WOOD ENERGY SCENARIOS AND SOUTHERN MARKETS

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Photo: Duke University

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Southern Research Station

NC STATE UNIVERSITY College of Natural Resources

Department of Forestry & Environmental Resources

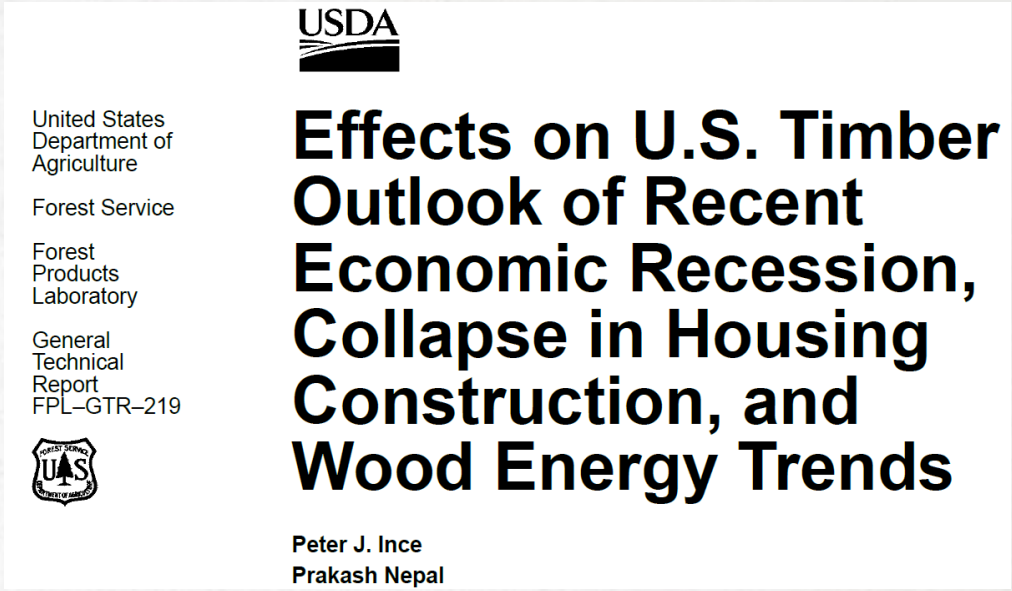
BACKGROUND

- Previous billion ton reports did not explicitly consider competition for wood with conventional products
- This update incorporates wood energy and conventional wood products market interaction
- Developed and analyzed 6 scenarios with 3 levels of wood energy demand in conjunction with 2 levels of housing growth and 2 levels of pine plantation growth
- Use of global, national, and regional timber market models

Photo: P. Nepal

BASELINE SCENARIO: DEMAND & SUPPLY DRIVERS

- Derived from the USDA Forest Service 2012 Baseline Scenario
- Single family housing growth returns to long-term average by 2020 (1.1 million)
- Historical relationship of fuelwood demand with respect to GDP
- About 26% increase in wood energy use by 2040 relative to 2010 level
- Assumes current rate of plantation growth
- Weaker projected U.S. dollar favoring export
- Declining timberland area- 2010 RPA A1B scenario


USDA

United States Department of Agriculture

Forest Service

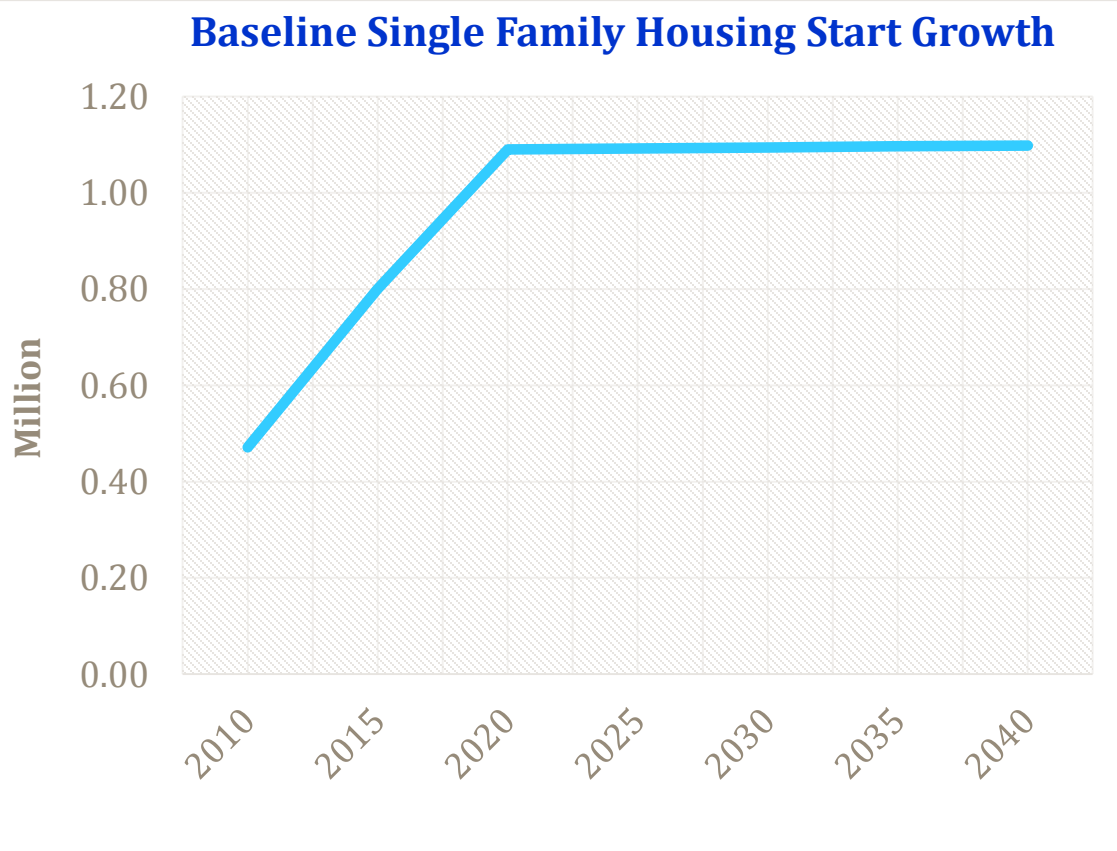
Forest Products Laboratory

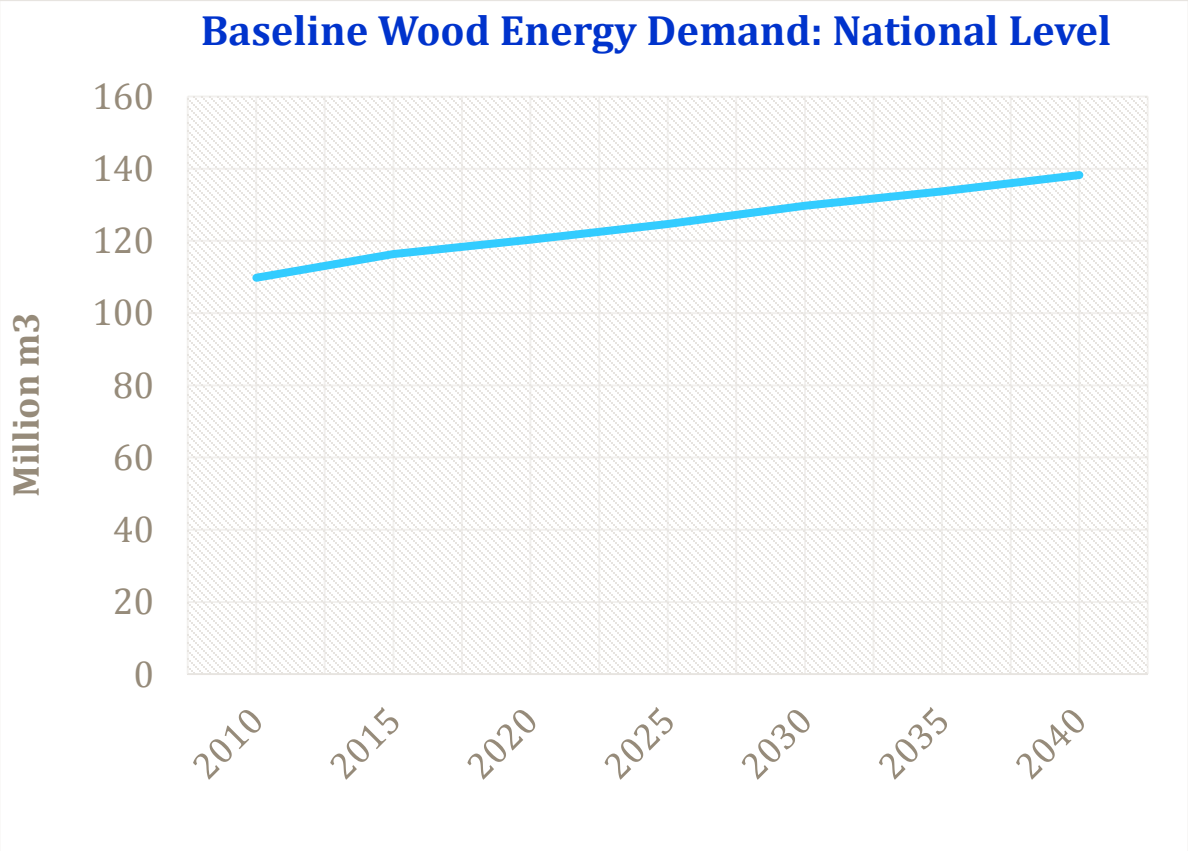
General Technical Report FPL–GTR–219

Effects on U.S. Timber Outlook of Recent Economic Recession, Collapse in Housing Construction, and Wood Energy Trends

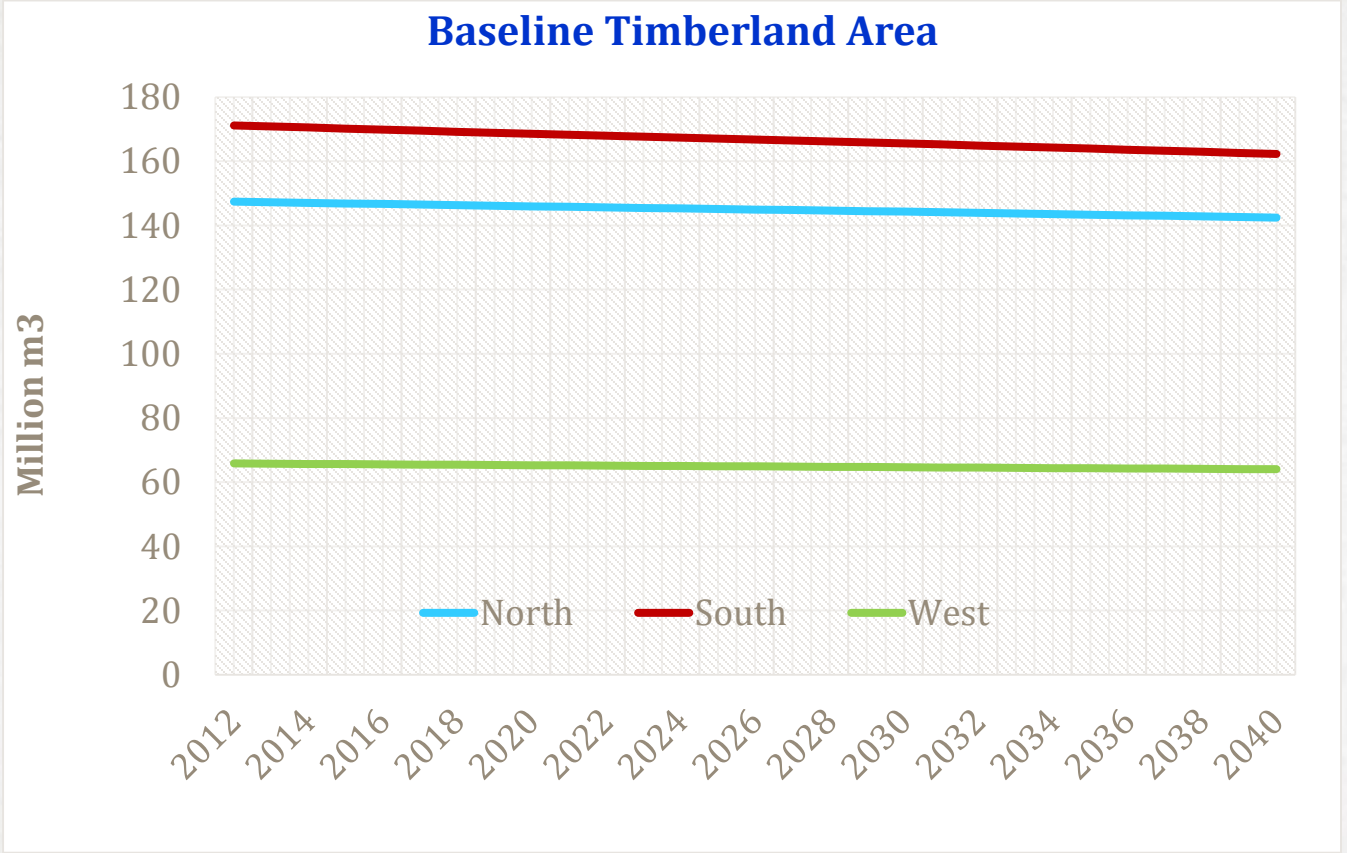
Peter J. Ince
Prakash Nepal

BASELINE SCENARIO: DEMAND DRIVER





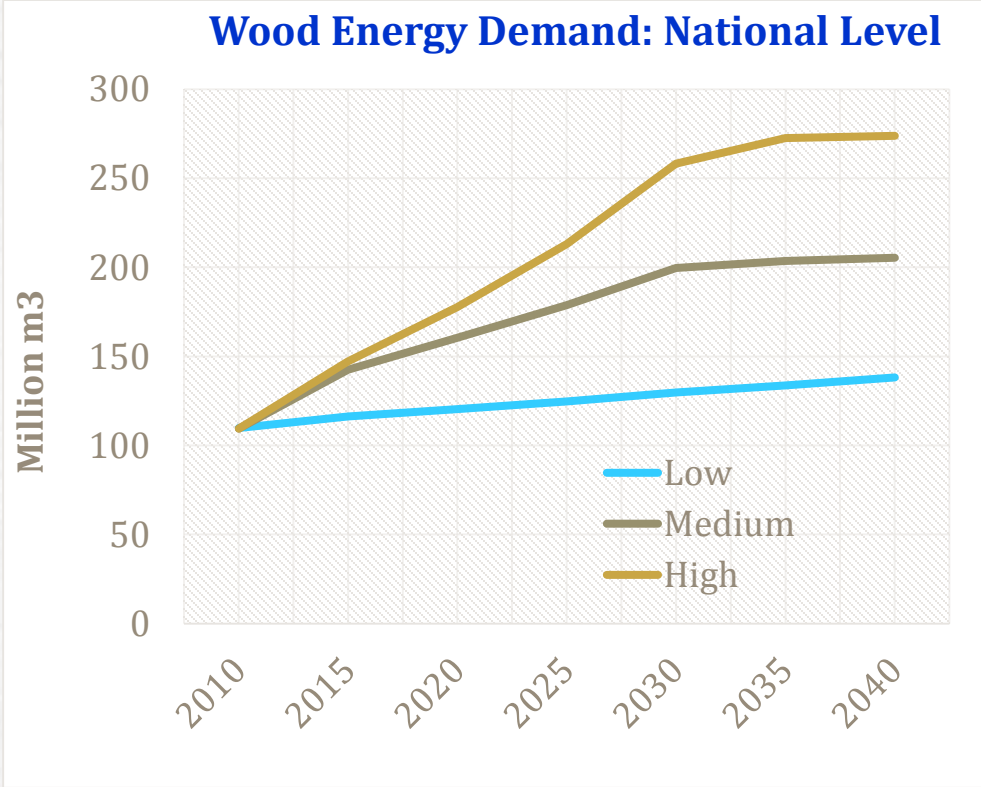
BASELINE SCENARIO: TIMBERLAND AREA



- Declining timberland area (about -0.15% per year) mainly due to urbanization
- Projected timberland area for 2010 RPA A1B scenario

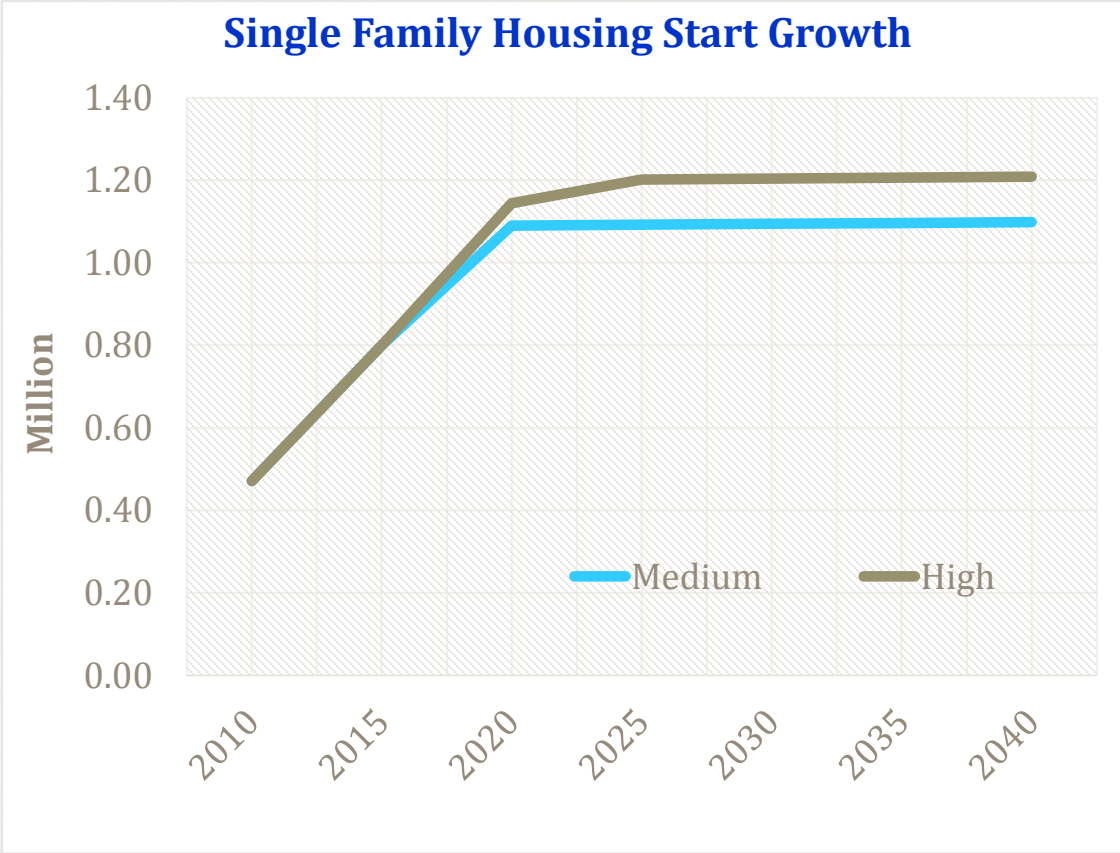
ALTERNATIVE SCENARIOS: WOOD ENERGY LEVEL

- Low wood energy: Based on historical relationship between fuelwood demand and GDP
  - 138 million m3 (73 million dry short ton) by 2040 (26% more from 2010 level)
- Medium wood energy: Based on announced pellet demand (FORISK consulting) and EU renewable energy requirement
  - 205 million m3 (108 million dry short ton) by 2040
  - 86% more from 2010 level
  - 50% more above baseline
- High wood energy: Double medium energy demand, assumes a boost in plantation growth
  - 273 million m3 by 2040 (145 million dry short ton) by 2040
  - 150% more from 2010 level
  - 100% more above baseline



ALTERNATIVE SCENARIOS: HOUSING STARTS LEVEL

- The top quartile of housing starts from 1959-2011 is at least 10% above the long-term average
- Indicates a possibility of achieving higher growth rate
- Assumed housing growth represents 10% increase above baseline
- SF housing starts increase to 1.2 million by 2025
- Remain at that level thereafter

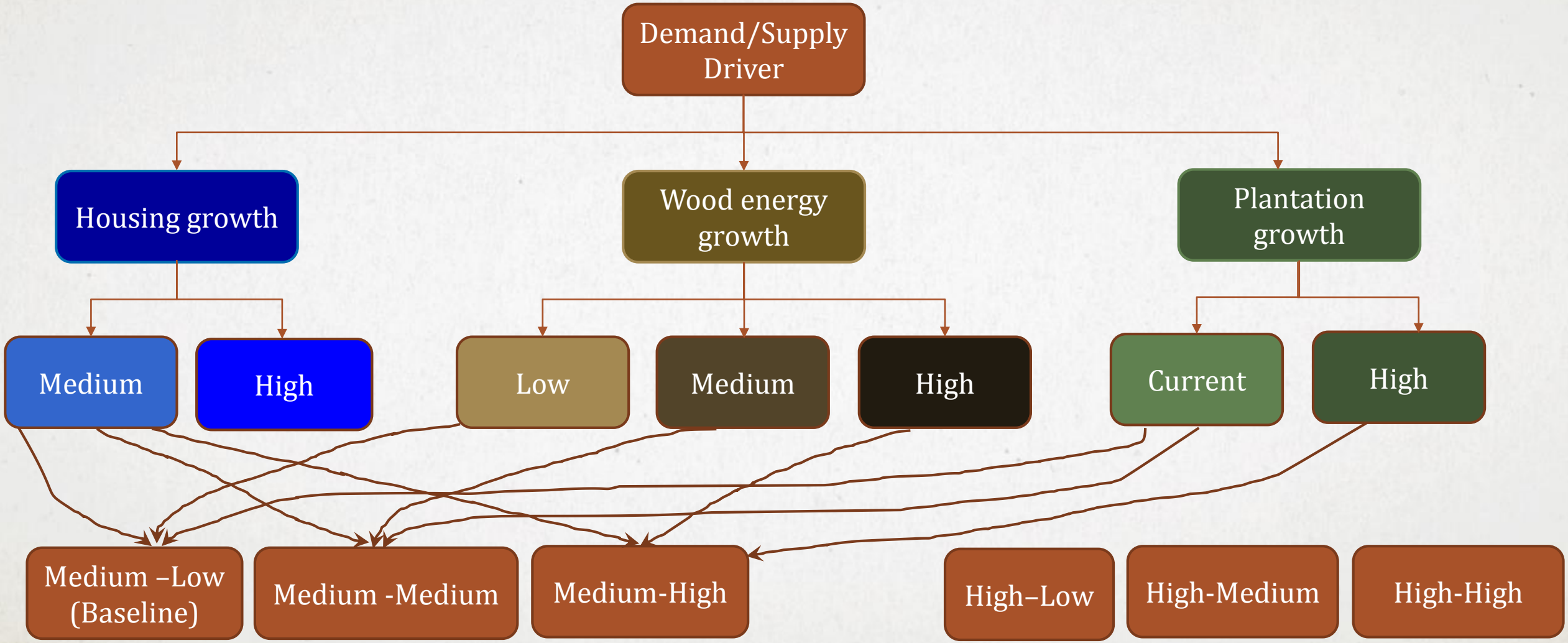


ALTERNATIVE SCENARIOS: MANAGEMENT INTENSITY

- The high energy scenario assumes a boost in plantation growth
  - 50% above current FIA growth rate by 2040
- Based on assumption that timber supply response occurs due to increased timber demand for energy
  - Increased use of selected genetic stocks and/or best practices for plantation management

Photo: P. Nepal

SCENARIO: SUMMARY

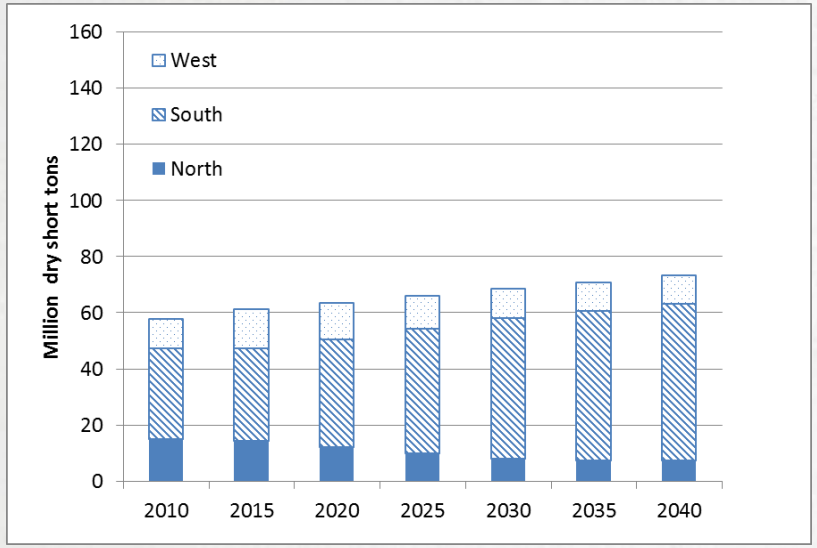


MODELS

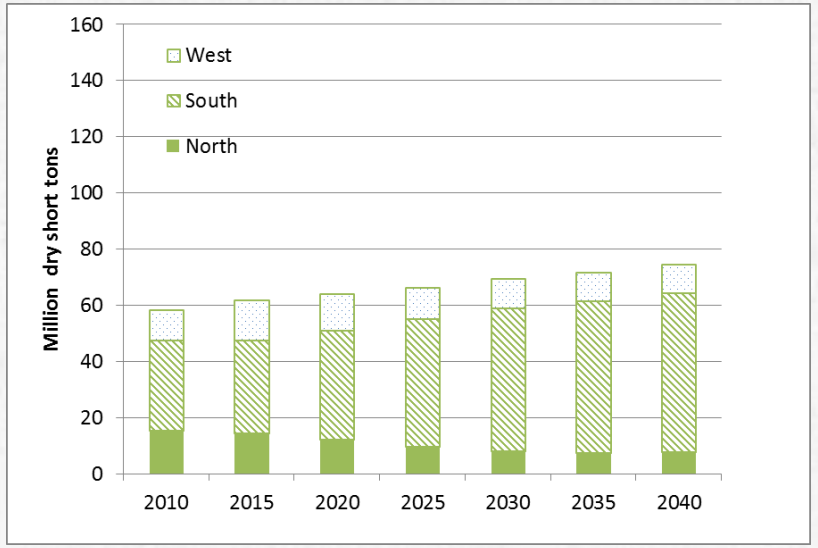
- United States Forests Products Module (USFPM) in conjunction with Global Forest Products Model (GFPM)
  - Partial market equilibrium model of the U.S. and global forest products market
  - Land use/timberland area projection is exogenous
- Southern Regional Timber Supply (SRTS) model
  - More detailed timber supply model of U.S. South
  - Demand for timber products is exogenous
- Projected outcome came from integrated runs of two models
- Projected biomass feedstock amounts were provided to FORSEAM as inputs for further runs

Photo: D.R. Larsen, University of Missouri

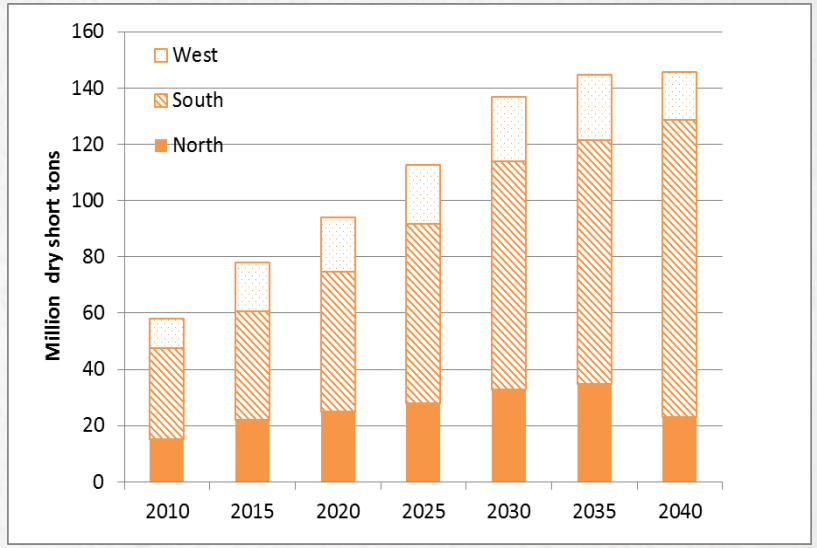
RESULTS: FUEL FEEDSTOCK SUPPLY BY REGION



- Low Energy

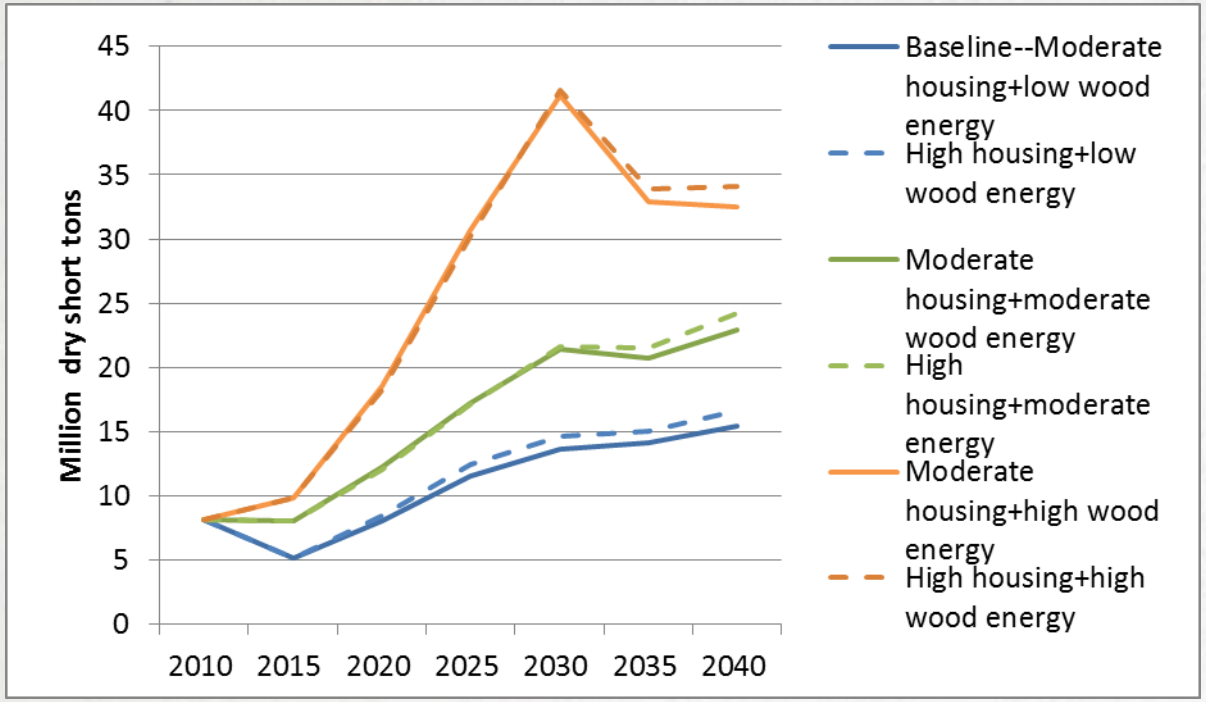


- Medium Energy

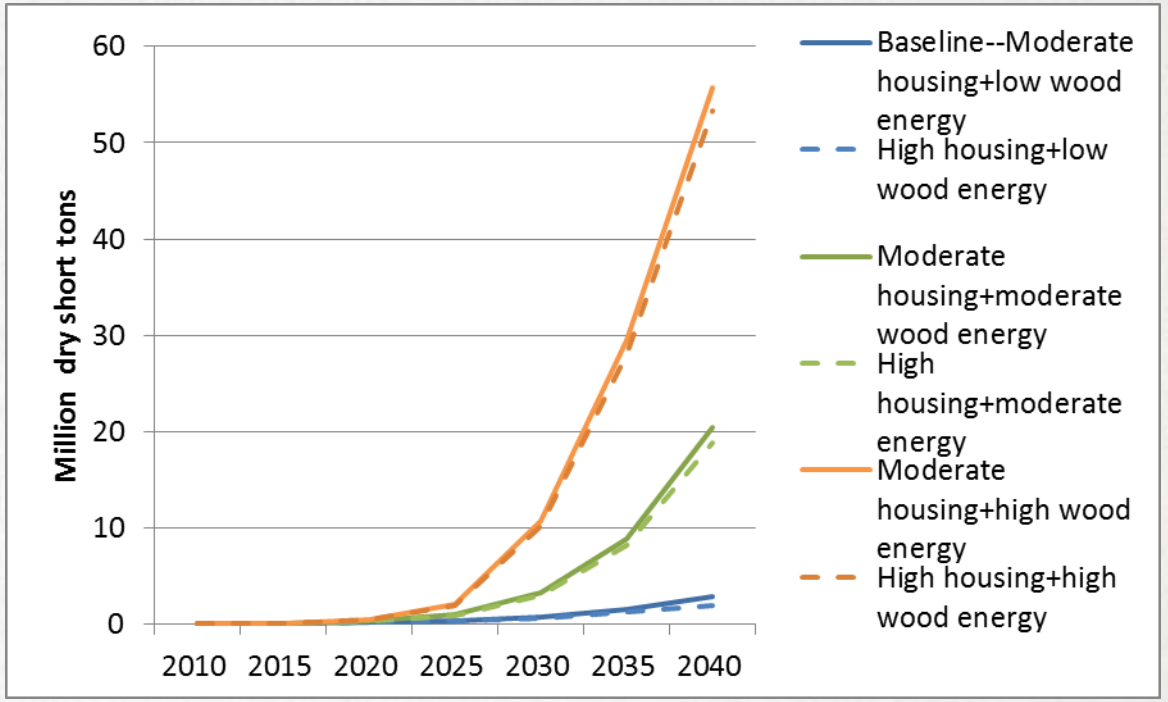


- High Energy

RESULTS: FUEL FEEDSTOCK SUPPLY BY SOURCE

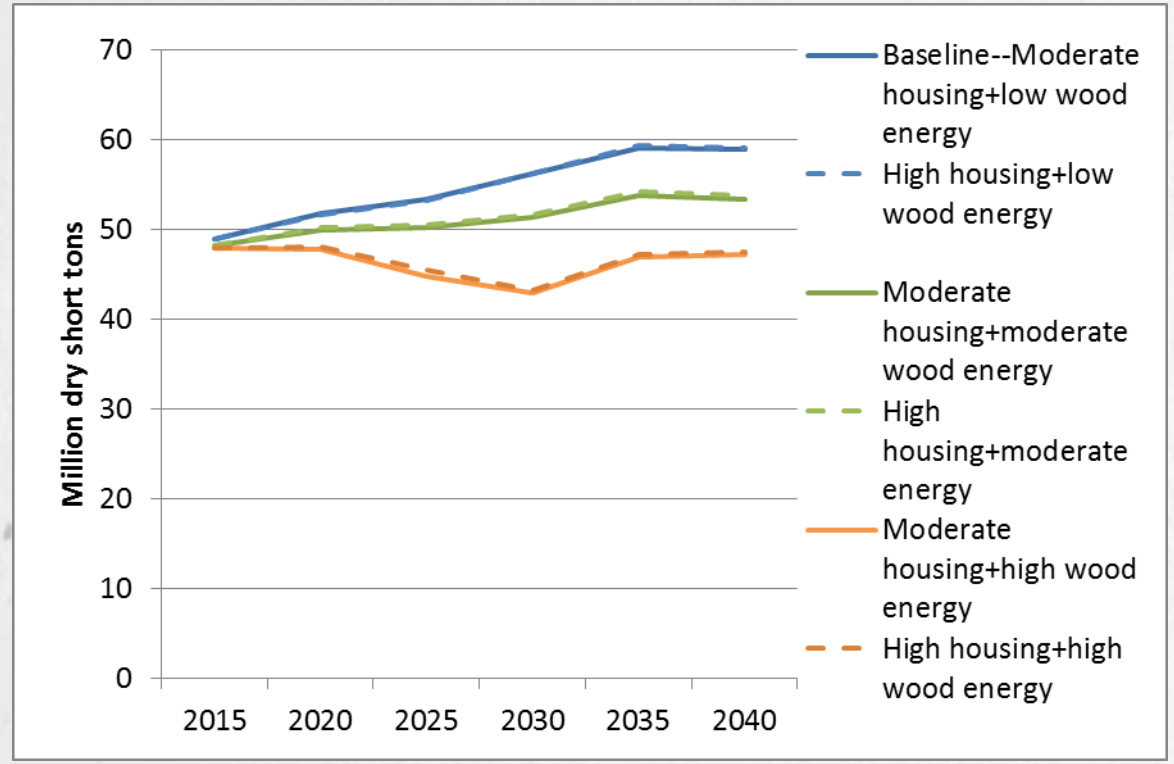


- Roundwood pulpwood used for energy

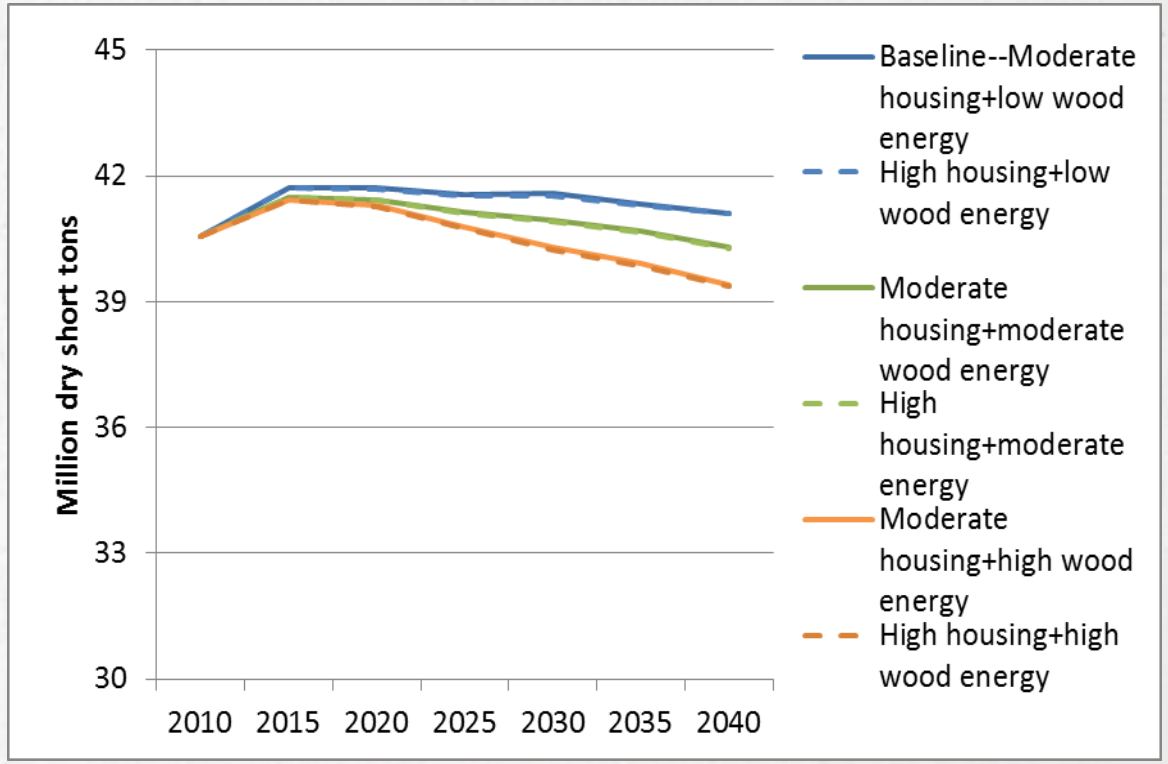


- Logging residue used for energy

RESULTS: COMPETITION FOR WOOD



- Roundwood pulpwood used in conventional products



- Total paper and paperboard production

SUMMARY & CONCLUSIONS

- Results show tradeoffs among fuel feedstock sources (e.g., logging residues, small roundwood) and between end uses (e.g., wood energy and conventional wood products)
- Increased wood energy demand coupled with increased housing demand raises both fuel feedstock prices and small roundwood prices
  - Makes both recovery of logging residues and the diversion roundwood pulpwood to wood energy use economically feasible
- The demand for wood energy competes with the demand for wood for conventional products
- Less pulpwood is available for production of panels and paper and paperboard products under the moderate and higher wood energy demand scenarios

Photo: conserve-energy-future.com

Photo: Juergen Henkelmann, Alamy

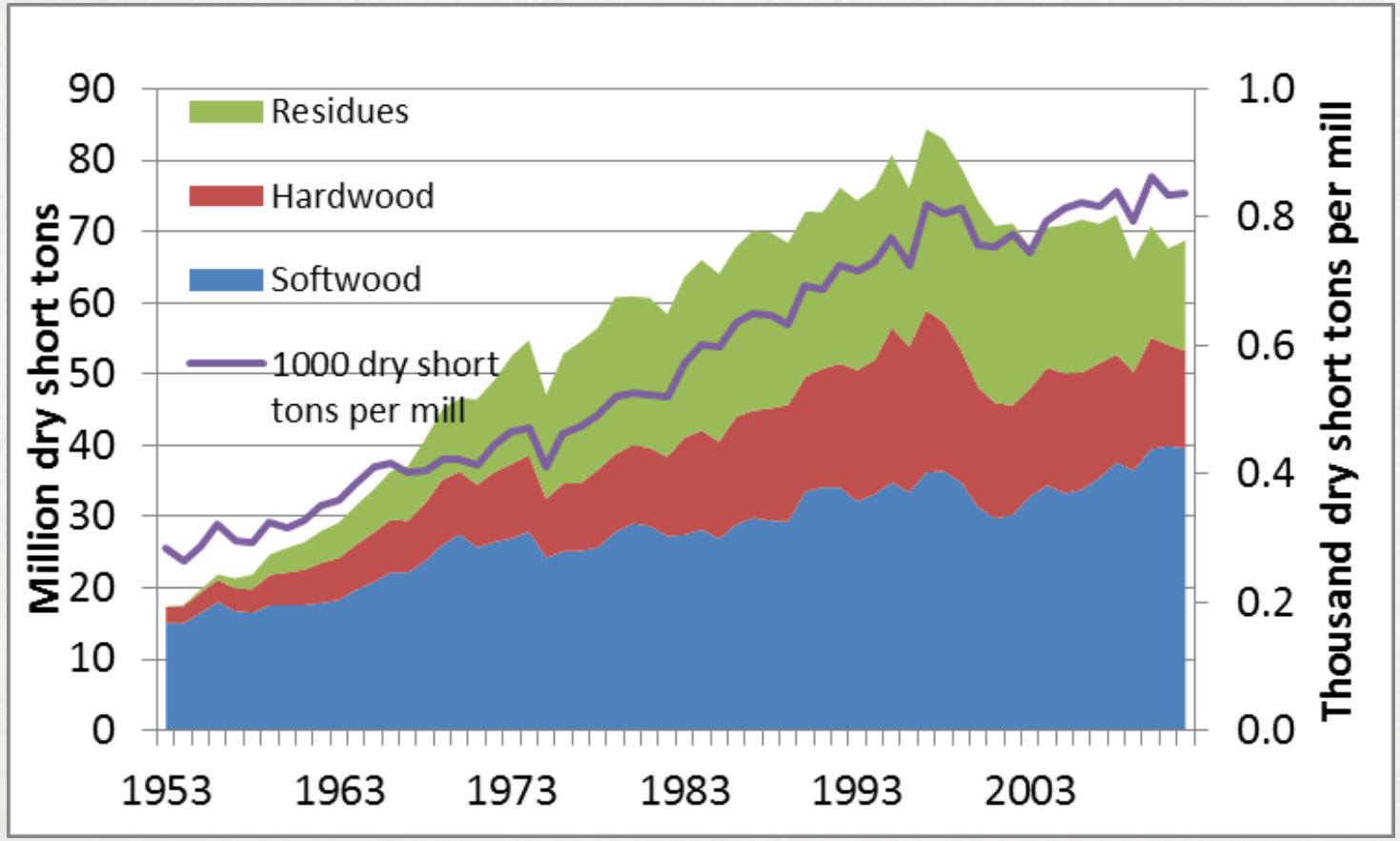
Wood energy demand in the context of southern forest resource markets

WOOD ENERGY DEMAND IN THE CONTEXT OF SOUTHERN FOREST RESOURCE MARKETS

- Evaluated the conditions and characteristics of Southern forests and timber markets that are relevant to wood energy
- Identified factors include
  - Changes in non-energy demand for softwood and hardwood pulpwood
  - Changes in demands for sawtimber
  - Existing age class distribution and replanting

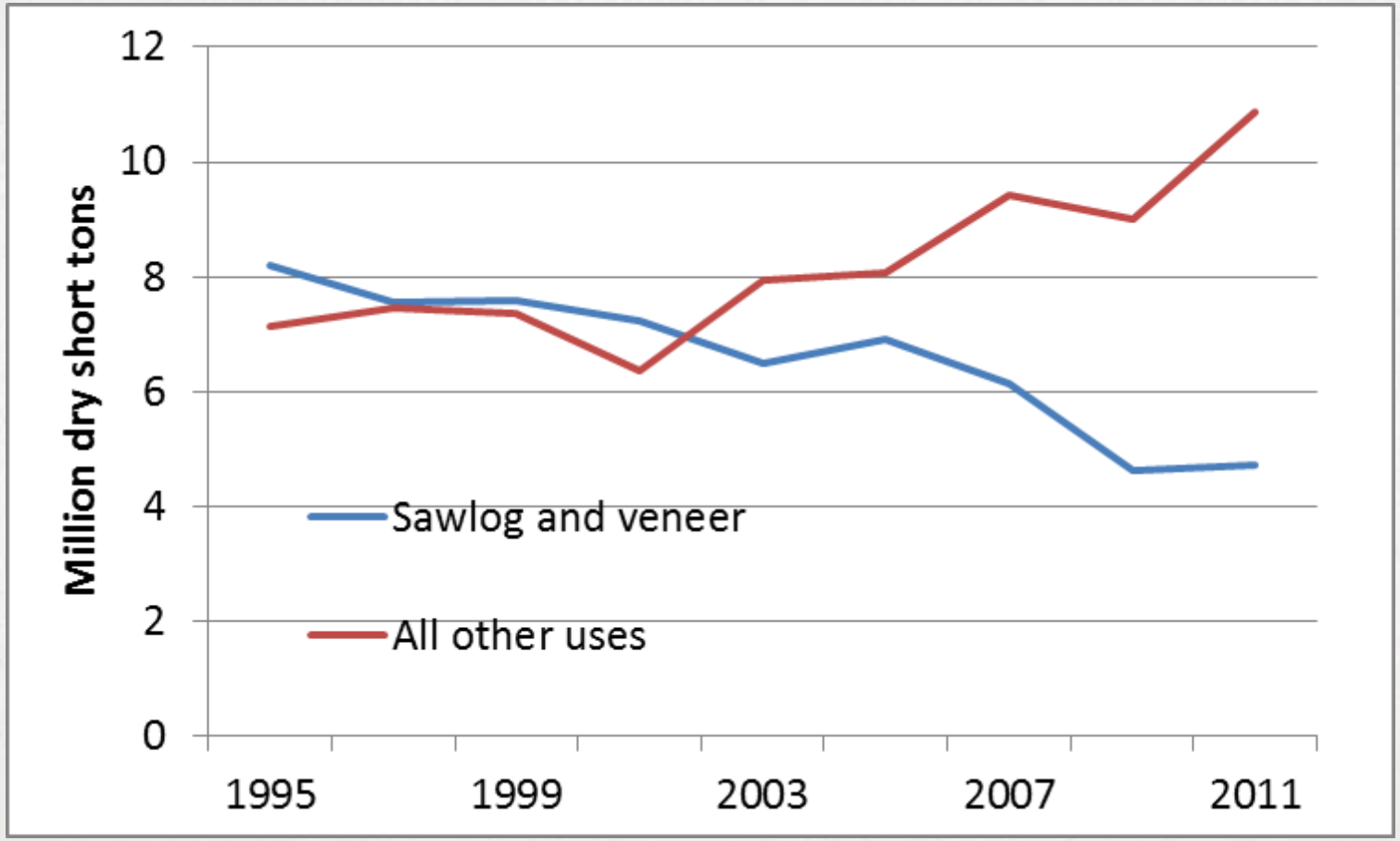
WOOD ENERGY DEMAND IN THE CONTEXT OF SOUTHERN FOREST RESOURCE MARKETS

- Changes in non-energy demand for softwood and hardwood pulpwood



WOOD ENERGY DEMAND IN THE CONTEXT OF SOUTHERN FOREST RESOURCE MARKETS

- Changes in demand for sawtimber



WOOD ENERGY DEMAND IN THE CONTEXT OF SOUTHERN FOREST RESOURCE MARKETS

- Effect of the 'sawtimber overhang'

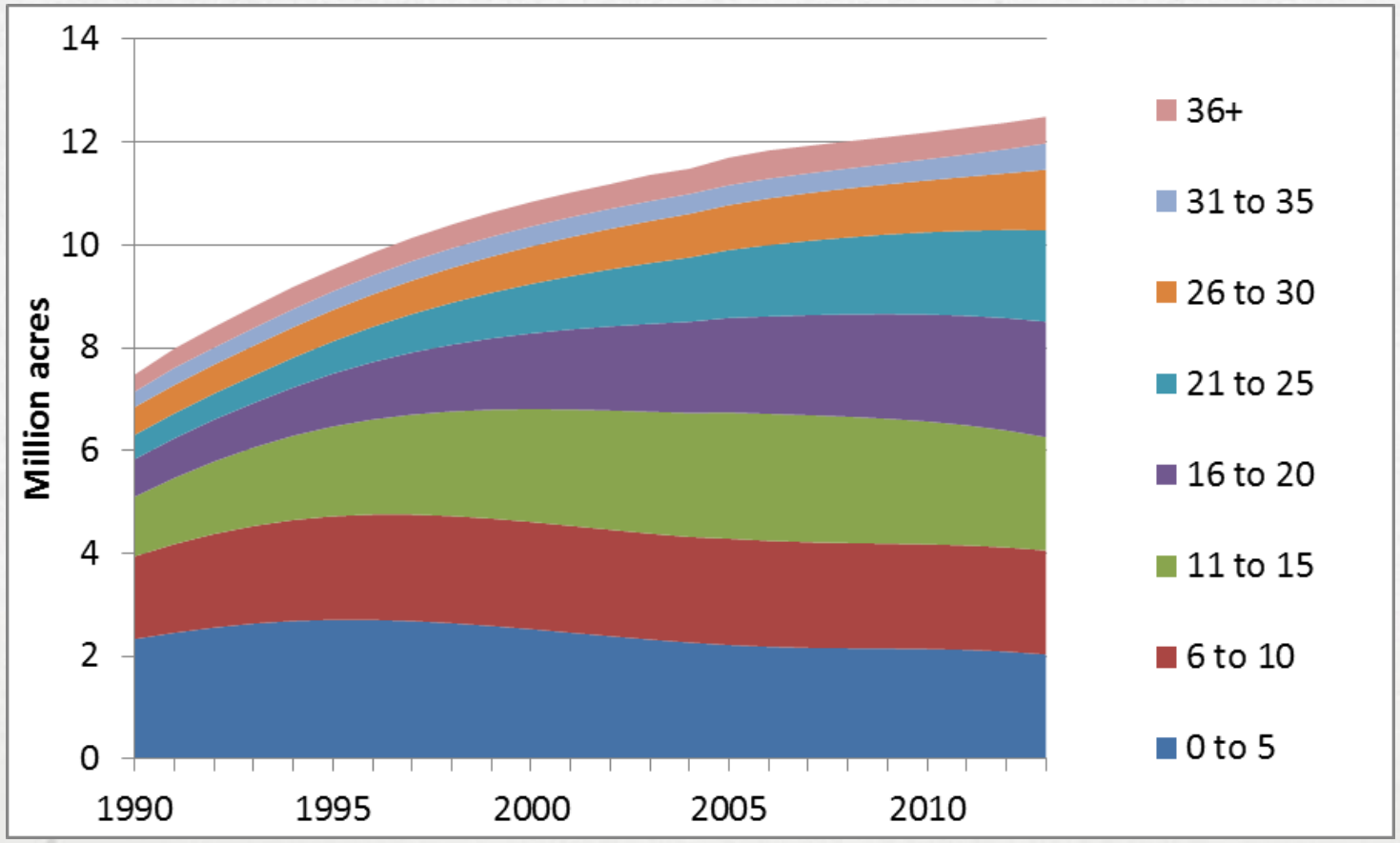


Photo: Kentucky Department of Parks