



Southwestern States' Policies Impacting Biofuels
Policy, Technology, Economics, and Incentives

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NM Policy - Clean Energy

New Mexico is the “Clean Energy State”

During 2007 legislative session:

- Created Renewable Energy Transmission Authority
 - 30% of any new transmission line must be clean energy
- Increased Renewable Portfolio Standards requirements
 - 6% now increasing in steps to 20% in 2020
- Established tax credits for:
 - Energy-efficient, sustainable buildings (e.g., \$10K for home)
 - Renewable energy production (up to 2.7 cents/kW-hr)
 - Biofuels infrastructure (incentives and biodiesel mandates)
 - Advanced energy generation (up to \$60M / facility)
- Established Energy Innovation Fund

NM - Planning

State Biodiesel Study

EMNRD to complete study by December 1, 2009.

Green Jobs Act

*NM Higher Education Dept must develop a state plan for the development of green jobs training programs by end of 2010
Including production and distribution of biofuels.*

State Green Jobs Cabinet

The Green Jobs Cabinet will prepare a statewide strategic plan for clean energy and clean technology economic development and job creation.

NM Laws and Regulations

Biodiesel Blend Mandate

After July 1, 2010, all diesel fuel sold to public entity vehicles must contain at least 5% biodiesel (B5).

After July 1, 2012, all diesel fuel must contain at least B5.

Biofuels Use Requirement

By 2010, cabinet-level state agencies, public/higher education schools must take action toward obtaining 15% of vehicle fuel requirements from renewables such as ethanol and biodiesel.

Alternative Fuel Vehicle /Hybrid Electric Vehicles Requirement

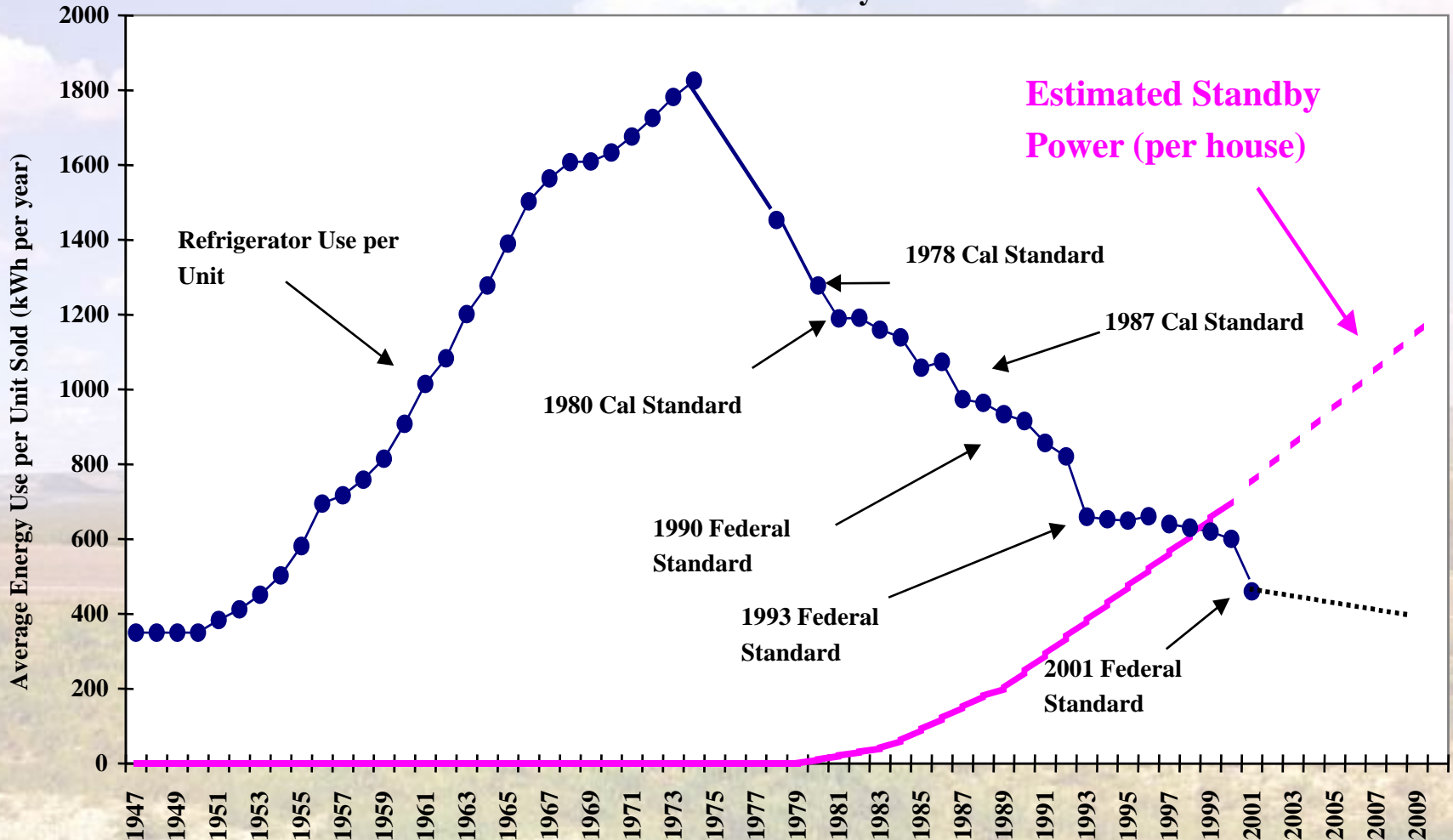
Minimum of 75% of state government/educational institution vehicles purchased must be HEVs or bi-fuel or dedicated AFVs.

State Agency Energy Plan

All state agency fleets in the executive branch must reduce energy consumption by 20% from 2005 levels, by 2015.

Policy - Conservation

United States Refrigerator Use (Actual) and Estimated Household Standby Use v. Time



NM Incentives

Biodiesel Blending Tax Credit

Tax credit available for each gallon of diesel blended with minimum 2% biodiesel, starting at \$0.03/gallon now, decreasing to \$0.01/gallon at end of 2012.

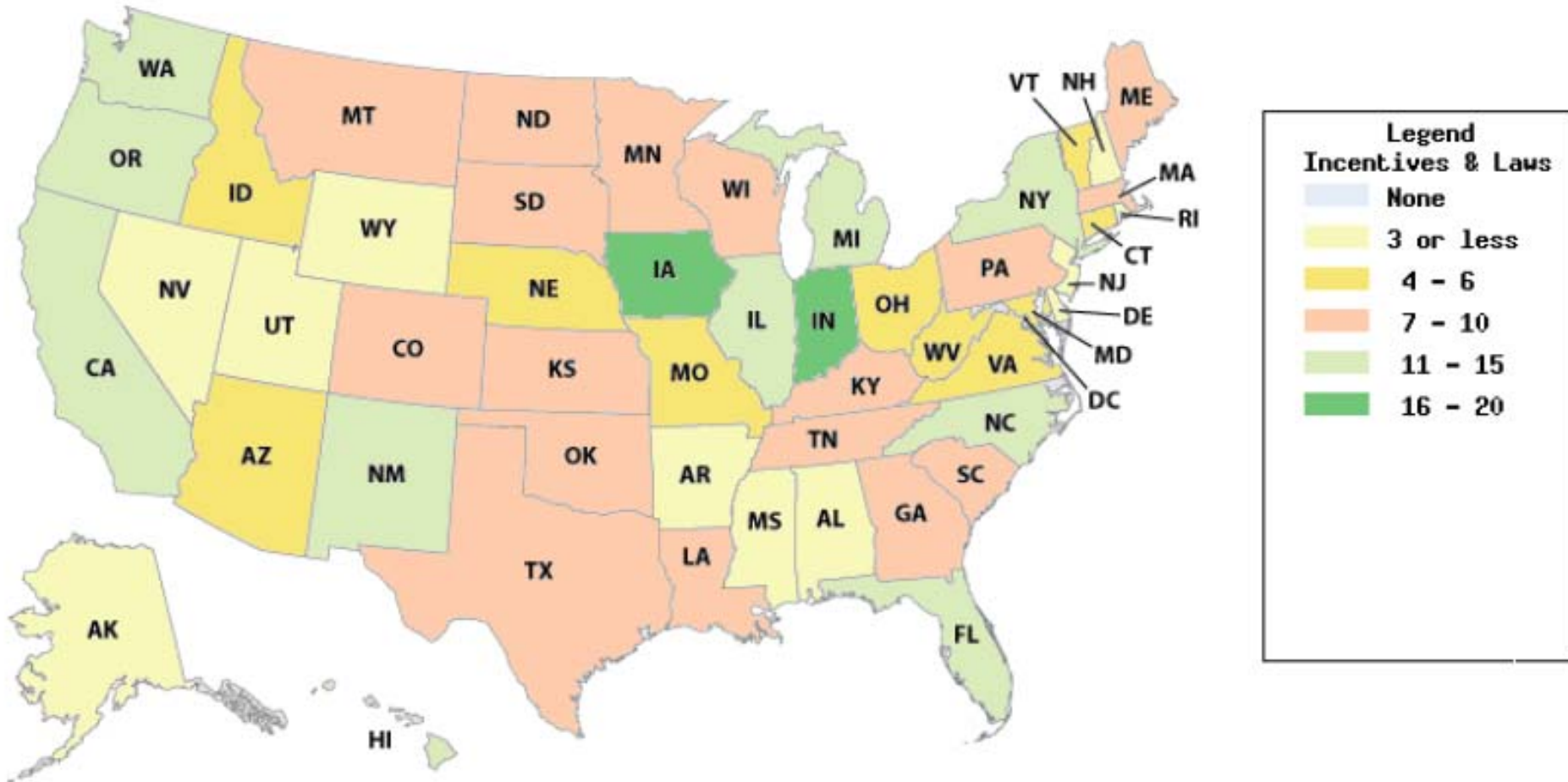
Biofuels Tax Deduction

Cost of biomass used for processing into biofuels may be deducted in computing Gross Receipts Tax.

Alternative Fuel Vehicle (AFV)/Fueling Infrastructure Grants Acquisition Requirements

Clean Energy Grants Program provides competitive grants for projects using AFV and fueling infrastructure.

E85 Incentives and Laws



The legend signifies the number of incentives and laws available in each state.

Renewable Fuels and New Mexico

New Mexico currently uses 23M barrels of gasoline and 14M barrels of diesel each year.

(about double the amount of electrical energy produced in New Mexico each year)

New Mexico produces 61M barrels of crude oil each year
Production is falling a few %/year

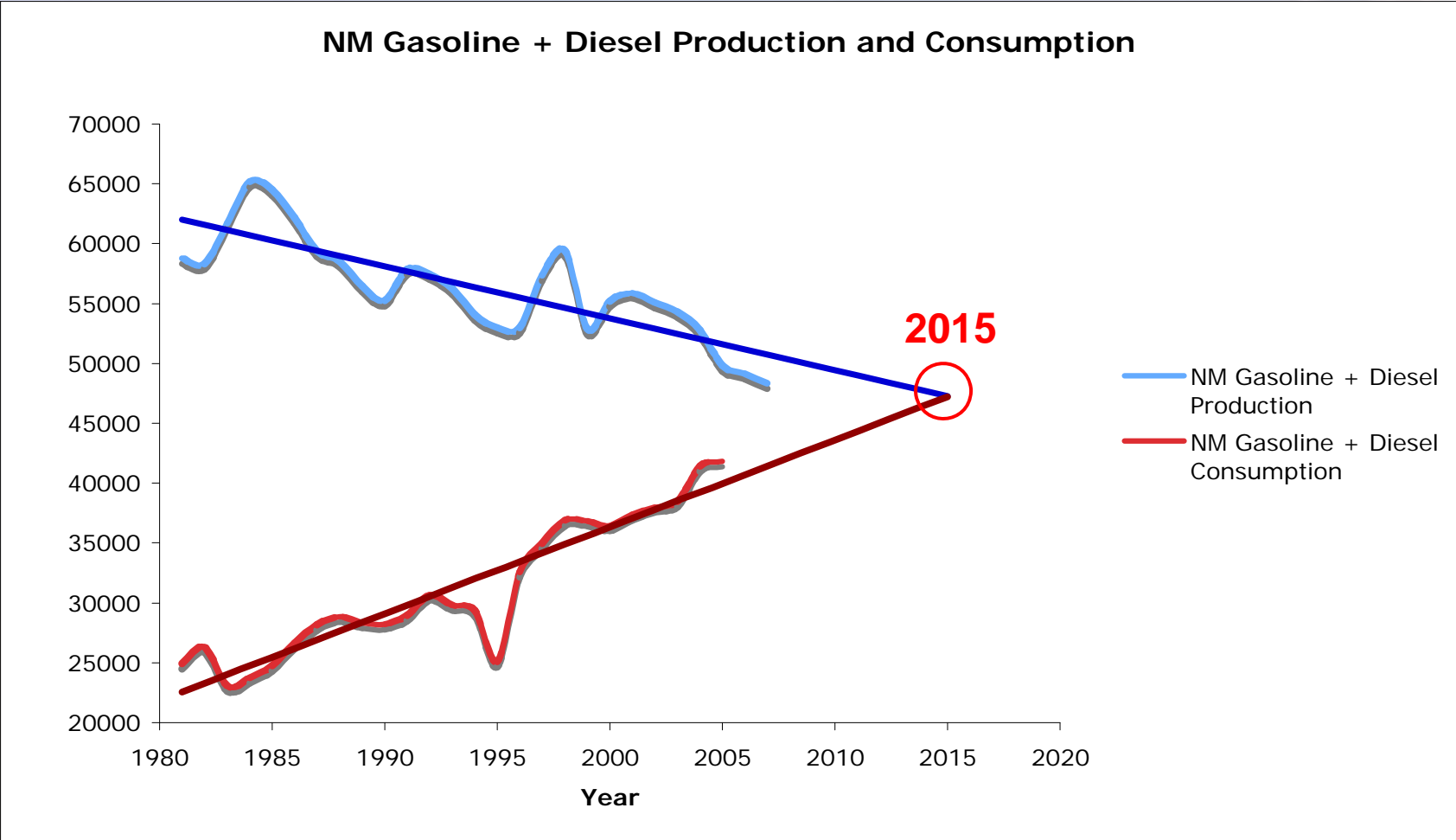
Demand for gasoline and diesel increasing 2-3%/year

Expect demand to exceed production in ~ 2015

Need to transition to biofuels and electric vehicles

Can New Mexico provide the
energy needed for future vehicles?

Renewable Fuels and New Mexico



Economics - Future Travel Issues (I)

Air:

- Will continue to be important for long-distance passenger travel
- Will continue to be important for urgent light-weight deliveries
 - Carbon taxes will have significant impact on costs
- Can run on biofuels

Rail:

- Will remain to be the cheapest form of surface transport
- Will assume greater importance as fuel costs rise
- Can be electric or biodiesel

Ship:

- Will remain as cost-effective means of international transport
- Can run on biodiesel

Economics - Future Travel Issues (II)

Truck:

- Will continue to be important as primary local and regional transport
- Will transition to biodiesel

Public Transportation:

- Will become more important in metro areas
- Light rail will become increasingly more important
- Can be electric or biofuels

Auto:

- Will continue to be primary means of local transport
- Will transition to renewable energy sources for fuel
- Will have a variety of alternative vehicles and fuels

Renewable Fuels - Algal Biodiesel

Crop	Gallons/Acre
Rapeseed (Canola)	127
Jatropha	202
Oil palm	635
Chinese tallow	699
Algae (actual yield)**	819
Algae (theoretical yield)**	5,000-10,000

Requirements:

- Abundant sunshine
- Salt water aquifers
- Flat, low cost land not currently used for crops
- CO₂

Biodiesel from microalgae

Best place in US is SE NM

Issues

Technology Development

Cost

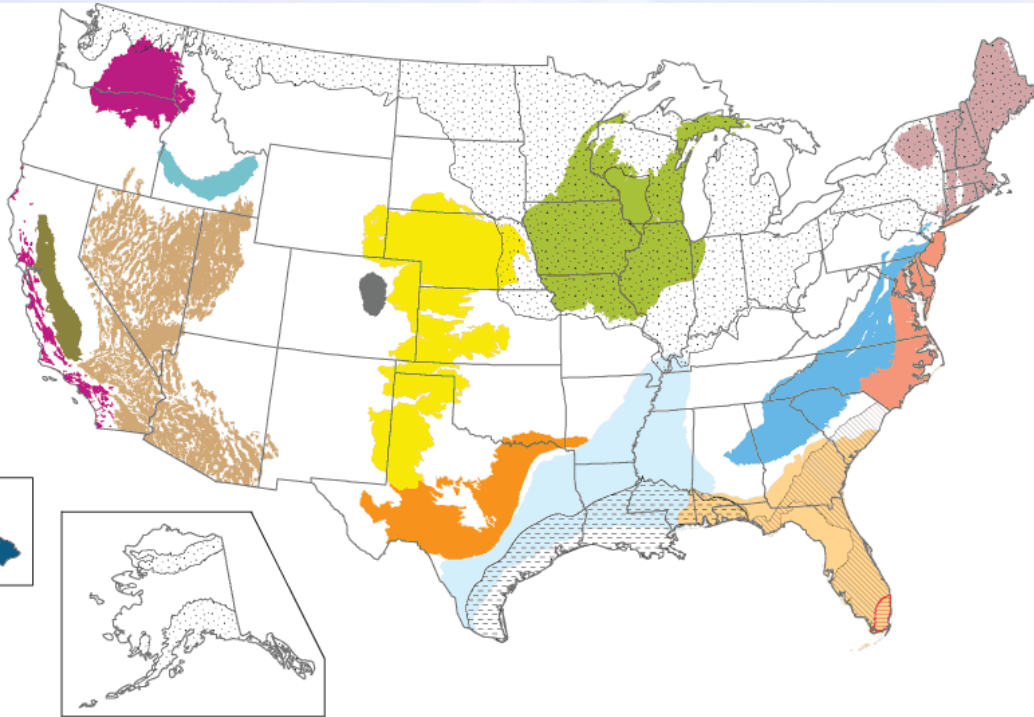
Water usage



Need for Integrated Planning

Billion ton biomass vision:
Replace 30% of fossil transportation fuel

Put 55 million acres of cropland, idle cropland, and cropland pasture to production for bioenergy purposes



High Plains Aquifer contains ~20% of the irrigated land in the US and ~ 30 percent of the ground water used for irrigation in the U.S. is pumped from the High Plains aquifer.

90% of the water pumped from aquifers is used to irrigate crops.

USDA projects that 25 M acres of cropland in the Ogallala aquifer will have to be taken out of agricultural production in the next 25 years

Conclusions

We will see an evolution of vehicles over the next 25 years:

E-10/HEVs → AFVs/PHEVS → AFVs/EVs

People are going to have a lot of options

Many challenges exist:

Cost driver of fossil and biofuels (cost of carbon/biofuels)

Technology issues - cost, environment, timetable

Policies and incentives

Culture

New Mexico is in a very good position to be the first state to achieve a clean and sustainable energy future with:

Ability to provide clean electricity (Green Grid Initiative)

Ability to provide biofuels for the state and country

Not only can New Mexico be a model for future transportation -

We are working to invent the technology for a clean future.