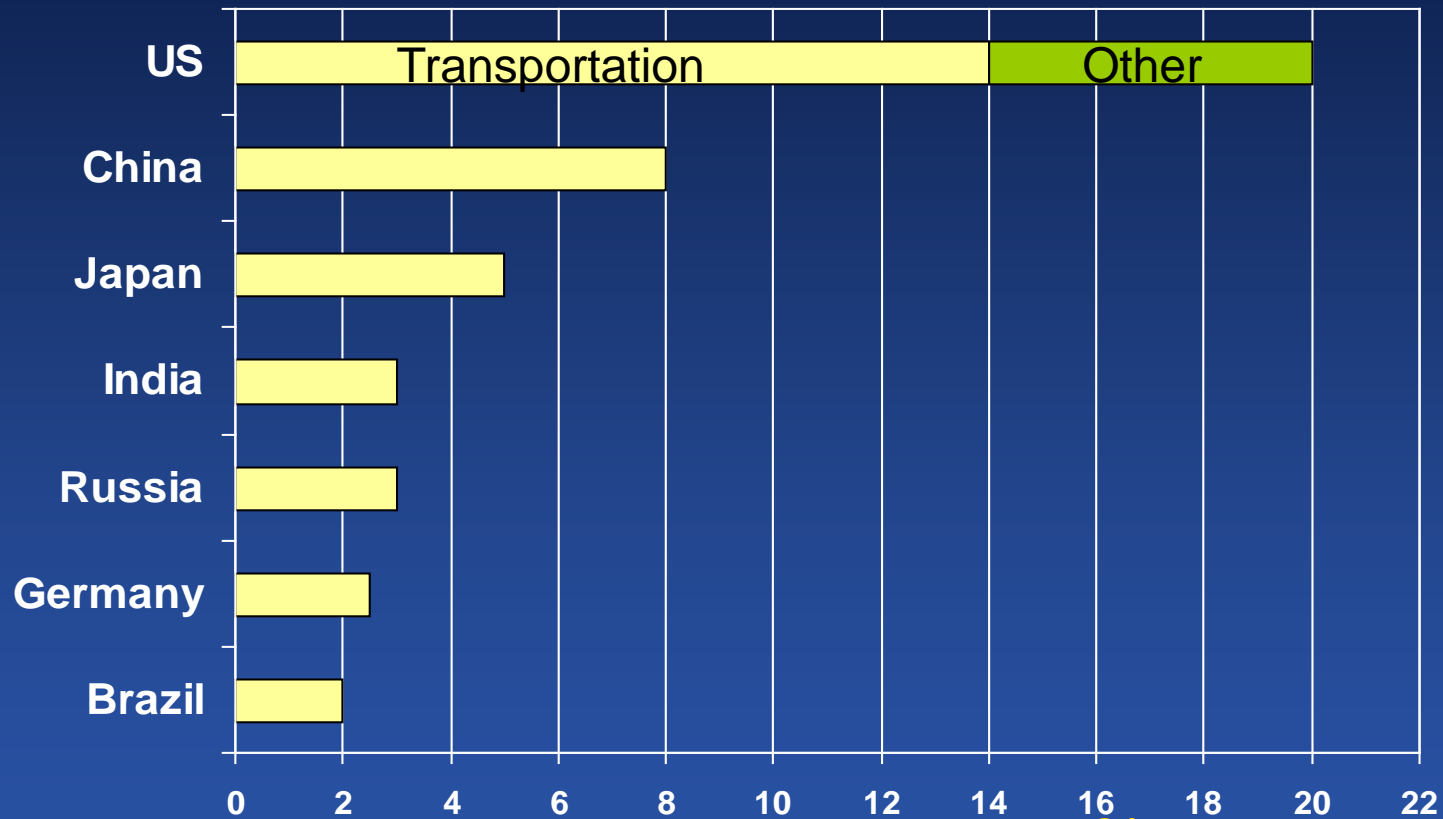


# Why – Electric Vehicles

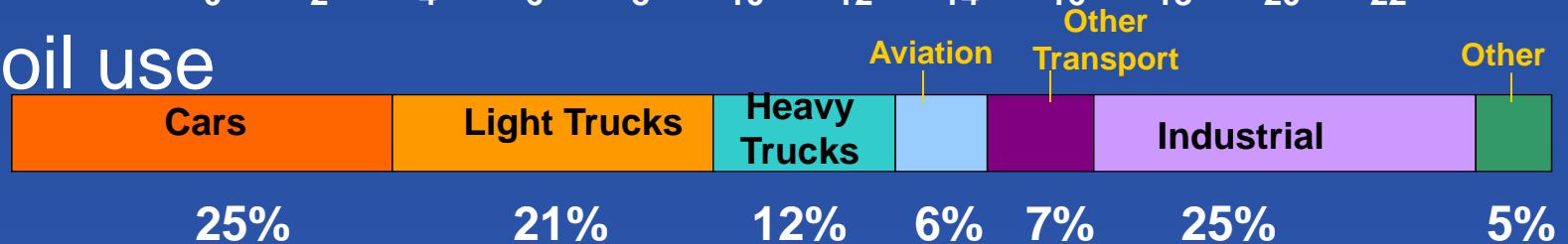
- ▶ **National security**
- ▶ **Economic vitality**
- ▶ **Environmental sustainability**

# National Security

## World Oil Consumption (Million barrels/day)

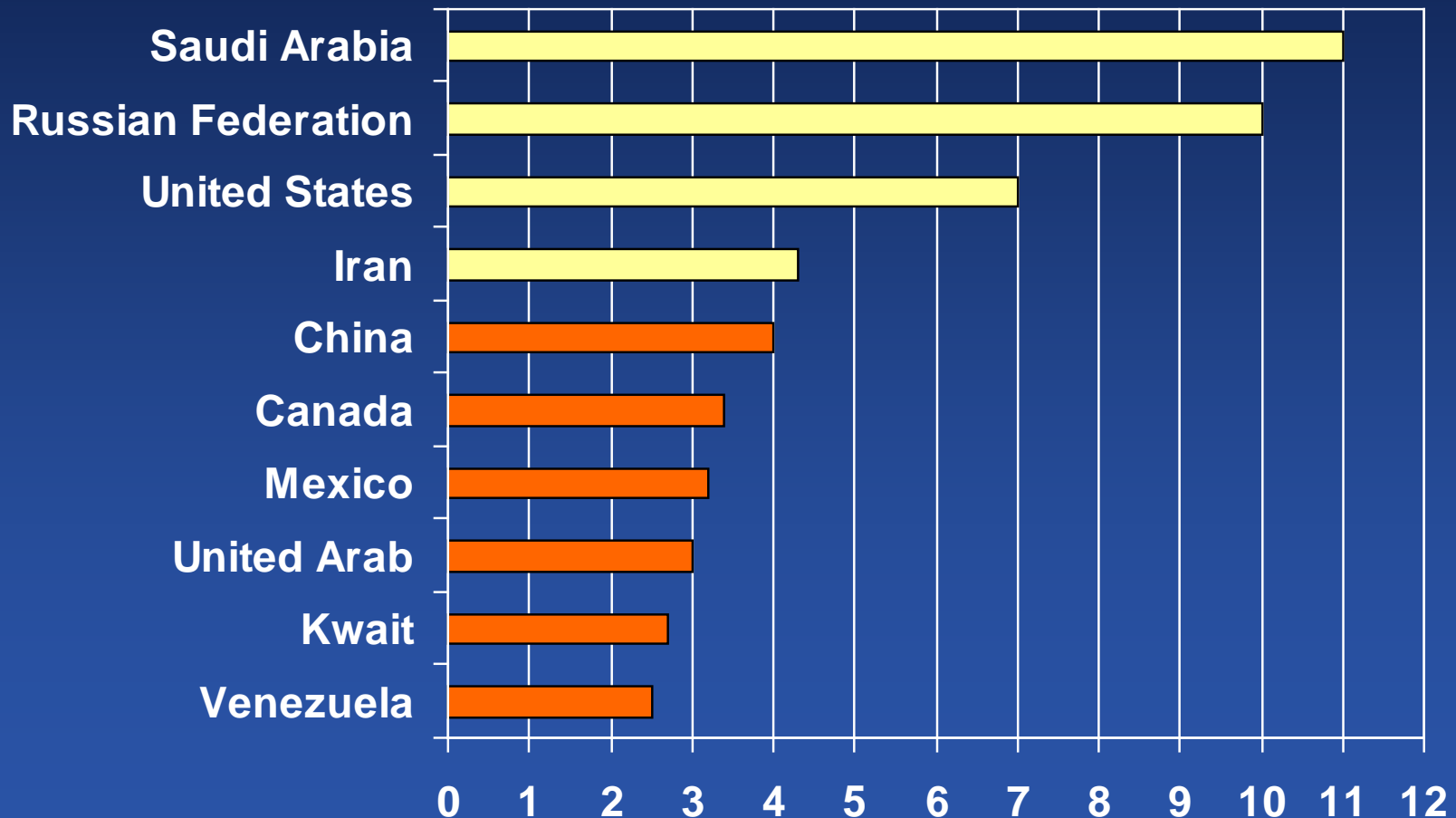


### US oil use



# National Security

## World Oil Production (Million barrels/day)

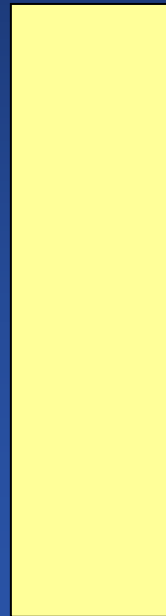


# Economic Vitality

## US Trade Deficit (\$ Billion)

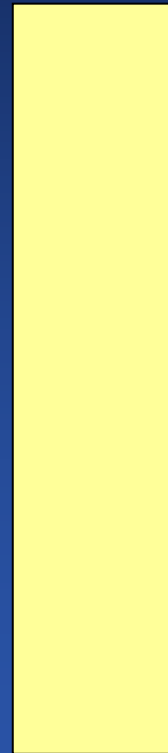
Oil and Refined Products

\$388 B



2008

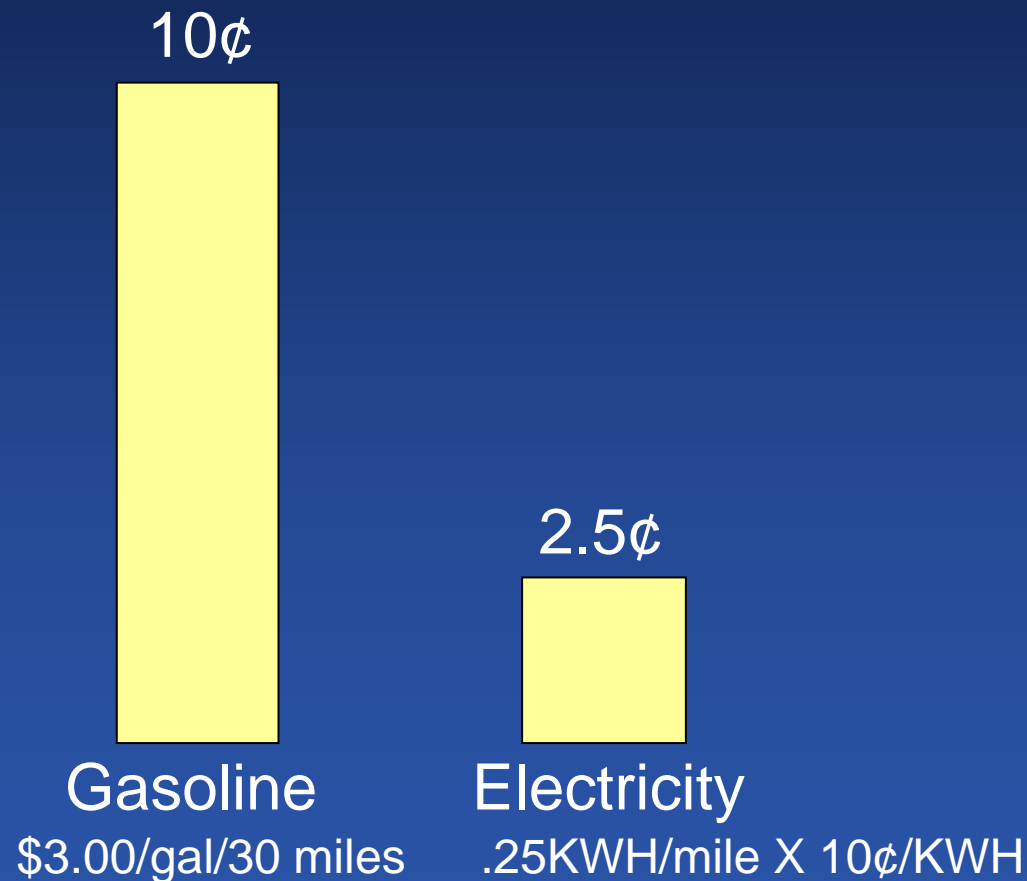
\$475 B



2011

# Economic Vitality

## Cost/Mile



# Environmental Sustainability

## Air Emissions

- ▶ **MPCA projects the state will become noncompliant with the federal Clean Air act for ozone:**
  - ▶ **Ozone is created through a reaction of NO<sub>x</sub> and VOCs mixing with sunlight. Highway vehicles contribute 1/4 of NO<sub>x</sub> and 1/3 of VOCs emissions**
  - ▶ **Gasoline and diesel combustion contribute 1/3 to 1/2 of fine particulate concentrations in highly populated urban areas**
  - ▶ **Non-road and on-road engines contribute about 2/3 of total air toxins in Minnesota**

Source: Minnesota Pollution Control Agency

# Comparison for Minnesota

	<b>Gasoline</b>	<b>Electric</b>	<b>Impact</b>
% Imported	100%	0 – 70%	Energy Independence
Fuel Cost Per Mile	10¢	2 – 3¢	Reduce fuel cost
Carbon Per Mile	1 lb	0 - .5 lbs	Reduce Emissions

# What's Happening Electric Vehicles



# What is going on Minnesota

## Drive Electric Minnesota

- ▶ American Lung Association in Minnesota
- ▶ Best Buy
- ▶ City of Minneapolis
- ▶ City of Saint Paul
- ▶ Dakota County
- ▶ ElectriCharge Mobility
- ▶ Environment Minnesota
- ▶ Fresh Energy
- ▶ GE
- ▶ Hennepin County
- ▶ Institute for Local Self-Reliance
- ▶ Metro Transit
- ▶ Metropolitan Airports Commission
- ▶ Minnesota Department of Administration
- ▶ Minnesota Electric Auto Association
- ▶ Minnesota Environmental Initiative
- ▶ Minnesota Pollution Control Agency
- ▶ Neighborhood Energy Connection
- ▶ HOURCAR
- ▶ PlugInConnect
- ▶ Ramsey County
- ▶ Southern Minnesota Municipal Power Agency
- ▶ Xcel Energy



# Drive Electric Minnesota Initiatives

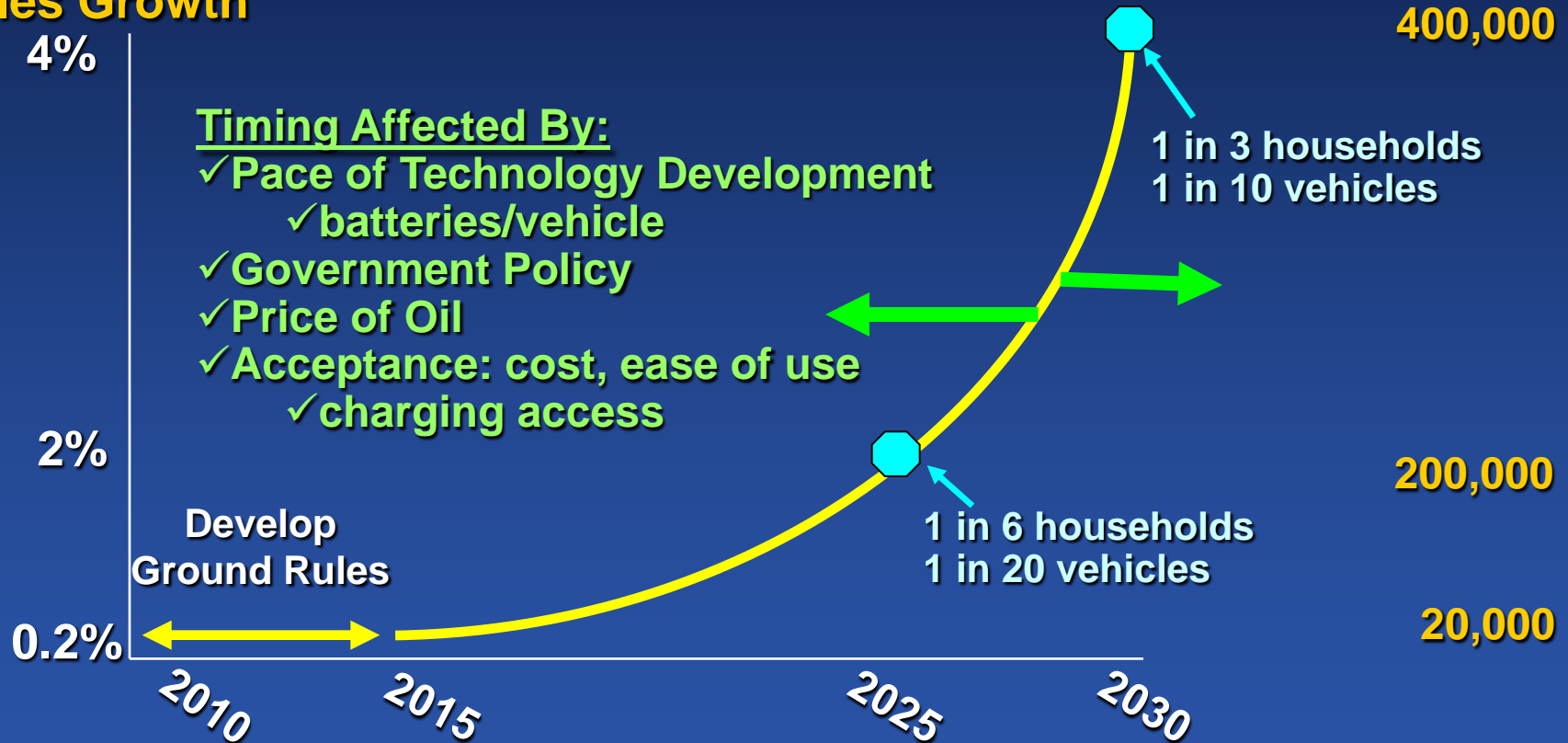
- ▶ **Public policy**
- ▶ **Funding**
- ▶ **Public education and support**
- ▶ **Physical deployment**
  - ▶ **15,000 vehicles by 2015**
  - ▶ **150 public charging stations by 2015**
  - ▶ **Integrate renewable energy for environmental & economic benefit**

# Minnesota Market

## Difficult to Predict

**% Electric  
Sales Growth**

**# Plug in Cars**



**Assumptions: Track National Academy of Science Projection**  
**Revenue based on Nissan Leaf**  
**(24 kwh/100 miles x 15,000 mi/yr x 10¢ /kwh = \$360/vehicle/year)**

# Impact on State

- ▶ 400,000 vehicles
- ▶ 500 gallons/vehicle
- ▶ \$3.00 per gallon
  - ▶ \$600 million annually to state economy

## Conclusion:

We know there will be challenges. It appears to be worth the effort.



***Xcel Energy***<sup>®</sup>

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RESPONSIBLE BY NATURE™