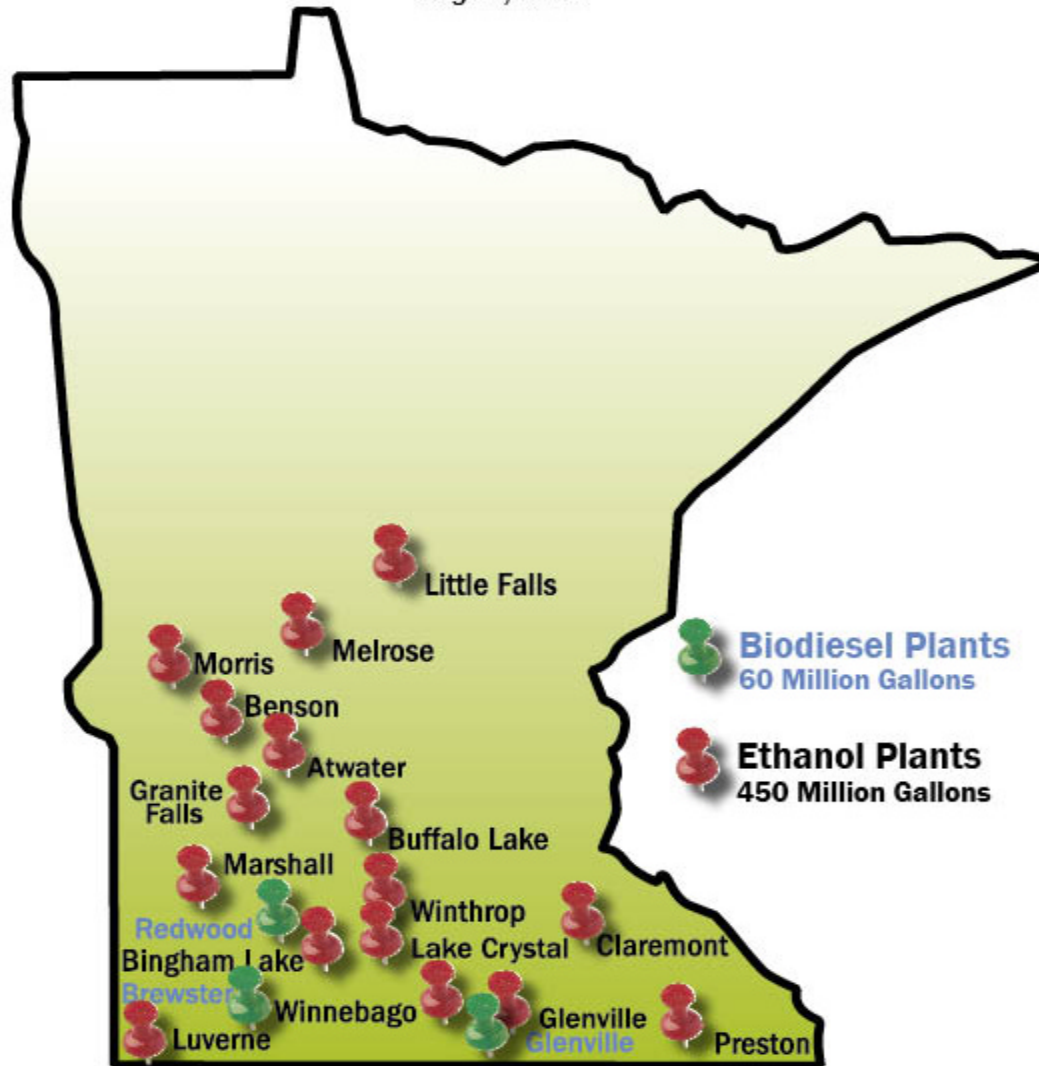


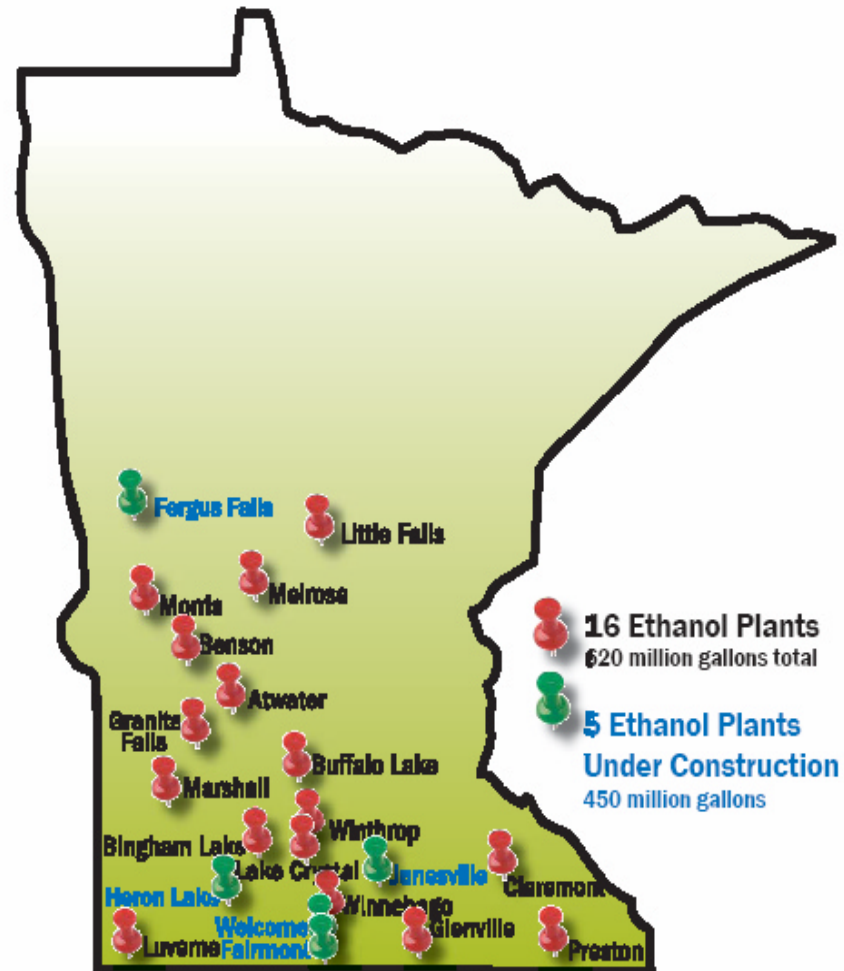
# Minnesota Biodiesel & Ethanol Plants

August, 2005



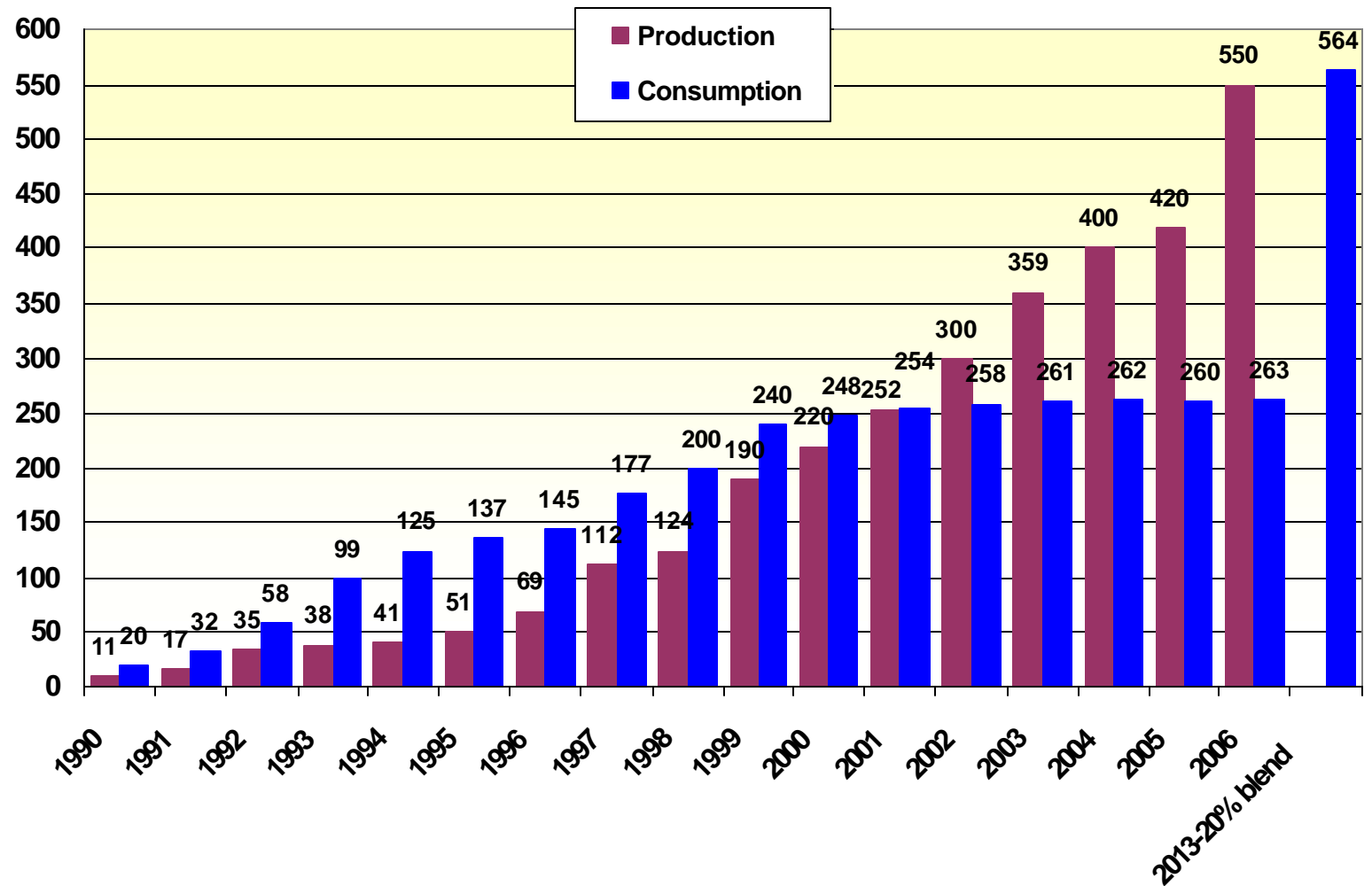
# Ethanol Plants in Minnesota

February, 2007

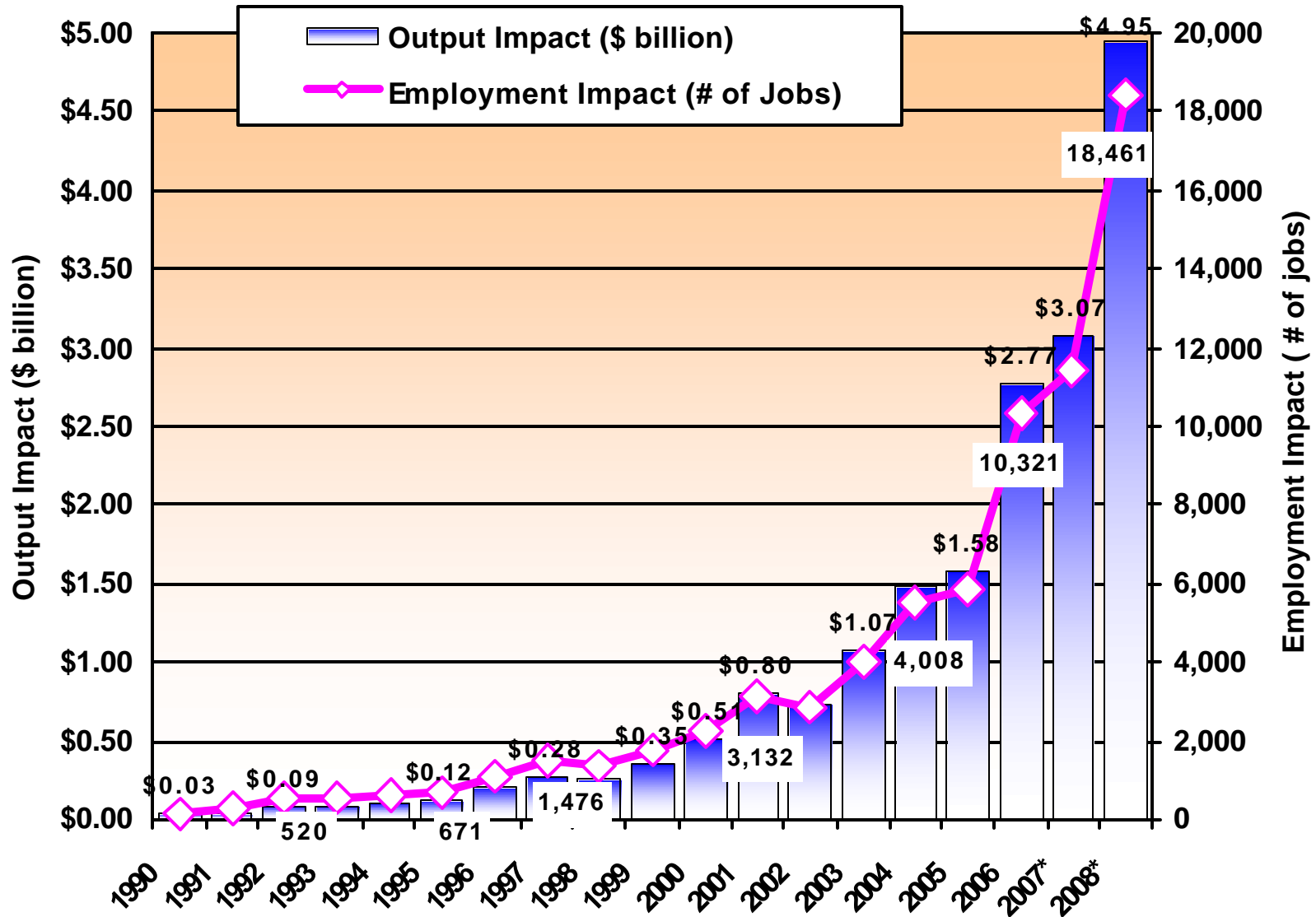


# Minnesota Ethanol Production and Consumption (Million Gallons)

● -



# Minnesota Ethanol: Output Impact & Employment Impact

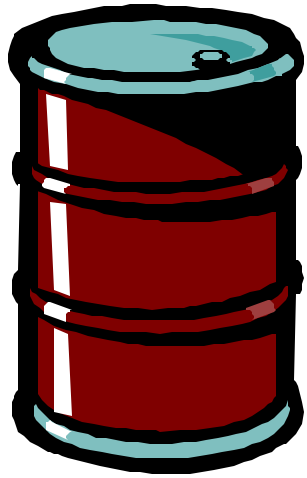


# Renewable Fuels in Minnesota

- Impacts of farmer-owned processing:
  - Corn-to-ethanol adds average of \$1.74 in value per bushel
  - Each 30-million gallon plant adds up to \$20 million in value to 11.0 million bushels of corn each year
  - Money pumped into rural communities

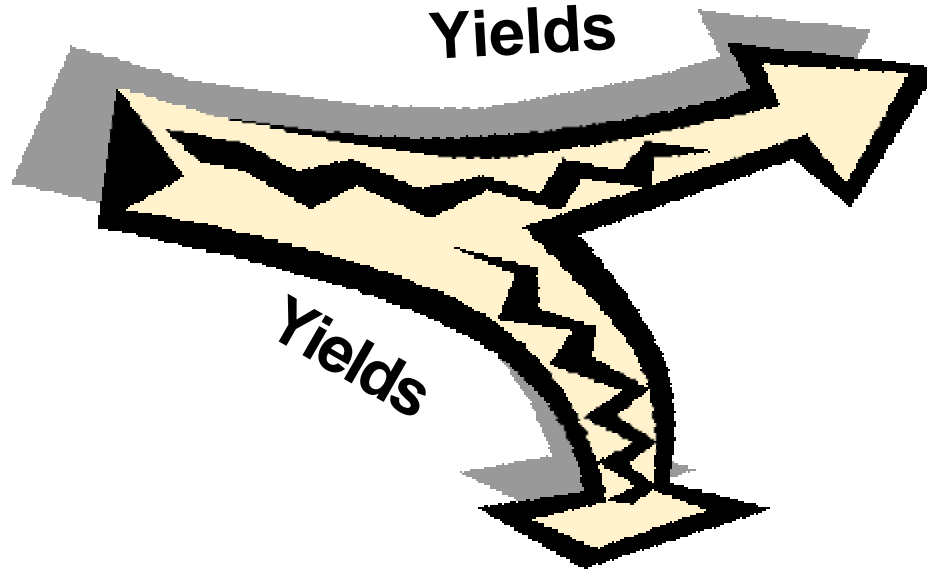
# Return To Fossil Fuel Energy

100% more energy w/ Ethanol



**1 Btu  
of fossil  
energy**

*Coal, oil,  
or gas*



**1.67 Btu of  
fuel ethanol**  
(USDA)



**0.805 Btu of  
gasoline**

# Existing Corn-ethanol

- National Corn Growers maintain that up to 13 billion gallons of corn/ethanol is doable.
- Higher prices for mid-west corn growers is not all bad.
  - Reduce dependence on Fed. farm payments
  - “Cheap corn makes cheap Hogs”
  - Third world can afford to grow their own?

# Renewable Fuels in Minnesota

- Minnesota's status in January 2007
  - Winnebago plant burns DDG syrup, replaces half of natural gas needs for process energy
  - Little Falls operating a gassification plant, using wood chips and possibly, DDGs to replace all natural gas and a third of their electricity needs
  - CVEC plant in Benson to produce syn-gas, opening door to cellulose-to-energy product technology



# Next Generation of Ethanol Technology.

- Conventional corn/ethanol production technology may average 4/1 water/ethanol use ratio.
- Initial indications are that water requirements for thermochemical or gasification technology can be reduced to 0.7 gallons of water per gallon of ethanol.
- Potential for more products, higher yields and less energy intensive.

# Next Generation of Ethanol Technology.

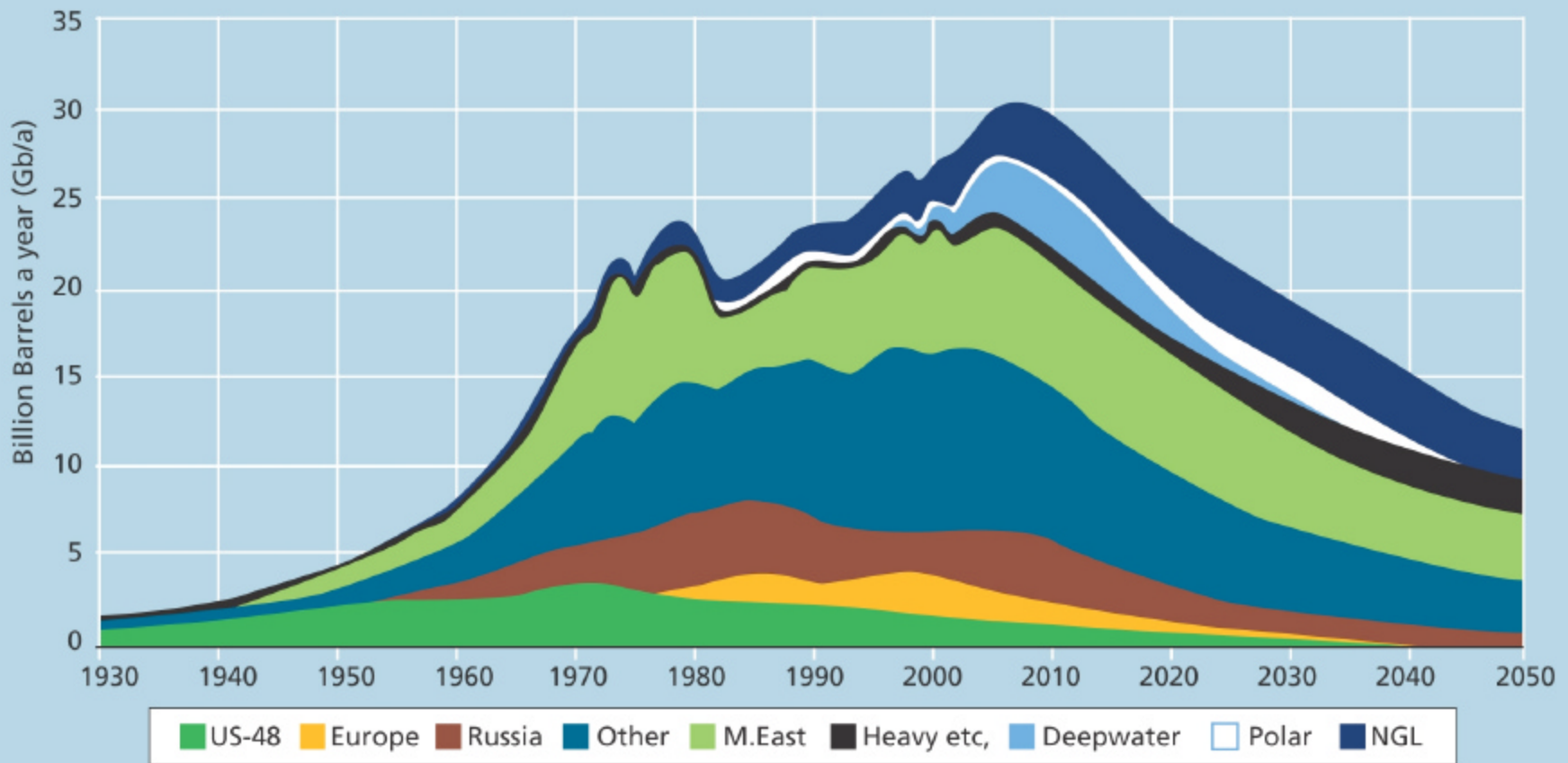
- Governor Pawlenty '08 - '09 Budget Prop.
  - \$5 million grant per year for 5 years
  - Grants to install gasification facilities
  - 20% of project value
  - \$50,000 min / \$500,000 max
  - At least 50% investor share
  - At least 51% producer/locally owned

# Next Generation of Ethanol Technology.

- **Governor Pawlenty Proposal**
- **\$9 million each year from FY'10-'20**
- **- \$6 million for Equity Grant Programs**
- **Revolving Loan Programs**
- **Loan Guarantee Pool**
- **- \$3 million for Producer Incentive Payments**

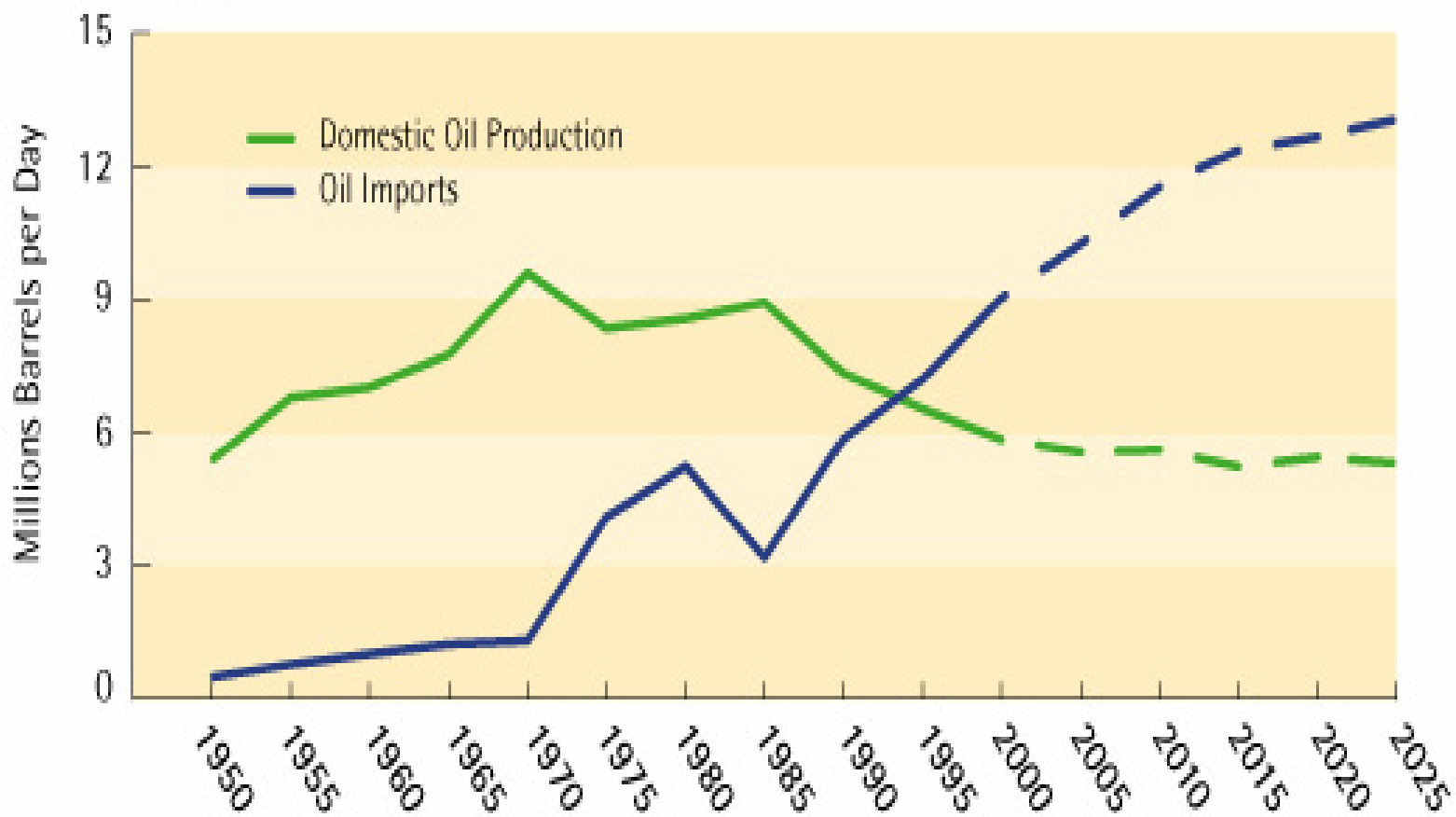
# PEAK OIL

Oil and Gas Liquids – 2004 Scenarios



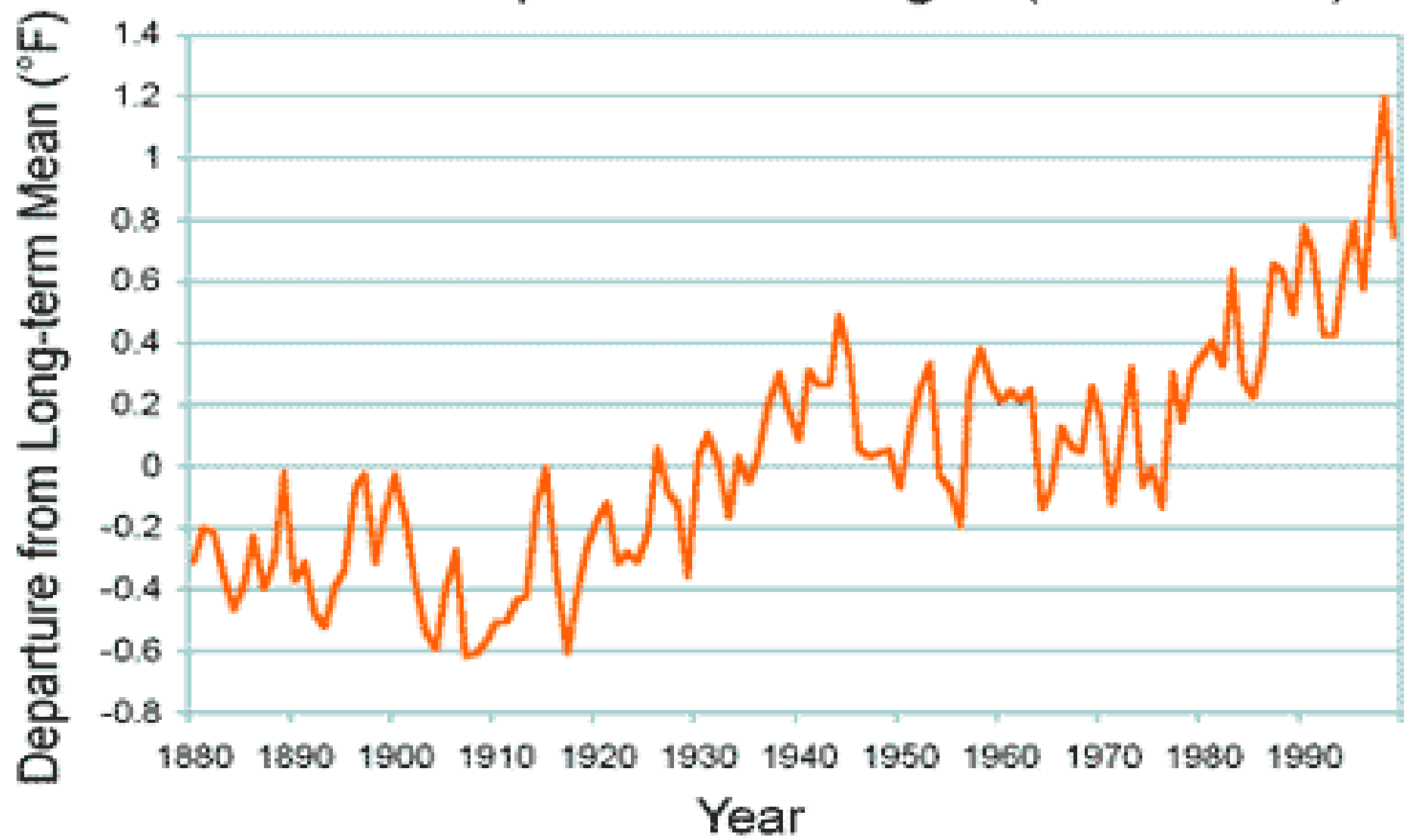
Source: Colin J. Campbell, PhD

## U.S. OIL PRODUCTION VS. IMPORTS



Source: U.S. Energy Information Administration

## Global Temperature Changes (1880-1999)



Source: National Climatic Data Center, 2000. Climate of 1999 - Annual Review.  
Online at <http://www.ncdc.noaa.gov/climate/research/1999/ann/ann99.html>

# What needs to happen?

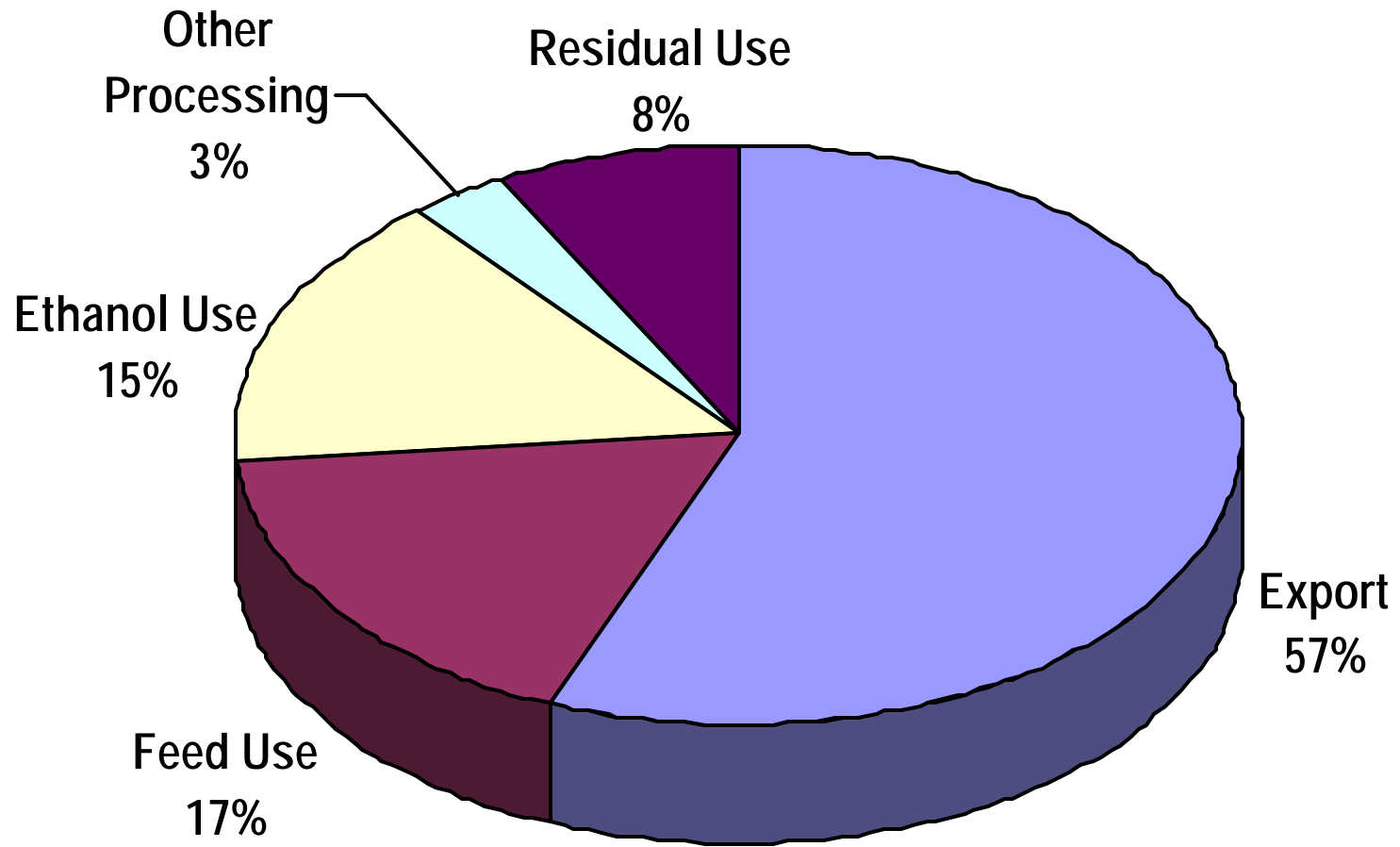
- **It is not a question of:**
- corn ethanol or,
- cellulose ethanol or,
- conservation of fuels or,
- more efficient exploration/utilization of oil or,
- alternative fuels
- **We can't afford to leave any stone unturned.**
- **Cold Fusion would be nice!**

# What needs to happen?

- Minnesota has no oil, gas or coal.
- Must champion development of our own resources.
- The energy status quo is not acceptable.
- Step by step development is only realistic approach.
- Should learn to walk before we run.
- Corn bridge to cellulosic ethanol.

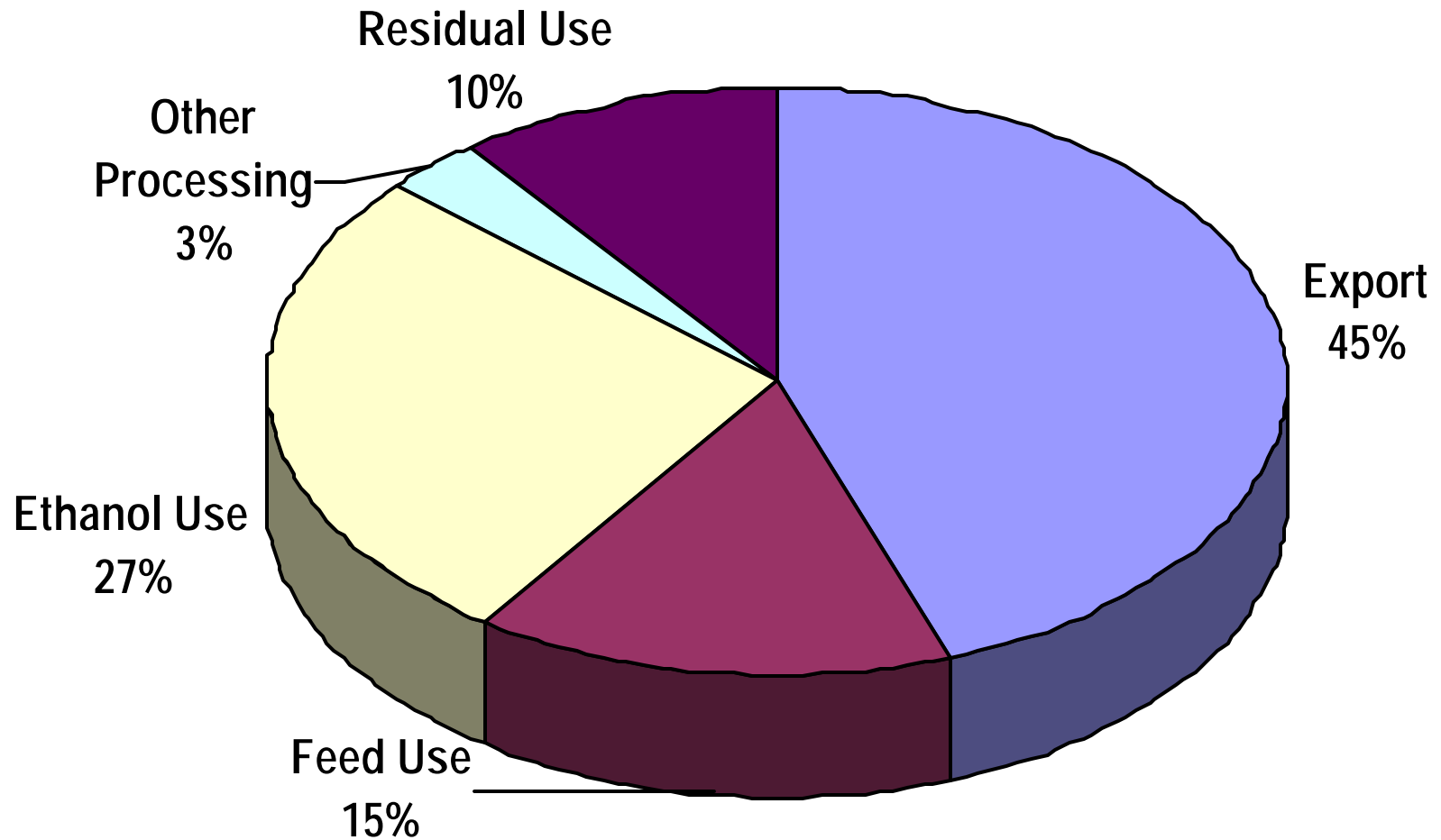
# MN Corn Utilization (2006)

*Corn Production: 1.13 billion bushels*



# MN Corn Utilization (2008 Projection\*)

*Corn Production: 1.31 billion bushels*



# Renewable Fuels in Minnesota

- Goals achieved:
  - Boost farm and rural economy ✓
    - Value added to corn crop
    - Multiple farmer-owned, value-added cooperatives
  - Reduce reliance on foreign energy ✓
    - Each gallon of ethanol cuts oil import needs by 7 gallons
  - Clean up environment ✓
    - Twin Cities in attainment for carbon monoxide