AR Legislative Task Force on Sustainable Building Design and Practices

Renewable Energy Opportunities for the Ag & Forestry Sectors

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25x'25
AMERICA'S ENERGY FUTURE

Bringing the Vision to Life

The 25x'25 Vision

By the year 2025, America's farms, ranches and forests will provide 25 percent of the total energy consumed in the U.S. while continuing to produce safe, abundant and affordable food, feed and fiber.

25x25 AMERICA'S ENERGY FUTURE

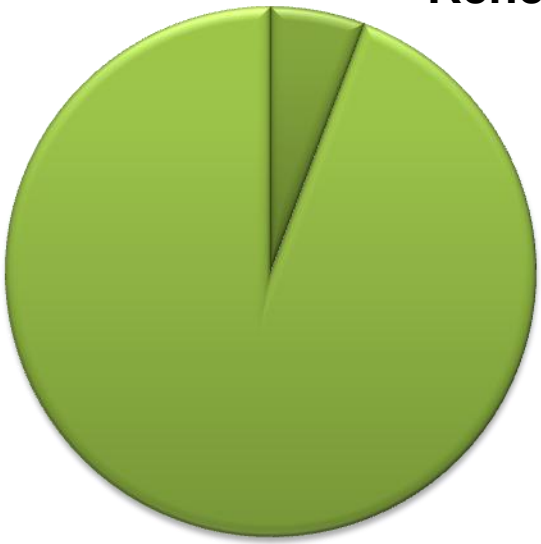
Bringing the Vision to Life

Where We Started…

Where We're Going

2004

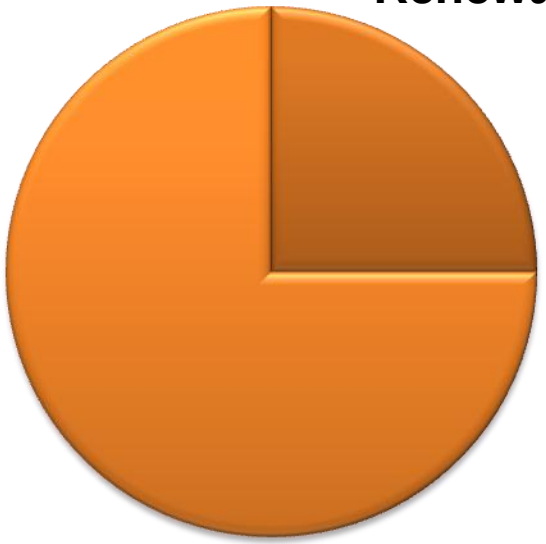
6.3 Quads
Renewable Energy



100.3 Quads
Total Energy Consumed

2025

27.8 Quads
Renewable Energy



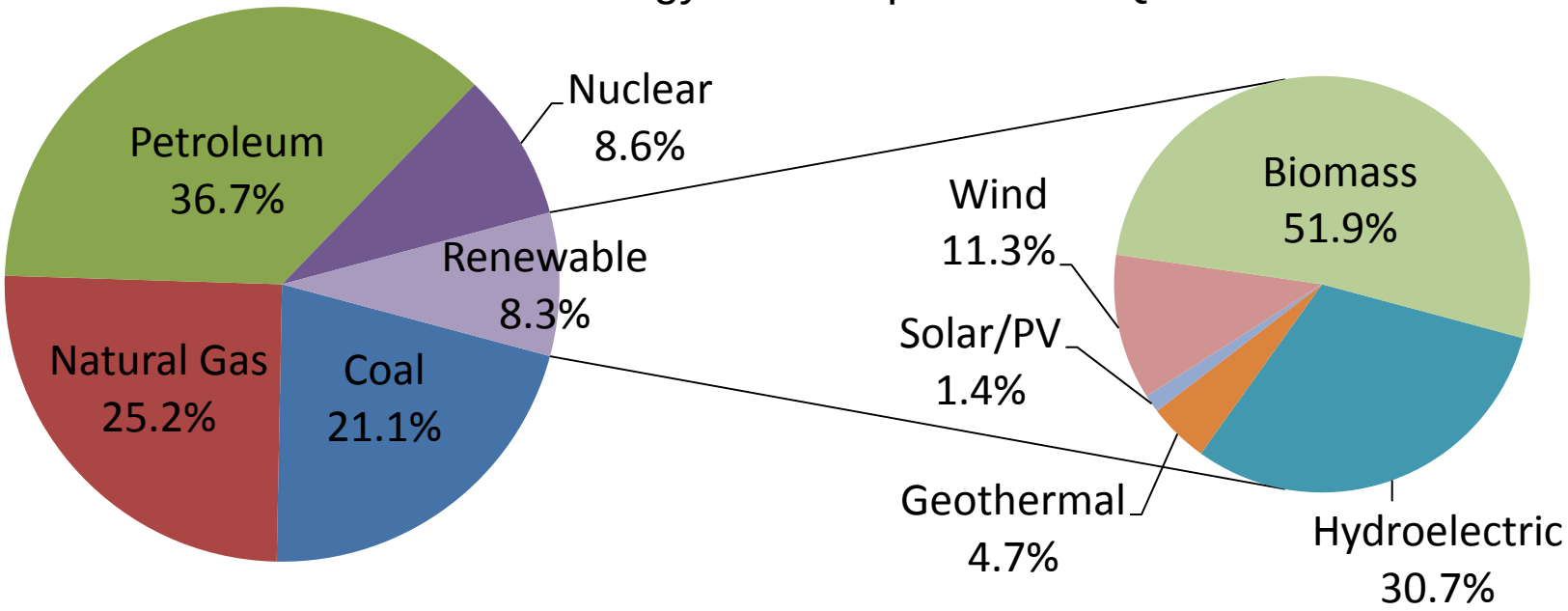
111.2 Quads
Estimated Total Energy Consumption

Where We Are Now

U.S. Primary energy consumption by source, 2010 (quad BTU)

2010 Total Energy Consumption: 97.95 Quad BTU

2010 Renewable Energy Consumption: 8.13 Quad BTU



Source: EIA Monthly Energy Review April 2011

Despite Obstacles, Renewable Energy Continues to Grow

- As a percentage of **Domestic Energy Production**: RE accounted for 11.95% of production thru 9/30/11
- **Biodiesel** set a new annual production record of (900+ Mgal)
- **Ethanol** expanded production to 900,000 bpd
- **Renewable energy** provided 12.73% of net electrical production in 2011; 24.73% increase over 2010

Today's Energy Paradigm

- Fossil fuel **resources are finite**
- Global energy **consumption is increasing** (nearly 30% increase by 2030)
- Fast-developing **economies** like India and China **are demanding more resources**
- The world **population is growing** (9+ billion by 2050)
- Greenhouse gas **emissions are increasing**

Need a portfolio approach to meet future energy needs:

- Increase energy efficiency/productivity
- Capture wind, solar, hydro, and geothermal energy
- Provide **biomass** for generating heat and power and for producing liquid transportation fuels

Characteristics of the Southeast

- Semi-tropical climate; variable weather
- Adequate rainfall, temperature and growing season length for most bioenergy crops
- Large amount of marginal and fiber crop land
- High number of livestock production (suppliers and users of bioenergy crops)
- Diverse ag production systems; many small land holdings

Most Promising Bioenergy Feedstocks

Woody crops

Sorghum

Switchgrass

Sugar/Energy Cane

Grasses

Miscanthus

Cover crops

Perennial Legumes

Biomass's Competitive Advantage

- Available year round from multiple sources
- Net energy ratios are large and positive
- Can be sustainably managed & produced
- Forest products industry has technical, financial and human resource competencies to capitalize on opportunities

Biomass's Ecological Advantage

- Generally provide perennial cover
- Require less commercial fertilizer
- Reduce soil erosion and runoff
- Possible opportunity to utilize manure and poultry litter
- Cost effective way of reducing significant nutrient and sediment loads.
- Sequester carbon

Need to do your Homework

- **Local approach to assessing energy crops**
  - Biomass resource assessments are needed
  - What crop? Switchgrass; Sorghum; Miscanthus; Willow; Poplar; Algae; Wastes; other?
  - Understand the feedstock you wish to produce or utilize

Need to do your Homework

- **Refer to the experts**
  - University research & extension and private sector
  - Best variety given geography, climate, soil quality, agronomic practices, harvest ability, storage, etc.
  - Goal: minimize inputs while maximizing yields

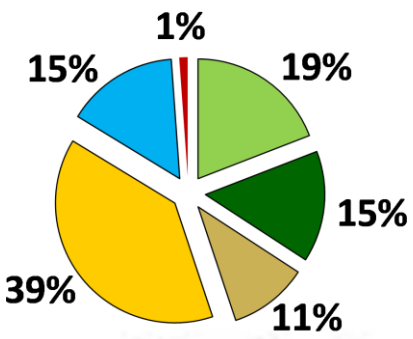
Need to do your Homework

- **What markets are available?**
  - What are the options/opportunities?
    - Low carbon fuels; biopower; bioproducts
  - Can you match supply with the demand?
  - Will you employ a sustainable production system that creates secondary benefits?

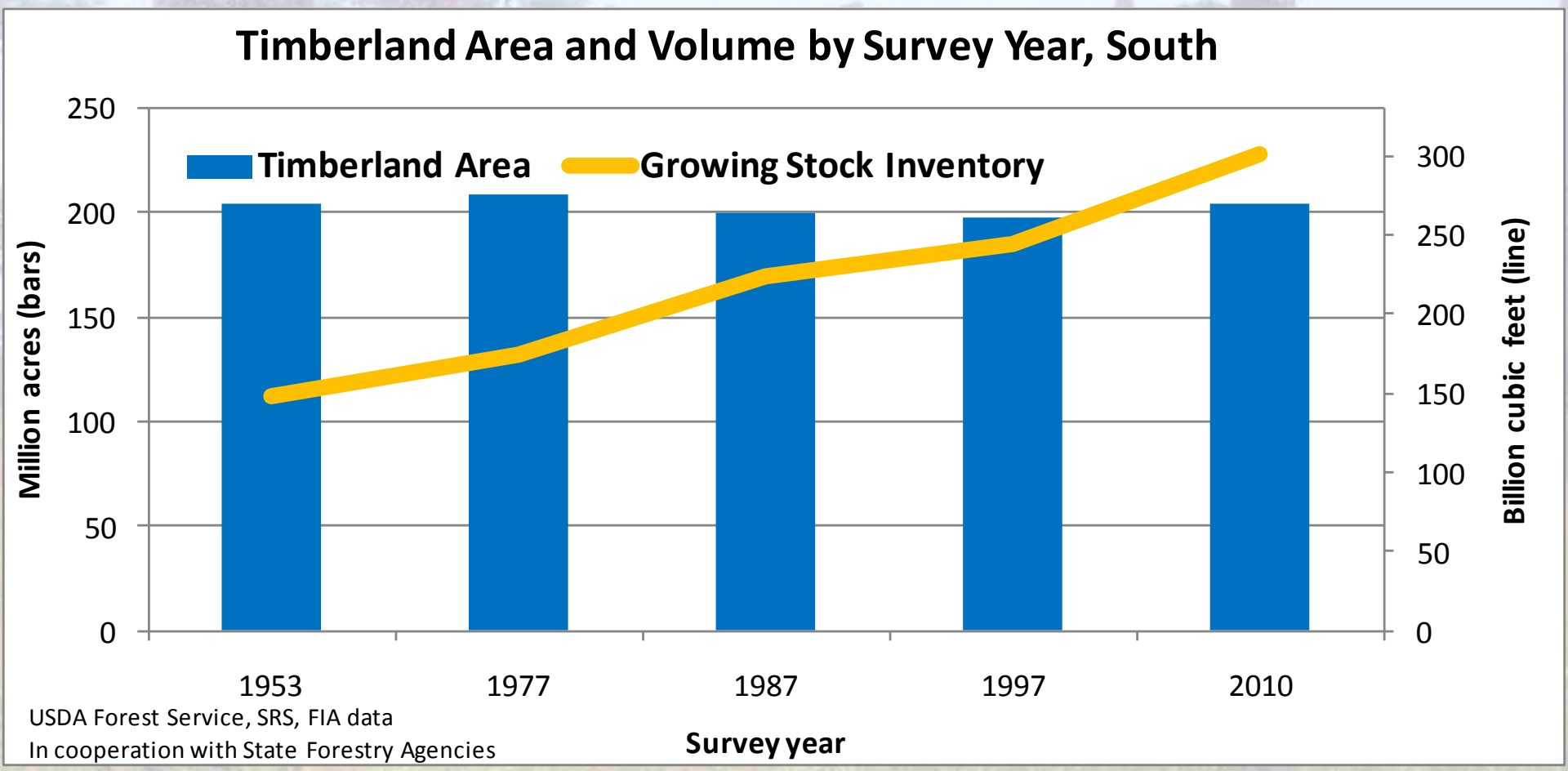
Southeast Biomass Resources

- 209 million acres of forestland
- 86 million acres of traditional cropland
- 120 million acres of pasture/hayland
- 8.5 million acres of CRP land
- 7.5 billion head of poultry
- 43 million head of livestock
- 151 million tons of municipal solid waste
- Many other unique biomass resources

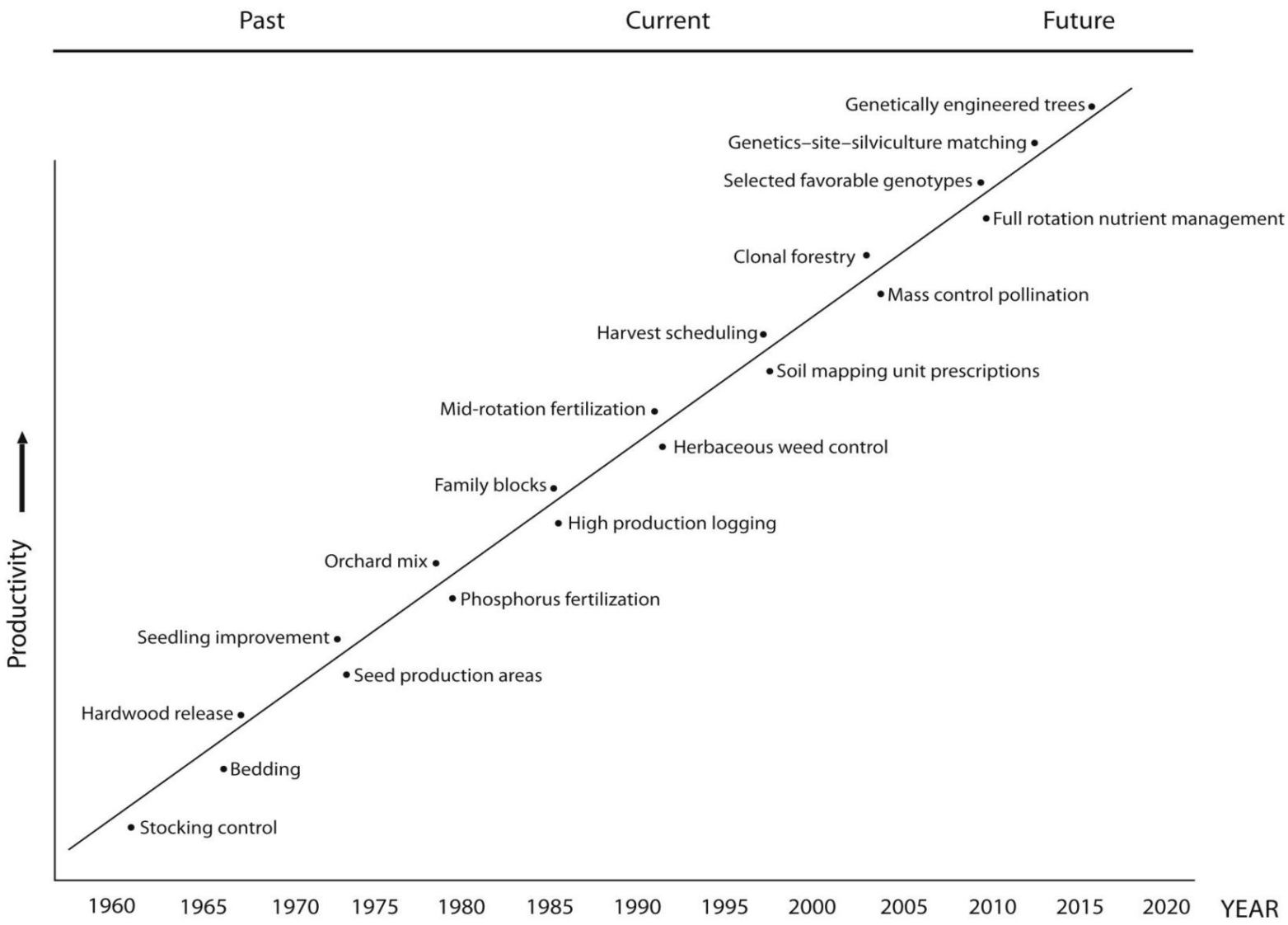
Forest Management Types Distribution



Source: USDA Forest Service, SRS, FIA


Timberland Area and Volume by Survey Year, South
Timberland Area
Growing Stock Inventory
Million acres (bars)
Billion cubic feet (line)
250
200
150
100
50
0
300
250
200
150
100
50
0
1953
1977
1987
1997
2010
Survey year
USDA Forest Service, SRS, FIA data
In cooperation with State Forestry Agencies

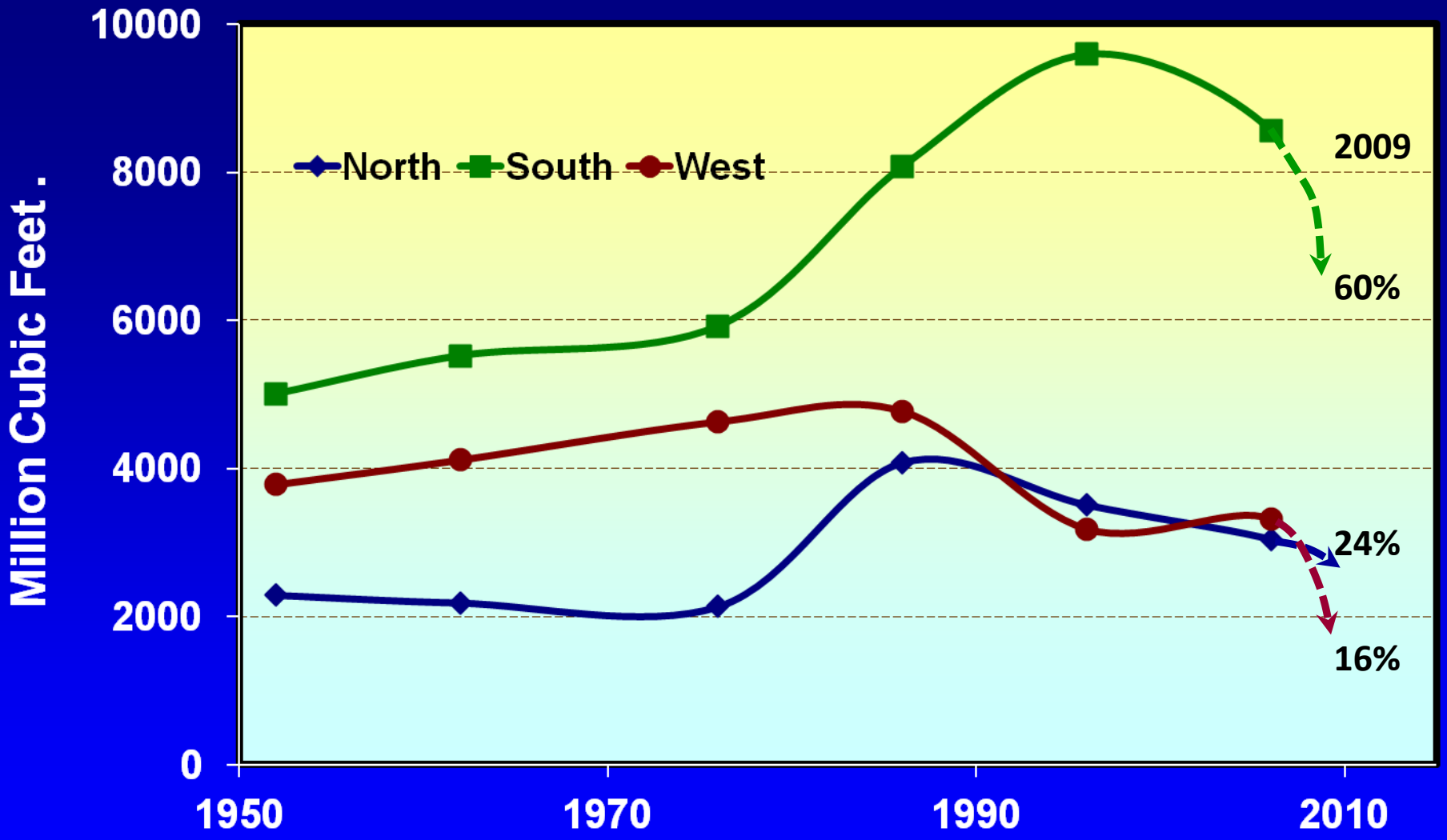
Improvements in Yield



Courtesy of Eric Vance

U.S. Timber Harvest Share

All Sources



Sources: RPA 2006

National Wood-to-Energy Roadmap

Guide for developing sustainable woody biomass energy solutions

July 19, 2011

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Why a National Roadmap?

- Growing interest in wood as an energy source – Heat, electricity, and liquid fuels
- Private forest investment lagging
- Forest health and wildfire threats
- Differing views on using wood for energy
- Thoughtful discussion of the issues
- Chart a proper course for use & conservation

Work Group Vision

"Unlock the nation's potential to sustainably produce woody biomass for energy and traditional uses while providing balanced multiple benefits from public and private forests for the American public."

Work Group Forums

- **Wood Demand and Supply**
- **Sustainability**
- **Carbon Sequestration and Climate Change**
- **Policy**

Policy Recommendations

- **Set realistic renewable energy goals with properly designed and scaled mandates and incentives.**
- **Treat all biomass energy facilities the same, regardless of age.**
- **Keep forests as forests.**
- **Increase domestic supplies of wood.**
- **Ensure sustainability in all uses of wood.**

Policy Recommendations

- **Reward appropriate scale and efficiency**
- **Maintain a simple, consistent definition of biomass.**
- **Achieve reliable carbon accounting for all energy sources, including wood.**
- **Maintain accurate feedback mechanisms on the use of forest resources over time.**
- **Invest in research and technology development.**

FUTURE OF BIOMASS ENERGY IN THE SOUTH

- **There <u>will be new</u> biomass energy added to the generation mix because:**

– Need to diversify our energy resources
– Need to add baseload resources
– Need to encourage energy dependence and rely on regional resources
– Need to provide markets for low-value biomass material
– Need to encourage economic development opportunities in rural areas

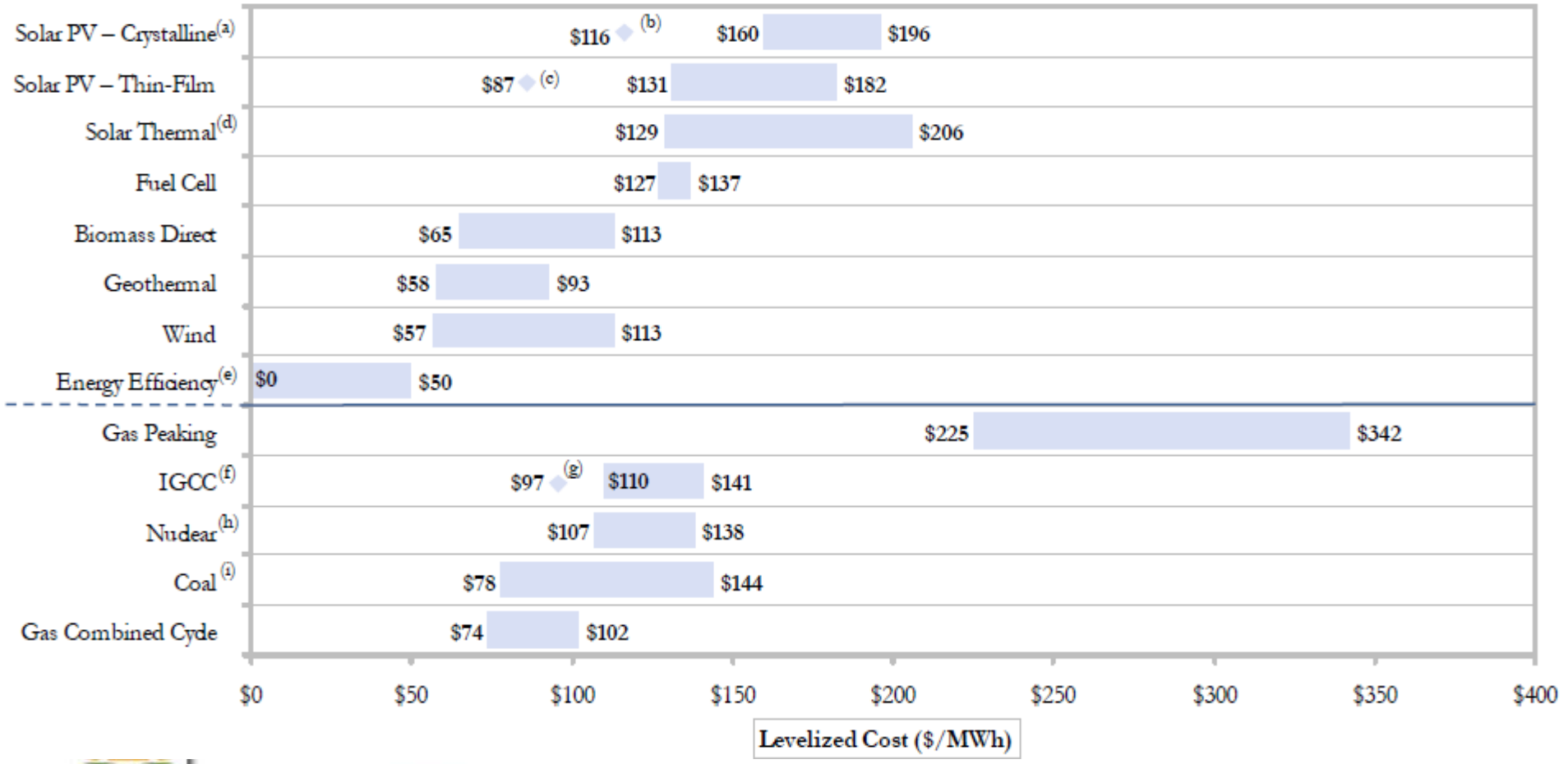
- **Will not happen immediately and most likely will need a combination of:**

– Comprehensive state and federal energy policies
– Regulatory certainty from state and federal regulators
– Reasonable economic incentives
– Higher prices for natural gas

Study Shows Pursuit of 25x'25 Renewable Energy Goal Will Generate Thousands of New Jobs for Arkansas

- Agriculture and forestry in Arkansas could see $6.0 billion in additional revenues by 2025
- Overall for the state:
- $3.1 billion in total economic activity and over 21,000 new jobs by 2015
- $14.7billion and 109,200 new jobs created by 2025

Levelized Cost of Energy Comparison



Source: Lazard Levelized Cost of Energy Analysis 2009

Points to Remember

- We are on a path to a lower carbon energy future
- Recognize concerns of increasing production of traditional crops and energy crops
- Multiple natural resources can be managed with proper market incentives
- All sectors are well positioned to deliver energy and environmental solutions
- Let's do this right the first time; control our own destiny

The Opportunity & Potential

Biomass Feedstock

- Ded. Energy Crops
- Ag and Forest Residues
- Hazardous Fuel Treatments
- SRWCs
- Food/Animal Wastes
- Wood Waste

Conversion Processes

- Co-firing
- Combustion
- Anaerobic Digestion
- Biochemical
- Thermochemical
- Gasification Fermentation
- Catalytic Cracking

USES

Fuels:
- Bio/Renewable Diesel
- Ethanol/Green Gas
- SynGas

Electricity and Heat

Biobased Products
- Composites
- Specialty Products
- Chemicals
- Traditional Products

Unresolved Issues

- National Renewable Electricity Standard (CES)
- Transmission (siting and financing)
- Definition of renewable biomass
- Indirect land use issues
- Expired/expiring tax credits (VEETC/Blender/PTC/ITC)
- What about oil subsidies and nat gas growth?
- FY 13 budgets and 2012 Farm Bill
- RFS2/ethanol blend wall (E15)
- Assessing costs and impacts of GHG regulation and other EPA regs (CSAPR; Utility MACT; Boiler MACT)

Strategies to Better Position Arkansas for Bioenergy Development

Established technologies have the best chance for near-term success (co-fire; pellets; biopower; landfill gas-to-energy)

Support **technology development** for long-term (2nd gen biofuels; manure digestion; algae)

Accelerate growth of established/respected companies through market tax credits, low-interest loans/loan guarantees, income tax benefits, accelerated depreciation, etc.

Strategies to Better Position Arkansas for Bioenergy Development

Other legislative measures: Renewable Portfolio Standard; incentives for biofuels use/biopower production; targeted tax incentive packages

Advance **bioenergy education** and grow technology incubation

Require **state agencies to demonstrate leadership** for biofuels and renewable electricity use

Recognize **energy efficiency and conservation** as the critical first step for any energy strategy

What is Arkansas' *vision* for a new energy future?

- Who/How will you participate?
- What is needed for this vision to be realized?
- Who is at the policy table representing the interests of stakeholders?

Thank you!

Copies of the Wood To Energy report and other materials are available at:

www.25x25.org

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