

**TRANSFORMING WASTE
BIOMASS MATERIAL
INTO NEXT GENERATION
BIOMASS FUELS**

January 2023

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About Active Energy Group

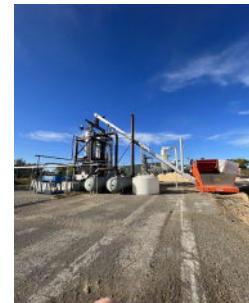
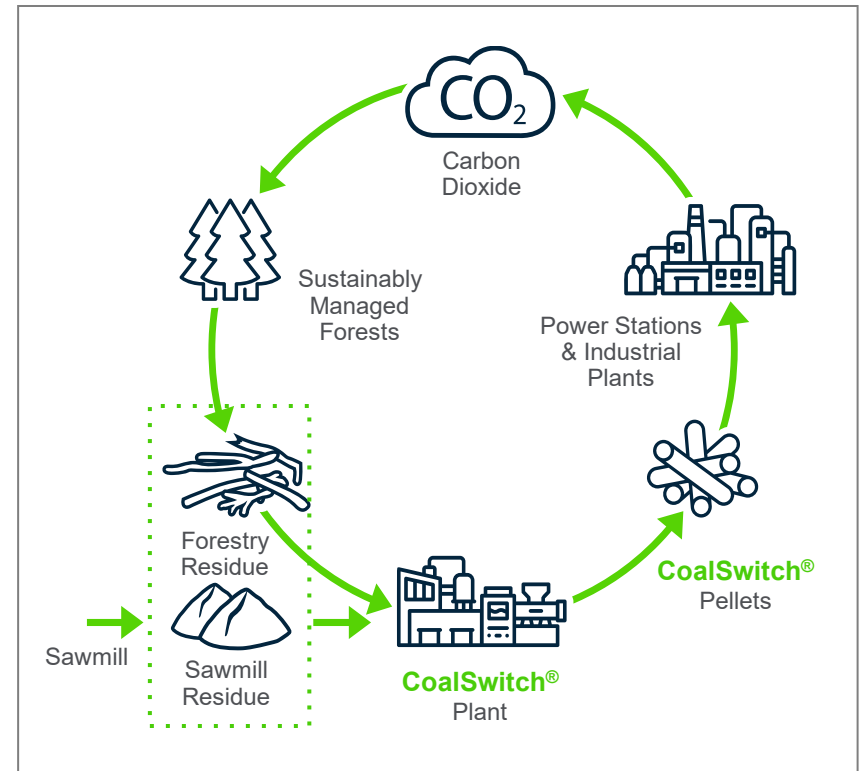
- Active Energy produces a superior biomass pellet:
 - in terms of heating values;
 - improved its ability to co-fire with coal at existing power facilities; and
 - improved environmental credentials
- Active Energy focuses on utilizing low value waste residuals as the core feedstock for **CoalSwitch**[®]
- Huge market opportunity in various industries to utilize Active Energy's **CoalSwitch**[®] to meet current and future environmental regulations without capital expenditure at current plants
- Active Energy is working on all options to increase production levels in North America either through both large scale to smaller scale joint venture projects

- **It is a better pellet. *Period.***
 - Higher heating value than current white pellet production
 - Proven hydrophobic qualities
 - Handles and burns much like coal only cleaner
- **Exclusive use of low value waste feedstock**
 - Boosts lifecycle analysis values, reduces negative perception/reputation
 - **CoalSwitch®** pellet fuel meets established sustainability standards
 - Used low-value waste residuals in first production
- **Extensive Testing Program shows consistent burn test results**
 - **CoalSwitch®** has been tested for its proprietary qualities as a biomass fuel and for its co-firing performance with coal.
 - Prospective customers own testing confirms reduced emissions levels.



Source: AEG

- **Proven production process for next generation pellets**
 - Reference plant constructed and operated in 2021
- **Successfully produced test volumes and delivered to customers**
 - In 2021 and through 2022 fuel delivered to program partners and future customers in US and internationally.
- **Production technology patents awarded**
 - First round patents already obtained in US & Canada, and South-East Asia
- **A revised plant with new reactors for increased production is now in the final stages of development and construction by our engineering partner, Player Design, Inc.**



Source: AEG

AEG only utilizes forestry and lumbermill residuals – already proven in Maine

**COALSWITCH®
COMPETITIVE
USE
ADVANTAGE**

Forestry economics support sustainable sourcing

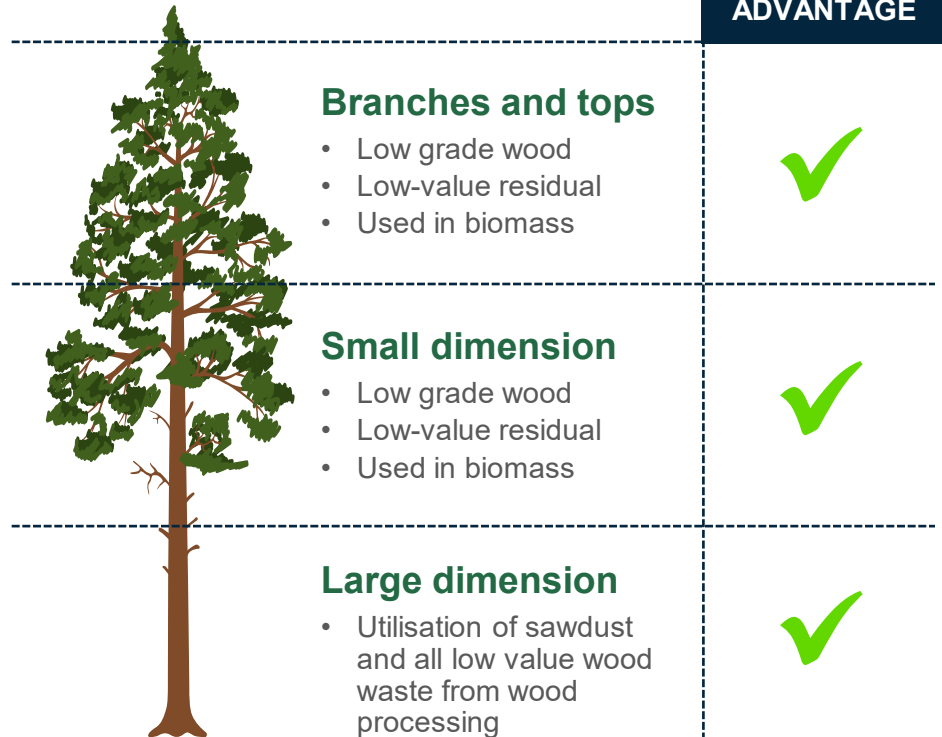
- Cutting down trees purely for biomass is not economic nor sustainable
- Commercial forest management is well regulated and controlled

Sawlogs are the primary economic driver for commercial forestry

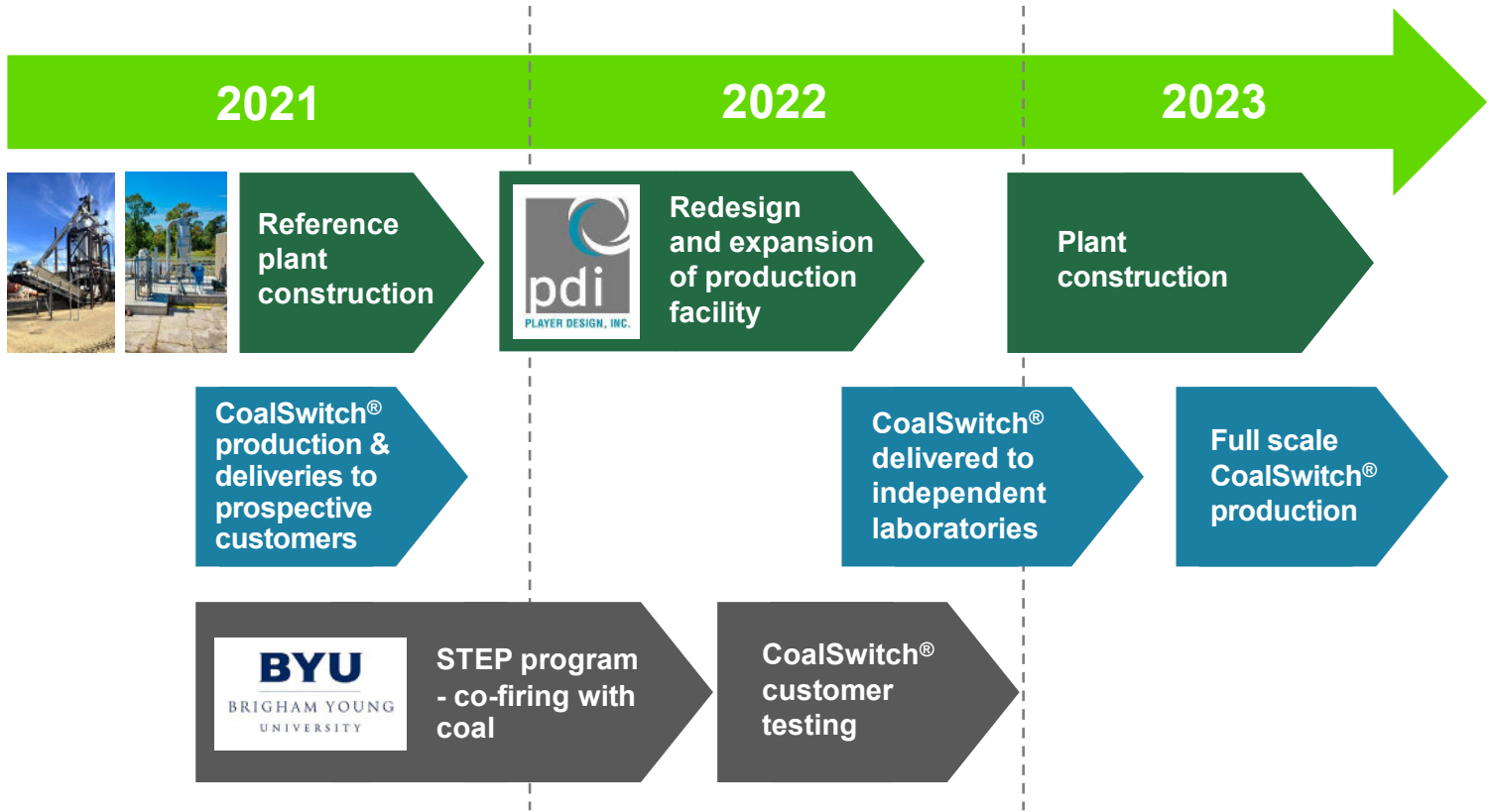
- We utilize their residuals, reducing waste and driving additional revenues

Biomass generation should use all low-grade residuals

- Forest sourced thinnings, branches, tops and other low-grade wood
- Sawdust and chips from wood processing plants



Sustainability - the vital component in future biomass production



STEP Program Partners:



 **BYU**
BRIGHAM YOUNG UNIVERSITY
 **THE UNIVERSITY OF UTAH**
 Chalmers University of Technology
 **ROCKY MOUNTAIN POWER**

Engineering Partner



pdi
PLAYER DESIGN, INC.



BYU: Test Furnace - Source: AEG

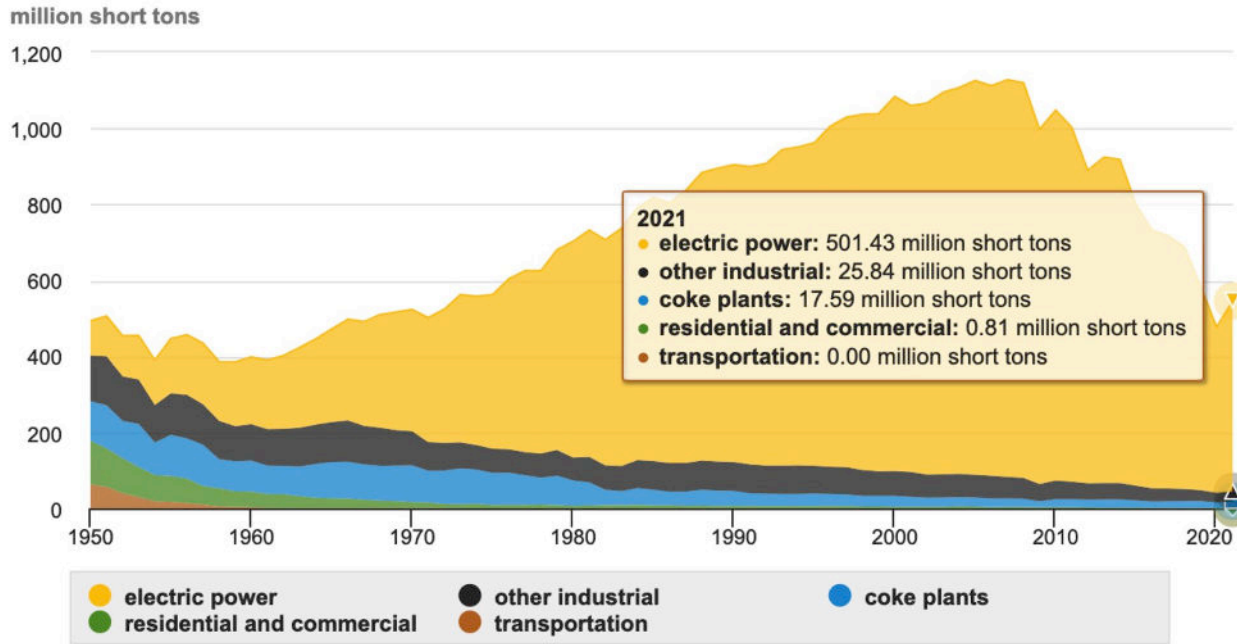


***Our Market
Opportunity***

- **Companies are facing regulations to reduce or eliminate CO₂ emissions from operations**
 - US EPA regulates CO₂ emissions across many sectors
 - IRA has introduced emissions reductions circa 40%
- **Companies are voluntarily choosing to reduce or eliminate CO₂ emissions from operations**
 - 20% of the world's 2000 largest companies have NET ZERO declarations
- **Many of these hard-to-decarbonize industries turn to costly (and unproven) carbon capture technologies and/or costly carbon offsets**
 - Value of carbon offsets doubled between 2019 - 2020



U.S. coal consumption by major end users, 1950-2021



Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 6.2, May 2022, preliminary data for 2021

 Note: Coke plants are industrial coking coal plants; other industrial includes all other, non-coking coal industry use.

TRENDS:

- Coal will remain a key component of fuel supply in near/medium term
- Heavy industry/power generators under pressure to reduce emissions
- Tough decisions ahead between shut down Vs expensive Capex to introduce cleaner technologies
- Estimates show 7% of capacity scheduled to close by 2025*

*Source: Reuters

- AEG has established an active program to co-fire test coal and **CoalSwitch®**
- **CoalSwitch®** can be co-fired with immediate environmental and emissions benefits - **Proven**
- **CoalSwitch®** can be handled in power generation facilities with limited to zero cap ex required for reconfiguration
- **CoalSwitch®** provides opportunity to extend life of current coal plants and meet increasing and immediate environmental regulations.

| | PERFORMANCE IMPACT OF CO-FIRING (75% COAL / 25% COALSWITCH®) |
|---|--|
| Calorific Value: (BTU/lb) | Only a 7% drop from normal heating values |
| ASH CONTENT %: | Significant reduction of ash deposits - up to 77% |
| Grindability – use on bowl mill facilities | FULLY TESTED No degradation in bowl mill performance - lower energy consumption use |
| SOx / NOx Emissions | DRASTIC REDUCTIONS in both Sulfur Dioxide and Nitrogen Oxide emissions |
| Emissions | 18% Improvement in emissions values |

Source: AEG test data 2021/2022
* Utah Bituminous Coal

INDUSTRIALS



Pulp & Paper



Cement



**Power
Generation**



Steel

CONSUMERS & SMALL BUSINESSES



Retail Sales

How are we marketing CoalSwitch®?

- AEG is in active sales discussions with companies (both large & SME) in each of these sectors.
- Established process to deliver smaller quantities at outset, testing in a facility and then leading to long term supply contracts.
- Focused on future customers both internationally and establishing use in North America
- Targeting customers and industries with a corporate commitment for ESG
- Identifying customers that would benefit from seamless change from white pellets to black pellets



Our Approach


Key partners in Maine:



Ashland Facility, 2022

Ashland: Integrated with established infrastructure



 = Interstate 95

 = Railways

 = Port Facilities

First production volumes scheduled for Q1 2023

- **FSC® Chain of Custody (CoC) and Controlled Wood certifications - May 2022**

- Confirms production of **CoalSwitch®** will use forest-based materials from responsible sources and that the Company's suppliers have committed to the strictest standards currently governing forest management.
- Is the basic market prerequisite to permit biomass products to be sold into all of Active Energy's target markets.
- FSC® certification will support customers' corporate Environmental, Social and Governance (ESG) agendas.



The mark of
responsible forestry

- **Independent LifeCycle Analysis - July 2022**

- Shows **CoalSwitch®** reduces overall (lifecycle) emissions:
 - significant reduction in emissions compared to coal and;
 - significant reduction in emissions compared to natural gas



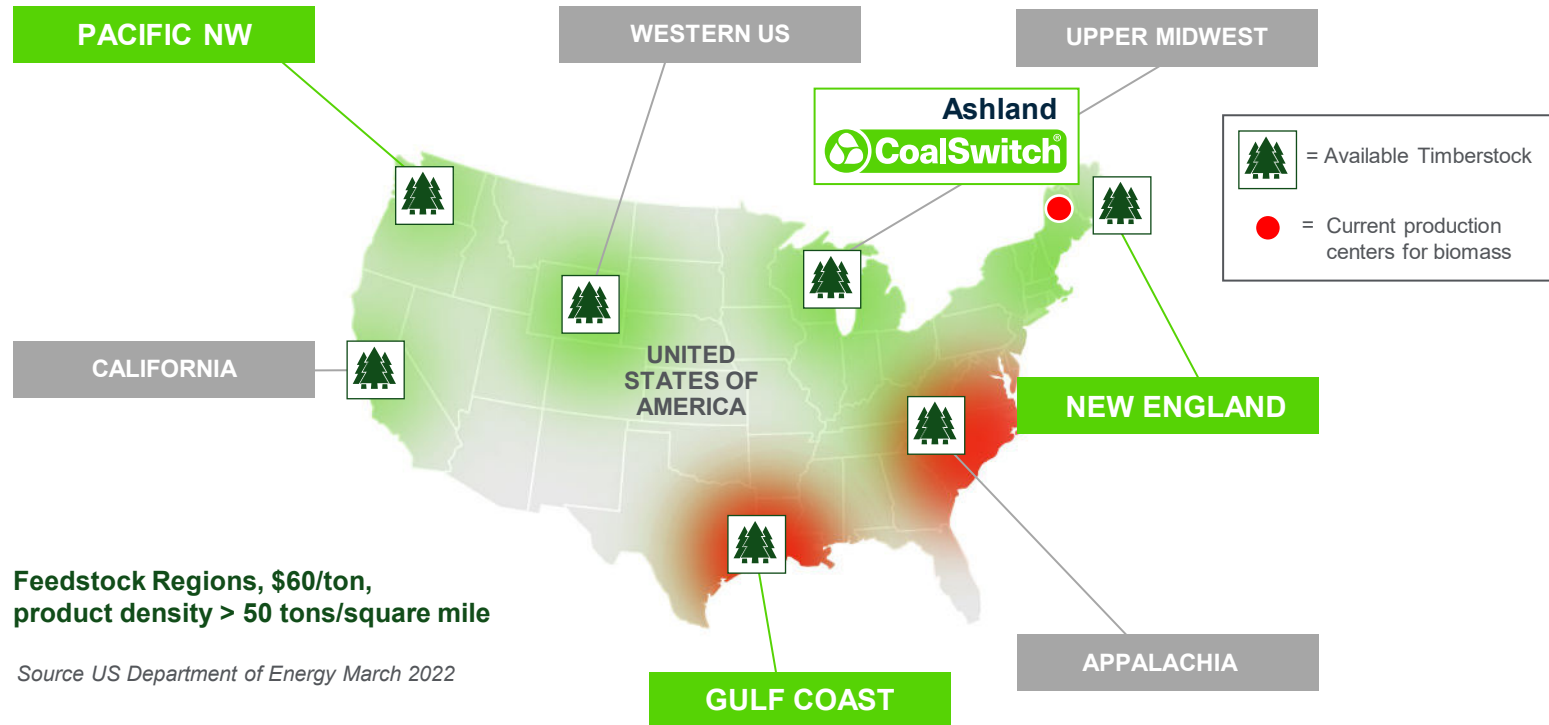
These two criteria already completed for future CoalSwitch® production in Maine



Providing long term licence and partnership revenues to AEG

- **AEG is focused on speed to market to scale up production levels**
- **AEG will focus on proprietary plants, with an initial optimum size of 100,000 tons per annum**
- **In addition, focus is on small scale CoalSwitch[®] production facilities which will encourage:**
 - Local production partners
 - Clusters of plants to benefit specific local opportunities
 - Simplify & reduce logistics costs
- **Joint Venture can provide immediate benefits:**
 - Accelerating production using existing sites & waste materials from these sites
 - Reducing Capex to establish **CoalSwitch[®]** production
 - Reducing on-going logistics costs

Opportunities for AEG in USA

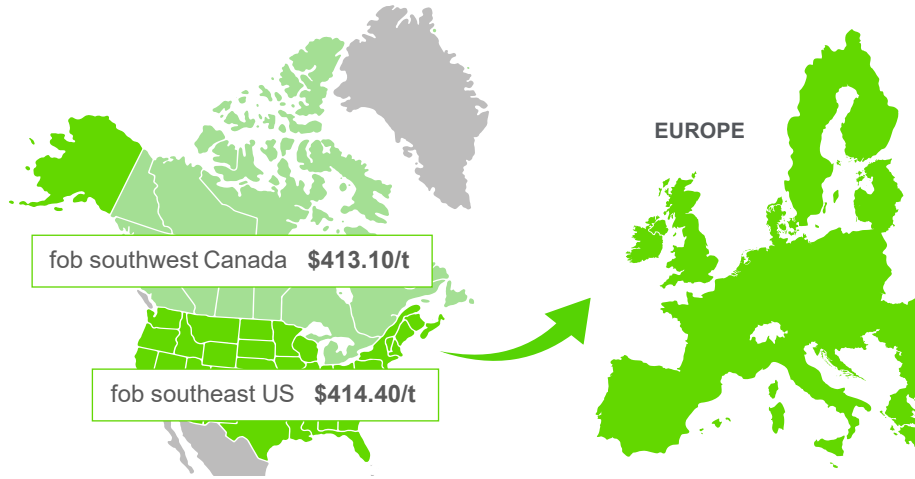


- Ashland presents the first commercial production centre for **CoalSwitch®**
- Breathes life into rural areas previously reliant on the lumber, pulp and paper industries
- New England, Pacific Northwest and Gulf Coast are regions of prime interest for future AEG expansion plans



Market and Illustrative Financial Information

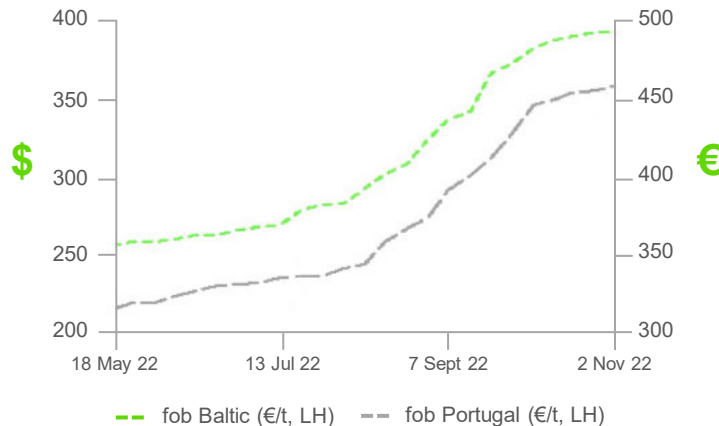
Industrial wood pellet spot prices at a glance as at Nov 2022



Pricing factors for CoalSwitch®

- **CoalSwitch®** should have a premium to current pellet pricing
- Pricing strengths for **CoalSwitch®**
 - More GJ per tonne
 - Less ash deposition in co-firing
 - Higher bulk density
 - lower transportation costs per tonne
 - Emissions benefits in co-firing

Industrial wood pellet index – Price activity in 2022



Pricing and feedstock supplies remain key issues for winter 2022/23

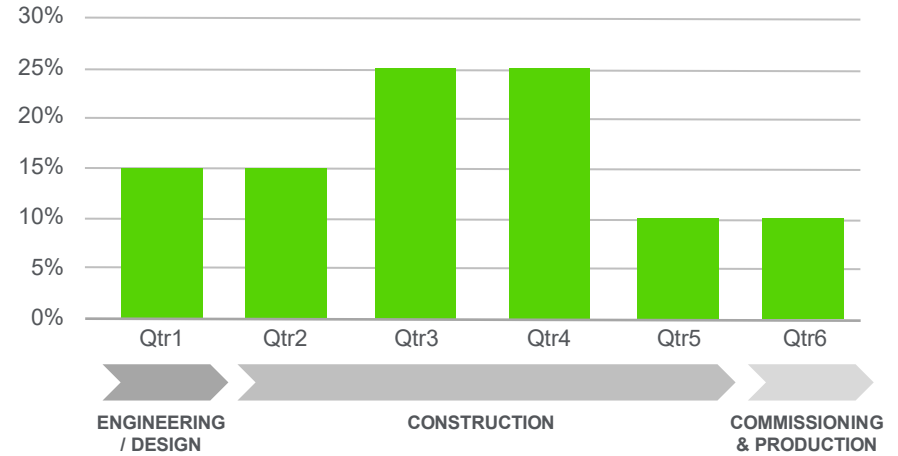
100% Owned 100,000 ton per annum Plant Capex

| Investment Requirement | \$'000 |
|---------------------------------------|-------------------|
| Permitting, Design & Engineering | \$3,250 |
| Equipment Cost incl. Dryer & Reactors | \$21,250 |
| Contingency | \$3,500 |
| TOTAL | \$28,000 * |

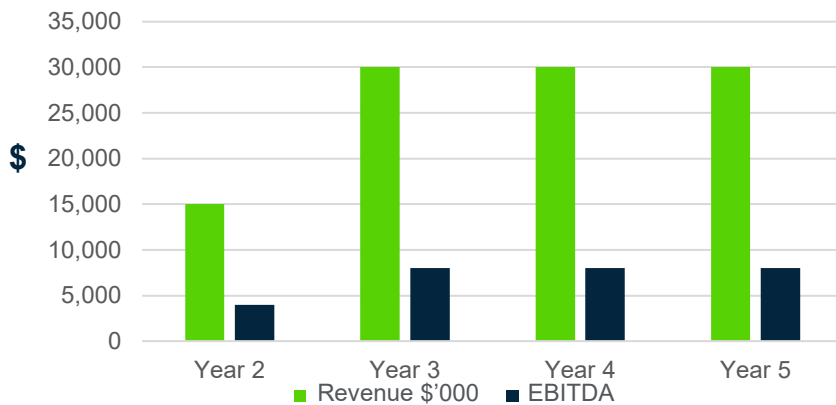
* ROI expected within 5 years

Typical Plant Development Cycle

Construction and commissioning of Plants expected to average 15-18 months



Fully Operational 100% Owned Plant *



Average ROCE 29%

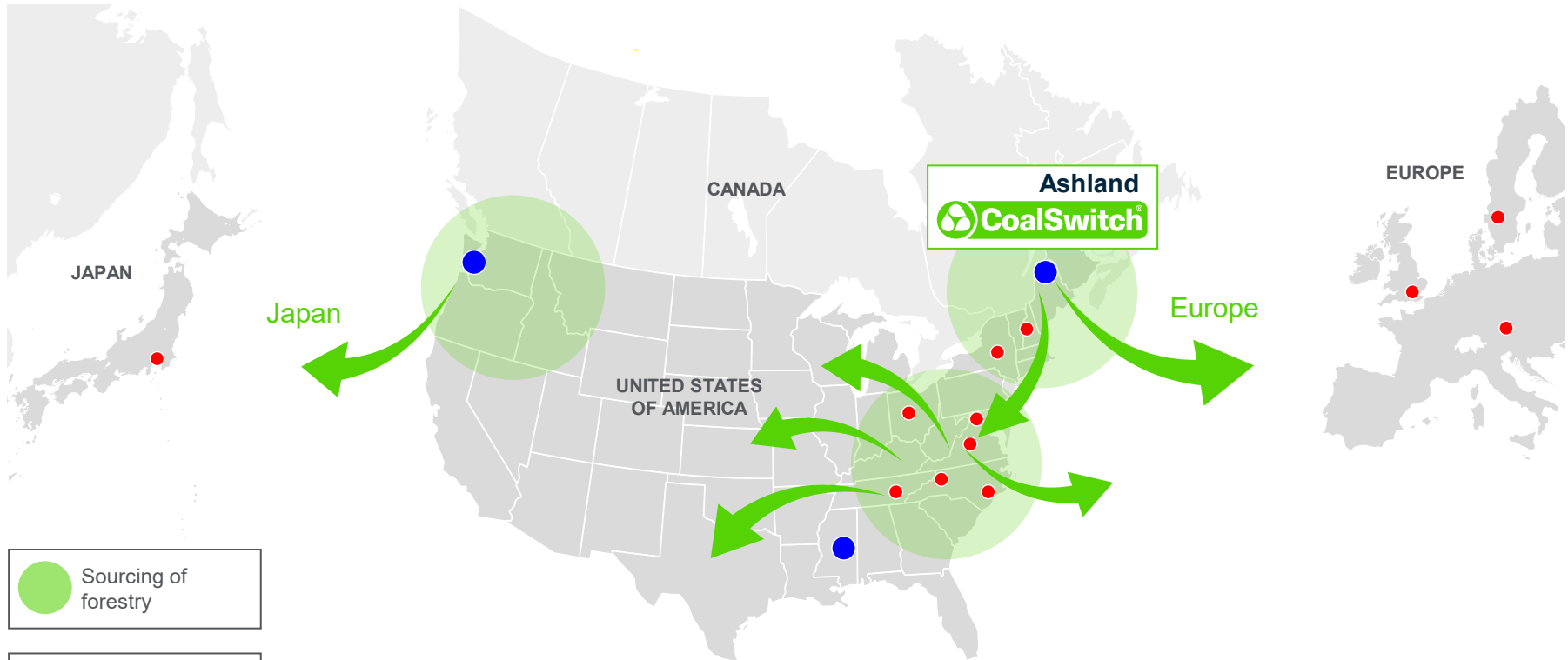
*Assumed sale price of \$300p/t

JV Economic Benefits


- Speed to building operating plant**
 - Use of existing sites and waste materials
 - Use of JV partners existing relationships for permitting
- Feedstock availability and pricing**
- Reduced Capex reflecting site availability**
- Reduced logistics costs**
- Long term license revenue stream for AEG**

Improved ROCE to 33%

Huge opportunity to utilize Active Energy's CoalSwitch® to meet future energy needs



 Sourcing of forestry

 Future production hubs

 Prospective customers as at Nov 2022

- By 2025 – at least 3 production centers in USA for delivery in North America & Internationally
- Establish **CoalSwitch®** as the successful 'black pellet' alternative to existing biomass customers
- Establish the production technology to produce industrial volumes either proprietary or under license



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