

# VERMONT'S “TOTAL ENERGY STUDY”

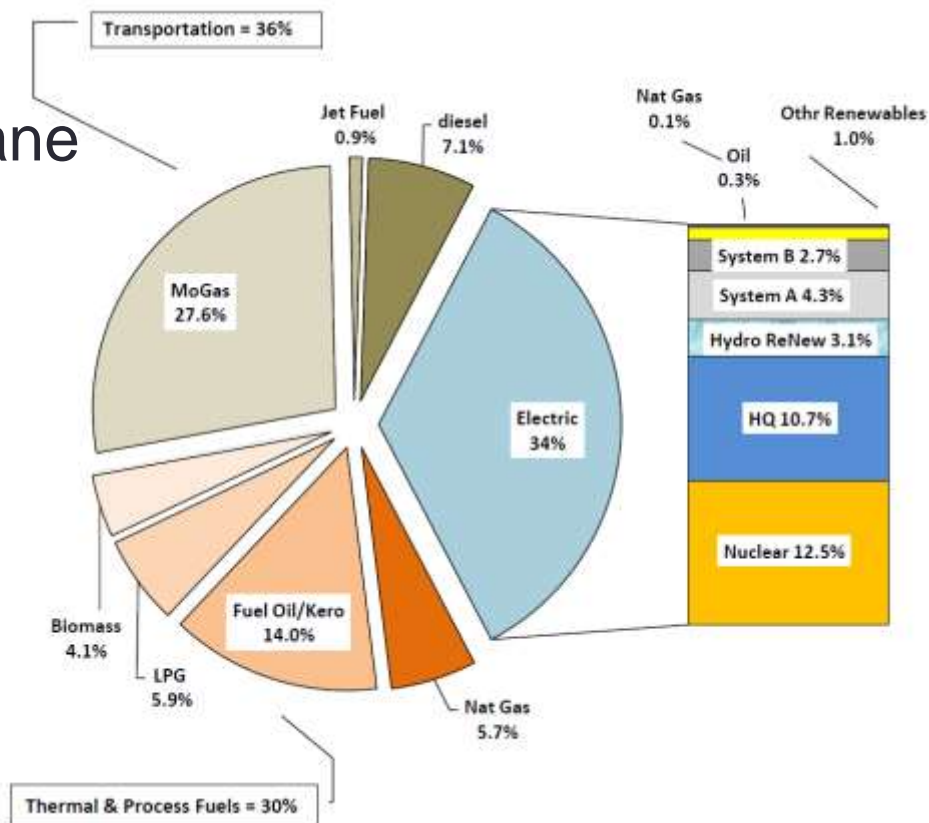
---

NASEO Energy Policy Outlook

Asa Hopkins  
Vermont Public Service Department  
February 5, 2015

# Vermont energy in brief

- 129 Trillion BTU of primary energy per year – over half of which is petroleum products
- Electricity mix is ~45% renewable (mostly hydro)
- Little natural gas access
- High use of fuel oil and propane
- Rural state – lots of driving



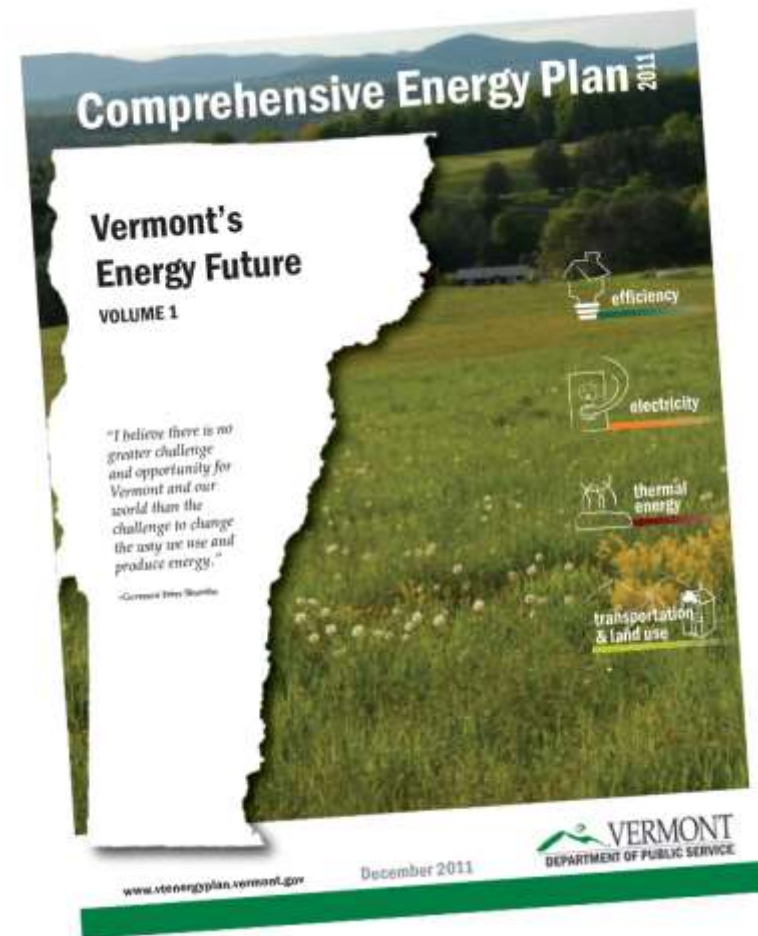
# Vermont's energy and climate goals

Vermont's Legislature has adopted climate change mitigation goals

- 50% reduction in GHG emissions from 1990 levels by 2028
- 75% reduction by 2050 "if practicable using reasonable efforts"

Our 2011 Comprehensive Energy Plan sets a goal of 90% renewable energy across **all sectors** by 2050

- We are currently at about 20% renewable



# Total Energy Study

Analyze policies designed to achieve Vermont's GHG and renewable energy goals in an integrated and comprehensive manner.

- 2 year process; 3 publications
- Extensive stakeholder outreach
- Energy system and economic modeling

# ENERGY SYSTEM MODELING

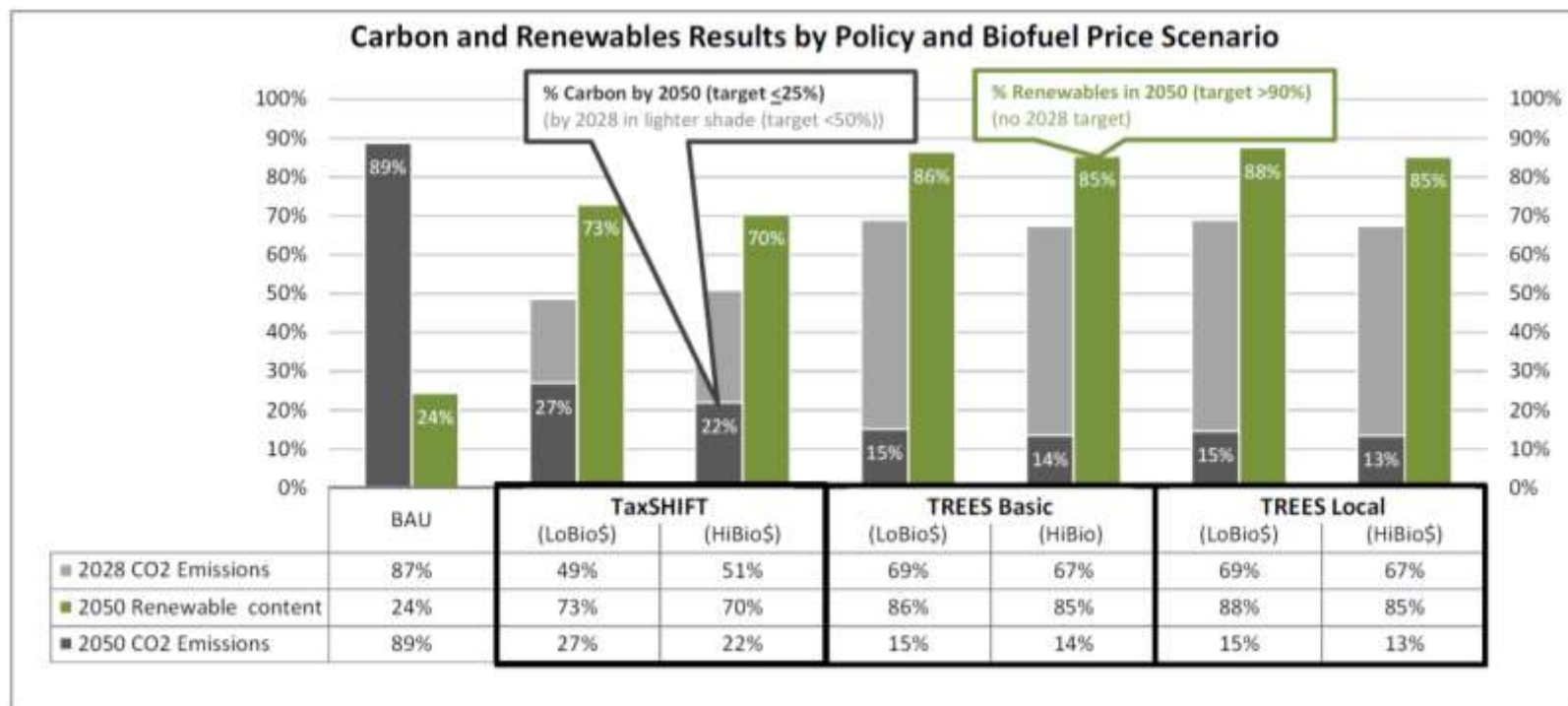
---

# Energy system modeling

Consultant modeled 4 scenarios defined by **policies:**

- Business as usual (BAU)
- Revenue-neutral carbon tax shift
- Total renewable and energy efficiency standard (TREES)
- TREES with additional local energy requirement

# Meeting GHG and RE goals



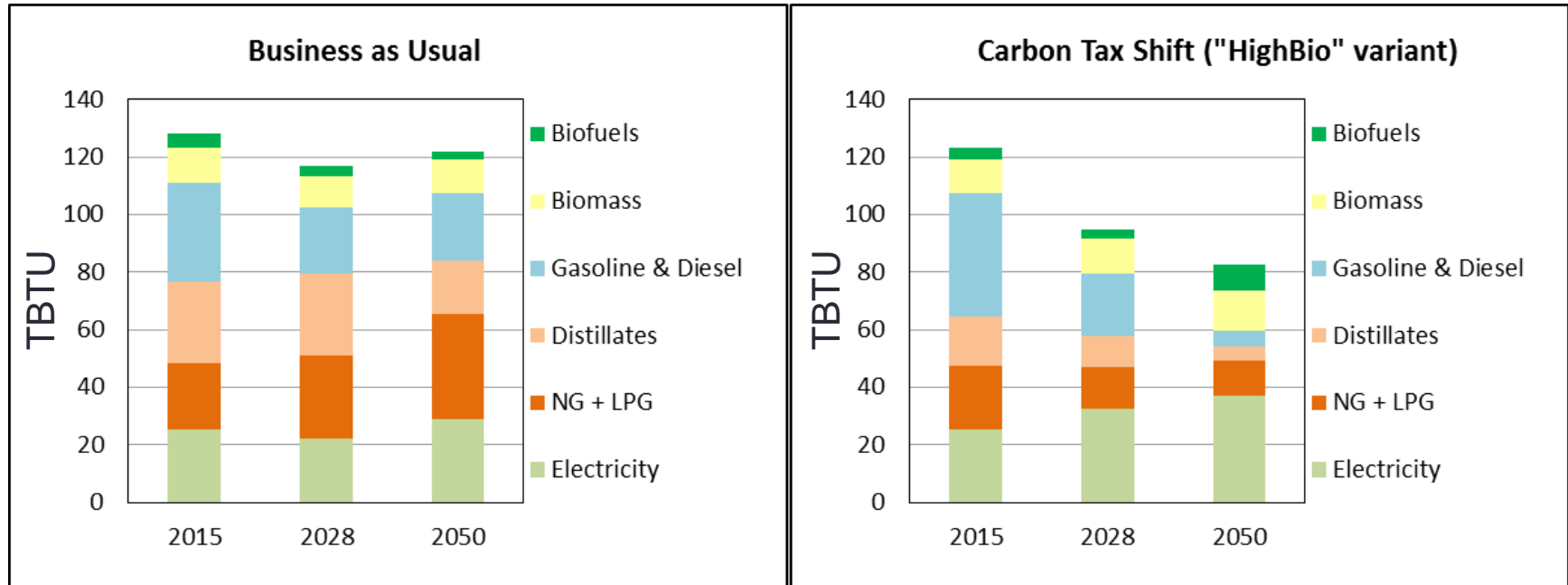
- All scenarios (but the BAU) meet 2050 GHG goals
  - As modeled, TREES does not meet 2028 GHG goal; exceeds 2050 goal
- TREES scenarios approach 90% renewable by 2050
  - Carbon Tax Shift only reaches approx. 70% renewable

# Energy sector-only costs

POLICY OPTION		COSTS			
		% change re: BAU		\$/ton	
	BIOFUEL PRICES:	LOW	HIGH	LOW	HIGH
<b>Tax Shift</b>		2.6%	4.5%	\$42	\$67
<b>TREES Basic</b>		2.2%	5.4%	\$38	\$89
<b>TREES Local</b>		3.3%	5.5%	\$56	\$90

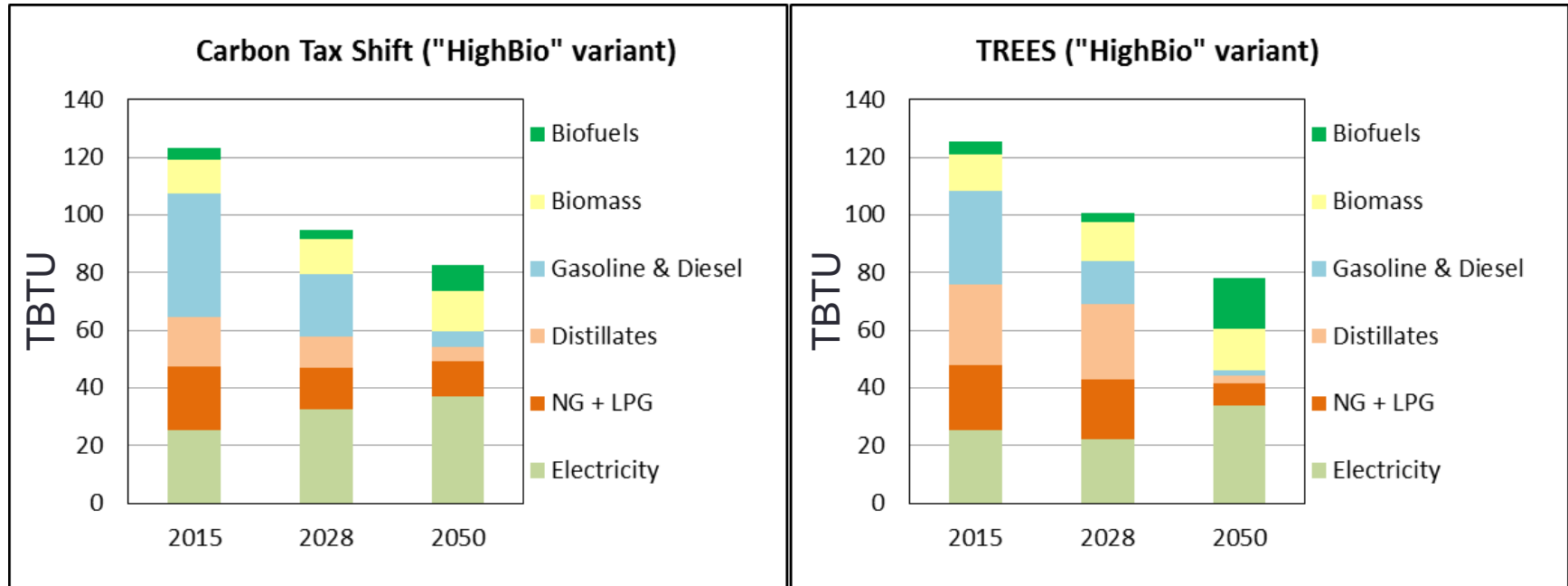


# Total Energy – BAU vs. an example policy case



*A caveat: This is a **model**, not a forecast. It doesn't capture detailed limitations, but can be used for insights on scale and direction*

# Carbon price vs. Renewable-focused policy



*A caveat: This is a **model**, not a forecast. It doesn't capture detailed limitations, but can be used for insights on scale and direction*

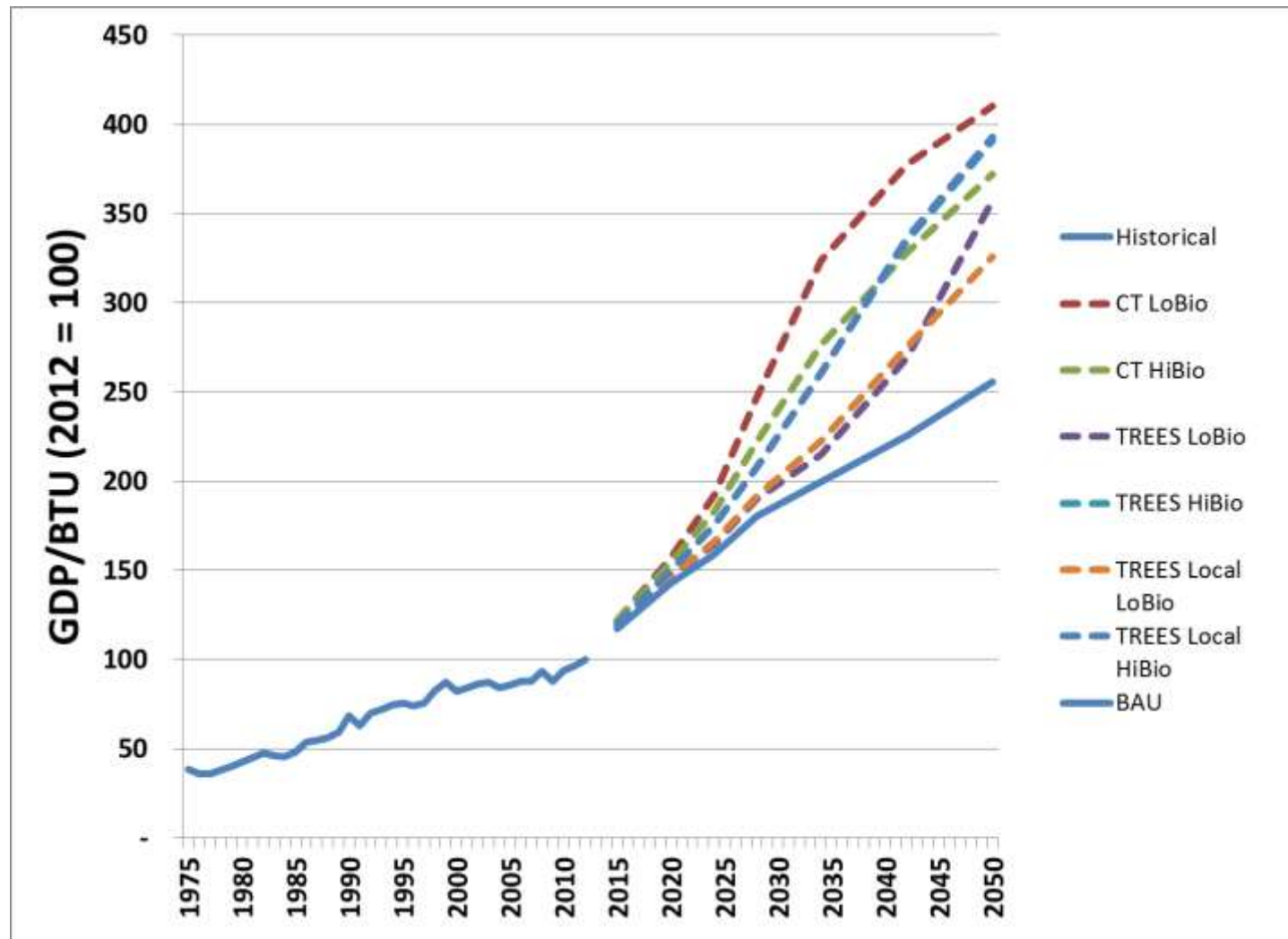
# ECONOMIC MODELING

---

## 4 conclusions from economic modeling

1. The net economic impacts for VT of implementation of any of the policies examined here are likely to be positive if the policies are designed and implemented well.
2. The net economic impacts for states that act will be better if everyone acts. (Global climate objectives can only be met if everyone does act.)
3. The net economic impacts in VT are expected to be small on the scale of the state's economy.
4. VT's clean energy sector is likely to thrive if these policies are implemented.

# Energy productivity up 27-60% over BAU



# POLICY CONCLUSIONS

---

# Complementary policies

A “market-based” policy (like carbon tax shift or TREES) can be aided by three other kinds of policies:

- Information and access
  - Including technical assistance and access to capital
- Strategic investment
  - For example, fostering of new technologies and industries (in VT: anaerobic digesters, solar PV, and pellets)
- Codes and standards
  - Such as building codes, CAFE, land use, and appliance standards

## In conclusion...

Vermont can achieve its greenhouse gas emission reduction goals and its renewable energy goals while maintaining or increasing economic prosperity. However, to do so will require significant changes in Vermont's energy policy, fuel supply, infrastructure, and technology.



# Thank you. Questions?

Total Energy Study webpage:

[http://publicservice.vermont.gov/publications/total\\_energy\\_study](http://publicservice.vermont.gov/publications/total_energy_study)

Asa Hopkins

[asa.hopkins@state.vt.us](mailto:asa.hopkins@state.vt.us)

802-828-4082