

Beyond Oil: Two Roads Diverge



Daniel Lashof, NRDC
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The road not taken

Two roads diverged in a wood, and
I—
I took the one less traveled by,
And that has made all the
difference.

Robert Frost, 1920

Two paths to replacing oil

Green

- Hybrid vehicles
- Plug-in hybrids w/clean electricity
- Low GHG biofuels
- CO2 for EOR
- H2 from renewables or coal w/CCS?

Brown

- Coal liquids
- Oil shale
- Tar sands
- Corn ethanol w/dirty heat input
- H2 from coal w/o CCS

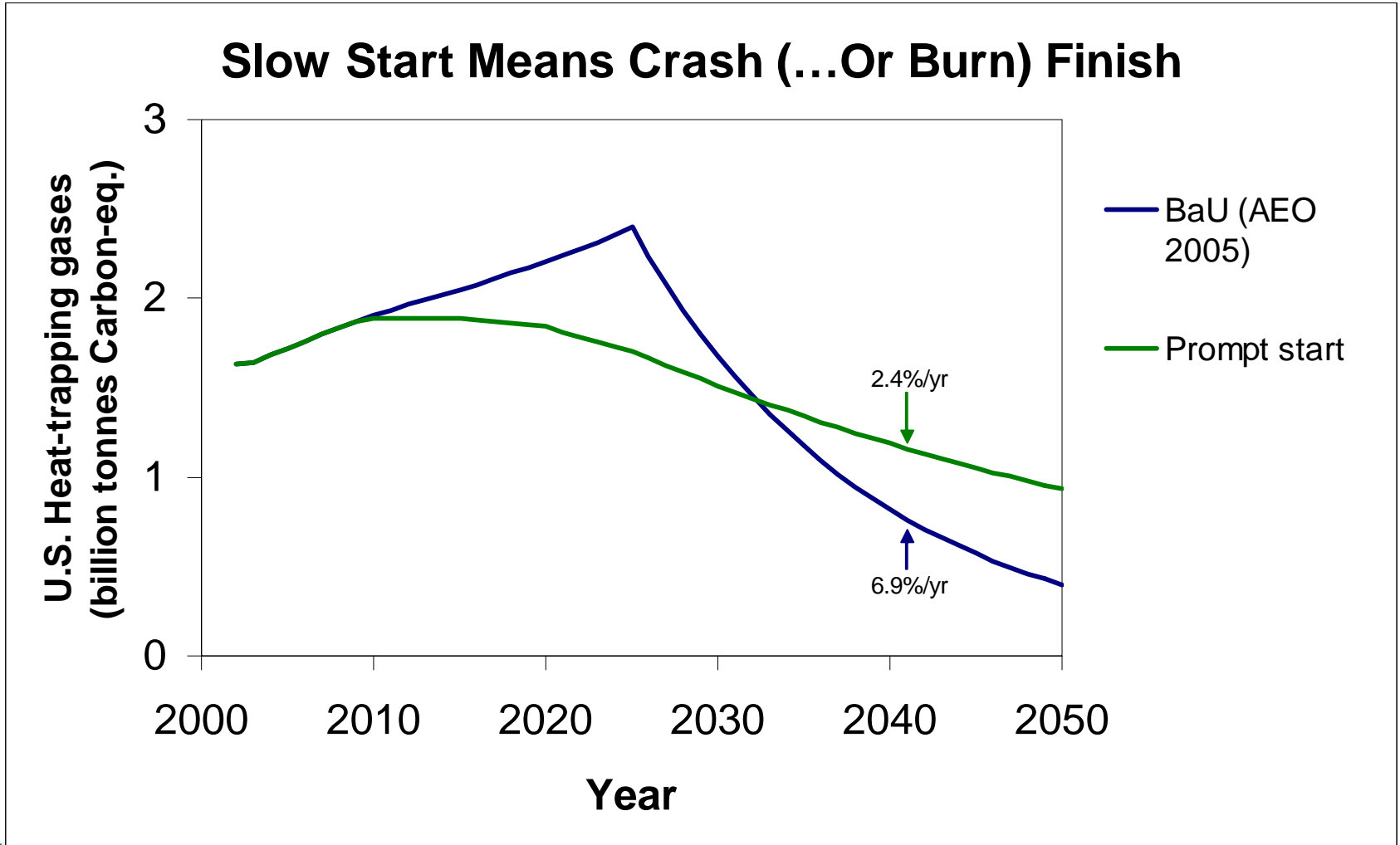
Brown path

- Global warming
- Conventional pollution
- Mining impacts

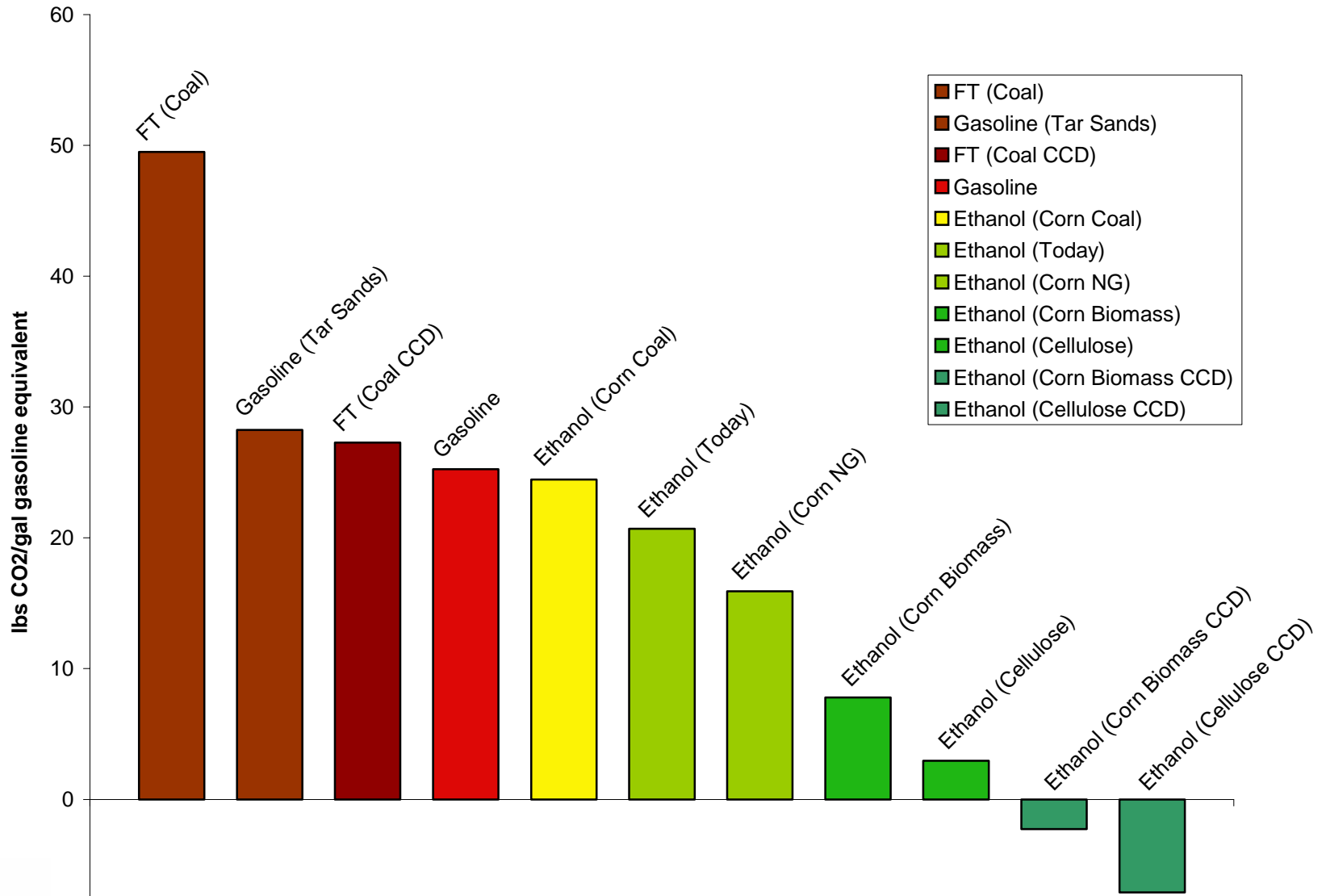


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Slow start, crash finish



Brown fuels v. Green fuels



Biofuels can compete

- To be more than a fuel additive, biofuels need to reach a price where they don't need subsidies
- Advanced cellulosic ethanol will be able to compete not just at today's high prices

Wholesale Price (\$ per Gal Gasoline Equivalent)		High	Average	Low
Advanced Cellulosic Ethanol (depending on technology and scale)		\$0.91	\$0.77	\$0.59
Gasoline	2000-2004	\$1.50	\$0.91	\$0.44
	2025 - EIA Forecast	\$1.03	\$0.79	\$0.48

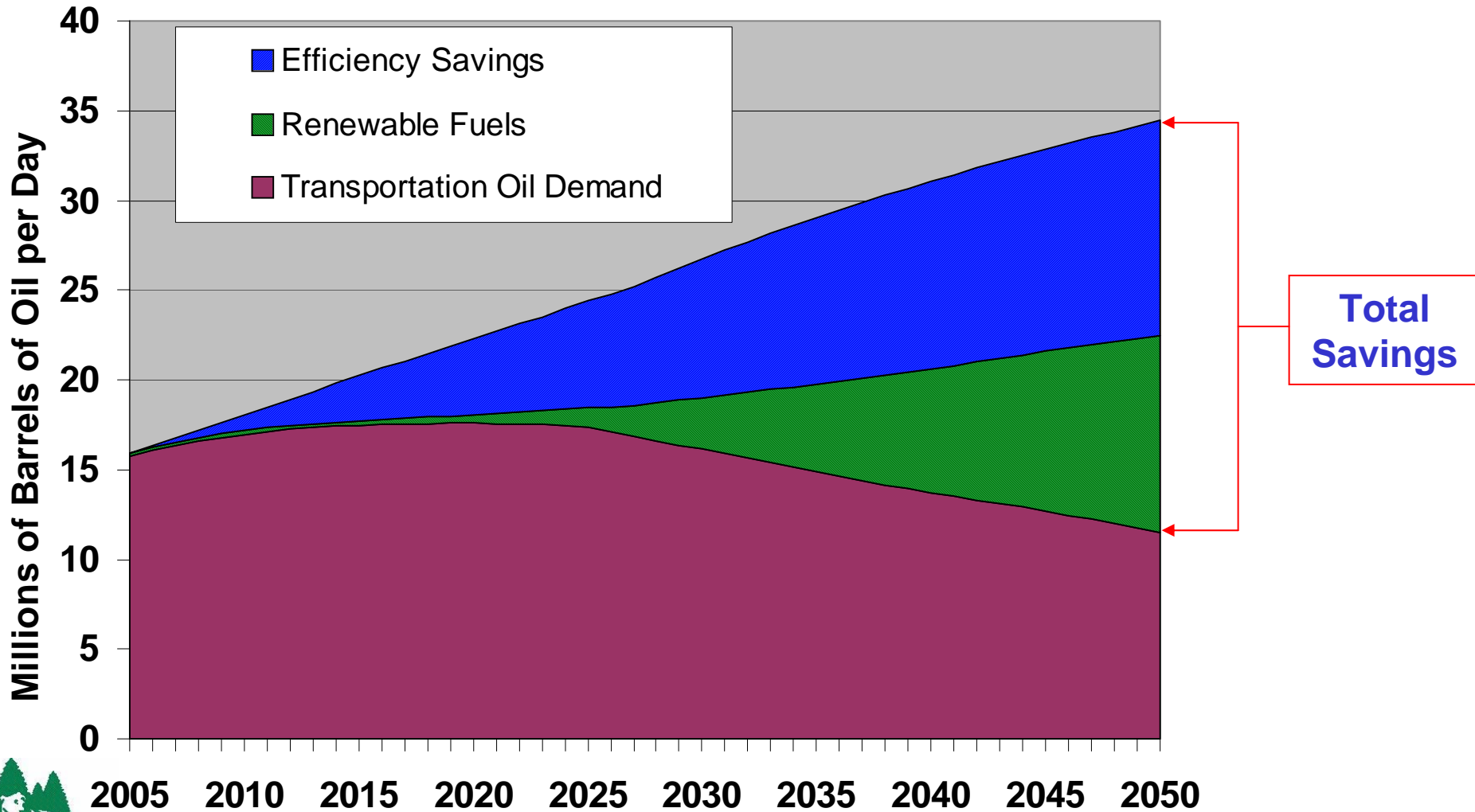
Land need not be a constraint

	<i>Gasoline Demand</i> (B. Gal. Gas-eq.)	<i>Switchgrass Yield</i> (dt/acre/year)	<i>Conversion Efficiency</i> (Gal. Gas-eq/dt)	<i>Land Needed</i> (Mill. Acres)
<i>Status Quo 2050</i>	289	5	33	1753
<i>Production and Efficiency Gains</i>				
<i>Smart Growth/Efficiency</i>	108	5	33	657
<i>Conversion Efficiency</i>	108	5	69	313
<i>Biofuels Coproduction</i>	108	5	77	282
<i>Switchgrass Yield</i>	108	12.4	77	114

Alternative Sources of Land and Biomass

<i>Protein Recovery</i>	Replace 50-100% of 73 million acres of soybean	41 - 77
<i>Corn Stover</i>	Collect 75% of 323 million tons of corn stover	21 - 58
<i>CRP Land</i>	Convert 33-50% of CRP acreage into switchgrass	6 - 48

Green path



Getting on the path: S.2025/H.R.4409

- Vehicles and Fuels Choices for American Security Act of 2005
 - Senate sponsors: Bayh (D-IN), Brownback (R-KS), Coleman (R-MN), Graham (R-SC), Lieberman (D-CT), Lugar (R-IN), Obama (D-IL), Salazar (D-CO), Bingaman (D-NM), Cantwell (D-WA)...
 - House sponsors: Vice Chair of the Republican Leadership Conference Rep. Kingston (R-GA), Rep. Saxton (R-NJ), and Rep. Engel (D-NY) and 22 other cosponsors
- National oil savings requirement: 2.5 million bbl/day day in 2015, increasing over time.
- Flexibility and accountability: achieved through a menu of existing and new authorities and incentives;
- Incentives and standards:
 - Retooling incentives for production of efficient vehicles
 - Authority to set efficiency standards for tires and heavy duty trucks
 - Flexible fuel vehicle mandate and biofuels incentives
 - Smart growth incentives

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