

The Present & Future State of The U.S. Biomass Pellet Industry

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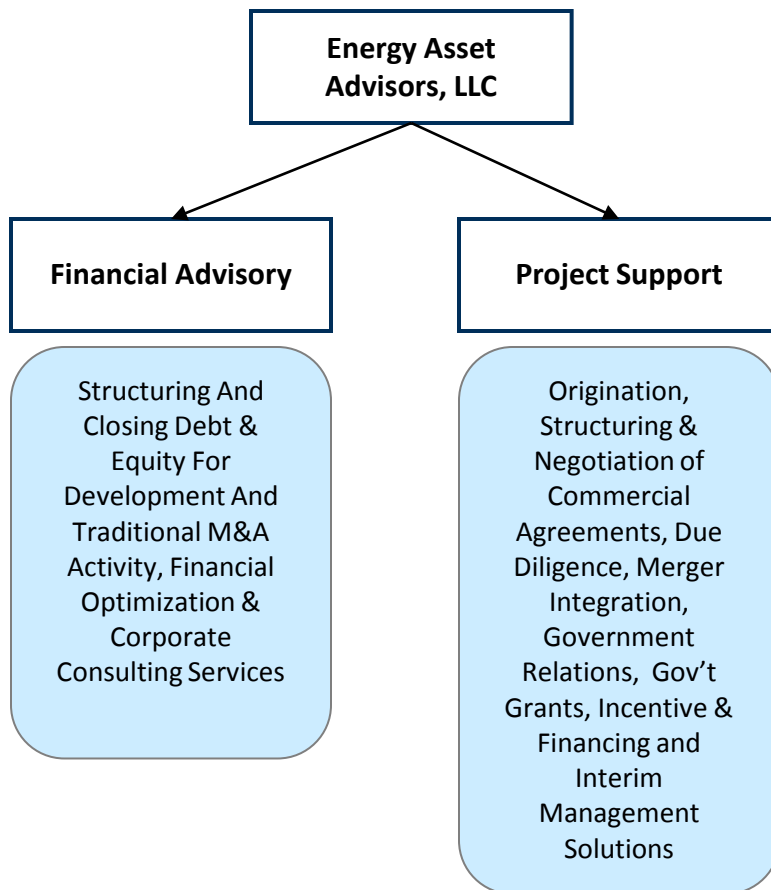
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Firm Overview

Energy Asset Advisors, LLC provides full-lifecycle financial advisory & project support solutions to Clients in the renewable & conventional energy industries.



Why EAA?

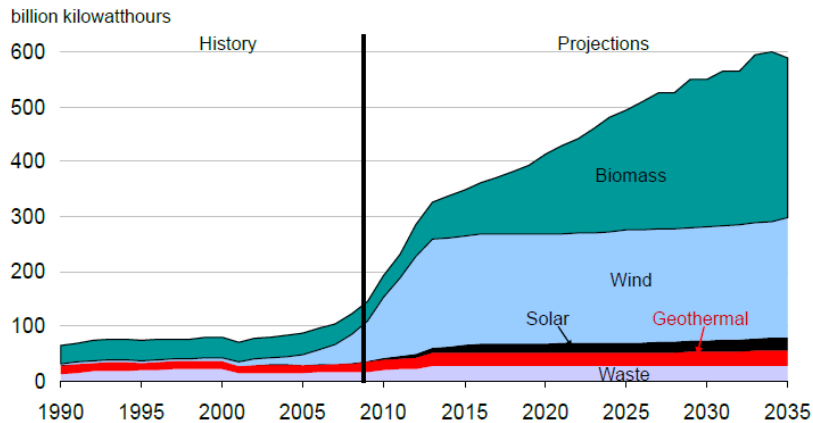
- Seasoned professionals that average 20 years of energy financial service experience
- Unique experience as members of middle-market and bulge bracket sell side firms as well as private equity investment firms
- Strong experience with conventional & renewable energy projects technologies
- Dedicated senior level professionals to ensure efficient execution
- Boutique firm that provides small and mid-cap companies with bulge-bracket service
- A local, national and international network of energy investors
- Strong sense of urgency: In a transactional world, timing and accuracy drive successful deal execution



State of the Market - US

Biomass power & Biofuels are an important and growing component of the broader energy industry

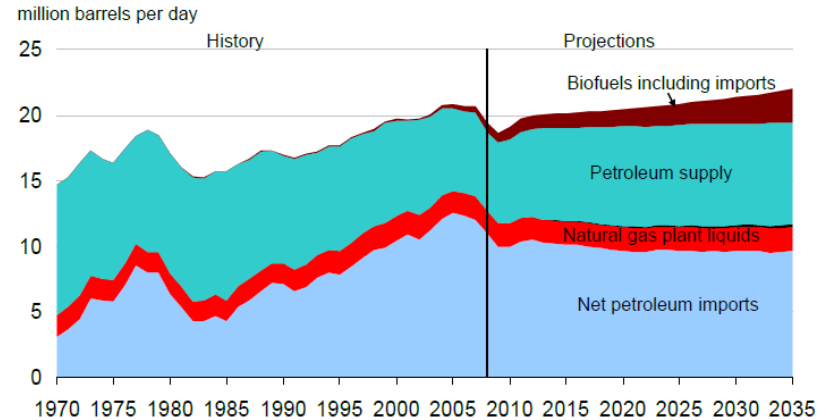
Nonhydropower renewable sources meet 41% of total electricity generation growth from 2008 to 2035



eia Richard Newell, SAIS, December 14, 2009

Source: Annual Energy Outlook 2010 21

Biofuels meet most of the growth in liquid fuels supply



eia Richard Newell, SAIS, December 14, 2009

Source: Annual Energy Outlook 2010 10

State of the Market - US

Despite its importance for power & fuels, the domestic biomass industry as a whole is challenged

- **Cost / MWh**

- Unlikely to be competitive w/natgas or coal w/o carbon / GHG legislation
- Wood Chips can competitive w/solar & wind
- Wood Pellets too pricey w/o carbon / GHG legislation

- **EPA**

- Tailoring (3 yr breather)
- Boiler MACT & CISWI – new rules being implemented
- Hostile legislative climate

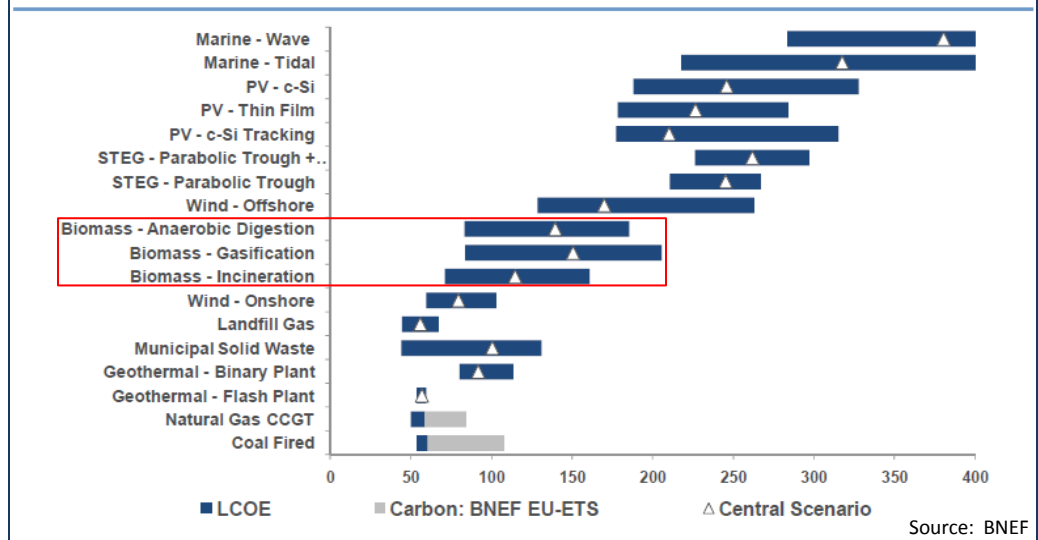
- **Environmentalists / Public Opinion**

- Serious misunderstanding / mistrust of industry practices (esp. sustainability) and carbon-neutrality of biomass
 - “Nothing that burns can be good!”

- **Rays of Hope**

- State-level RPS
- BCAP
 - Partially defunded by budget compromise

Levelised cost of energy, Q3 2010 (\$/MWh)



State of the Market - EU

In the absence of US federal carbon policy and with continued spiraling demand from EU countries, the US biomass pellet industry will remain almost entirely export focused

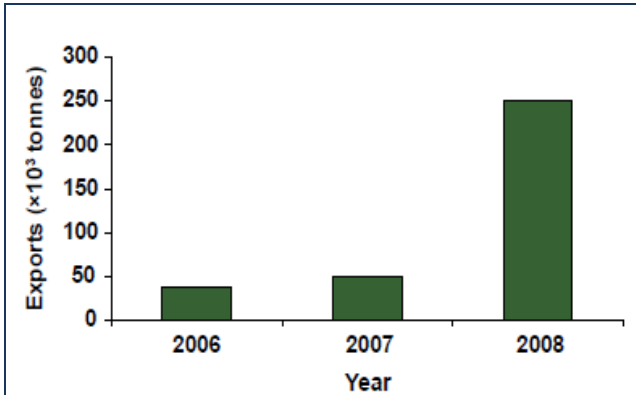
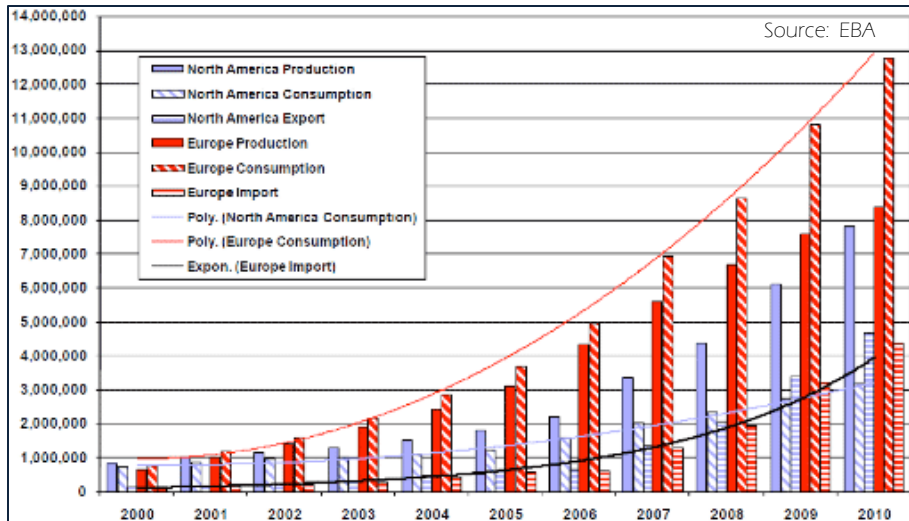
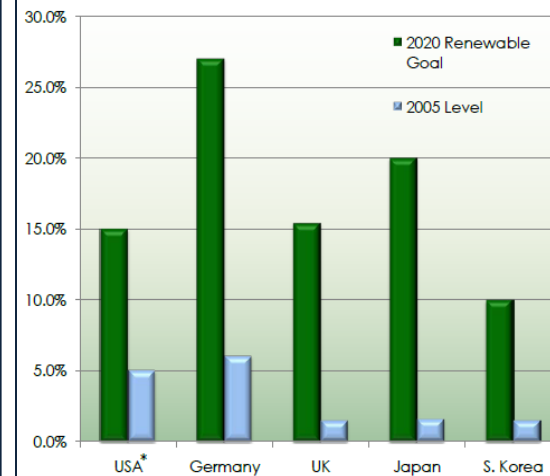


Figure 4—United States pellet and waste wood exports (U.S. International Trade Commission 2009).

Source: USDA



Renewable Portfolio Standards vs. Current Generation

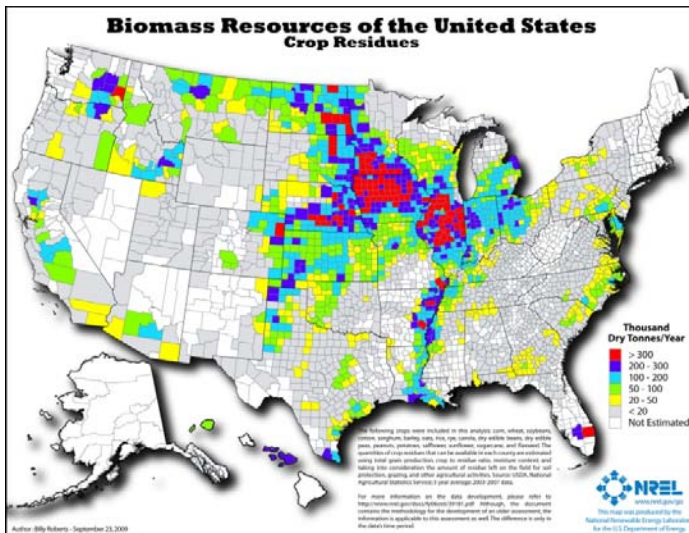
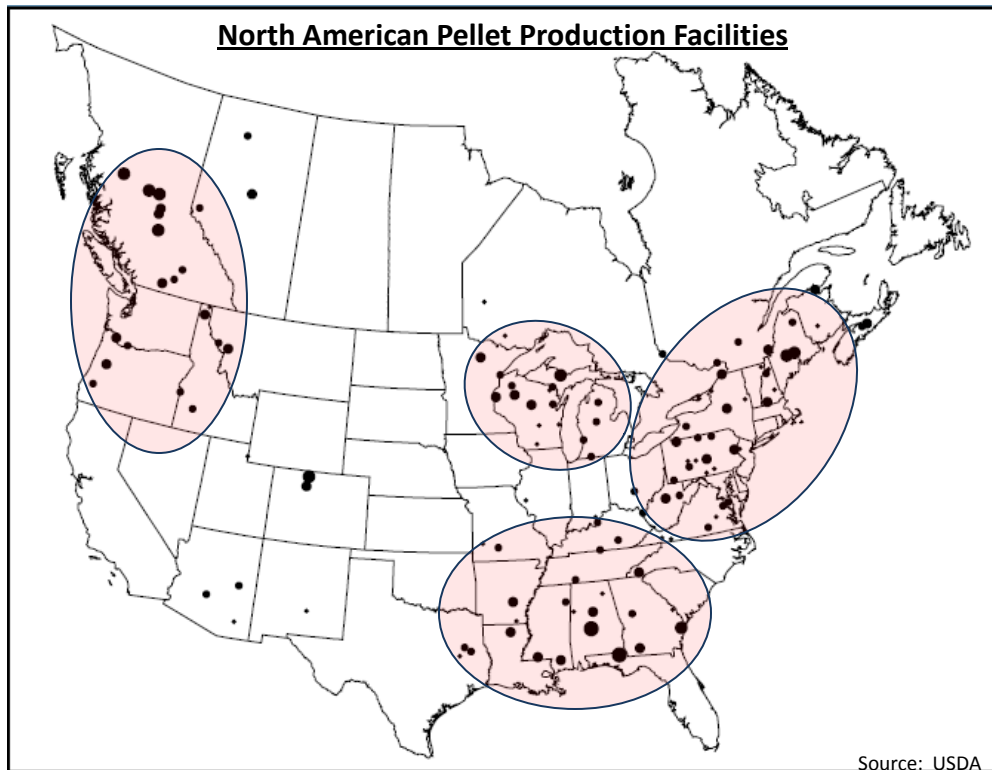
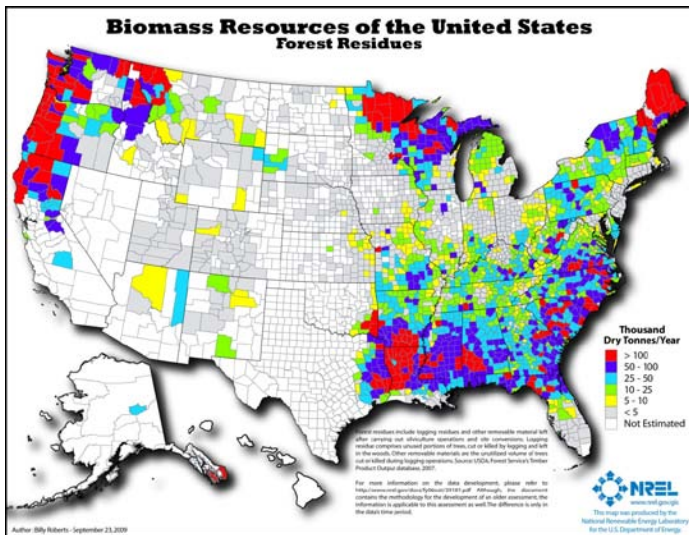


72 nations have legislated use of renewables to mitigate climate change.

Renewable power production needs to grow dramatically to satisfy aggressive goals for national Renewable Portfolio Standards.

State of the Market

(Biomass Resources & Pellet Production)



Despite EU subsidies favoring ag-oriented biomass, US production will remain largely focused in forest-dense areas due to existing pulp & paper infrastructure & favorable port access

State of the Market

(Business Models)

- **Business Models**

- All Export Driven / Oriented
- Majority Model
 - US-sited, US-owned (Undisclosed Client)
 - Can include cellulose coops
- Minority Models
 - US-Sited, Foreign-Owned (Green Circle)
 - Foreign-Sited, US-Owned (Undisclosed Client)

- **The “Dixie Green” Hangover**

- Still a factor for US investors

State of the Market

(The Impact of Torrefaction)

- European utilities willing to do things for start-up torrefaction entities that they won't do for standard pellet companies
- View from Europe is that torrefaction is the best way forward
 - Cap on standard pellet opportunities / development
- Europe getting short on time to line up the biomass supply chain

Fuel	Energy Value per Ton	Moisture Content	Hardgrove Grindability Index	Density	Ash Content	Storage Behavior
Southern Pine Green Chips	4,100 – 5,700 Btu	35% -50%	20 - 25	19 - 23 lb/ft ³	~8%	Prone to Mold & Decay
Ag Residues (Corn Stover)	7,000 Btu	10%	Unknown		~7%	Prone to Mold & Decay
Wood Pellets	7,800 – 8,000 Btu	5% -10%	25 – 28	38 - 43lb/ft ³	1% - 5%	Prone to Mold & Decay Explosion Risk
Ag Residue Pellets	7,000 – 7,500 Btu	8% – 12%	Unknown	40lb/ft ³	8% - 9%	No Data
Bituminous Coal	10,000 – 14,000 Btu	5% - 25%	50	50 – 53 lb/ft ³	5 – 10%	Stable
Torrified Pellets	9,500 – 11,000 Btu	< 3 % (Hydrophobic)	50 - 55	45 – 52 lb/ft ³	~4%	Stable

State of the Market

(Noteworthy Deals)

Company	Investor	Location	Size	Investment	Strategic / Financial	Type
Intrinity <i>(Enviva)</i>	Riverstone	US <i>(Various)</i>	1.3M / TPY <i>(# plants - projected)</i>	\$250M	Financial	Standard Wood Pellets
Georgia BioMass	RWE	US <i>(Georgia)</i>	750K / TPY	\$150M	Strategic (Power)	Standard Wood Pellets
Pinnacle Pellets	Various	Canada	750K / TPY <i>(5 plants)</i>	Unknown	Unknown	Standard Wood Pellets
Pacific BioEnergy	Electrabel	Canada	225K / TPY	\$23.5M	Strategic (Power)	Standard Wood Pellets
Suzano Energia Renovavel	Suzano Papel e Celulose SA	Brazil	3 x 1M / TPY	\$1.3B	Strategic (Paper)	Standard Wood Pellets
CONFIDENTIAL	Undisclosed <i>(Pending)</i>	US <i>(Various)</i>	250K / TPY <i>(projected)</i>	Undisclosed <i>(Pending)</i>	Undisclosed <i>(Pending)</i>	Torrefied Biomass Pellets
CONFIDENTIAL	Undisclosed <i>(Pending)</i>	US <i>(Various)</i>	100K / TPY <i>(projected)</i>	Undisclosed <i>(Pending)</i>	Undisclosed <i>(Pending)</i>	Torrefied Biomass Pellets
Topell	RWE	Europe <i>(Netherlands)</i>	60K / TPY <i>(projected)</i>	\$21M	Strategic	Torrefied Biomass Pellets
Other Torrefied Biomass Firms <i>(Stramproy, Torrsys, Rotawave)</i>	Various	Various	200K / TPY <i>(# plants - projected)</i>	\$75M	Various	Torrefied Biomass Pellets

Final Thoughts – Take Aways

- The biomass industry is becoming mature
 - Entry of commodity markets, indices & trading firms
- Biomass is a supply chain game
 - He with the best supply chain (least cost, most sustainable & reliable) wins
- BTU's matter, but technology is irrelevant (assuming you can prove it works)
- New product offerings have disruptive potential
 - Esp. Torrefaction
- Export markets will drive biomass pellet deals for the foreseeable future
 - Accordingly, export market sensitivities – especially sustainability of supply – will be keys success factors
- Solid deals – strong management, clear economics & good plans – will continue to be funded
 - Likely sources will be European and other foreign investors (see “Add'l Content”)
- US energy policy disconnects will not resolve in the near-term
 - Biomass – power & fuel – will continue to be a renewable energy “stepchild” (see “Add'l Content”)



Final Thoughts – Wild Cards

- US adoption of CES / RPS / Carbon Legislation
 - Depending on the details, could create a major shift of focus by US utilities, IPPs and investors
- EU economic collapse
 - Would likely lead to a curtailment of current renewable energy subsidies, depressing the export market
- Supply disruptions
 - Unpredictable disruptions related to shipping, stumpage, environment, etc. will be a persistent worry for investors

- **Biomass**

- *For a project-specific view of the biomass pellet market, visit our website at <http://www.energyassetadvisors.com/keys-to-financing-a-biomass-pe/>*

- **US Energy Policy**

- *For our view of an integrated path-forward for US energy policy, see our presentation “Changing the Game for US Renewable Energy Policy” available on our website at <http://www.energyassetadvisors.com/integrating-us-energy-policy/>*

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