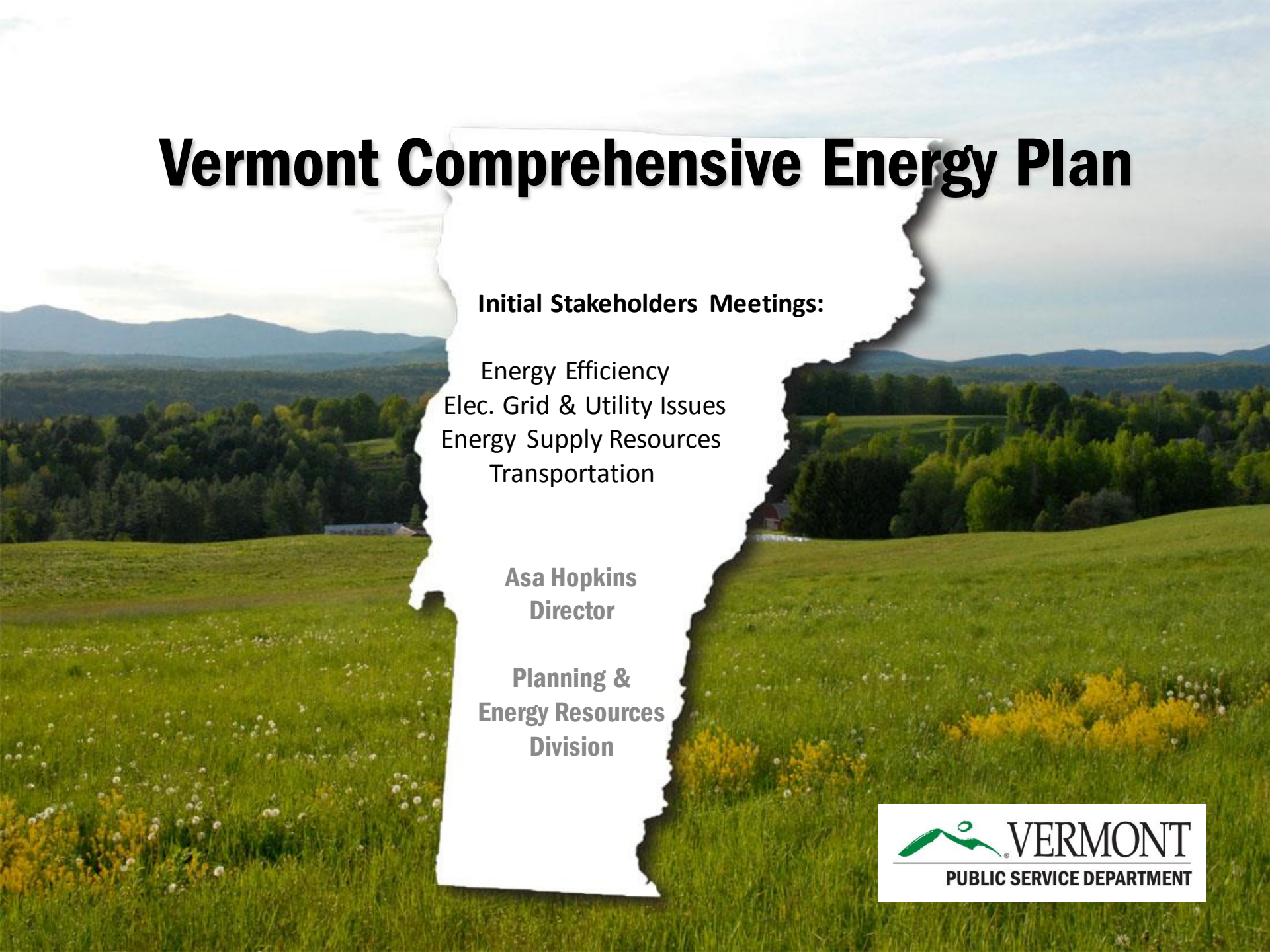
Vermont Comprehensive Energy Plan



Initial Stakeholders Meetings:

Energy Efficiency
Elec. Grid & Utility Issues
Energy Supply Resources
Transportation

Asa Hopkins
Director

Planning &
Energy Resources
Division

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Comprehensive Energy Plan

Team Effort

State Government

- Public Service Dept.
- Dept. of Buildings & General Services
- Agency of Agriculture, Food, & Markets
- Agency of Commerce & Community Dev.
- Agency of Human Services
- Agency of Natural Resources
- Agency of Transportation

Community & Business Partners

All of you!

- Utilities
- Energy Services Companies and Consultants
- Public Interest Organizations and Community Groups
- Business Community
- Town Energy Committees

Comprehensive Energy Plan

What is it?

Title 30, Section 202b-the CEP must include:

Comprehensive Analysis and Projections

- Usage
- Supply
- Cost
- Environmental Effects

Recommendations for State Implementation

- Actions – Public and Private
- Regulation
- Legislation

Title 30, Section 202 - Electric Plan

Comprehensive Energy Plan

Why create it?

Title 30, Section 202a:

To assure, to the greatest extent practicable, that Vermont can meet its energy service needs:

- In a manner that is **adequate, reliable, secure** and **sustainable**
- Assuring **affordability** and encouraging the state's **economic vitality**
- **Using** energy resources **efficiently** and managing demands cost effectively
- Employing **environmentally sound** practices

Recommendations based upon all state law on the subject: e.g., GHG reduction goals, renewable energy goals

Overarching goals of CEP

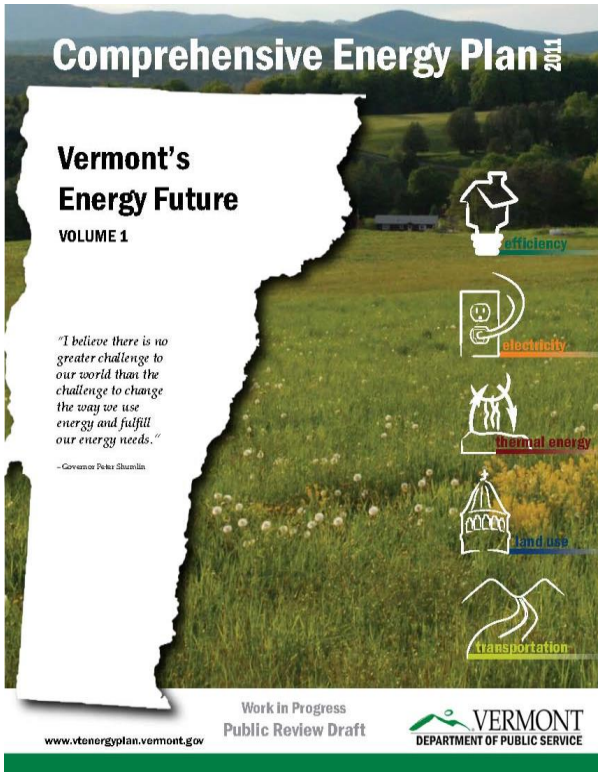
✦ Address all energy sectors, not just electricity ✦

★ Strive for lower GHG footprint, toward state targets ★

✶ Support in-state energy solutions & economic growth ✶

✸ Keep Vermont's costs regionally competitive ✸

Progress since the 2011 Plan



List of examples:

- ✓ H.40 (Ren. Energy Standard & Energy Transformation)
- ✓ Standard Offer
- ✓ Updated building energy codes
- ✓ Multi-state ZEV MOU and action plan
- ✓ Smart Growth and Downtown programs
- ✓ Net metering expansion and redesign
- ✓ Building Energy Disclosure Working Groups & Reports
- ✓ VT Energy Generation Siting Commission
- ✓ Thermal Efficiency Task Force
- ✓ Total Energy Study

2015 CEP Timeline

- Stakeholder meetings – 6/24 & 6/30
- Regional public forums:
  - July 9 – Woodstock
  - July 16 – Middlebury
  - July 20 – Manchester
  - July 23 – St. Albans
- Initial comment period – through 7/24/15
- Draft CEP – September
- Public hearings, further written comments – Fall 2015
- CEP published – December

Stakeholder Meeting Objectives

- Update stakeholders about the current energy picture in VT (including state goals)
- Obtain input and recommendations from stakeholders regarding future energy options to inform the 2015 CEP
- Share the timeline and objective for updating the CEP, including public engagement

Format for today's meeting

8:50 a.m.: Energy supply resources topic overview

9:20 a.m.: Breakout discussion #1

10:20-10:30 a.m.: Break

10:30 a.m.: Breakout discussion #2

11:45 a.m.: Wrap-up

… Help us set the path for Vermont's energy future.

Meeting Working Agreement

✌ Start and stop on time

☞ Focus on the topic of discussion

👍 Keep comments brief to allow time for others

☝ One person speaks at a time

For more information on the energy plan and to submit comments

go to:

www.energyplan.vt.gov

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Comprehensive Energy Plan 2015

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Comprehensive Energy Plan: Energy Supply Resources

Stakeholder Meeting

June 30, 2015

Presentation Overview

- Energy Use Reduction and Renewable Energy goals
  - Informed by Total Energy Study modeling
- Energy supply portfolios, present and future

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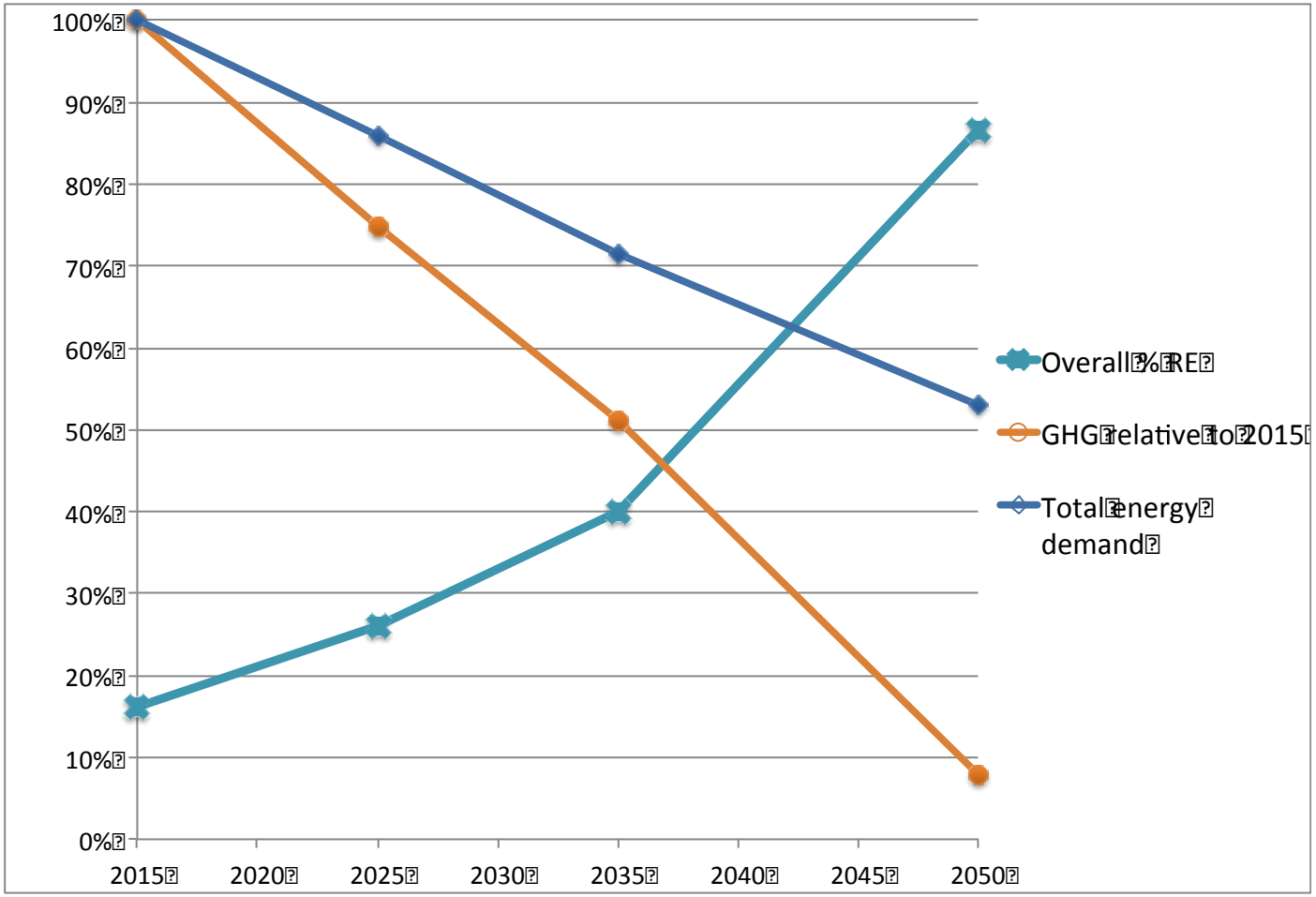
Energy Use Reduction Goal?

- The 2015 CEP could establish a goal of reducing total energy consumption by ~33% or more by 2050, from our current level.
- Accomplished through increased efficiency in energy production and use.
- For context, Vermont's total energy consumption has declined about 7% from a peak in 2004.

Two Types of Energy Efficiency

- Expending less energy to perform the same end use services
  - Also includes switching to new fuels/technologies that are fundamentally more efficient (e.g. EVs, heat pumps)
- More efficient production
  - Avoid the lost heat that comes from combustion and conversion to electricity

TES-based Renewable % and GHG



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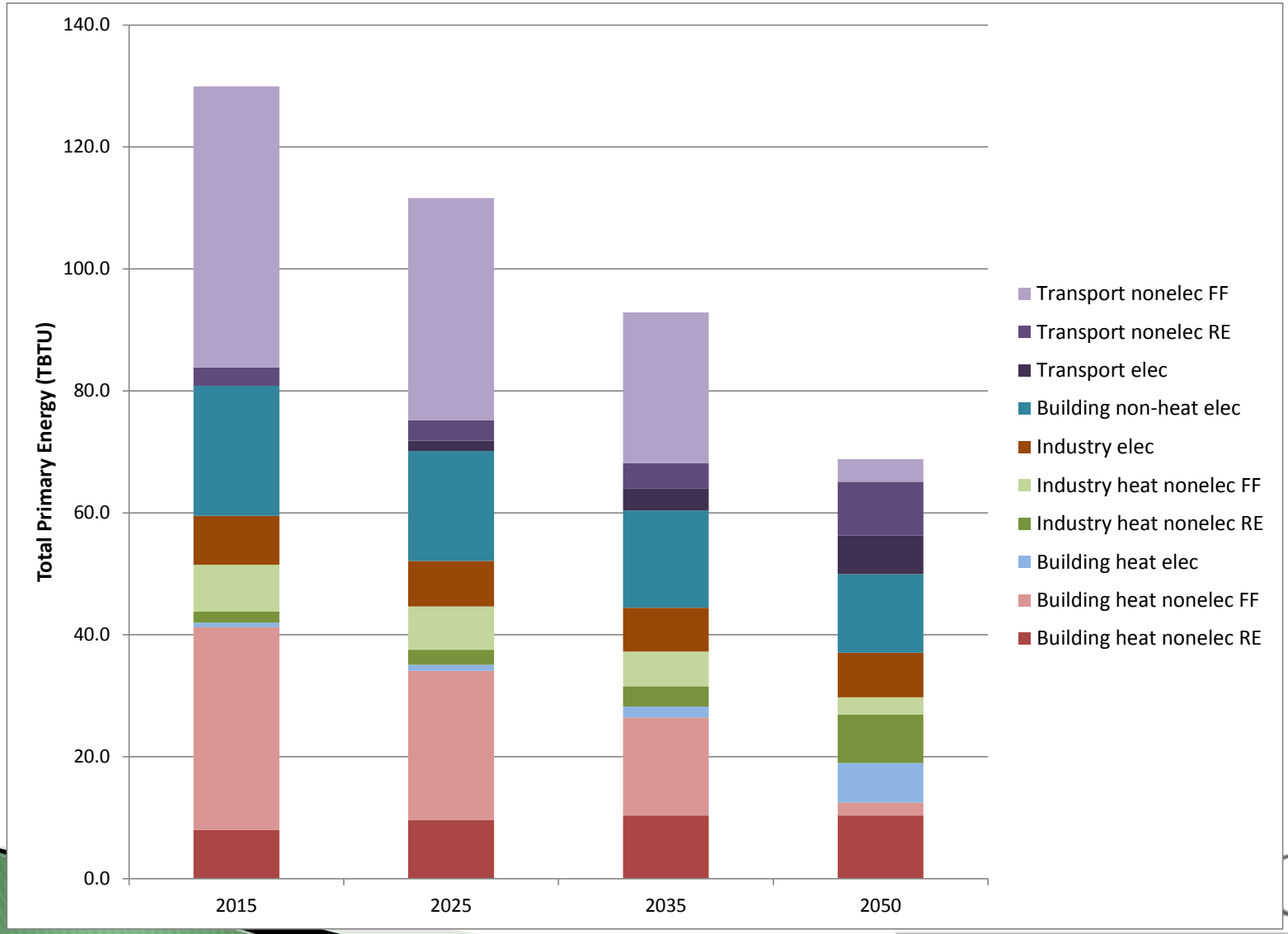
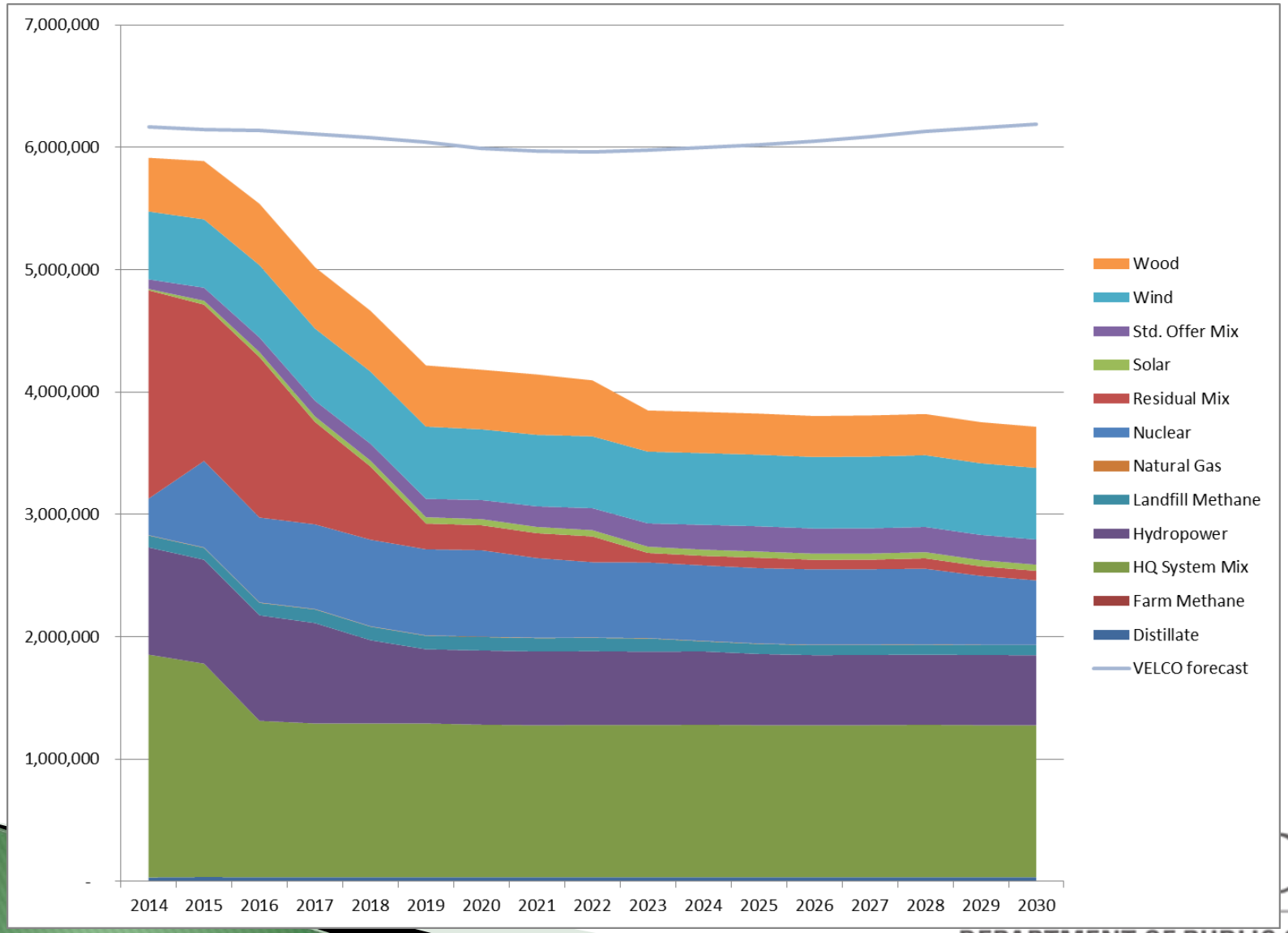
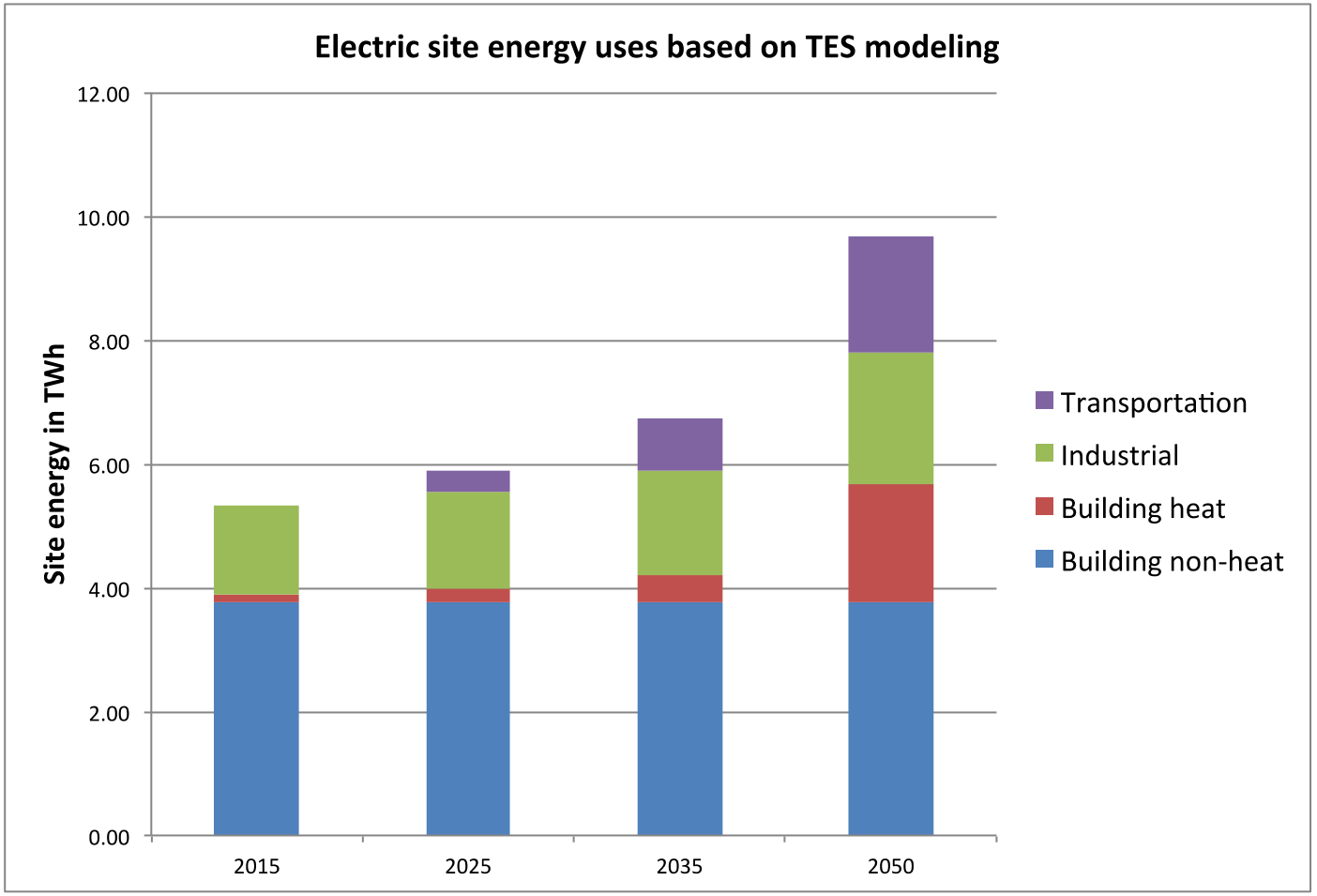
TES-based total primary energy



Known electric sources



TES-based electric site energy



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Commissioner Recchia

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Secretary Markowitz

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Small Group Breakouts

#1: The "Energy Pie"

- Breakout into small groups based on the color of your question sheet. Everyone will be discussing the same set of questions.

****Break****

#2: Technology-specific discussions

- Breakout into small groups based on your interests. Large groups may be broken into smaller groups, and tiny groups may be disbanded

Facilitated discussions, note takers recording key points; you can also submit written comments on the question sheets

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Small Group Breakout #1 Question #1 background

- Assume that the use of solid and liquid bioenergy somewhat more than doubles, with the largest changes in heavy duty transportation and industrial heat.
- Assume achievement of very aggressive efficiency goals.
- To meet remaining expected energy demand and the 90% goal, electric end use energy would still need to grow by about 75% while supplies become virtually 100% renewable.

Question #1 background cont.

- Expected/identified resources (owned, under long term contract, or expected from H.40) add up to:
  - Solar: 9%
  - Wind: 6%
  - Hydro: 31%
  - Biomass: 6%
  - Methane: 2%

  where the %s are calculated from the assumed 2050 energy need.

- This leaves **46%** of the electric portfolio undetermined.

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Small Group Breakout Question #1

1. Approximately 46% of the electric portfolio in 2050 is undetermined. Of this, how much should come from in-state vs. out of state, and why?
   - 1% of energy from solar is 65 MW
   - 1% of energy from wind is 37 MW
   - 1% of energy from large hydro is 11 MW
   - 1% of energy from small hydro is 25 MW
   - 1% of energy from biomass is 12 MW
   - 1% of energy from methane is 12 MW

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Wrap-Up

Thank you!

For more information on the energy plan and to submit comments, go to:

www.energyplan.vt.gov

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Supplemental Slides

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Breakout #1 questions cont.

2. Of the total amount of energy to be supplied by in-state renewables, how should the pie be sliced:

- By technology…?
- By size…?
- By cost…?
- By……?

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Breakout #1 questions cont.

3. We're already assuming a doubling of solid and liquid bioenergy, with the largest changes in heavy duty transportation and industrial heat. Going even further would reduce the pressure on electricity expansion.
   - Is that possible?
   - What sectors will be the hardest to move to renewables?

4. What should be the state's #1 priority in achieving 90% by 2050?

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Breakout #2: By Technology

- Wind, solar, woody biomass, biofuels, methane, hydro, natural gas & petroleum

1. What is the state of the national and Vermont market for _____?
2. What are the potential available _____ resources within and importable to VT?
3. What are the benefits of adding more _____ to the VT portfolio?
4. What are the challenges to developing more _____?

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Breakout #2 questions cont.

5. Are there pitfalls to developing too much _____?
6. What strategies should Vermont pursue with respect to the development of _____?
7. What opportunities and recommendations with respect to _____ would you suggest?

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Breakout #2: By Technology

- Wind, solar, woody biomass, biofuels, methane, hydro, natural gas & petroleum

1. What is the state of the national and Vermont market for _____?
2. What are the potential available _____ resources within and importable to VT?
3. What are the benefits of adding more _____ to the VT portfolio?
4. What are the challenges to developing more _____?
5. 5. Are there pitfalls to developing too much _____?
6. 6. What strategies should Vermont pursue with respect to the development of _____?
7. 7. What opportunities and recommendations with respect to _____ would you suggest?

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Additional Break Out #1 Question #1 Materials

Assume that the use of solid and liquid bioenergy somewhat more than doubles, with the largest changes in heavy duty transportation and industrial heat.

Assume achievement of very aggressive efficiency goals.

To meet remaining expected energy demand and the 90% goal, electric end use energy would still need to grow by about 75% while supplies become virtually 100% renewable.

In order to meet this demand, and in *addition* to resources owned by utilities or under contract or expected under H.40, Vermont will need 4.5 TWh of renewable electricity each year.

Known resources (owned, under long term contract, or expected from H.40) add up to:

Solar: 9%
Wind: 6%
Hydro: 31%
Biomass: 6%
Methane: 2%

where the %s are calculated from the assumed 2050 energy need.

This leaves 46% of the electric portfolio undetermined.

Two examples, choosing extremes between baseload and variable generators:

1,830 MW of generation capacity (heavy on baseload):

Solar:	600 MW	9%
Wind:	210 MW	6%
Hydro:	900 MW	75%
Biomass:	80 MW	7%
Methane:	40 MW	3%

3,500 MW of generation capacity (heavy on variable):

Solar:	2000 MW	31%
Wind:	1000 MW	28%
Hydro:	420 MW	31%
Biomass:	80 MW	7%
Methane:	40 MW	3%

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