



USDA Forest Service
Pacific Northwest Research Station

NeRC

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Estimates of Potential Wood Energy Demand in Alaska: the 30% Question

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Why wood energy in Alaska?

Policy goals

- Forest Service: 30% heating oil to wood conversion in 10 years goal for SE Alaska
- Tongass National Forest young growth transition
- State Renewable Energy Goal: 50% of the state's electricity from renewable sources by 2025

Economic goals

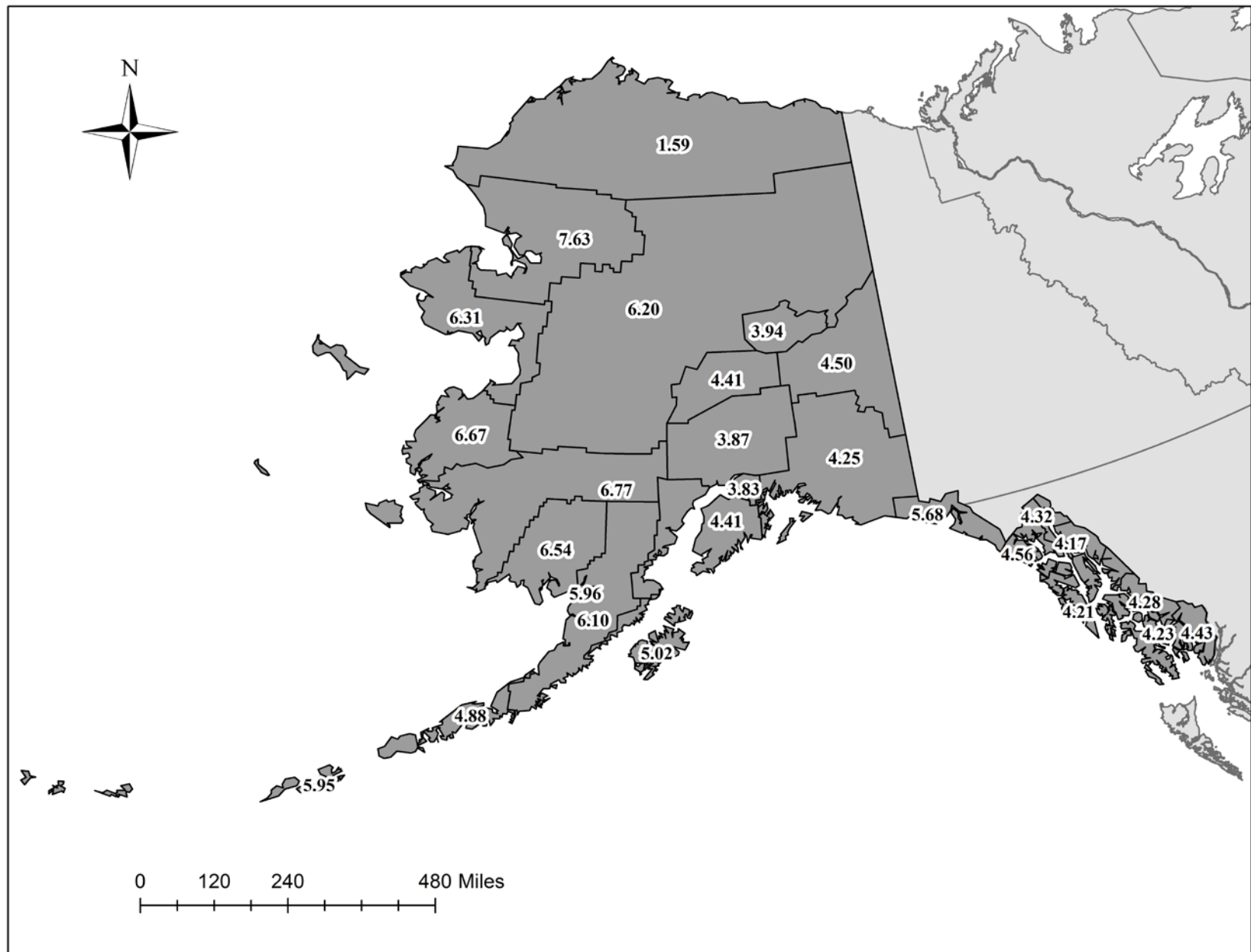
- High (and highly variable) energy costs
- Stress on hydroelectric resources
- Create markets and utilization for mill residues and low-grade material
- Local job creation

Methods overview

- Estimate **potential** demand for wood energy products
- Focus on residential, commercial, and industrial sectors
- Estimate the space heating energy needs of those sectors
- Derive the amount wood material necessary to replace 30% of heating oil
- Project and distribute additional harvest among three SEAK landowners

Heating oil prices in Alaska are **high and variable**

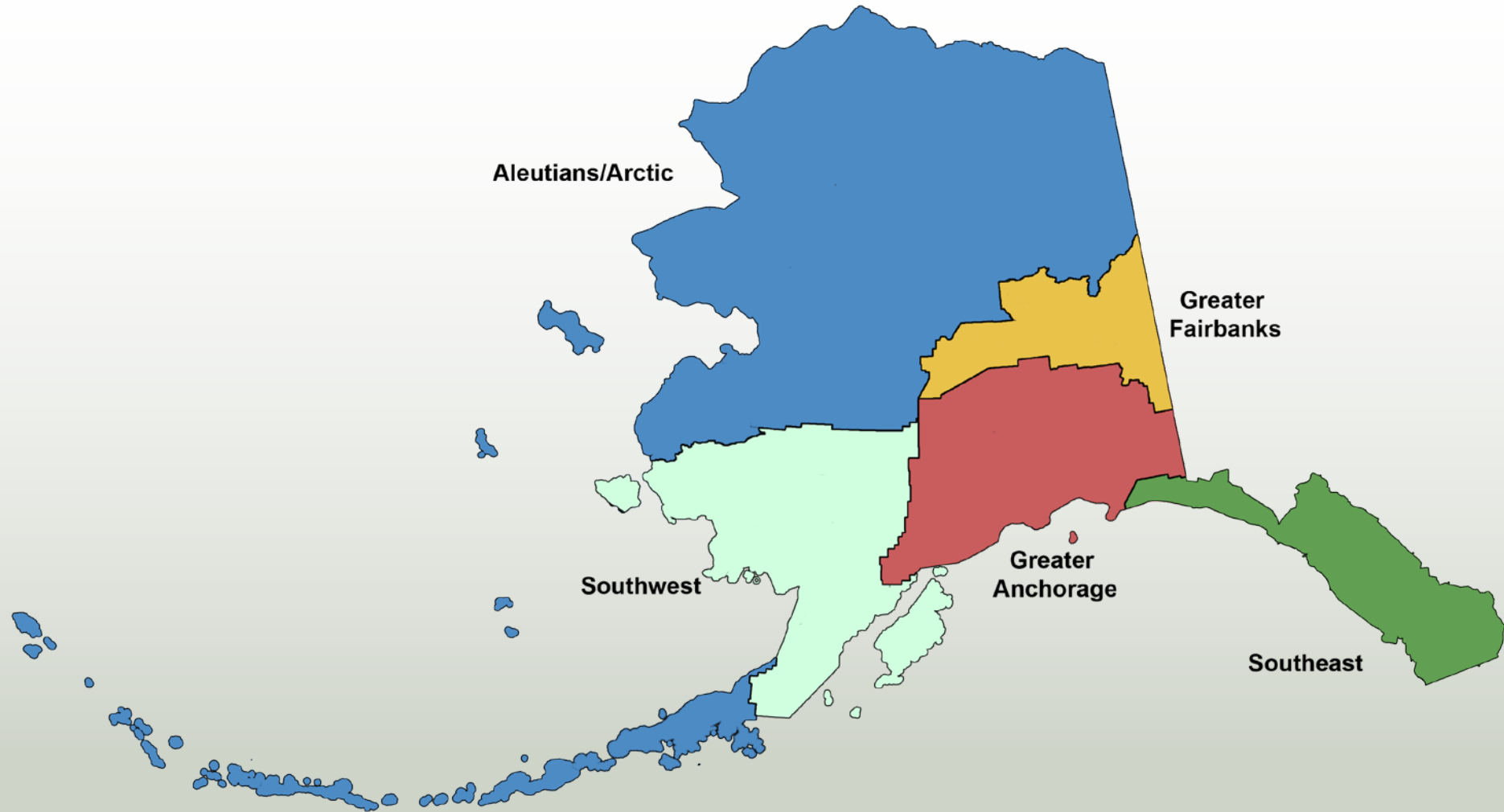
2012 statewide average price:
\$170.30/Barrel
\$3.25/Gallon



Heating oil consumption

- Data: U.S. Energy Information Administration (EIA)
U.S. Census Bureau
- Residential sector: per household consumption estimate
- Adjusted for heating degree days
- Prorated by number of households

$$\left[\frac{\text{State total consumption}}{\# \text{ of homes of fuel type}} \right] \times \text{climate adjustment} = \text{consumption per home}$$



Alaska residential heating oil use and roundwood equivalent, 2012

Region	Heating oil homes (#)	Average Btu per home	Therms needed for conversion	Cord wood (Cords)	Roundwood (MBF)
Aleutians and Arctic	8,482	125,958,967	9,295,930	44,763	86,776
Greater Anchorage	18,636	95,059,470	15,173,253	73,064	141,640
Greater Fairbanks	29,781	122,768,136	32,022,967	154,200	298,929
Southeast	19,232	73,540,247	11,953,888	57,561	111,588
Southwest	9,344	100,116,812	7,918,469	38,130	73,918
Total (average)	85,475	98,835,917	76,364,507	367,717	712,851

30% roundwood equivalent by sector, SEAK, historic

Year	Residential		Commercial		Industrial		Total	
	Billion Btus	MBF	Billion Btus	MBF	Billion Btus	MBF	Billion Btus	MBF
2003	433	40,385	166	15,479	408	38,021	1,007	93,885
2004	497	46,283	206	19,233	388	36,184	1,091	101,700
2005	477	44,418	179	16,708	355	33,119	1,011	94,245
2006	569	53,005	208	19,366	406	37,882	1,183	110,253
2007	429	40,000	175	16,293	500	46,612	1,104	102,905
2008	367	34,239	218	20,362	503	46,924	1,088	101,525
2009	442	41,153	195	18,153	612	57,022	1,249	116,328
2010	443	41,263	343	31,955	456	42,524	1,242	115,742
2011	410	38,217	311	28,949	615	57,317	1,336	124,483
2012	399	37,202	264	24,597	754	70,256	1,417	132,055



Modelling assumptions

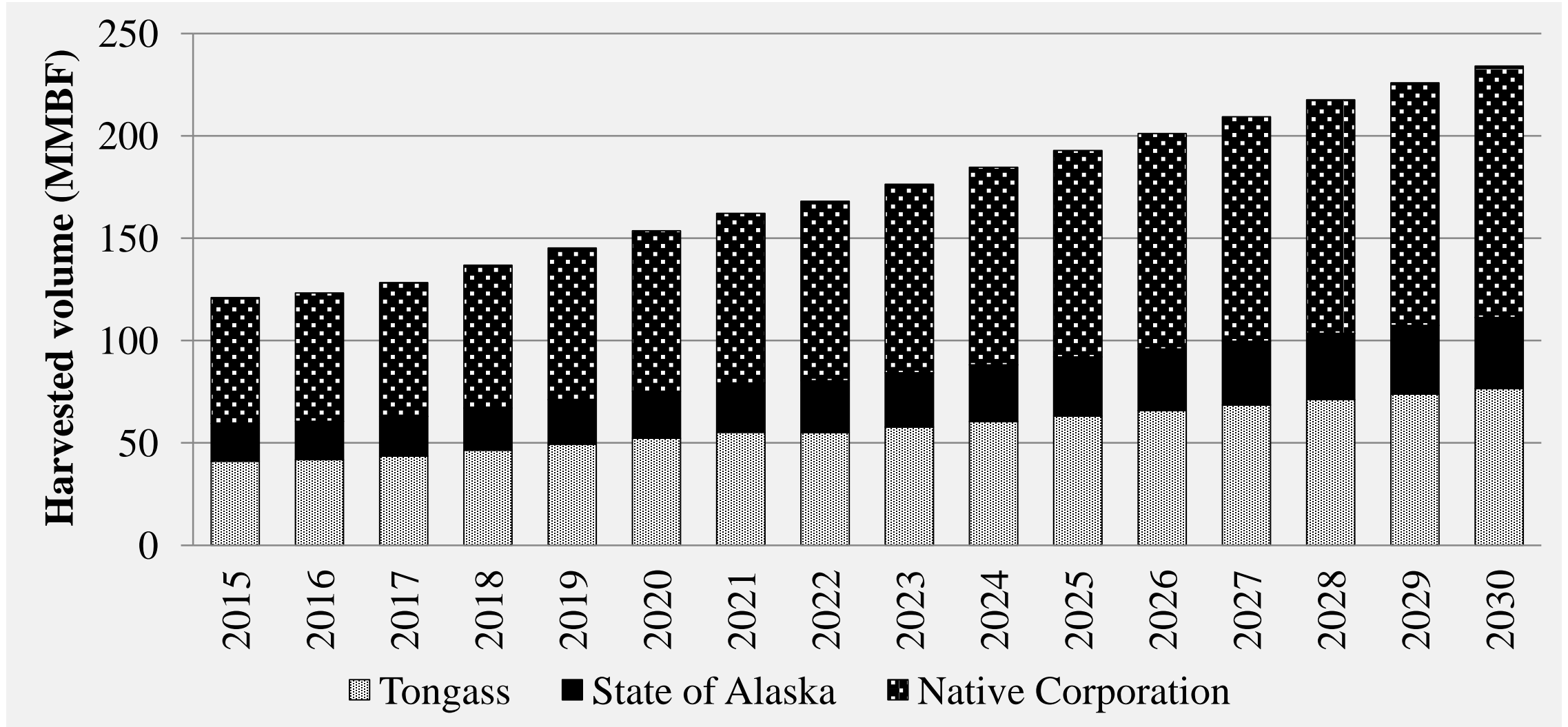
Target:

- 30% of SE 2012 heating oil consumption in residential, commercial, industrial sectors
- **1.4 trillion Btus = 70.8 billion Btus annually**

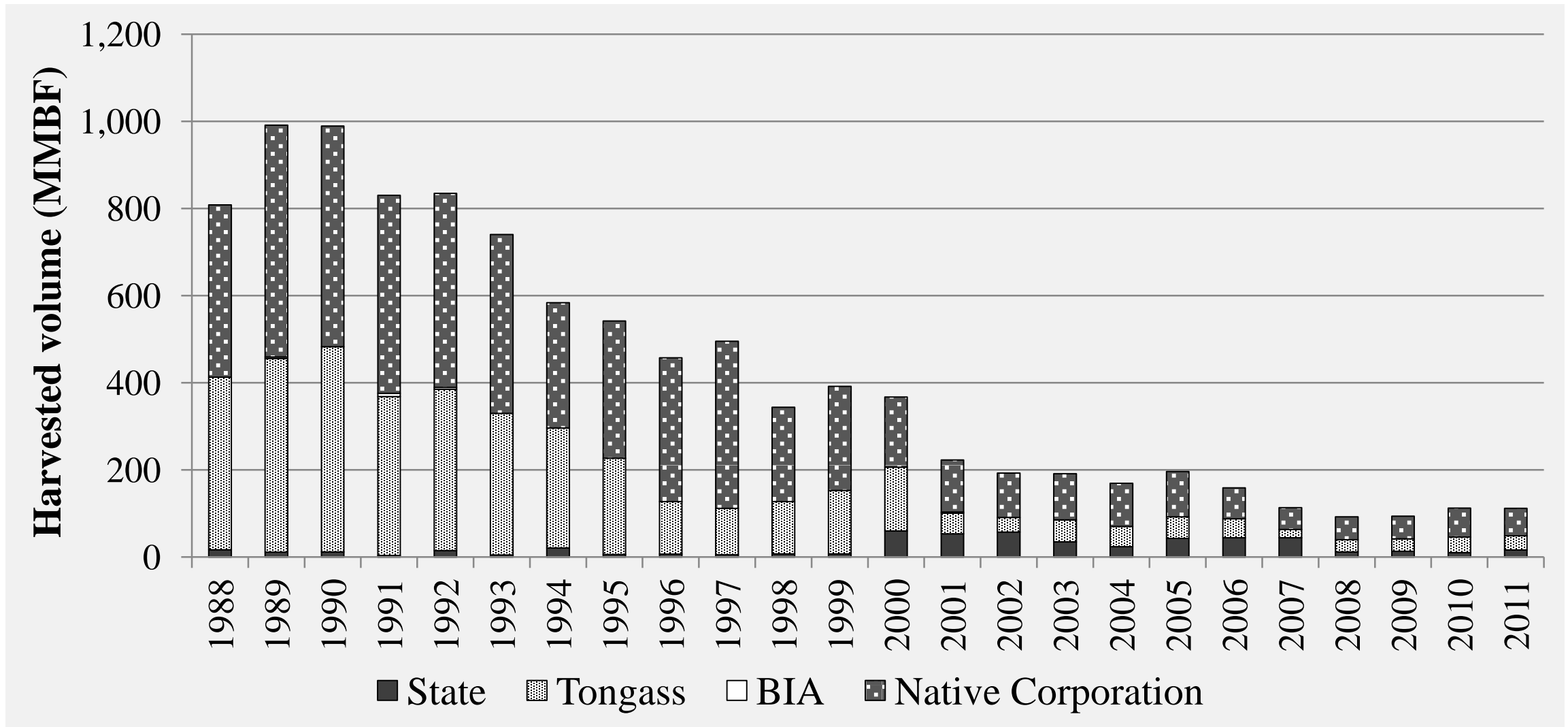
Assumptions:

- Phase in 5% of goal per year starting in 2015
- New equipment is 65% efficient
- Moisture content
- Mill residues and utility grade logs are available for energy
- Additional harvested material will be utility grade
- Harvest distributed equally among Tongass National Forest, State, and Native Corporation

Results: projected SE harvest by owner



But... timber harvest in Southeast Alaska, 1988 - 2011



Conclusions

Goal is ambitious

- To meet the 30% goal, entities must convert at a rate of 7% per year for 15 years
- Rate of adoption, market penetration unknown

Barriers likely

- Harvest impacts contentious
- Transportation networks
- Air quality