

The Future of Biofuels in Minnesota

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Low Carbon Fuel Standard

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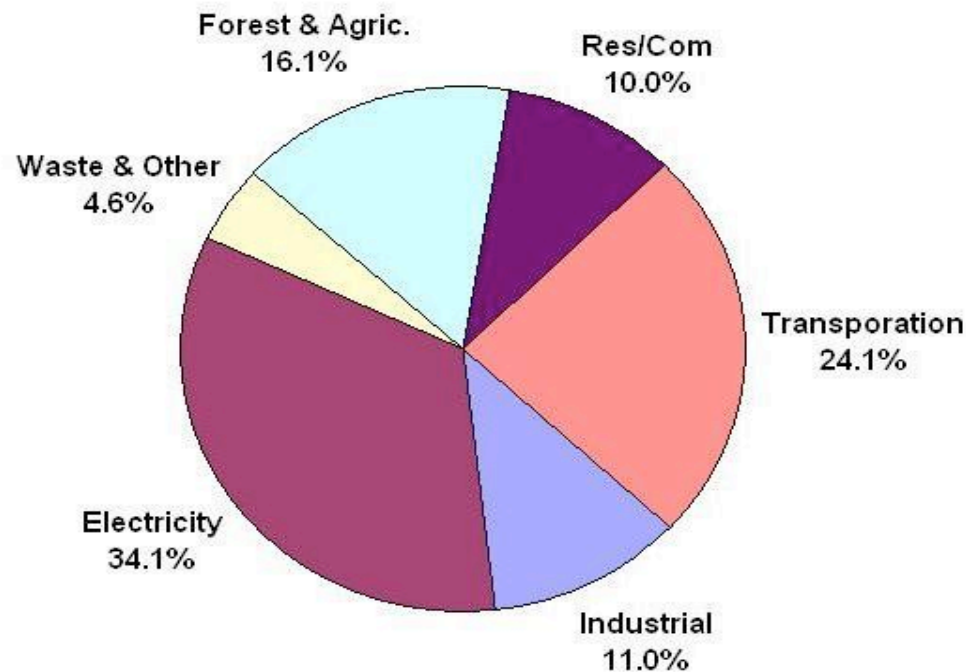
Transportation and Climate

- Transportation sector GHG emissions account for roughly $\frac{1}{4}$ of Midwest emissions
- Three-pronged strategy for meeting aggressive climate targets:
 - Reduce vehicle miles traveled
 - Improve drive-train efficiencies
 - Reduce carbon content of fuels



Low Carbon Fuel Standard: Reduce Global Warming Pollution from Vehicles

MN Emissions by Sector: 2005

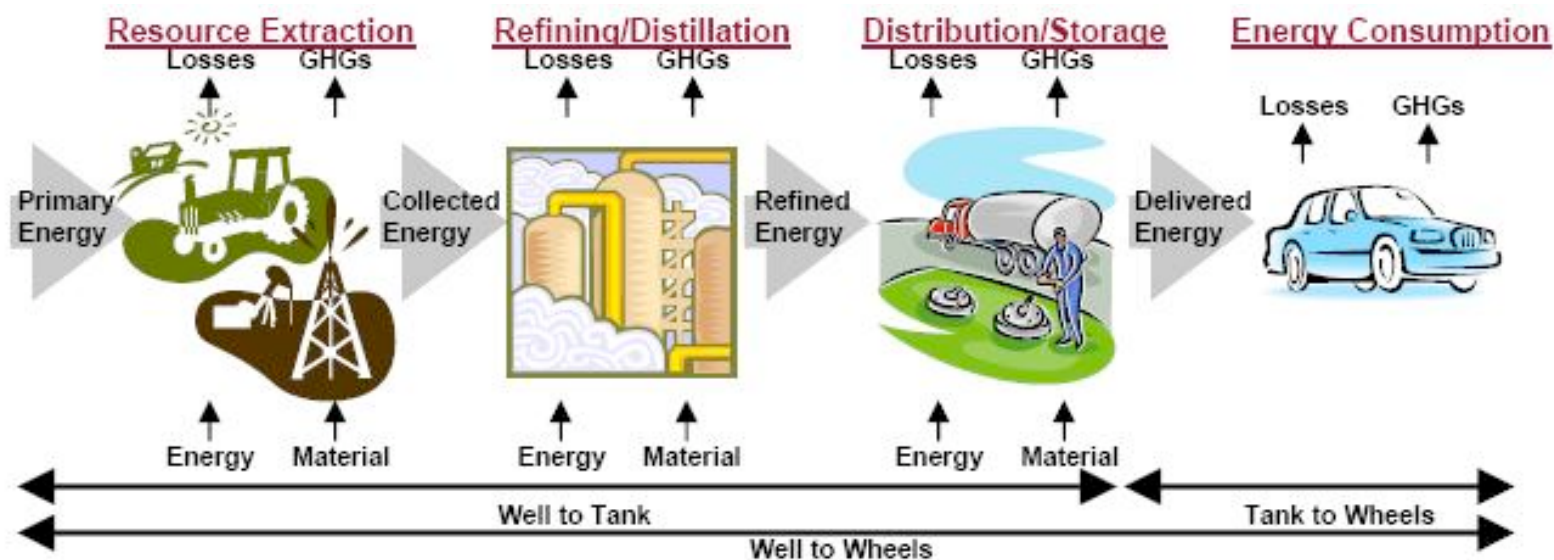


Source: MN GHG Inventory and Reference Case Projections 1990-2025, Center for Climate Strategies, March 2008. Transportation sector based on tailpipe emissions, not full lifecycle

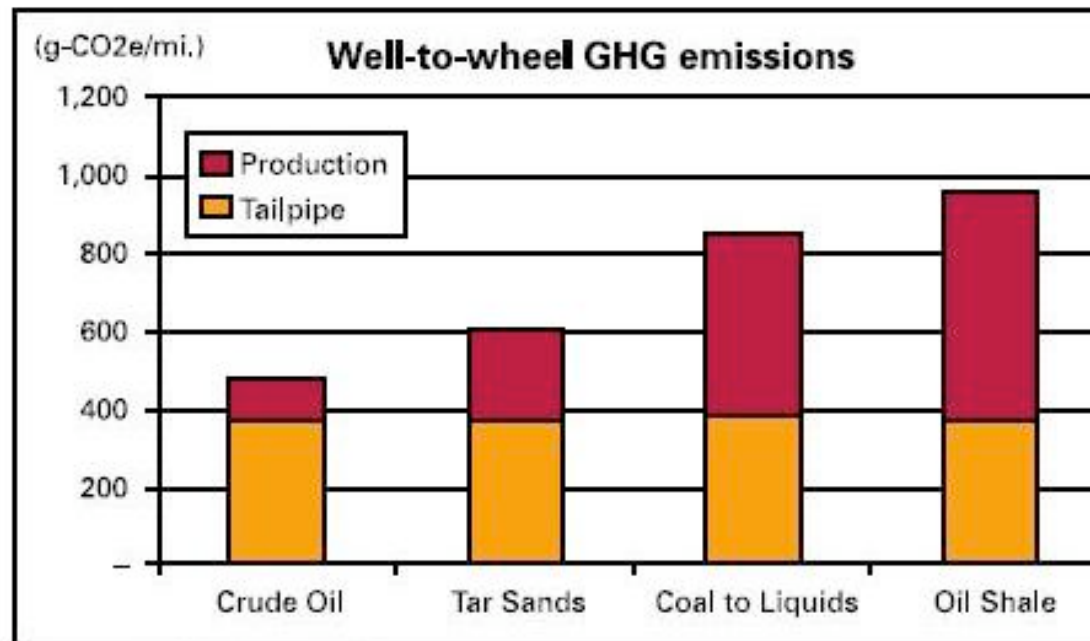
+ Clean Cars Standard + Cap and Trade + Reduce Vehicle Miles



Low Carbon Fuel Standard: Reduce the Life-cycle carbon intensity of fuels



Without new direction, Minnesota's use of higher carbon transportation fuels is expected to increase

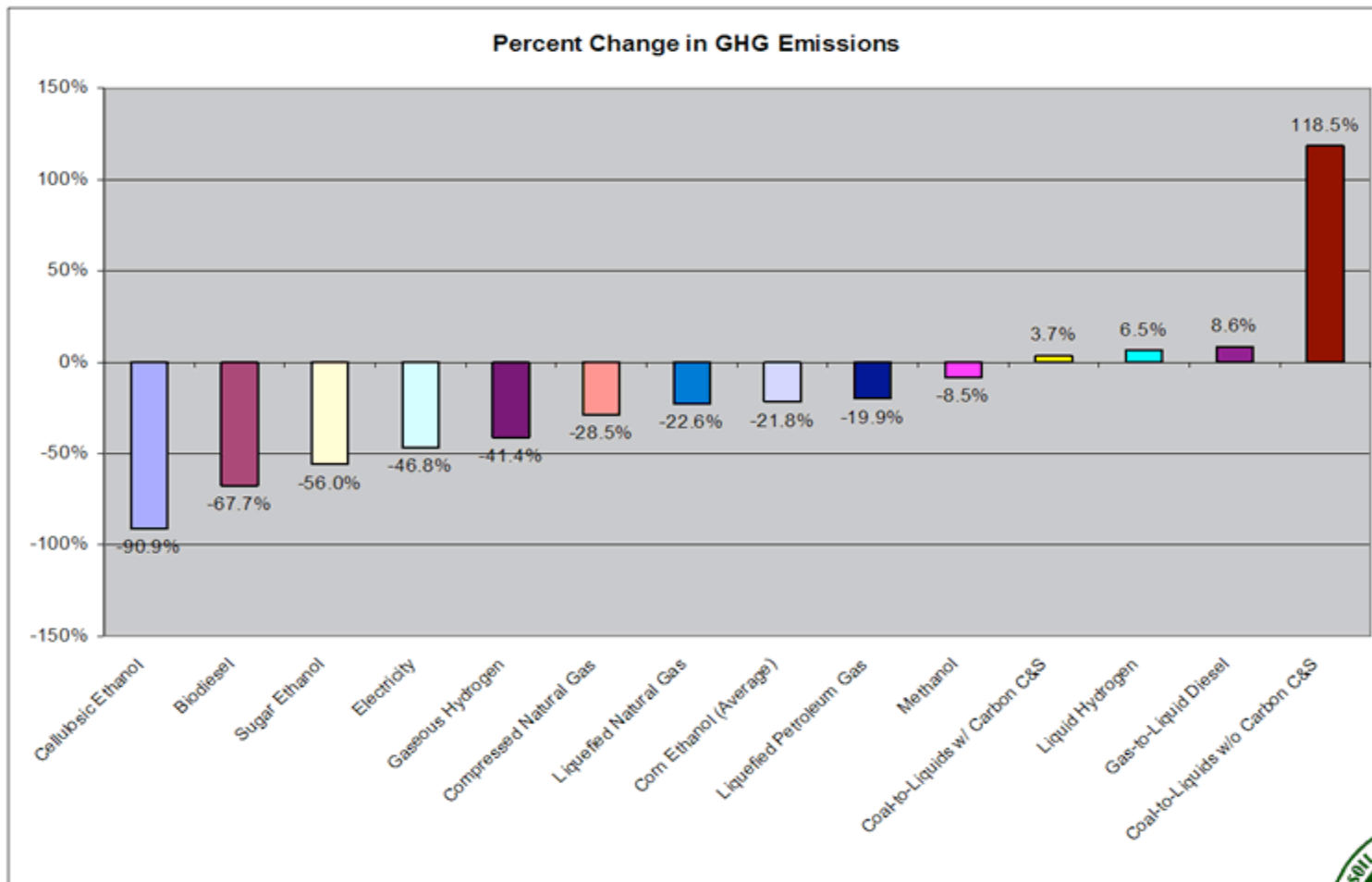


Source: NRDC June 2007

Note: Values based on averages and do not indicate uncertainties



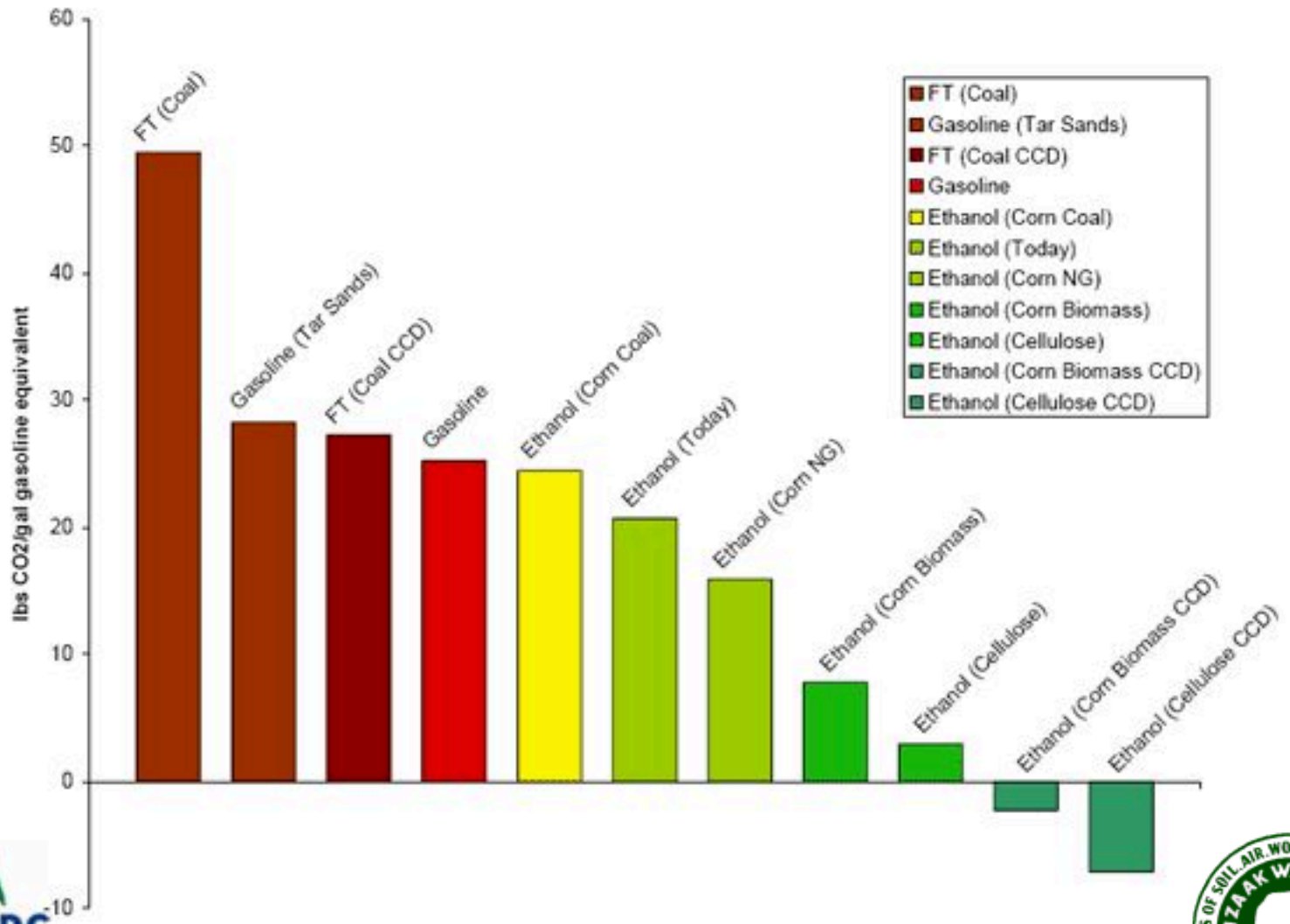
A Low Carbon Fuel Standard will shift the fuel mix to a variety of lower carbon fuels, including advanced biofuels



U.S. EPA 2007 (Note: life-cycle ghg, relative to gasoline)



Brown fuels v. Green fuels



LCFS Compliance Options

- Blend low carbon biofuels at higher rates
- Reduce imports of high carbon petroleum products, e.g. tar sands oil
- Improve efficiencies in extraction and refining of petroleum and biofuels
- Switch to low carbon transportation fuel alternatives, e.g. plug-in electric hybrids, CNG vehicles, hydrogen fuel cell vehicles



LCFS Challenges

- Measuring full life-cycle impacts is technically difficult and controversial with various interests
- Measurement of indirect land use impacts particularly tricky
- Not all compliance options are fully developed or created equal



A Low Carbon Fuel Standard is an important policy for Minnesota to consider:

- **Minnesota Climate Change Advisory Group**
- **Next Generation Energy Board**
- **Midwest Governors' Association**

University of Minnesota will complete a study of the economic and environmental outcomes from a Minnesota low carbon fuel standard in early 2009

Other Midwest states also considering a low carbon fuel standard: WI, IL, MI



Expected Legislative Timetable

- **Early January: Informational hearing before Legislative Energy Commission – includes chairs of all relevant committees**
- **Mid January – Energy Committee**
- **Early February – Government Operations**
- **Mid February - Transportation**
- **Late February – Agriculture**
- **Early March – Finance**
- **April/May – Final passage**



Thanks!

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