# E = MC³ © TOWARD CARBON NEUTRALITY

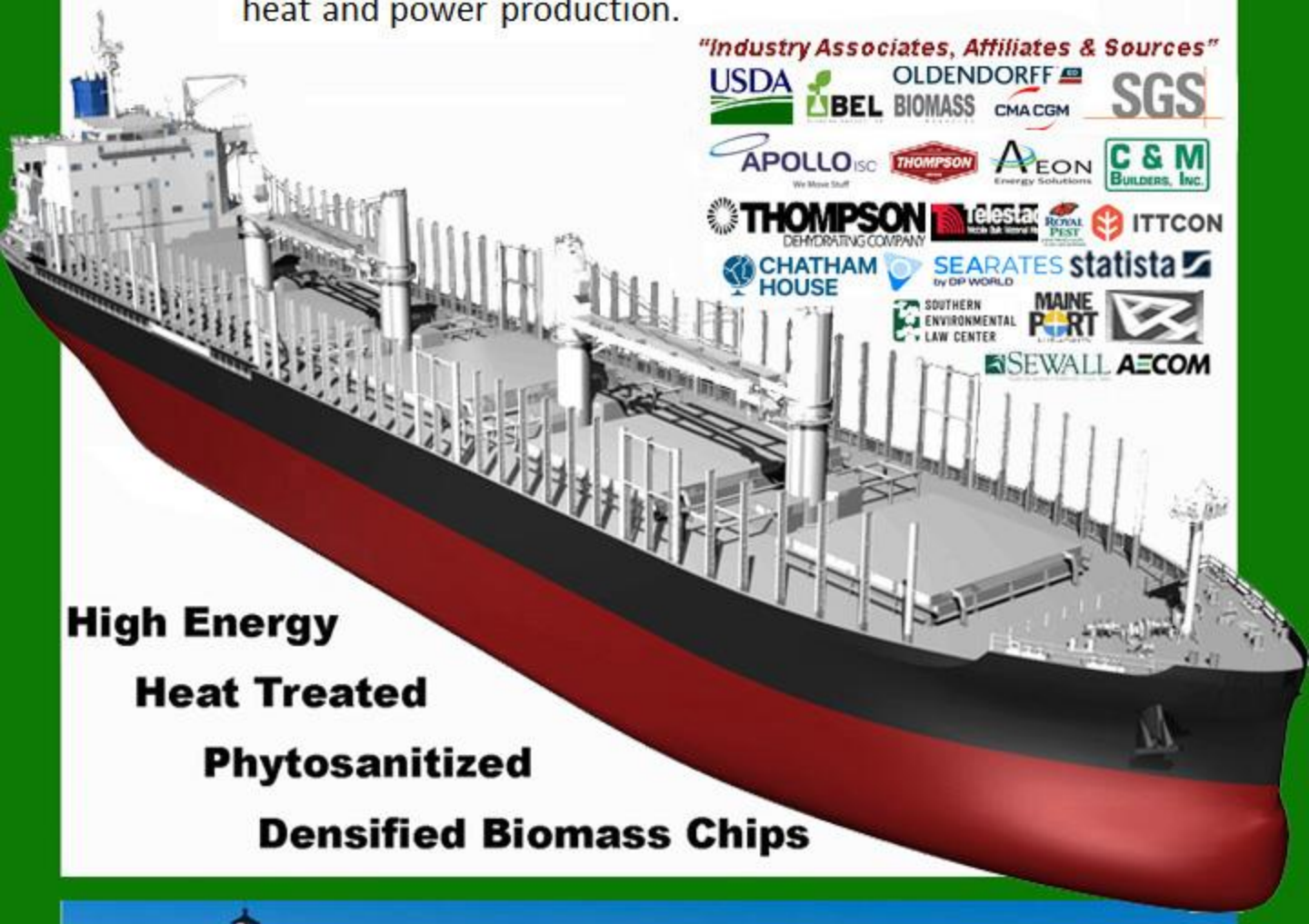
Energy = Maine Chips (cubed)

# Transforming Traditional CHP Fiber Supply

**E=MC³** as a renewable-energy fiber, is a perfect substitute commodity, and seamless complimentary alternative to the use of wood pellets for combined heat and power production.

*"Industry Associates, Affiliates & Sources"*

USDA · BEL BIOMASS · OLDENDORFF · CMA CGM · SGS · APOLLO ISC · THOMPSON · AEON Energy Solutions · C & M Builders, Inc. · THOMPSON Dehydrating Company · Telestar · Royal Pest · ITTCON · CHATHAM HOUSE · SEARATES by DP WORLD · statista · Southern Environmental Law Center · Maine Port · SEWALL · AECOM



**High Energy**

**Heat Treated**

**Phytosanitized**

**Densified Biomass Chips**

**E=MC³ maximizes greenhouse gas reduction and moves toward verifiable carbon-neutrality:**
**The perfect substitute for wood pellets.**

**Exponential expansion of the wood pellet industry threatens global climate stability. To reverse the imminent catastrophic damages we must recognize the issues as follows:**

## Traditional Wood Pellet Consumption Burden on the Environment

Wood pellet consumption in the European Union in 2019, as measured in million metric tonnes (MMt), reveals that the UK alone consumed 9.2 MMt, followed by Italy at 3.4 MMt, Denmark at 3 MMt, Germany at 2.3 MMt, and France at 1.8 MMt – for a total of 19.7 MMt per year. [1] The report predicts wood pellet demand will expand to 30.8 MMt in 2020.[2] Research reveals annual "global production of wood pellets would increase from 38.9 to 120 MMt between 2019 and 2050."[3]

The Southern Environmental Law Center reports that "Drax imported over 4.4 million tonnes of wood pellets from the southeastern U.S. and this equates to over 32,500 hectares (80,309 acres) of forests that were harvested in 2018 alone to supply wood pellets."[4] This conversion of 4.4 MMt equal to 80,309 acres means that every 1 MMt of wood pellets requires 18,252 acres of timber harvest. By 2050 the global annual consumption will reach 120 MMT/year and require 2.10 million acres of forest harvest per year.

The production of wood pellets requires approximately 2.4 times the annual pellet production volume. One million metric tonnes of wood pellets will require 2.4 million US short tons of raw fiber after harvesting, debarking, chipping and size classification, and drying shrinkage during the extensive heating process. By 2050 the total deforestation of forests in terms of material tonnage will be approximately 288 million tons of raw fiber. This is an entirely unsustainable volume of raw fiber and an overall stripping of 2.1 million acres of forest per year – or roughly 32% of the entire land mass of Massachusetts – at this rate it would take 3-years to clear-cut the entire state.

"Emissions from US-sourced biomass burnt in the UK are projected to rise to 17 million–20 million tonnes of $CO_2$ a year by 2025."[5] "The most negative impacts on carbon concentrations in the atmosphere is derived from harvesting … natural forests."[6] "Where whole trees are harvested and used for energy, not only is the stored carbon in the tree released to the atmosphere immediately, but the tree's future carbon sequestration capacity is lost.)[7]

# $E=MC^3$©

## Transforms Traditional Supply Processes Toward True Carbon Neutrality Goals

### Heat Treated – High Energy Phytosanitized High Density CHP Biomass Chips

## The production of $E=MC^3$©

Utilizes **ZERO** forest harvesting

Processes only forest residue and wastes

Phytosanitized chips are 100% Bark Free

Heat treatment - processing reduces raw material by 20%

1 MMt exported = 1.2 M US Ton (residue/waste only)

Vessel Stowage exceeds wood pellet density stow.

The smallest impacts on the climate are derived of the use of residues and wastes from forest harvesting or forest industries, that imply no additional harvesting, and would otherwise be burnt as waste or left to decay, thereby releasing carbon to the atmosphere in any case. [8} $E=MC^3$ © Utilizes only that waste and residue left over from merchantable harvests for timber and lumber production such as Mass Timber, Cross Laminated Timber (CLT), furniture manufacturing and as waste from harvests necessary for paper manufacturing.

No raw material is derived from cutting, none is left in forest to decay, and all waste is a byproduct of a forest harvest use in a production of a fiber or timber product that will continue to sequester its carbon for the life-cycle of that product – in construction that can be 50 to 75 years.

# Environmental Obligations Demand Changes:

**Starting with Identification and Reduction of Carbon Emissions Threats**

## Reduce Threats to Global Environment

1.) End **Clear-Cutting - Intrusive Forest Harvesting**

2.) **Fiber Origination** – source only **Residues and Wastes**

3.) Curtail **Carbon Intensive Trucking** to **Reduce GHG Emissions**

4.) **Transition to Rail Transport** – **GHG Emission Reduced 84%**

5.) **Centralize Fiber Aggregate**, **Classify**, **Process** for **Quality Assurance**

6.) Exceed **EU Import Mandates** – **Phytosanitation**

7.) **Densify** for **Effective**, **Efficient** and **Low Cost Material Handling**

8.) Eliminate:

**Costly Storage Buildings**,
**Chip-Pile Management**,
**Port Handling – Movement & Covering**,
**Inclement Weather – Climate Exposure**;

9.) **Ocean Freight** cost **Reduction** exceed Wood Pellet **Density/Stowage Value**

10.) **Financial Benefits from Acting Responsibly**

11.) **Replicate** the Above.

## Adherence Assures Meaningful Carbon Emission Reductions

$E = MC^3$

## 1.) End Clear-Cutting - Intrusive Forest Harvesting

### Intrusive Harvesting Impacts – EU

**Based on 1 EU Company**

**In 2019 one EU company alone consumed roughly 9 MMt of wood pellets (or roughly 21.6 M-US tons of raw wood chip fiber per year). This requires active management and harvesting of 4,600 sq. miles of forests or 2.94 m acres Slightly smaller than the entire State of Connecticut.**

**"An estimated 4,600 square miles of forest are needed to feed the voracious Drax plant." [9] Roughly 2.94 million acres annually - Roughly 8,066 acres a day to maintain operations. Replanted trees will take 50 Years to regrow. Despite the decarbonization claims, the CO2 emitted from the Drax plant is far greater today than when coal fuel was burned. [10]**

### Intrusive Harvesting Impacts US-SE

**Based on 1 SE Based Company**

**US-SE region expected to export 13.6 MMt annually by 2030**

**At the time of this report in 2017 80,000 acres were being harvested annually.**

**By 2030 this will increase to 280,000 acres annually to keep up with demand.**

**"The use of wood and other biomass will increase at an average annual rate of 4.4 % from 2014 through 2040" [11]**

## Negative Perceptions – Damaging to Industry

**Surprise! Greedy Green Energy Corporatists are Clear Felling Protected Forests for Biomass** [12]

**The Obvious Biomass Emissions Error** [13]

**A Trifecta of Green Lunacy: The law of unintended consequences kicks in** [14]

**Wood-burning power plants: Misguided climate change solution?** [15]

**Green Shock: Entire Forests Being Murdered to Produce Wood Pellet Biomass** [16]

**Hardwood forest cut down to feed Power plant, Channel 4 Dispatches claims** [17]

**Dangerous delusions: biomass is not a renewable energy source** [18]

**Negative Effects of Biomass** [19]

**The biomass industry should come clean about its environmental impact** [20]

**False [Bad] News Travels Farther, Faster Than The Truth, MIT Study Finds**
https://www.wbur.org/commonhealth/2018/03/08/fake-news-twitter
**Word of Mouth 7 Times Faster - Social Media 1,000 Times Faster**

## 2.) Fiber Origination – source only Residues and Wastes


100% Debarked, fiber waste from **Paper Manufacturing** plants. Typically reduced to < 20% MC prior to arrival. Blended with other residues and wastes. Photos: *Apollo – Bucksport Mill*



Waste materials, 100% debarked, derived from **Regional Lumber Mills**. Shavings, wood chips, screened and sized for processing biomass. Photos: *Apollo & Maine Biomass Exports – Irving Mill*


Removing the smaller, weaker trees by **Thinning Forests** (left) produces a more natural and healthier stand (right) that will be more resilient to wildfire and insect infestations. Photos: *Glenn Kohler/DNR*

Major tree removal companies deliver tree trunks and branches to the aggregate yard for processing. Raw material is typically delivered free or at a nominal dipping fee paid to the yard. Photo: *MB Exports – Searsport Yard*

Residue generated by merchantable timber harvests. For every 1,000 cubic feet delivered to a mill, there is approximately 28 cubic feet of slash and logging residue created and left in forest. Residues would arrive on rail cars at about 75 Mt per car (replacing 2.5 truck loads over the road. Source: *U.S. Forest Service*


Fiber chips produced from softwood residuals and wastes. Photos: *MB Exports – Searsport Yard*

**Fiber Origination** – **Residuals come from well managed and properly certified forests**

- Maine contains an estimated **17.6 million acres of forest land** and covers **89.1%** of the land area in the State. Most of the forest land, **95.3 %, is classified as timberland**, meaning that it **exceeds a minimum level of productivity** and is not legislatively reserved from timber harvesting.
- Forest land, in Maine there is an estimated **23.9 billion live trees** ≥1 in d.b.h.
- These trees have a total **above ground biomass** of **713.8 million tons** and, looking at trees ≥5 in d.b.h., a total net volume of 27.3 billion ft3 . The ratio of net growth to **removals is 1.4:1**.
- **Certificated Fiber: 1.55 M acres FSC**; **2.83 M acres SFI** and **3.26 M acres both FSC and SFI** = **7.64 M acres total**
- As a result of merchantable forest harvest – the **residual and waste** is **abundant.**
  https://www.fs.fed.us/nrs/pubs/ru/ru_fs160.pdf

## Sustainability Statistics
## Considering all Four (4) Mega Forest Regions

### Certifications

**Major Landowners Harvest Acreage**

| Certifications | Acres | Owners |
|---|---|---|
| FSC | 1,548,319 | 11 |
| SFI | 2,831,237 | 7 |
| FSC & SFI | 3,257,579 | 1 |
| | **7,637,135** | **19** |

Every landowner has cutting plans, sustainability plans and works with licensed, certified Forester to define annual cuts and to oversee all required to supply fiber from the land through licensed logging companies.

**Logging Contractors and Trucking Firms**

| | | |
|---|---|---|
| Total | **86** | |
| Within 50 mi | 53 | 62% |
| Beyond 50 mi | 33 | 38% |

| | |
|---|---|
| **5,000,000** | US Tons Available |
| **4,508,500** | Metric Tons Available |

# Fiber Statistics: Specifications – Classification & Testing

## WOOD CHIPS - SOFTWOOD

### Spruce/Pine/Fir – and Hemlock

Maine wood chips are produced from paper-quality, SPF fiber. Harvested from within a 17.7 million acre wood basket in the state of Maine. Maine fiber is chosen for its extremely high quality and designer suitability in the manufacture of paper and pulp, particleboard, MDF and wood pellets.

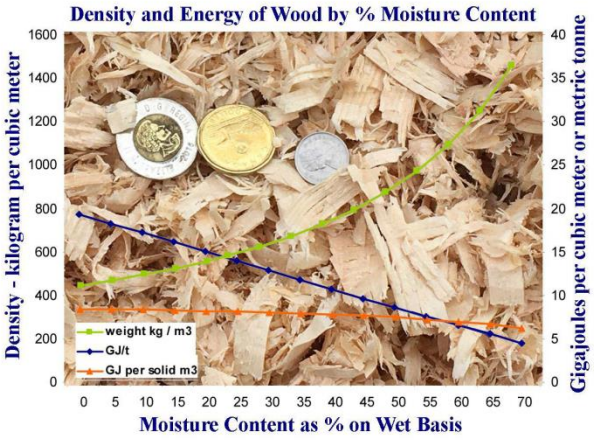
## PROCESSED – VALUE ADDED

Maine softwood chips are harvested from base-cut trees, debarked, and chipped according to design specifications. They are screened and size-filtered to spec and finish as pristine softwood chips.

## TYPICAL WOOD CHIP SPECIFICATIONS

### Spruce/Pine/Fir – and Hemlock

| | | |
|---|---|---|
| Accepts: | .45 cm - 4.5 cm | 90% Maximum |
| Overs: | 4.5 cm | 5% Maximum |
| Fines: | .45 cm | 5% Maximum |
| Bark | | < 1% Maximum |



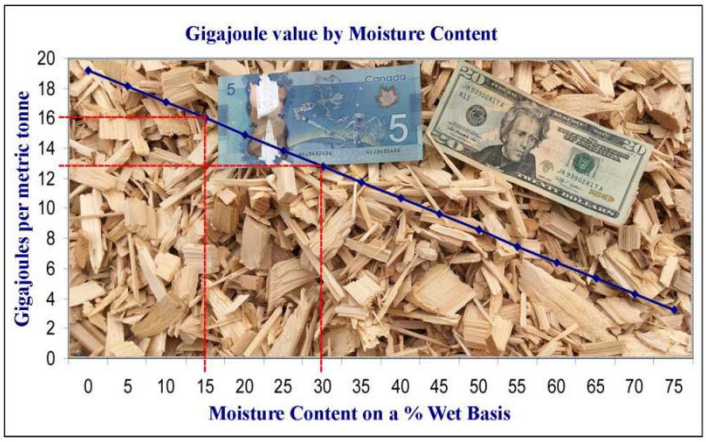
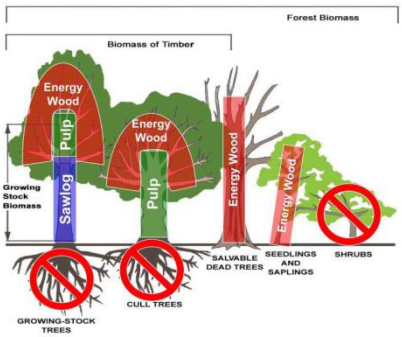




*Table 1. Classification of 1 Woody biomass (EN 14961-1)[5]*

| | | |
|---|---|---|
| 1.1 Forest, plantation and other virgin wood | 1.1.1 Whole trees without roots | 1.1.1.1 Broadleaf |
| | | 1.1.1.2 Coniferous |
| | | 1.1.1.5 Blends and mixtures |
| | 1.1.2 Whole trees with roots | 1.1.2.1 Broadleaf |
| | | 1.1.2.2 Coniferous |
| | | 1.1.2.5 Blends and mixtures |
| | 1.1.3 Stemwood | 1.1.3.1 Broadleaf |
| | | 1.1.3.2 Coniferous |
| | | 1.1.3.3 Blends and mixtures |
| | 1.1.4 Logging residues | 1.1.4.3 Stored, Broadleaf |
| | | 1.1.4.4 Stored, Coniferous |
| | | 1.1.4.5 Blends and mixtures |
| | 1.1.5 Stumps/roots | 1.1.5.1 Broadleaf |
| | | 1.1.5.2 Coniferous |
| | | 1.1.5.5 Blends and mixtures |
| | 1.1.6 Bark (from forestry operations) [a] | |

Design Mixture - 100% Coniferous.
[a] Max 1% bark only from logging operations - residuals on site.
No short rotation coppice, no brush or bushes, no leaves, no needles.

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# Fiber Statistics: Specifications – Classification & Testing

## Supply Specifications for Co-firing of CHP Plants UK

Targeted specifications can be met for preferential off-take.

Certifications: Sustainability Forestry Initiative® (SFI) Standards and Certified Responsible Forestry® (FSC) Standards.

Species: Coniferous: Spruce, Pine, Fir and Hemlock

Bark Content: < 2% Predicted to meet Ash requirement - can debark to < 1%

| Characteristics | Unit | Basis | Typical | Min. | Target | Max. | Table |
|---|---|---|---|---|---|---|---|
| Total Moisture | % | AR | | 30 | 35 | 40 | |
| Ash Content | % | OD | | | < 1 | | |
| Greens | | | | | | | |
| Leaves | % | AR | None | | | | |
| Pine Needles | % | AR | None | | | | |
| Foreign Matter | % | AR | None | | | | |
| Particle Sizes: | *mm* | | | *mm* | | | |
| Overs | % | AR | | > 40 x 20 | | 0 | |
| Accepts | % | AR | | ≤ 40 x 20 | | 95 | |
| Unders | % | AR | | ≤ 1 mm | | 5 | |
| Chlorine | % | OD | | | | < .10 | Trace Amt. |
| Sulpher | % | OD | | | | < .05 | |
| Nitrogen | % | OD | | | | < .70 | |

For Buyer A. R. = As Received *(For Seller A. D. = As Delivered)*
Oven Dry = OD

The Impact of Bark Content of Wood Biomass on Biofuel Properties; Holubcik, Michael & Jandacka, Jozef Peer Reviewed Article; Bioresources.com Department of Power Engineering, Faculty of Mechanical Engineering, University of Zilma, Univerzitma 1, 010 26 Zilma, Slovakia Radovan.nosek@fstroj.uniza.sk Retrieve from:
https://bioresources.cnr.ncsu.edu/BioRes 11/BioRes 11 1 44 Nosek HJ Impact Bark%2
Finding: Ash content decreses in the range of .0333 to .0444% per 1% decrease in bark content.

Production and Delivery Methodology:

All processed materials shall be in accordance with Sustainability Forestry Initiative® (SFI) Standards and with Certified Responsible Forestry® (FSC) Standards.

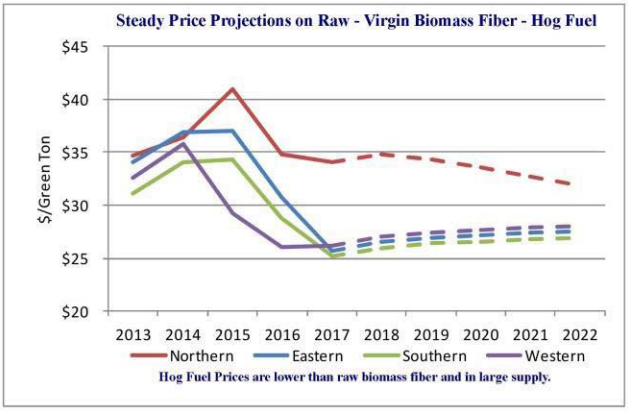
Heat treatment as defined by the application of 56°C for a minimum duration of 45 continuous minutes throughout the entire profile of the wood (including at its core).

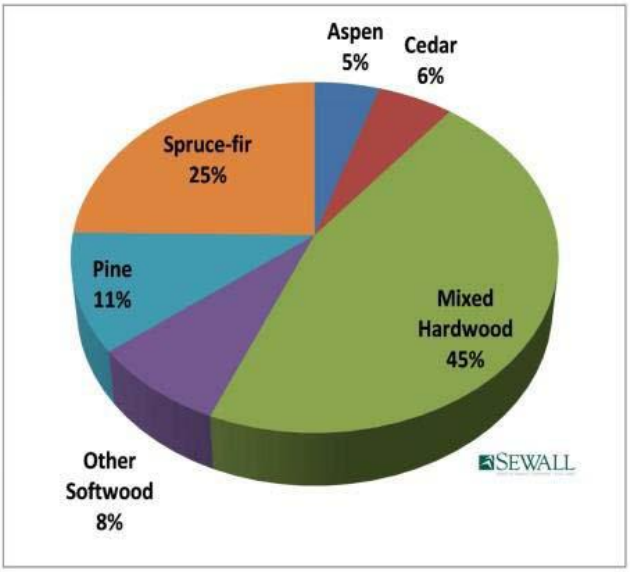
E = MC³© Heat treatment Predicted to meet 60°C for a minimum duration of 30 continuous minutes throughout the entire profile of the wood (including at its core).

| | Specific Gravity | Density *(lb/ft³)* | Weight per Cord (lb/cord) | Specific Gravity | Density *(lb/ft³)* | Weight per Cord *(lb/cord)* |
|---|---|---|---|---|---|---|
| **Sampled Softwood** | | | | | | |
| Spruce, Canadian | | 34 | | 0.45 | 28.0 | |
| Pine, Northern White | | 36 | | | 25.0 | |
| Fir, Balsam | | 45 | | | 25.0 | |
| Hemlock, Eastern | | 50 | | | 28.0 | |
| | | | | Average SW | 26.5 | |

# Fiber Statistics: Specifications – Classification & Testing

| Species | Scientific Name | Regions Available | Green MC | Green Lbs./CF | 40% MC Lbs./CF | 20% MC Lbs./CF | BTU - Cord Dried | Forest Vol. Today | 17.7 14.2 | Forest Vol. 2060 |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Total Acres - Millions* | | | | Est. | | | | | |
| | *Timberland Acres - Million* | | | | | | | | | |
| Eastern White Pine | Pinus strobus | ME & E. CA | 50% | 36 | 32 | 25 | 14.30 | 5.2% | 920,400 | 899,600 |
| Eastern/Red Spruce | Picea rubens | ME & E. CA | 50% | 34 | 30 | 28 | 15.90 | 17.4% | 3,079,800 | 3,010,200 |
| Eastern Balsam Fir | Abies balsamea | ME & E. CA | 50% | 45 | 40 | 25 | 14.30 | 15.2% | 2,690,400 | 2,629,600 |
| Eastern Red Cedar | Juniperus virginiana | ME & E. CA | 50% | 28 | 25 | 22 | 12.20 | 10.3% | 1,823,100 | 1,781,900 |
| Eastern Hemlock | Tsuga canadensis | ME & E. CA | 50% | 50 | 44 | 28 | 15.90 | 5.8% | 1,026,600 | 1,003,400 |
| | | | | | | *Timberland Acres - Million* | | 53.9% | 9,540,300 | 9,324,700 |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1641 Sigman Road
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Conyers, GA 30012
1-770-922-8000 ext 303
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## Report of Analysis

BEL2690
TS Laurent - Osahada of Maine, LLC
East Main Street
RT 1 Searsport, ME 04974

**Company Contact:** Art 207-930-5168

| | | | |
|---|---|---|---|
| **BEL ID Number:** | BEL190245-1 | **Sample Weight (kg):** | 1.38 |
| **Product / Commodity:** | Wood Chips Fresh Cut | **Sample Received:** | 2/11/2019 |
| **Sample Designation:** | 50% Hemlock- 20% Pine - 15% Spruce - 5% Fir | **Report Date:** | 2/21/2019 |
| **Date Sampled:** | 2/19/2019 | **Report Code:** | |
| | | **Purchase Order #:** | |

| Parameter | As-Received | Dry Basis | Analytical Method |
|---|---|---|---|
| Total Moisture (%) | 43.59 | | ISO 18134-1 |
| Ash (%) | 0.28 | 0.49 | ISO 18122 |
| Volatiles (%) | 45.22 | 80.16 | ISO 18123 |
| Fixed Carbon (%) | 10.90 | 19.34 | By Difference |
| GCV (GJ/Tonne) | 11.77 | 20.87 | ISO 18125 |
| NCV cV (GJ/Tonne) | 10.07 | 19.63 | ISO 18125 |
| NCV cP (GJ/Tonne) | 9.97 | 19.56 | ISO 18125 |
| Carbon (%) | 29.75 | 52.73 | ISO 16948 |
| Hydrogen (%) | 3.37 | 5.98 | ISO 16948 |
| Nitrogen (%) | 0.07 | 0.12 | ISO 16948 |
| Oxygen (%) | 22.94 | 40.67 | ISO 16948 |
| Sulfur (%) | 0.01 | 0.01 | ISO 16994 |
| Chlorine (%) | < 0.005 | < 0.005 | ISO 16994 |

All samples cut in Waldo and Hancock County - Maine. All samples were air dried for 30 days then debarked and chipped on day 32. Samples were then sent to the lab for testing.

**Prepared By:**

**David Robles - Assistant Laboratory Manager**





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Conyers, GA 30012
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## Report of Analysis

BEL-ME201111
Osahada of Maine
177East Main Street
Searsport, ME 04974

Contact: Arthur House

| | | | |
|---|---|---|---|
| **BEL ID Number:** | | **Sample Weight (kg):** | 4.95 |
| **Product / Commodity:** | ME201111 | **Sample Received:** | 3/24/2019 |
| **Sample Designation:** | Wood Chips | **Report Date:** | 3/31/2019 |
| **Date Sampled:** | Fresh Cut<br>Hemlock Chips<br>3/12/2019 | **Report Code:** | |
| | | **Purchase Order #:** | |

| Parameter | As-Received | Dry Basis | Analytical Method |
|---|---|---|---|
| Total Moisture (%) | 52.54 | | CEN/EN 14774-1 |
| Ash (%) | 0.20 | 0.43 | CEN/EN 14775 |
| Volatiles (%) | 39.02 | 82.21 | CEN/EN 15148 |
| Fixed Carbon (%) | 8.23 | 17.35 | By Difference |
| GCV (GJ/Tonne) | 9.83 | 20.71 | CEN/EN 14918 |
| NCV cV (GJ/Tonne) | 8.02 | 19.46 | CEN/EN 14918 |
| NCV cP (GJ/Tonne) | 7.92 | 19.39 | CEN/EN 14918 |
| Carbon (%) | 24.60 | 51.84 | CEN/EN 15104 |
| Hydrogen (%) | 2.89 | 6.09 | CEN/EN 15104 |
| Nitrogen (%) | 0.11 | 0.23 | CEN/EN 15104 |
| Sulfur (%) | < 0.01 | 0.01 | CEN/EN 15104 |
| Oxygen (%) | 19.65 | 41.41 | CEN/EN 15104 |
| Chlorine (%) | < 0.005 | < 0.005 | CEN/EN 15289 |

**Prepared By:**

**Christopher Cox - Laboratory Manager**





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## Report of Analysis

Osahada of Maine
177East Main Street
Searsport, ME 04974

Company Contact: Art House

| | | | |
|---|---|---|---|
| **BEL ID Number(s):** | BEL-ME11001 | **Sample Weight (kg):** | 3.65 |
| **Product/Commodity:** | Biomass | **Sample Received:** | 3/7/2019 |
| **Sample Designation:** | Hog Fuel Biomass | **Report Date:** | 3/14/2019 |
| **Packaging:** | Plastic Bag | **Report ID:** | BEL-ME11001 |
| **Date Sampled:** | N/A | **Purchase Order #** | N/A |

**Compositional Analysis: Proximate/Ultimate Analysis**

| Parameter | As-Received | Oven Dry | Analytical Method |
|---|---|---|---|
| Total Moisture (%) | 23.62 | | CEN/EN 14774-1 |
| Ash (%) | 0.98 | 1.29 | CEN/EN 14775 |
| Volatiles (%) | 62.58 | 81.93 | CEN/EN 15148 |
| Fixed Carbon (%) | 12.81 | 16.78 | By Difference |
| Gross Calorific Value (GJ/Tonne) | 15.56 | 20.37 | CEN/EN 14918 |
| Net Calorific Value (cV)(GJ/Tonne) | 14.04 | 19.10 | CEN/EN 14918 |
| Net Calorific Value (cP)(GJ/Tonne) | 13.96 | 19.03 | CEN/EN 14918 |
| Carbon (%) | 38.89 | 50.91 | CEN/EN 15104 |
| Hydrogen (%) | 4.71 | 6.16 | CEN/EN 15104 |
| Nitrogen (%) | 0.26 | 0.33 | CEN/EN 15104 |
| Sulfur (%) | 0.01 | 0.01 | CEN/EN 15289 |
| Oxygen (%) | 31.54 | 41.29 | By Difference |
| Chlorine (ppm) | | | ASTM D6721 |

**Prepared By:** Chris Wibey





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## Report of Analysis

Osahada of Maine
177 East Main Street
Searsport, ME 04974

Company Contact: Art House

| | | | |
|---|---|---|---|
| **BEL ID Number(s):** | BEL190101 | **Sample Weight (kg):** | 5.67 |
| **Product/Commodity:** | Wood Chips | **Sample Received:** | 7/31/2018 |
| **Sample Designation:** | Mixed Conifers | **Report Date:** | 8/8/2018 |
| **Packaging:** | Plastic Bag | **Report ID:** | BEL-ME190101 |
| **Date Sampled:** | N/A | **Purchase Order #** | N/A |

**Compositional Analysis: Proximate/Ultimate Analysis**

| Parameter | As-Received | Oven Dry | Analytical Method |
|---|---|---|---|
| Total Moisture (%) | 28.96 | | CEN/EN 14774-1 |
| Ash (%) | 2.66 | 3.74 | CEN/EN 14775 |
| Volatiles (%) | 56.77 | 79.91 | CEN/EN 15148 |
| Fixed Carbon (%) | 11.59 | 16.32 | By Difference |
| Gross Calorific Value (GJ/Tonne) | 13.28 | 18.69 | CEN/EN 14918 |
| Net Calorific Value (cV)(GJ/Tonne) | 11.74 | 17.47 | CEN/EN 14918 |
| Net Calorific Value (cP)(GJ/Tonne) | 11.65 | 17.40 | CEN/EN 14918 |
| Carbon (%) | 33.68 | 47.41 | CEN/EN 15104 |
| Hydrogen (%) | 4.22 | 5.94 | CEN/EN 15104 |
| Nitrogen (%) | 0.32 | 0.46 | CEN/EN 15104 |
| Sulfur (%) | 0.02 | 0.03 | CEN/EN 15289 |
| Oxygen (%) | 30.14 | 42.42 | By Difference |
| Chlorine (ppm) | | | ASTM D6721 |

**Prepared By:** Chris Wibey





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## 3.) Curtail Carbon Intensive Trucking to Reduce GHG Emissions

**More than 70,000 US tons of wood harvested, transported, and delivered *every day* from US forests = 2,333 Truck Load Movements per day** [21]

### Carbon Emission Analysis

**Assume all truck transport is regional and located within 50-miles of the facility.**

| | |
|---|---|
| **Export Commodity**: | Industrial Wood Pellets for CHP |
| **Export Volume:** | 13,600,000,000 Metric Tonnes |
| **U.S. Tons Required**: | 32,600,000 Short Tons of Raw Whole Tree Fiber |
| **US Tons Per Truckload:** | 30 US Short Ton or 27 Metric Tonnes per load |
| **Total Truckloads Required:** | 1,088,000 Truck loads |
| **Distance - Harvest to Plant:** | 50 miles (each way) or 100-miles per load (averaged) |
| **Total Miles Traveled:** | 54,400,000 Miles Driven |
| **Carbon Calculations:** | Average truck in US emits 161.8 grams of CO2 per ton mile |
| **Total Carbon Emitted:** | 54,400,000 ton miles X 161.8 grams = 8,802 MT Annually |

**Projected 2030 Export Volume - in MT Converted to US Short Tons**

**Calculated by Miles Required to Deliver to Facility**

| *Ton Miles* | *Grams CO2* | *Total Grams* | *Annual MT CO2* |
|---|---|---|---|
| 54,400,000 | 161.8 | 8,801,920,000 | 8,802 |

Medium- and heavy-duty trucks in the United States emitted 444 million metric tons of carbon dioxide equivalent in 2019. Greenhouse gas emissions from these modes of transportation have increased by more than 90 percent since 1990. It is estimated that the U.S. accounts for 18 percent of global road freight CO2 emissions. Source: *Statista, Published by Ian Tiseo, Apr 23, 2021* [22]

# 4.) Transition to Rail Transport – GHG Emission Reduced 84%

**Log Truck** 300,000 UST per year to Facility

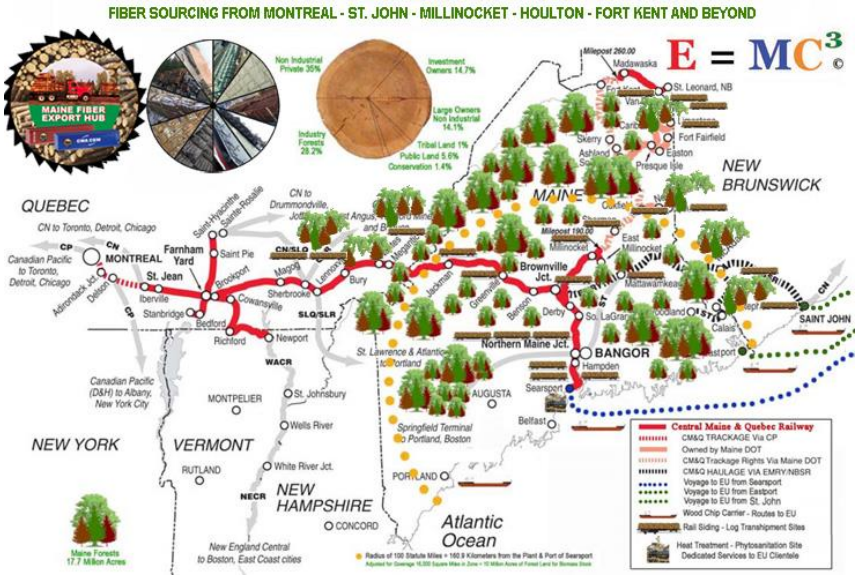
| Distance Miles | Weight Cargo UST | Emission Factor | Grams of $CO_2$ | MT of $CO_2$ | $ Per Loaded Mile Truck | $ Per Truck | $ Per US Ton | $ for 300 USTPY | Annual Tons | Annual Loads | Grams of $CO_2$ | MT of $CO_2$ Per Load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 30 | 161.8 | 970800 | 0.971 | $ 3.50 | $ 700.00 | $ 23.33 | $ 7,000,000 | 300,000 | 10,000 | 9,708,000,000 | 9,708 | 100% |
| 175 | 30 | 161.8 | 849450 | 0.849 | $ 3.50 | $ 612.50 | $ 20.42 | $ 6,125,000 | 300,000 | 10,000 | 8,494,500,000 | 8,495 | 100% |
| 150 | 30 | 161.8 | 728100 | 0.728 | $ 3.50 | $ 525.00 | $ 17.50 | $ 5,250,000 | 300,000 | 10,000 | 7,281,000,000 | 7,281 | 100% |
| 125 | 30 | 161.8 | 606750 | 0.607 | $ 3.50 | $ 437.50 | $ 14.58 | $ 4,375,000 | 300,000 | 10,000 | 6,067,500,000 | 6,068 | 100% |
| 100 | 30 | 161.8 | 485400 | 0.485 | $ 3.50 | $ 350.00 | $ 11.67 | $ 3,500,000 | 300,000 | 10,000 | 4,854,000,000 | 4,854 | 100% |
| 75 | 30 | 161.8 | 364050 | 0.364 | $ 3.50 | $ 262.50 | $ 8.75 | $ 2,625,000 | 300,000 | 10,000 | 3,640,500,000 | 3,641 | 100% |
| 50 | 30 | 161.8 | 242700 | 0.243 | $ 3.50 | $ 175.00 | $ 5.83 | $ 1,750,000 | 300,000 | 10,000 | 2,427,000,000 | 2,427 | 100% |
| 25 | 30 | 161.8 | 121350 | 0.121 | $ 3.50 | $ 87.50 | $ 2.92 | $ 875,000 | 300,000 | 10,000 | 1,213,500,000 | 1,214 | 100% |
| | | | | | | Average | $ 13.13 | $ 3,937,500 | | | | Average | 5,461 | 100% |

**Rail Car** 300,000 UST per year to Facility

| Distance Miles | Weight Cargo UST | Emission Factor | Grams of $CO_2$ | MT of $CO_2$ | $ Per Loaded Mile Rail | $ Per Rail Car | $ Per US Ton | | Annual Tons | Annual Loads | Grams of $CO_2$ | MT of $CO_2$ Per Load | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 75 | 22.9 | 343500 | 0.344 | $ 4.13 | $ 825.00 | $ 11.00 | $ 3,300,000 | 300,000 | 4,000 | 1,374,000,000 | 1,374 | 14% |
| 175 | 75 | 22.9 | 300563 | 0.301 | $ 4.50 | $ 787.50 | $ 10.50 | $ 3,150,000 | 300,000 | 4,000 | 1,202,250,000 | 1,202 | 14% |
| 150 | 75 | 22.9 | 257625 | 0.258 | $ 5.00 | $ 750.00 | $ 10.00 | $ 3,000,000 | 300,000 | 4,000 | 1,030,500,000 | 1,031 | 14% |
| 125 | 75 | 22.9 | 214688 | 0.215 | $ 5.70 | $ 712.50 | $ 9.50 | $ 2,850,000 | 300,000 | 4,000 | 858,750,000 | 859 | 14% |
| 100 | 75 | 22.9 | 171750 | 0.172 | $ 6.75 | $ 675.00 | $ 9.00 | $ 2,700,000 | 300,000 | 4,000 | 687,000,000 | 687 | 14% |
| 75 | 75 | 22.9 | 128813 | 0.129 | $ 8.50 | $ 637.50 | $ 8.50 | $ 2,550,000 | 300,000 | 4,000 | 515,250,000 | 515 | 14% |
| 50 | 75 | 22.9 | 85875 | 0.086 | NA | NA | NA | | 300,000 | 4,000 | 343,500,000 | 344 | 14% |
| 25 | 75 | 22.9 | 42937.5 | 0.043 | NA | NA | NA | | 300,000 | 4,000 | 171,750,000 | 172 | 14% |
| | | | | | | | $ 9.75 | $ 2,925,000 | | | Average | 773 | 14% |
| Transition Point | | | | | | Average Savings | 26% | $ 1,012,500 26% | | | | GHG Reduced | 86% |

## Target Procurement = ~ 70% of Fiber Inbound by Rail and ~ 30% on Local Trucks

***To:*** **Searsport Fiber Hub** **Inbound Fiber 65% to 70% - By rail to reduce truck use - reduce GHG by ~ 86%**

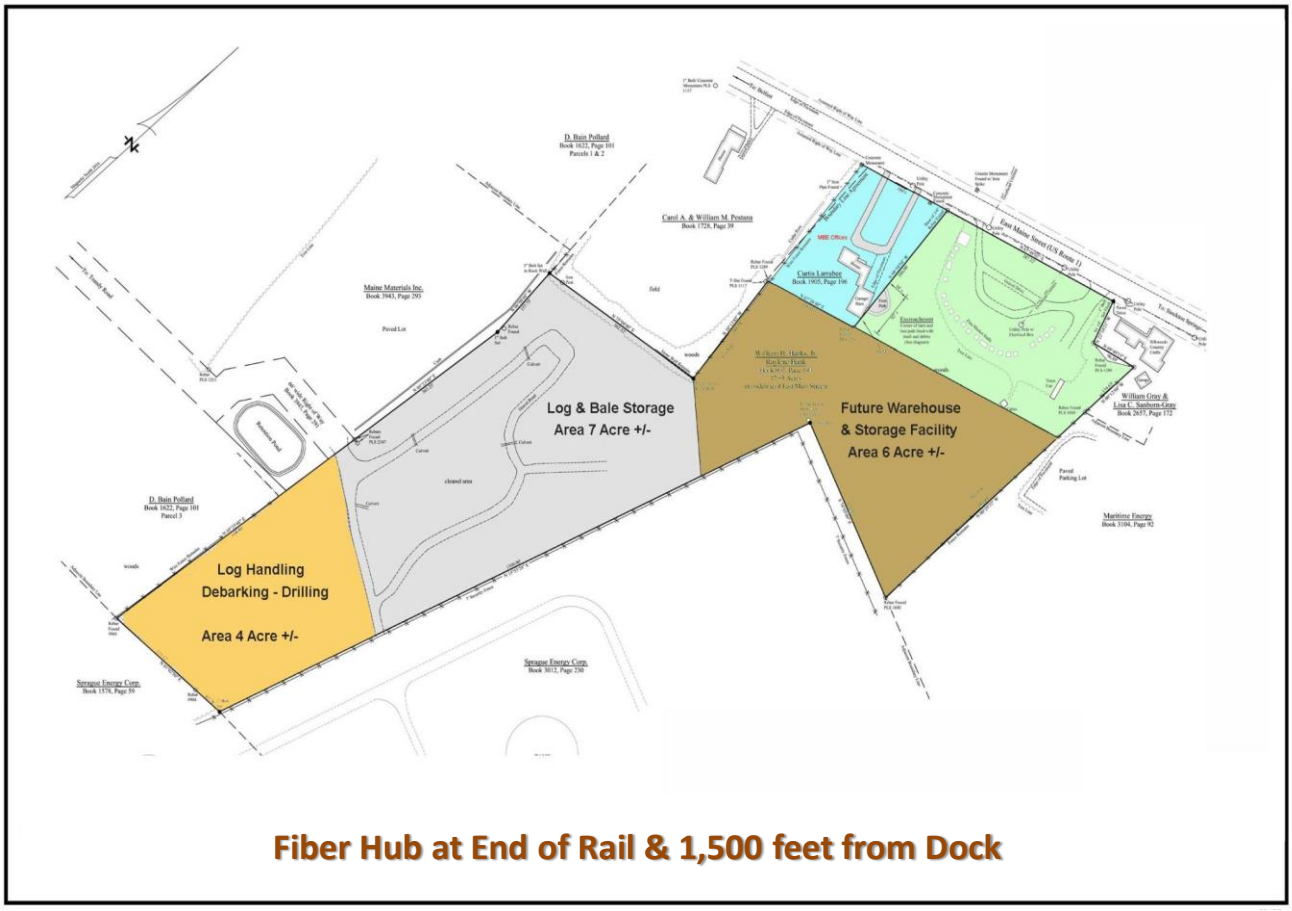



## Other Benefits of Rail:

- Rail sidings located ~ 50 miles apart
- ~ 2.5 Truckloads per rail car
- Loggers increase fiber supply 2.5x
- Opens Work to Smaller Companies
- Residuals/Slash Removed Faster
- Thinning/Clearing more Efficient
- Reduced Forest Fire Hazards
- Reduced truck traffic
- Lower accident incidents
- Increase rail service (efficiencies)
- Activates rail service
- Provides Job Opportunities
- Enhances Local Economies

E = MC3©

## 5.) Centralize Fiber, Aggregate, Classify, Process for Quality Assurance




**Fiber Hub at End of Rail & 1,500 feet from Dock**


# Cost Efficiencies by Operating Fiber Hub – Aggregation Yard

## Production of Low Cost – Low Value Residual and Waste Fiber

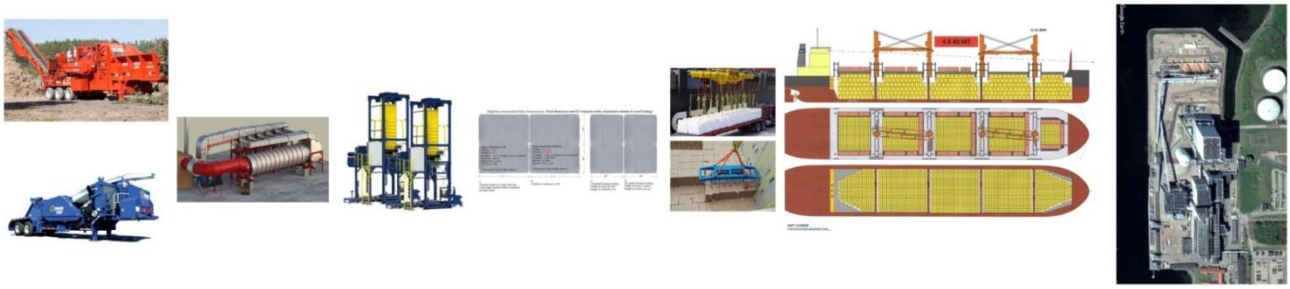
## Blending Material From Various Sources to Achieve Low Cost Conifer - Softwood Fiber Only

| Fiber As-Received: Description | Average 50-mile Radius | Annual US Ton Available | Value Per US Ton As Received | Extended Yard Cost Received | Tipping Fee Paid to Yard | Blended Values Net Yard Costs |
|---|---|---|---|---|---|---|
| Residual Derived from Merchantable Harvests | | 150,000 | $ 29.00 | $ 4,350,000 | | $ 4,350,000.00 |
| Small Diameter From Forest Clearing | | 250,000 | $ 32.00 | $ 8,000,000 | | $ 8,000,000.00 |
| Whole Tree Residual Softwood Chipped in Forest by Logger | | 90,000 | $ 34.00 | $ 3,060,000 | | $ 3,060,000.00 |
| Lumber Mill - Factory Residuals, Shavings, and Waste | | 6,000 | $ 28.00 | $ 168,000 | | $ 168,000.00 |
| Tree Clearing - Thinnings, Trimmings - Power Line Maintenance | | 10,000 | $ (10.00) | | $ 100,000.00 | $ (100,000.00) |
| Residential Debris - Roadside Cleaning - Clean Debris and Waste | | 5,000 | $ (10.00) | | $ 50,000.00 | $ (50,000.00) |
| Disaster Clearing - Fire Prevention Contractors | | 5,000 | $ (15.00) | | $ 75,000.00 | $ (75,000.00) |
| Municiple Removals - Softwood Only - Received to Yard | | 500 | $ (25.00) | | $ 12,500.00 | $ (12,500.00) |
| Totals | | 516,500 | $ 7.88 | | $ 237,500 | $ 15,340,500 |

*Research Sample of Materials: Conducted 2020 thru 2022*

NET Cost Received to Yard p/US-T $ 29.70

**Note: With cooperation and goal sharing by Strategic Alliance Partners one can consistently achieve these low costs targets of raw fiber before processing through the Phytosanitation System.**



## From Forest to Furnace – Streamlined – Toward Carbon Neutral

E = MC³ ©

## 6.) Exceed EU-2014 Import Mandate – Phytosanitation

*"On June 17, 2014 the European Union published amendments to its principle plant health directive (Council Directive 2000/29/EC) which regulates the import of plants and plant products including forestry products. Member countries of the European Union are to adopt the requirements within their laws, regulations, etc. by 30 September 2014. The Requirements will come into force for imports arriving on or after October 1, 2014. Wood must be: - heat Treated or…. by using approved processes. At present the E.U. has not approved any fumigation products. Heat treatment is defined as the application of 56C for a minimum duration of 30 continuous minutes throughout the entire profile of the wood (including at its core)."*

***Since 1945 Thompson Dryers*** have been pioneering drying; patenting, perfecting and servicing dryer systems across many industries. Take a tour around one of our single-pass rotary drying systems. Thompson's believes equipment should work like it's supposed to and you deserve the very best solution for your drying needs. [24]

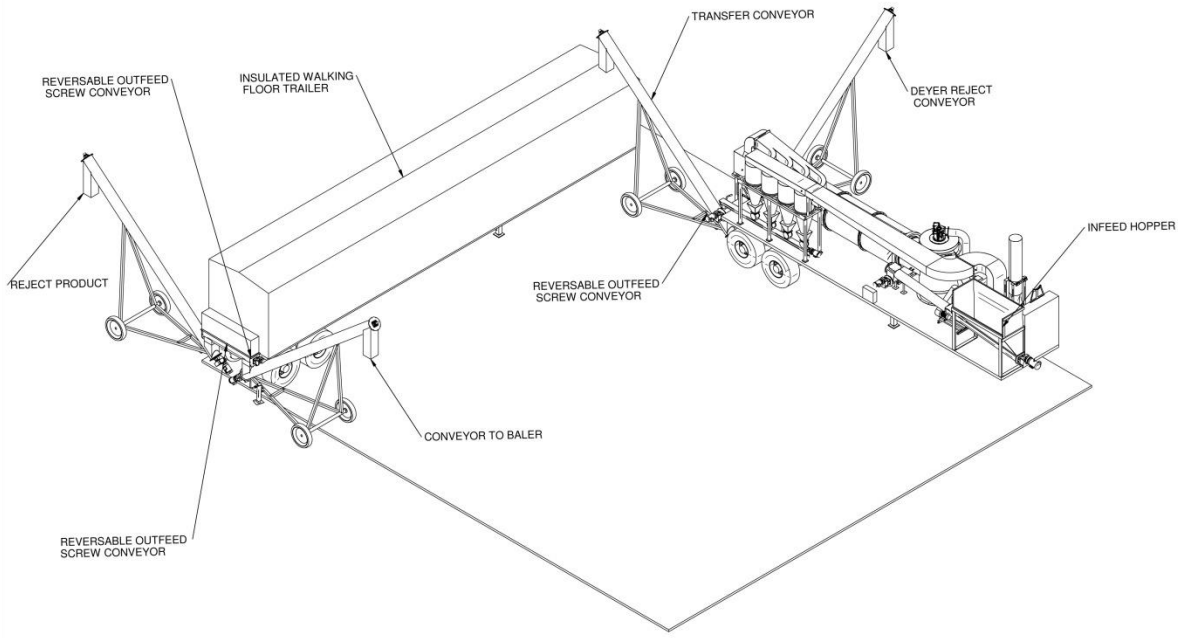
### Trailer Mounted Phyto Heater Dryer

**520 Trailer Mounted Phyto Heater Dryer System**

*Design Drawing Only: TD Dryers*

THOMPSON DEHYDRATING COMPANY

| ***Wood Chip No Bark*** | ***MT Year*** | ***MC%*** |
|---|---|---|
| **Feedstock - In** | 165,000 | 35 |
| **Feedstock - Out** | 150,000 | 30 |




| NO. | REVISION DESCRIPTION: | BY: | DATE: |
|---|---|---|---|
| A | INITIAL ISSUE | RP | 03/27/20 |

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN FT - IN
FRACTIONS ± 1/16" ANGLES ± 1/2°

THOMPSON DRYERS
2953 SW WANAMAKER DRIVE, TOPEKA, KANSAS 66614 (785) 272-7722

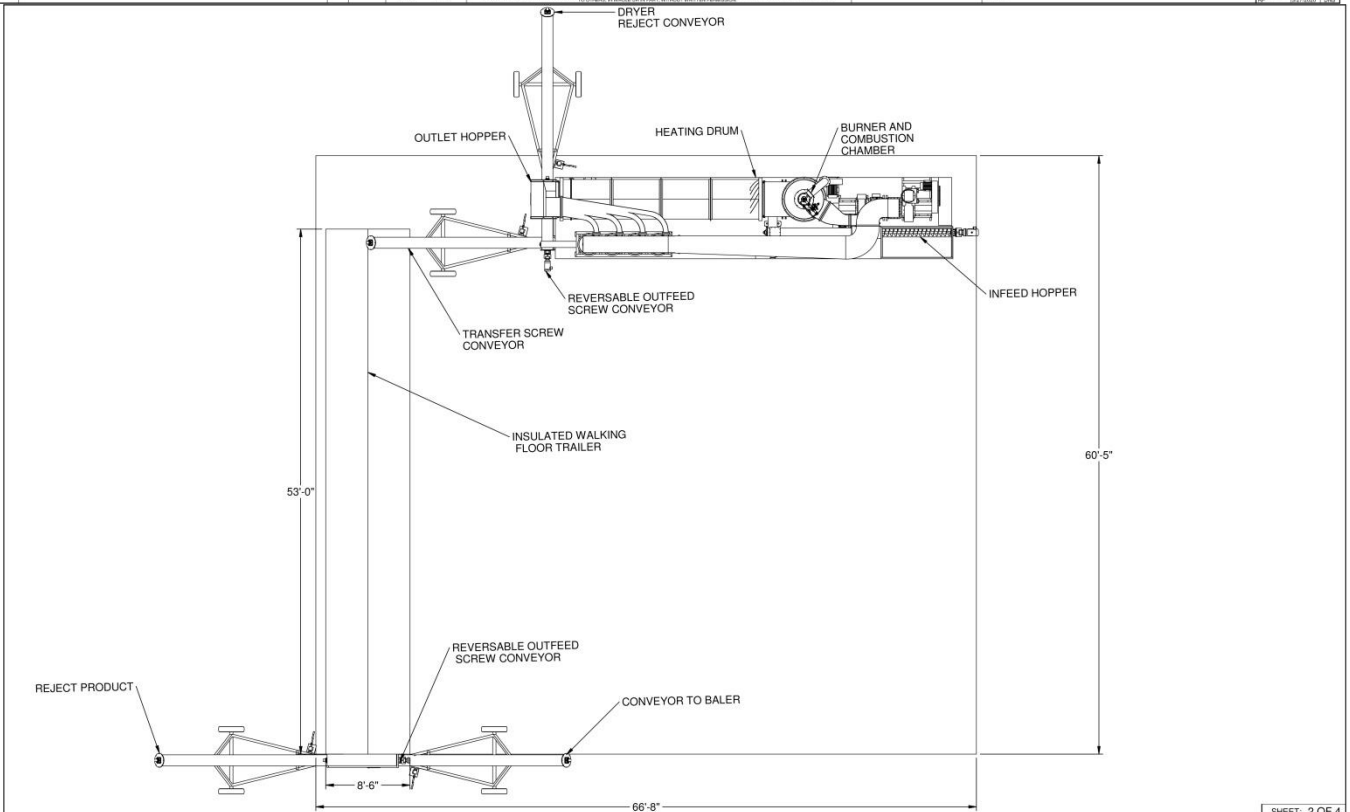


MATERIAL: AS NOTED
WEIGHT: 32601 lbm

DRAWING NUMBER: 42--PHYTO-00
DESCRIPTION: 4'-6" TRAILER MOUNTED PHYTO SYSTEM
REFERENCE:

| | | | |
|---|---|---|---|
| DRAWN BY: | MWC | DATE: | 3/27/2020 |
| CHECKED BY: | MWC | DATE: | 3/27/2020 |
| APPROVED BY: | RP | DATE: | 3/27/2020 |

REVISION: A
SCALE: 2NS
SHEET: 1 OF 4

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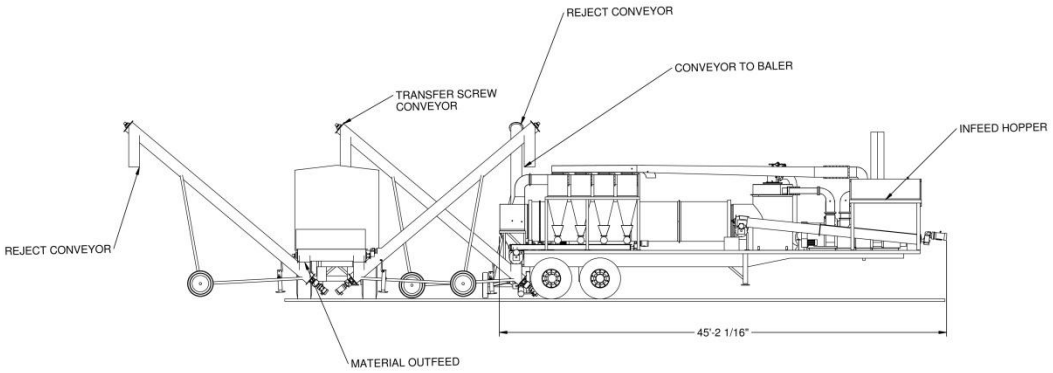
| APPROVED BY: | RP | DATE: | 3/27/2020 |

REVISION: A
SCALE: 2NS
SHEET: 2 OF 4

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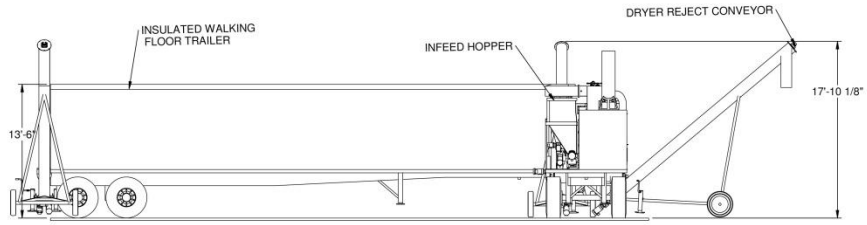
REVISION: A
SIZE: ANSI

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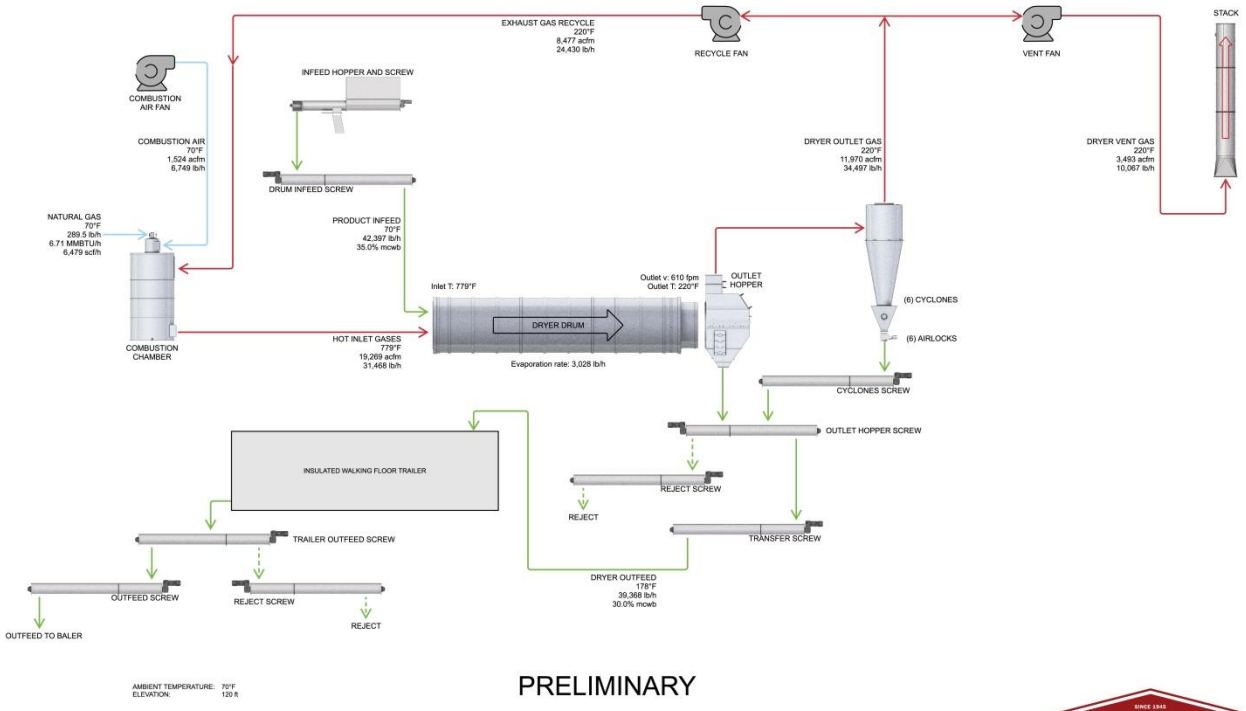
REVISION: A
SIZE: ANSI




PRELIMINARY

## *Thompson 520 Mobile Wood Phytosanitary Heater*

Design production

*Description:*

5-ft-diameter trailer-mounted Thompson woodchip phytosanitary heater, 150,000-t/y design outfeed production.

| | |
|---|---|
| *Project:* | Mobile Phyto |
| *Revision:* | 2 |
| *Date:* | 23-Feb-2021 |
| *By:* | Parker Robb |
| *Page:* | 1 of 1 |



*Thompson Dehydrating Company, Inc*
2953 SW Wanamaker Dr, Topeka, KS 66614
*+1 (785) 273-7722*

SINCE 1945 THOMPSON DRYERS

E = MC³ ©

# 7.) Densify for Effective, Efficient and Low Cost Material Handling


**Bale Statistics US Measures**

Width 1 = 45"
Width 2 = 45"
Length = 72" (*Length can be modified*)
Volume = 84 *cubic feet*
Bale weight = 3,360 *US Pounds*
Bale weight = 1.68 *US Short Tons*
Bale weight = 40 *US Pounds per cubic foot*

**Bale Statistics Metric Measures**

Width 1 = 1.14 m
Width 2 = 1.14 m
Length = 1.828 m (*Length can be modified*)
Volume = 2.38 *cubic meters*
Bale weight = 1,524 *Kilograms*
Bale weight = 1.5 *Metric tonne*
Bale weight = 1.13 *cubic meters*

A. 1 Bundle of bales is 2 bales wide and 2 bales high. Bundles are omprised of 4 bales total = 6.72 US Tons, or 4 bales total of 6 Metric Tonnes

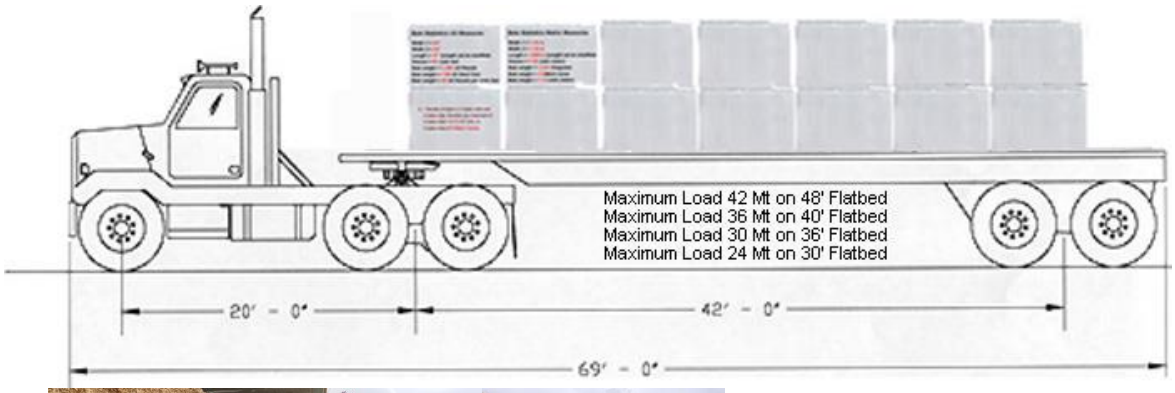
B. US Inland Transport Sizing
2 bales wide x 2 bales high
Width 90" (on truck) = 7.5 '
Height 90" (on truck) = 7.5 '

C. EU Inland Transport Sizing
2 bales wide x 2 bales high
Width 2.28 m (on truck) = 7.5 '
Height 2.28 m (on truck) = 7.5 '

1.14 m

45"

6' | 1.828 m | 45" | 1.14 m




E = MC³ ©

**The Apollo ISC Big Bale Press (BBP65)** is part of our Big Bale Packaging and the most efficient and flexible compressing and packing system available on the market today. The Big Bale press in itself is a compact, fully automatic installation for compressing, packing and palletizing bulk products. The Big Bale Press can be used for a wide range of compressible and cohesive products, such as peat, biomass and compost. As designed this system will bale up to 300,000 Metric Tonnes of wood chips annually, with a compression ratio of ~ 1.65 to 1 (roughly 24.5 lbs/cf to 40.4 lbs/cf in bale. [25]

## Rock Solid - Perfectly Sized to Fit:

***Shipping Containers – No Wasted Space***

Tightly Arranged Vessel – handy sized 28 – 30 KMt

US & EU Trucks/Rail and Transport

**Different De-baler Systems**

**Slicing – 100 Mt Per Hour**

**Trommel - Stripper**

## 8.) Eliminate:

### Costly Silo Storage or Warehouse Buildings,


### Chip-Pile Management,


### Port Handling – Movement& Covering,


### Inclement Weather – Climate Exposure.

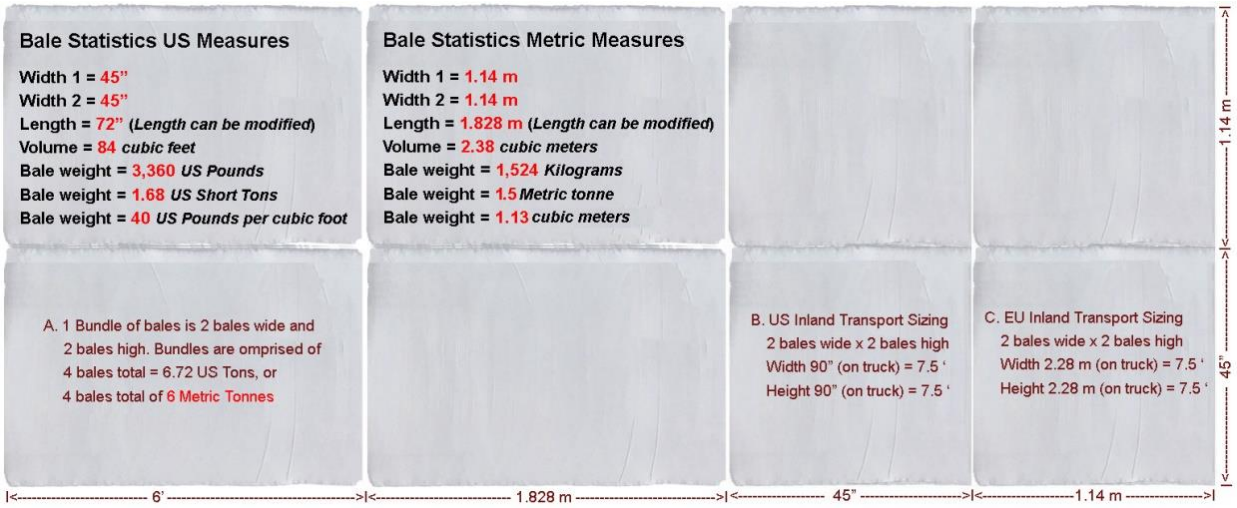
Bales are hermetically sealed in a watertight and airtight sturdy plastic seal wrapping. Wrapping is Double layered to provide strong, rigid, and nearly Impenetrable during movement, storage, loading And unloading and long-term inventory stacking. Quality and Integrity can be held a year – outside.

## 9.) Ocean Freight cost Reduction exceed Pellet Density/Stowage Value

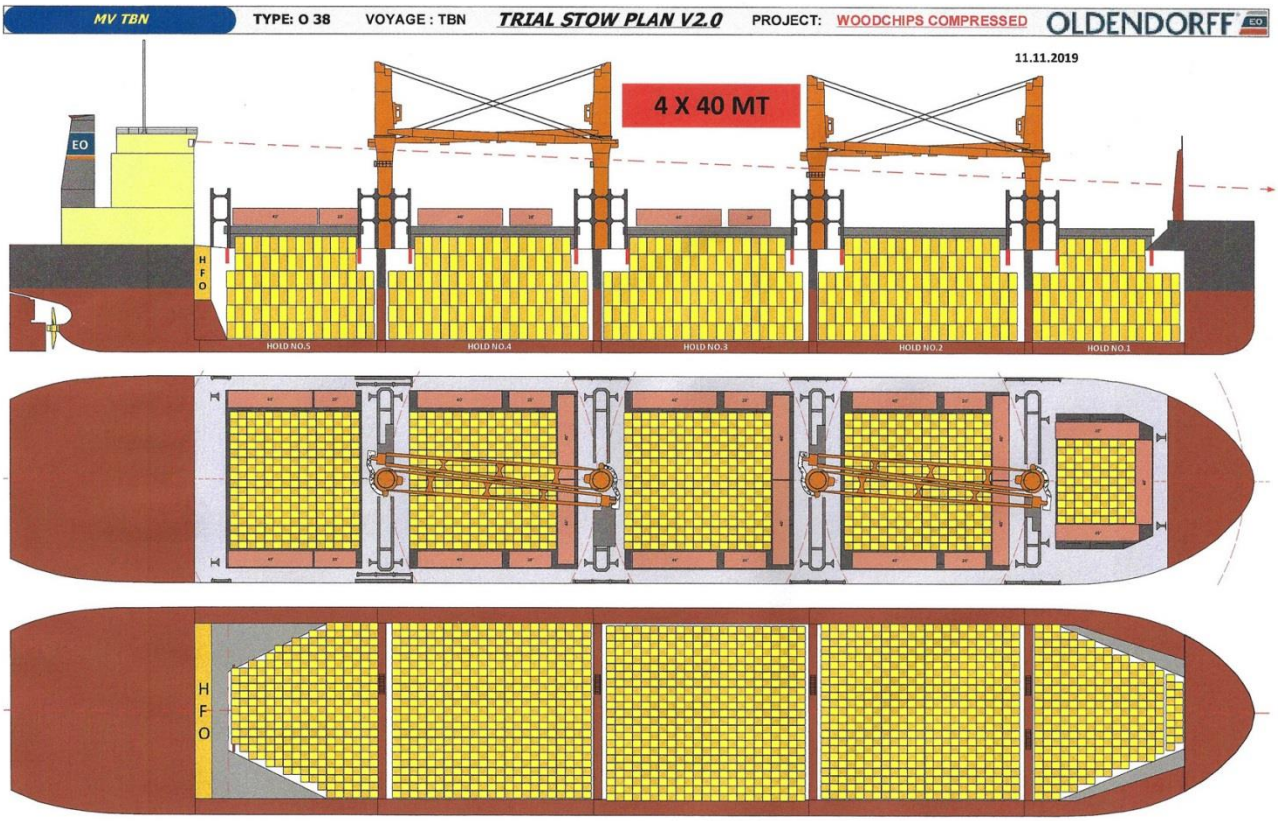
Ocean freight costs are directly related to the stowage value of any commodity. Industrial wood pellets weigh 40 lbs/cf. E=MC³© densified biomass chips weigh 40.6 lbs/cf or slightly more comparable to industrial wood pellets. Therefore, these two commodities weighing the same; there is no appreciable difference in the ocean freight density, stowage or loading variables. The stowage per vessel is equal.

They will have the same stowage as each other, but the ocean freight will differ in the exception that the ocean distance for industrial wood pellets is from Savannah, GA, USA to Liverpool GP with a distance of 3629.86 mi, (6722.49 km). The transit time is: 11 days 15 hours at an average speed of: 13 knots.

E=MC³© is from Searsport, ME, USA to Liverpool GP with a distance of 2681.05 mi, (4965.29 km). The transit time is: 8 days 14 hours at an average speed of: 13 knots. This is a 3-day or 27% reduction of time on water each way or a 6-day round trip sailing time reduction, which allows more vessel turn around trips each year. [26]



# Vessel Loading Configurations – System and Equipment




CAPT. H.VISSER
PORTOPS-STA@OLDENDORFF.COM

# Load Perfection:

OLDENDORFF

***28-30 KMT Cargo – Handy size Under & Below Hatch***

- ❑ **Tightly Arranged Vessel**
- ❑ **3 Cranes on Board**
- ❑ **24 Mt Per Cranston Bar**
- ❑ **7 Turns Per Hr (24 MT EA)**
- ❑ **168 MT P/hr per/Crane**
- ❑ **504 MT per Hr Total**
- ❑ **60 Hrs. to Load ~ 30 KMt**
- ❑ **~ 3 Days in Port**
- ❑ **Reciprocal Back Hauls (*may be arranged*)**
- ❑ **Same Ports – Same Type Loads (*may be arranged*)**
- ❑ **5 Dedicated Loads Per Year – for 150 KMTPY cargo**
- ❑ **150,000 MT Potential per Dryer System**
- ❑ **Dual HT System = 300 KMTPY – With 2nd Dryer**
- ❑ **10 Dedicated Loads Per Year – for 300 KMTPY cargo**

E = MC³ ©

## 10.) Achieve Efficiency by promoting Strategic Alliances.

**Strategic Alliances** are established by and between landowners, loggers and transportation professionals. All fiber sourced is strictly derived of forest residuals and waste materials. No trees are harvested for this entire project. No forest land/acreage is deforested.

Relationships are established with Canadian Pacific Rail for transport and several laydown yards have been identified to enhance supply chain efficiency. Reliance upon rail transport will replace truck traffic and carbon emissions by roughly 86%. The Searsport laydown yard is under site control for 30-years with land lease cost at below market rate in consideration to an exchange for pass through costing, whereby payment is made upon loading and shipping vessels.

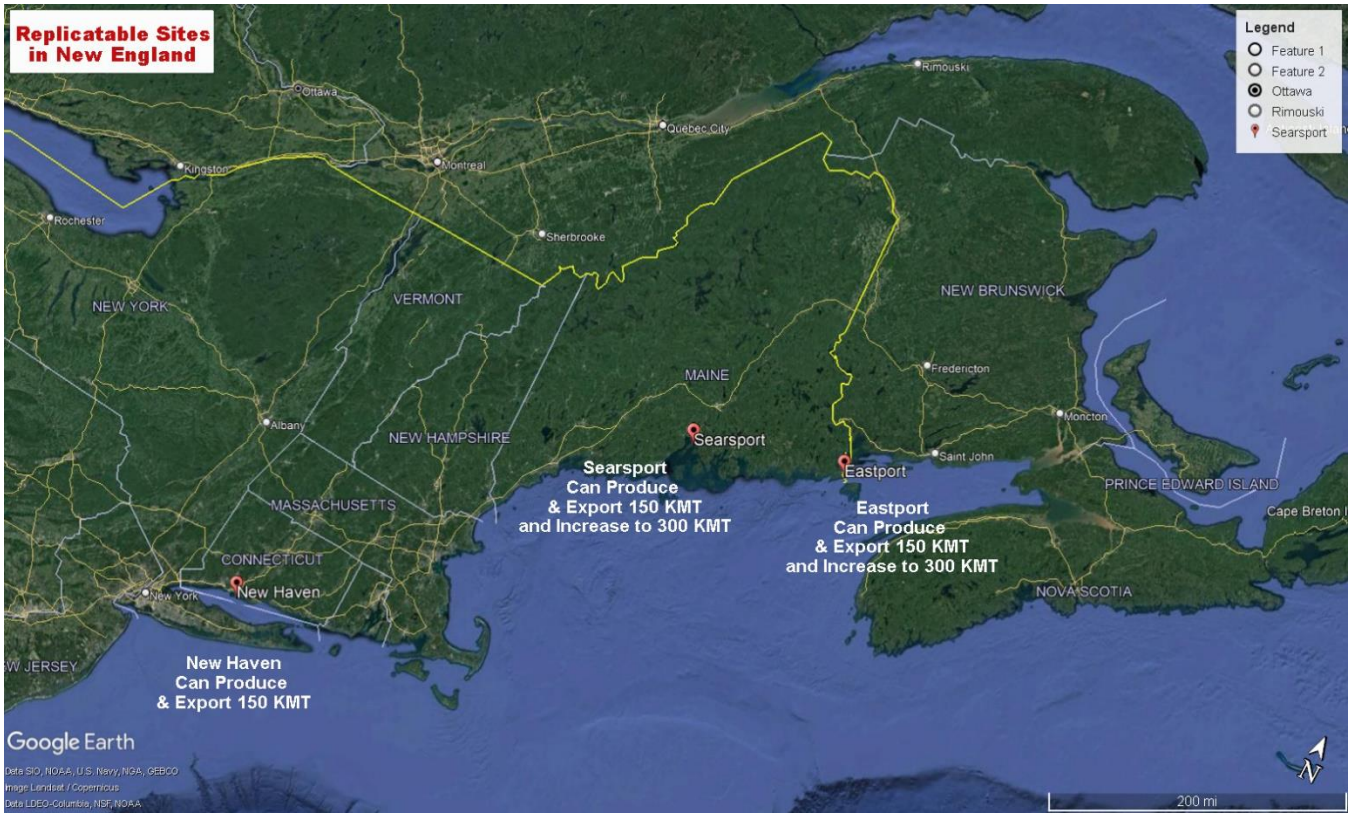
The aggregate yard acts as the central handling facility to ensure exacting specifications, in both quality, species, and sizing – also, to maintain a consistent and exacting record of Phytosanitation processes. The EU mandate of 56°C for 30 minutes to the core is exceeded at 60°C for 45minutes to the core (in expectation of increased mandates).

Densification of wood chips lowers the ocean freight rate and delivery time. The absence of need for buildings, chip piles, silos and costly port handling mitigates cost and environmental exposure to the commodity.

Direct contract relationships by Oldendorff Shipping and buyers or end-user distribution centers or CHP facilities will save significantly by eliminating a middleman exporter in the financial equation.

Partnering relationships with buyers or end-user distribution centers or CHP facilities will save significantly by providing an opportunity to own, lease or manage the fiber received to the aggregation yard. Gigajoule values can increase during natural drying periods with no costs.

## 11.) Replicate the Above.



# Financial Benefits from Acting Responsibly

## Comparison of Commodities – MC & Gj Values

### Analysis of Gigajoule Value Calculations

**GJ/tonne = 19.2 - (0.2164*MC),**

*where MC is the moisture content in percent of total weight* [27]

| *BDT-Gj* | | | | *Gj* | | |
|---|---|---|---|---|---|---|
| 19.2 | - (0.2164 * MC) | | = | GJ | | |
| | Given MC% | 55 | = | 7.30 | Gj/tonne | |
| | Given MC% | 54 | = | 7.51 | Gj/tonne | |
| | Given MC% | 53 | = | 7.73 | Gj/tonne | |
| | Given MC% | 52 | = | 7.95 | Gj/tonne | |
| | Given MC% | 51 | = | 8.16 | Gj/tonne | |
| | Given MC% | 50 | = | 8.38 | Gj/tonne | |
| | Given MC% | 49 | = | 8.60 | Gj/tonne | |
| | Given MC% | 48 | = | 8.81 | Gj/tonne | |
| | Given MC% | 47 | = | 9.03 | Gj/tonne | |
| | Given MC% | 46 | = | 9.25 | Gj/tonne | |
| | Given MC% | 45 | = | 9.46 | Gj/tonne | |
| | Given MC% | 44 | = | 9.68 | Gj/tonne | |
| | Given MC% | 43 | = | 9.89 | Gj/tonne | |
| | Given MC% | 42 | = | 10.11 | Gj/tonne | |
| | Given MC% | 41 | = | 10.33 | Gj/tonne | |
| | Given MC% | 40 | = | 10.54 | Gj/tonne | |
| | Given MC% | 39 | = | 10.76 | Gj/tonne | |
| | Given MC% | 38 | = | 10.98 | Gj/tonne | |
| | Given MC% | 37 | = | 11.19 | Gj/tonne | |
| | Given MC% | 36 | = | 11.41 | Gj/tonne | |
| | Given MC% | 35 | = | 11.63 | Gj/tonne | |
| | Given MC% | 34 | = | 11.84 | Gj/tonne | |
| | Given MC% | 33 | = | 12.06 | Gj/tonne | |
| | Given MC% | 32 | = | 12.28 | Gj/tonne | |
| | Given MC% | 31 | = | 12.49 | Gj/tonne | |
| | Given MC% | 30 | = | 12.71 | Gj/tonne | |
| | Given MC% | 29 | = | 12.92 | Gj/tonne | |
| | Given MC% | 28 | = | 13.14 | Gj/tonne | |
| | Given MC% | 27 | = | 13.36 | Gj/tonne | |
| | Given MC% | 26 | = | 13.57 | Gj/tonne | |
| | Given MC% | 25 | = | 13.79 | Gj/tonne | Targeted E=MC3© |
| | Given MC% | 24 | = | 14.01 | Gj/tonne | |
| | Given MC% | 23 | = | 14.22 | Gj/tonne | |
| | Given MC% | 22 | = | 14.44 | Gj/tonne | |
| | Given MC% | 21 | = | 14.66 | Gj/tonne | |
| | Given MC% | 20 | = | 14.87 | Gj/tonne | |
| | Given MC% | 19 | = | 15.09 | Gj/tonne | |
| | Given MC% | 18 | = | 15.30 | Gj/tonne | |
| | Given MC% | 17 | = | 15.52 | Gj/tonne | |
| | Given MC% | 16 | = | 15.74 | Gj/tonne | |
| | Given MC% | 15 | = | 15.95 | Gj/tonne | |
| | Given MC% | 10 | = | 17.04 | Gj/tonne | Industrial Wood Pellets |
| | Given MC% | 5 | = | 18.12 | Gj/tonne | |
| | Given MC% | 0 | = | 19.20 | Gj/tonne | |

**E=MC³© *v.* Wood Pellets**

# Financial Benefits from Acting Responsibly

## Comparative Adjustment of Volume to Balance Gj Purchase

### Justification for Substitution or Inclusion of E=MC$^3$© Wood Chips in Place of Industrial Wood Pellets

Analysis conducted on the basis of a Gigajoule Purchase = to 1 Million MT of Wood Pellets = 17 million Gj

| | Forward | US $ FOB Mt | Gj/per-Mt | Per Gj US $ | MMt Supply | Gj Equivalent | Annual Supply US$ |
|---|---|---|---|---|---|---|---|
| Industrial Wood Pellets | | | | | | | |
| | 1Q22 | $ 197.00 | 17.04 | $ 11.56 | 1 | 17,036,000 | $ 197,000,000 |
| | 2Q22 | $ 187.00 | 17.04 | $ 10.98 | 1 | 17,036,000 | $ 187,000,000 |
| | 3Q22 | $ 178.50 | 17.04 | $ 10.48 | 1 | 17,036,000 | $ 178,500,000 |
| | 4Q22 | $ 180.50 | 17.04 | $ 10.60 | 1 | 17,036,000 | $ 180,500,000 |
| *Averaged - 22* | 2022 | $ 185.75 | 17.04 | $ 10.90 | 1 | 17,036,000 | $ 185,750,000 |
| | **2023** | **$ 172.50** | **17.04** | **$ 10.13** | **1** | **17,036,000** | **$ 172,500,000** |
| | 2024 | $ 173.00 | 17.04 | $ 10.15 | 1 | 17,036,000 | $ 173,000,000 |
| *Predicted* | 2025 | $ 173.50 | 17.04 | $ 10.18 | 1 | 17,036,000 | $ 173,500,000 |

| | Forward | US $ FOB Mt | Gj/per-Mt | Per Gj US $ | MMt Supply | Gj Equivalent | Annual Supply US$ |
|---|---|---|---|---|---|---|---|
| E=MC3© | 1Q22 | $ 124.95 | 13.79 | $ 9.06 | 1 | 13,790,000 | $ 124,955,000 |
| | 2Q22 | $ 116.75 | 13.79 | $ 8.47 | 1 | 13,790,000 | $ 116,755,000 |
| | 3Q22 | $ 107.85 | 13.79 | $ 7.82 | 1 | 13,790,000 | $ 107,855,000 |
| | 4Q22 | $ 112.75 | 13.79 | $ 8.18 | 1 | 13,790,000 | $ 112,745,500 |
| *Averaged - 22* | 2022 | $ 115.56 | 13.79 | $ 8.38 | 1 | 13,790,000 | $ 115,560,000 |
| | **2023** | **$ 115.66** | **13.79** | **$ 8.39** | **1** | **13,790,000** | **$ 115,660,000** |
| | 2024 | $ 115.76 | 13.79 | $ 8.39 | 1 | 13,790,000 | $ 115,760,000 |
| *Predicted* | 2025 | $ 115.86 | 13.79 | $ 8.40 | 1 | 13,790,000 | $ 115,860,000 |

### Adjustment to Purchase equivalent Gigajoules to Wood Pellets

*To provide an equivalent Gigajoules, the wood chip purchase volume is increased by* 17.17%

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Wood Pelets | **2023** | **$ 172.50** | **17.04** | **$ 10.13** | **1** | **17,036,000** | **$ 172,500,000** | |
| E=MC3© | **2023** | **$ 115.66** | **13.79** | **$ 8.39** | **1** | **17,036,000** | **$ 142,884,972** | |

**Adjusted Volume** **1,171,681** **Metric Tonnes Required** **E=MC3©** **Savings** **$ 29,615,028** **17.17%**

*Source :* Argus Biomass Markets Issue 21-50 Wednesday December 15, 2021 FOB Northeast USA

*Gj Value Formula:* GJ/tonne = 19.2 - (0.2164*MC), where MC is the moisture content in percent of total weight.

E = MC$^3$©

# Financial Benefits from Acting Responsibly

## Analysis of Savings to CHP Facility by Substitution

### Justification for Substitution or Inclusion of E=MC$^3$© Wood Chips in Place of Industrial Wood Pellets

Analysis conducted on the basis of a Gigajoule Purchase = to 1 Million MT of Wood Pellets = 17 million Gj

| | Forward | US $ FOB Mt | Gj/per-Mt | Per Gj US $ | MMt Supply | Gj Equivalent | Annual Supply US$ | |
|---|---|---|---|---|---|---|---|---|
| Industrial Wood Pellets | | | | | | | | |
| | 1Q22 | $ 197.00 | 17.04 | $ 11.56 | 1 | 17,036,000 | $ 197,000,000 | |
| | 2Q22 | $ 187.00 | 17.04 | $ 10.98 | 1 | 17,036,000 | $ 187,000,000 | |
| | 3Q22 | $ 178.50 | 17.04 | $ 10.48 | 1 | 17,036,000 | $ 178,500,000 | |
| | 4Q22 | $ 180.50 | 17.04 | $ 10.60 | 1 | 17,036,000 | $ 180,500,000 | |
| *Averaged - 22* | 2022 | $ 185.75 | 17.04 | $ 10.90 | 1 | 17,036,000 | $ 185,750,000 | |
| | **2023** | **$ 172.50** | **17.04** | **$ 10.13** | **1** | **17,036,000** | **$ 172,500,000** | |
| | 2024 | $ 173.00 | 17.04 | $ 10.15 | 1 | 17,036,000 | $ 173,000,000 | |
| *Predicted* | 2025 | $ 173.50 | 17.04 | $ 10.18 | 1 | 17,036,000 | $ 173,500,000 | |

| | Forward | US $ FOB Mt | Gj/per-Mt | Per Gj US $ | MMt Supply | Gj Equivalent | Annual Supply US$ | |
|---|---|---|---|---|---|---|---|---|
| E=MC3© | 1Q22 | $ 124.95 | 13.79 | $ 9.06 | 1 | 13,790,000 | $ 124,955,000 | |
| | 2Q22 | $ 116.75 | 13.79 | $ 8.47 | 1 | 13,790,000 | $ 116,755,000 | |
| | 3Q22 | $ 107.85 | 13.79 | $ 7.82 | 1 | 13,790,000 | $ 107,855,000 | |
| | 4Q22 | $ 112.75 | 13.79 | $ 8.18 | 1 | 13,790,000 | $ 112,745,500 | |
| *Averaged - 22* | 2022 | $ 115.56 | 13.79 | $ 8.38 | 1 | 13,790,000 | $ 115,560,000 | |
| | **2023** | **$ 115.66** | **13.79** | **$ 8.39** | **1** | **13,790,000** | **$ 115,660,000** | **$ 56,840,000** |
| | 2024 | $ 115.76 | 13.79 | $ 8.39 | 1 | 13,790,000 | $ 115,760,000 | |
| *Predicted* | 2025 | $ 115.86 | 13.79 | $ 8.40 | 1 | 13,790,000 | $ 115,860,000 | |

### Adjustment to Purchase equivalent Gigajoules to Wood Pellets

*To provide an equivalent Gigajoules, the wood chip purchase volume is increased by* 32.95%

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wood Pellets | 2023 | $ 172.50 | 17.04 | $ 10.13 | 1 | 17,036,000 | $ | 172,500,000 | |
| | | | | | | | | | *Difference* |
| E=MC3© | 2023 | $ 115.66 | 13.79 | $ 8.39 | 1 | 13,790,000 | $ | 115,660,000 | 32.95% |
| **Added Mt Volume Required to Equal Gj** | | | **235,388** | **$ 8.39** | **1,235,388** | **3,246,000** | **$** | **10,361,492** | |
| | | | | | **Adjustment** | **17,036,000** | | **126,021,492** | 26.94% Savings |

| | | | | | |
|---|---|---|---|---|---|
| 17.04 | Wood Pellets | 13.79 | E=MC3© | Adjustment | 23.54% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Adjusted Mt Volume Required | | | Previous | 1,000,000 | | |
| Adjusted Volume | 1,329,507 | Metric Tonnes Required | E=MC3© | Savings | $ 56,840,000 | 32.95% |

Here, a CHP facility can reduce its fiber supply costs by 32.95% by a total substitution of wood pellets as a supply commodity with E=MC3© however, the suggestion is to substitute and or complement the traditional utilization of wood pellets with a marginal influx of E=MC3© as demonstrated herein.

| | *Commodity* | *% Adjusted* | *Mt Required* | *Original Gj* | *Adjusted Gj* | *Gj USD $ FOB* | *Delivered USD $* |
|---|---|---|---|---|---|---|---|
| Suggested Modification | ood Pellets | 35% | 650,000 | 17,036,000 | 11,073,400 | $ 10.13 | $ 112,125,000 |
| | E=MC3© | | 432,386 | | 5,962,600 | $ 8.39 | $ 50,009,740 |
| | | | 1,082,386 | | 17,036,000 | | $ 162,134,740 |
| | | | | | | Original Pellet USD $ | $ 172,500,000 |
| | | | | | | CHP Facility Savings with Substitution | $ 10,365,260 |
| | | | | | | Savings % | 6.01% |

*Source :* Argus Biomass Markets Issue 21-50 Wednesday December 15, 2021 FOB Northeast USA

*Gj Value Formula:* GJ/tonne = 19.2 - (0.2164*MC), where MC is the moisture content in percent of total weight.

***The Parameters:*** For Analysis of Savings made possible by substitution or utilizing a partial substitution of E=MC3© Wood Chips in place of industrial wood pellets. This analysis starts with the values attributed to the purchase and supply of 1-million metric tonnes of industrial wood pellets with a Gj value of $17.04 per Mt. for a Gj contract purchase of 17,036,00 Gj delivered. Using values established herein, the Gj value per Mt for E=MC3© Wood Chips is $13.79 Gj/Mt. To increase the Gj value to an equivalent of wood pellets we must add an additional 23.54% to the base Gj of $13.79 to achieve $17.04 per Gj.

Here we adjust the volume of wood pellet consumption by 35% and remain with a total ocean freight volume of 1,082,386 Mt afloat. This adjustment lowers the overall cost to the CHP facility from $172,500,000 to about $162,134,740 for a savings of $10,365,260 or about 6.01%. The total Gj purchase volume remains the same.

*By reducing the Mt volume by 35% fiber volume decreases by 840,000 US Ton of fiber and annual acres saved = 6,388*

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# Financial Projections – Proforma 150 KMTPY

## Calculated with 1 Dryer System and 1 Baler System

## Adding Dryer for 2nd Year (in scaled up stage)

***Shown on 5-Year Proforma although Off Takes are Typically 7- years.***

Source: ***Argus*** Biomass Markets Issue 21-50 Wednesday December 15, 2021 **FOB** *This Proforma Dated March 20, 2022*

| **Proforma Profit and Loss (Yearly)** | **Based on 150KMT Operations from Searsport - w/2nd year Increase to 300KMT** | | | | |
|---|---|---|---|---|---|
| **Year** | **2023** | **2024** | **2025** | **2026** | **2027** |
| HT Densified E=MC3 Biomass Energy Chips – EU - UK | $17,334,626 | $35,102,618 | $36,155,696 | $37,240,367 | $38,357,578 |
| Residual Bark Mulch from Operations | $157,500 | $318,938 | $334,884 | $351,629 | $369,210 |
| **Total Revenue** | **$ 17,492,126** | **$ 35,421,555** | **$ 36,490,581** | **$ 37,591,996** | **$ 38,726,788** |
| **Rev. %** | **100.00%** | **100.00%** | **100.00%** | **100.00%** | **100.00%** |
| **Expenses** | | | | | |
| **Hard Costs - Raw Fiber - Processing** | **2023** | **2024** | **2025** | **2026** | **2027** |
| Fiber Costs (Estimated) | $ 5,175,000 | $ 10,453,500 | $ 10,767,105 | $ 11,090,118 | $ 11,422,822 |
| Yard Aggregation Costs (Sort, Debark, Chip, Screen) | $ 1,035,000 | $ 2,090,700 | $ 2,153,421 | $ 2,218,024 | $ 2,284,564 |
| Heat Costs (Estimated) | $ 975,000 | $ 1,969,500 | $ 1,949,805 | $ 1,930,307 | $ 1,911,004 |
| New Site Baler Operation - (Bale Lease/Subcontracted) | $ 2,025,000 | $ 4,090,500 | $ 4,049,595 | $ 4,009,099 | $ 3,969,008 |
| Utilities (Estimated) | $ 225,000 | $ 454,500 | $ 463,590 | $ 472,862 | $ 482,319 |
| Equip. Maint. (Estimated) | $ 52,500 | $ 106,050 | $ 108,171 | $ 110,334 | $ 112,541 |
| On Site Handling - Conveyance Systems | $ 120,000 | $ 242,400 | $ 247,248 | $ 252,193 | $ 257,237 |
| Stevedoring - FOB Incoterm Basis | $ 2,469,250 | $ 4,987,885 | $ 5,087,643 | $ 5,189,396 | $ 5,293,183 |
| **Cost of Goods Sold COG - Operations** | **$ 12,076,750** | **$ 24,395,035** | **$ 24,826,578** | **$ 25,272,333** | **$ 25,732,678** |
| **Hard Costs** | **69.04%** | **68.87%** | **68.04%** | **67.23%** | **66.45%** |
| **Managerial & Field Expenses** | **2023** | **2024** | **2025** | **2026** | **2027** |
| Maine Based Yard Manager 1st Yr w/2nd Yr increase | $ 70,000 | $ 105,000 | $ 107,625 | $ 110,316 | $ 113,074 |
| General and Administrative | $ 38,000 | $ 75,240 | $ 77,121 | $ 79,049 | $ 81,025 |
| Production Manager 1st Shift | $ 60,000 | $ 118,800 | $ 121,770 | $ 124,814 | $ 127,935 |
| Production Manager 2nd Shift | $ 65,000 | $ 128,700 | $ 131,918 | $ 135,215 | $ 138,596 |
| Field Manager 1st Shift | $ 50,000 | $ 99,000 | $ 101,475 | $ 104,012 | $ 106,612 |
| Field Manager 2nd Shift | $ 55,000 | $ 108,900 | $ 111,623 | $ 114,413 | $ 117,273 |
| Shipping/Receiving/Yard Labor Shift 1 | $ 45,000 | $ 89,100 | $ 91,328 | $ 93,611 | $ 95,951 |
| Shipping/Receiving/Yard Labor Shift 2 | | | | | |
| FICA | $ 68,940 | $ 136,501 | $ 139,914 | $ 143,412 | $ 146,997 |
| Worker's Comp. Insurance | $ 55,000 | $ 108,900 | $ 111,623 | $ 114,413 | $ 117,273 |
| **Managerial & Field Expenses** | **$ 506,940** | **$ 970,141** | **$ 994,395** | **$ 1,019,255** | **$ 1,044,736** |
| **Managerial Costs** | **2.90%** | **2.74%** | **2.73%** | **2.71%** | **2.70%** |
| **G & A - Office - Land Exp.** | **2023** | **2024** | **2025** | **2026** | **2027** |
| Professional Executive Consultant Fee | $ 40,000 | $ 44,000 | | | |
| Authorized Maine Fiber Procurement Broker | $ 45,000 | $ 69,750 | $ 69,053 | $ 68,362 | $ 67,678 |
| Insurance Costs | $ 30,000 | $ 33,000 | $ 36,300 | $ 39,930 | $ 43,923 |
| Port Laydown - Land Lease | $ 49,005 | $ 50,475 | $ 51,989 | $ 53,549 | $ 55,156 |
| Port Pass Through Fees - Loading Event Only | $ 147,000 | $ 279,300 | $ 283,490 | $ 287,742 | $ 292,058 |
| Yard Prep 1st Year - Ongoing Maintenance | $ 85,000 | $ 12,750 | $ 14,025 | $ 15,428 | $ 16,970 |
| Local Taxes | $ 11,761 | $ 12,937 | $ 14,231 | $ 15,654 | $ 17,220 |
| Office Trailer Expense | $ 18,000 | $ 19,800 | $ 21,780 | $ 23,958 | $ 26,354 |
| Miscellaneous Costs | $ 15,000 | $ 16,500 | $ 18,150 | $ 19,965 | $ 21,962 |
| **G & A - Office - Land Exp.** | **$ 440,766** | **$ 538,512** | **$ 509,017** | **$ 524,588** | **$ 541,320** |
| **Gen./Admin. Exo. %** | **2.52%** | **2.57%** | **2.62%** | **2.67%** | **2.73%** |
| **Debt Service** | **2023** | **2024** | **2025** | **2026** | **2027** |
| Primary Loan - Principle Expense (Start up) | $ 629,800.83 | $ 671,980 | $ 716,983 | $ 765,001 | $ 816,235 |
| Primary Loan - Interest Expense Only (Start up) | $ 215,456.78 | $ 173,278 | $ 128,274 | $ 80,256 | $ 29,023 |
| Primary Loan - Principle Expense Only (2nd HT System) | | $ 433,054 | $ 462,056 | $ 493,001 | $ 526,018 |
| Primary Loan - Interest Expense Only (2nd HT System) | | $ 148,149 | $ 119,147 | $ 88,202 | $ 55,185 |
| **Debt Service** | **$ 845,258** | **$ 1,426,460** | **$ 1,426,460** | **$ 1,426,460** | **$ 1,426,460** |
| **Debt Svc. %** | **4.83%** | **4.03%** | **3.91%** | **3.79%** | **3.68%** |
| **Feedstock - Procure/Sales/Reserve** | **2023** | **2024** | **2025** | **2026** | **2027** |
| E=MC3® Licensed -transfer of Copyright (on contract) | $ 25,000 | $ - | $ - | $ - | $ - |
| International Broker Fees (TBD - Carden?) | $ 67,500 | $ 68,850 | $ 70,227 | $ 71,632 | $ 73,064 |
| Reserve Fund - Inventoried Fiber | $ 100,000 | $ 198,000 | $ 196,020 | $ 194,060 | $ 192,119 |
| **Feedstock - Procure/Sales/Reserve** | **$ 67,500** | **$ 68,850** | **$ 70,227** | **$ 71,632** | **$ 73,064** |
| **Feedstock - %** | **0.39%** | **0.39%** | **0.40%** | **0.41%** | **0.42%** |
| **TOTAL ALL EXPENSES** | **2023** | **2024** | **2025** | **2026** | **2027** |
| Cost of Goods Sold COG - Operations | $ 12,076,750 | $ 24,395,035 | $ 24,826,578 | $ 25,272,333 | $ 25,732,678 |
| G & A - Office - Land Exp. | $ 440,766 | $ 538,512 | $ 509,017 | $ 524,588 | $ 541,320 |
| Debt Service | $ 845,258 | $ 1,426,460 | $ 1,426,460 | $ 1,426,460 | $ 1,426,460 |
| Feedstock - Procure/Sales/Reserve | $ 67,500 | $ 68,850 | $ 70,227 | $ 71,632 | $ 73,064 |
| **Totals** | **$ 13,430,274** | **$ 26,428,858** | **$ 26,832,282** | **$ 27,295,012** | **$ 27,773,523** |
| | **76.78%** | **74.61%** | **73.53%** | **72.61%** | **71.72%** |
| **Gross Margin** | **$ 4,061,852** | **$ 8,992,698** | **$ 9,658,298** | **$ 10,296,984** | **$ 10,953,266** |
| **% Retain for Continued Operations** | **35.0%** | **35.0%** | **35.0%** | **35.0%** | **35.0%** |
| **$ Retained by Company** | **$ 1,421,648** | **$ 3,147,444** | **$ 3,380,404** | **$ 3,603,944** | **$ 3,833,643** |
| **Distributed to Shareholders** | **$ 2,640,204** | **$ 5,845,254** | **$ 6,277,894** | **$ 6,693,040** | **$ 7,119,623** |
| **NET - NET to Owner** | **15.09%** | **16.50%** | **17.20%** | **17.80%** | **18.38%** |

| | |
|---|---|
| **Total Investment (1) System)** | **$ 4,400,000.00** |
| **Payback in Years** | **1.67** |

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# Financial Projections – Proforma 150 KMTPY

## Calculated for 1 Dryer System and 1 Baler System

## Total Capital Expense Budget to Start 150KMTPY Line

| | |
|---|---|
| Location Name: | 10 Trundy Road, Searsport - ME 04974 |
| Project Name: | E=MC3 Biomass Export Operations |
| Project MT Throughput: | 150,000 |
| Date of Estimate: | March 19, 2022 |
| Anticipated Construction Start: | May 1, 2022 |
| Anticipated Construction Finish: | November 30, 2022 |
| Anticipated Construction Cost: | $ 4,400,000.00 |

**CONSTRUCTION SPECIFICATION INSTITUTE (CSI)**

| | ESTIMATE SUMMARY | | TOTAL $ | COST PER MTPY-TD | % OF TOTAL |
|---|---|---|---|---|---|
| 00 | DOCUMENTS | | | | |
| | | TOTAL DOCUMENTS | $ 25,000.00 | $ 0.17 | 0.630% |
| 01 | GENERAL REQUIREMENTS | | | | |
| | | TOTAL GENERAL REQUIREMENTS | $ 90,558.06 | $ 0.60 | 2.283% |
| 02 | SITE WORK | | | | |
| | | TOTAL SITEWORK | $ 130,000.00 | $ 0.87 | 3.277% |
| 03 | HEAVY EQUIPMENT | | | | |
| | | TOTAL HEAVY EQUIPMENT | $ 626,650.00 | $ 4.18 | 15.796% |
| 04 | MAJOR SYSTEM EQUIPMENT | | | | |
| | | TOTAL MAJOR EQUIPMENT | $ 2,770,000.00 | $ 18.47 | 69.822% |
| 05 | INVENTORIES | | | | |
| | | TOTAL METALS | $ 100,000.00 | $ 0.67 | 2.521% |
| 06 | UTILITIES | | | | |
| | | SUBTOTAL UTILITIES | $ 225,000.00 | $ 1.50 | 5.671% |
| | | PROJECT SUBTOTAL CONSTRUCTION | $ 3,967,208.06 | $ 26.45 | 100.000% |
| 07 | 99010 - DESIGN CONTINGENCY | 99011 - DESIGN CONTINGENCY | $ 25,000.00 | | |
| | | TOTAL CONTINGENCIES | $ 25,000.00 | | |
| | | PROJECT SUBTOTAL | $ 3,992,208.06 | $ 26.61 | 100.630% |
| 08 | 99030 - CONSTRUCTION MANAGER/ GENERAL CONTRACTOR | 99031 - CM/GC GENERAL CONDITIONS | $ 43,639.29 | | |
| | | 99032 - CM/GC PERSONNEL | $ 158,688.32 | | |
| | | 99033 - CM FEE/GC PROFIT | $ 99,180.20 | | |
| | | TOTAL AE FIXED LIMIT OF CONSTRUCTION | $ 301,507.81 | | |
| | | PROJECT SUBTOTAL | $ 4,293,715.87 | $ 28.62 | 108.230% |
| 09 | 99040 - CONSTRUCTION MANAGER | 99041 - CM CONTINGENCY (zero for GC projects) | $ 35,704.87 | | |
| | | 99042 - PRECONSTRUCTION SERVICES | $ - | | |
| | | TOTAL CM FIXED LIMIT OF CONSTRUCTION | $ 35,704.87 | | |
| | | PROJECT SUBTOTAL | $ 4,329,420.75 | $ 28.86 | 109.130% |
| 10 | 99050 - ALLOWANCES | 99055 - CHILLED WATER CONNECTION FEE ALLOWANCE | $ 45,579.25 | | |
| | | 99056 - SIDEWALK CLOSURE ALLOWANCE FOR AA | $ 25,000.00 | | |
| | | TOTAL ALLOWANCES | $ 70,579.25 | | |
| | | PROJECT SUBTOTAL | $ 4,400,000.00 | $ 29.33 | 110.909% |
| | | PROJECT TOTAL | $ 4,400,000.00 | $ 28.86 | 110.909% |

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| SOURCES OF FUNDS - INPUTS | | Origination | Apr-22 | May-22 | Jun-22 | Jul-22 | Aug-22 | Sep-22 | Oct-22 | Nov-22 | Dec-22 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30% | Investment | $ 1,320,000.00 | $ 13,310.40 | $ 23,112.99 | $ 180,441.33 | $ 27,272.73 | $ 425,390.04 | $ 204,756.24 | $ 248,390.73 | $ 139,849.23 | $ 57,476.33 | $ 1,320,000.00 |
| 70% | Loans | $ 3,080,000.00 | $ 31,057.60 | $ 53,930.30 | $ 421,029.76 | $ 63,636.36 | $ 992,576.75 | $ 477,764.55 | $ 579,578.36 | $ 326,314.86 | $ 134,111.43 | $ 3,080,000.00 |
| | Total | $ 4,400,000.00 | $ 44,368.00 | $ 77,043.29 | $ 601,471.09 | $ 90,909.09 | $ 1,417,966.79 | $ 682,520.79 | $ 827,969.09 | $ 466,164.09 | $ 191,587.76 | $ 4,400,000.00 |

| USES OF FUNDS - OUTPUTS | Expenditures | Apr-22 | May-22 | Jun-22 | Jul-22 | Aug-22 | Sep-22 | Oct-22 | Nov-22 | Dec-22 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 DOCUMENTS | | | | | | | | | | | |
| 00010 - Receive Submittals from Equipment Sources | $ 25,000.00 | $ 5,000.00 | $ 5,000.00 | $ 15,000.00 | | | | | | | $ 25,000.00 |
| 01 GENERAL REQUIREMENTS | | | | | | | | | | | |
| 01510 - Mobilization to Site | $ 45,000.00 | $ 10,000.00 | $ 15,000.00 | $ 20,000.00 | | | | | | | $ 45,000.00 |
| 01530 - Temporary Office Trailer | $ 36,058.06 | | $ 5,408.71 | $ 4,378.48 | $ 4,378.48 | $ 4,378.48 | $ 4,378.48 | $ 4,378.48 | $ 4,378.48 | $ 4,378.48 | $ 36,058.06 |
| 01550 - Site Permitting & Engineering | $ 9,000.00 | $ 3,000.00 | $ 3,000.00 | $ 2,500.00 | $ 500.00 | | | | | | $ 9,000.00 |
| 01560 - Barriers & Enclosures | $ 500.00 | | $ 250.00 | $ 250.00 | | | | | | | $ 500.00 |
| 02 SITE WORK | | | | | | | | | | | |
| 02100 - Site Clearing | $ 9,000.00 | | | $ 3,000.00 | $ 3,000.00 | $ 3,000.00 | | | | | $ 9,000.00 |
| 02200 - Sitework - Earth Preparation | $ 85,000.00 | | $ 5,000.00 | $ 18,000.00 | $ 18,000.00 | $ 18,000.00 | $ 18,000.00 | $ 8,000.00 | | | $ 85,000.00 |
| 02225 - Barrier Fencing | $ 15,000.00 | | $ 3,000.00 | $ 4,000.00 | $ 3,000.00 | $ 3,000.00 | $ 2,000.00 | | | | $ 15,000.00 |
| 02400 - Debris & Bolder Removal | $ 21,000.00 | | $ 7,000.00 | $ 7,000.00 | $ 7,000.00 | | | | | | $ 21,000.00 |
| 03 HEAVY EQUIPMENT | | | | | | | | | | | |
| 03100 - Log Trailers - Non Road-worthy | $ 13,650 | | | | | $ 6,825.00 | $ 6,825.00 | | | | $ 13,650.00 |
| 03200 - Dump Trailer | $ 7,000 | | | | | $ 3,500.00 | $ 3,500.00 | | | | $ 7,000.00 |
| 03300 - 8-Ton Trailer | $ 8,000 | | | | | $ 4,000.00 | $ 4,000.00 | | | | $ 8,000.00 |
| 03400 - Flatbed Trailer | $ 10,000 | | | | | $ 5,000.00 | $ 5,000.00 | | | | $ 10,000.00 |
| 03500 - Debarker/Chipper | $ 500,000 | | | | | $ 250,000.00 | $ 250,000.00 | | | | $ 500,000.00 |
| 03600 - Trucks - Tractor Cabs | $ 52,000 | | | | | $ 26,000.00 | $ 26,000.00 | | | | $ 52,000.00 |
| 03900 - Pickup Trucsk (Used) | $ 36,000 | | | | | $ 18,000.00 | $ 18,000.00 | | | | $ 36,000.00 |
| 04 MAJOR SYSTEM EQUIPMENT | | | | | | | | | | | |
| 11010 - HT - TD Phytosanitation System | $ 2,175,000.00 | | | $ 435,000.00 | | $ 652,500.00 | | $ 652,500.00 | $ 326,250.00 | $ 108,750.00 | $ 2,175,000.00 |
| 11020 - Baling Susyem (300 MTPY) Capital Lease | $ 500,000.00 | | | | | $ 275,000.00 | $ 225,000.00 | | | | $ 500,000.00 |
| 11030 - Conveyance Systems | $ 95,000.00 | | | | | | | $ 38,000.00 | $ 38,000.00 | $ 19,000.00 | $ 95,000.00 |
| 05 INVENTORIES | | | | | | | | | | | |
| 12050 - Reserves - Raw Fiber | $ 100,000.00 | | | | | | $ 25,000.00 | $ 25,000.00 | $ 25,000.00 | $ 25,000.00 | $ 100,000.00 |
| 06 UTILITIES | | | | | | | | | | | |
| 16100 - Water | $ 35,000.00 | | | $ 5,250.00 | $ 7,000.00 | $ 7,000.00 | $ 5,000.00 | $ 5,000.00 | $ 3,000.00 | $ 2,750.00 | $ 35,000.00 |
| 16200 - Electrical Power - Generator | $ 90,000.00 | | $ 13,500.00 | $ 13,500.00 | $ 10,500.00 | $ 10,500.00 | $ 10,500.00 | $ 10,500.00 | $ 10,500.00 | $ 10,500.00 | $ 90,000.00 |
| 16300 - Natural Gas Contract - Install | $ 100,000.00 | | | $ 16,666.67 | $ 16,666.67 | $ 16,666.67 | $ 16,666.67 | $ 16,666.67 | $ 16,666.67 | | $ 100,000.00 |
| 07 DESIGN CONTINGENCY | | | | | | | | | | | |
| 99011 - TD DESIGN | $ 25,000.00 | | $ 5,000.00 | $ 5,000.00 | $ 5,000.00 | $ 5,000.00 | $ 5,000.00 | | | | $ 25,000.00 |
| 08 GENRAL CONTRACTOR | | | | | | | | | | | |
| 99031 - CM / GC GENERAL CONDITIONS | $ 43,639.29 | $ 198.00 | $ 683.75 | $ 6,045.00 | $ 825.50 | $ 14,392.07 | $ 6,873.57 | $ 8,360.50 | $ 4,661.75 | $ 1,599.16 | $ 43,639.29 |
| 99032 - CM / PROJECT MANAGEMENT OVERSIGHT | $ 158,688.32 | $ 720.00 | $ 2,486.35 | $ 21,981.81 | $ 3,001.81 | $ 52,334.81 | $ 24,994.81 | $ 30,401.81 | $ 16,951.81 | $ 5,815.14 | $ 158,688.32 |
| 99033 - CM FEE / GC PROFIT | $ 99,180.20 | $ 450.00 | $ 1,553.97 | $ 13,738.63 | $ 1,876.13 | $ 32,709.25 | $ 15,621.75 | $ 19,001.13 | $ 10,594.88 | $ 3,634.46 | $ 99,180.20 |
| 09 CONSTRUCTION MANAGER | | | | | | | | | | | |
| 99041 - CONSTRUCTION CONTINGENCY | $ 35,704.87 | | $ 4,463.11 | $ 4,463.11 | $ 4,463.11 | $ 4,463.11 | $ 4,463.11 | $ 4,463.11 | $ 4,463.11 | $ 4,463.11 | $ 35,704.87 |
| 10 ALLOWANCES | | | | | | | | | | | |
| 99055 - ALLOWANCES | $ 45,579.25 | | $ 5,697.41 | $ 5,697.41 | $ 5,697.41 | $ 5,697.41 | $ 5,697.41 | $ 5,697.41 | $ 5,697.41 | $ 5,697.41 | $ 45,579.25 |
| 99091A - PURCHASE TRADE NAME | $ 25,000.00 | $ 25,000.00 | | | | | | | | | $ 25,000.00 |
| Total | $ 4,400,000.00 | $ 44,368.00 | $ 77,043.29 | $ 601,471.09 | $ 90,909.09 | $ 1,417,966.79 | $ 682,520.79 | $ 827,969.09 | $ 466,164.09 | $ 191,587.76 | $ 4,400,000.00 |

Budgeted Draw Schedule – 9 Month

## FORWARD-LOOKING AND PREDICTIVE STATEMENTS

The representations depicted herein are based on exhaustive, multi-year cross industry disciplined research and development, primarily related to woody biomass as a sustainable source of renewable energy fiber for use in co-generation CHP facilities and in stand-alone power plants intended to rely only on biomass wood chips.

All predictions and statements, other than cited commentary derived of published or historical facts, included in this presentation that address activities, events or developments that we expect, believe or anticipate will or may occur in the future are forward-looking statements. The words “may,” “estimated,” “believe,” “expect,” “will,” “anticipate,” “plan,” “intend,” “foresee,” “should,” “would,” “could,” or other similar expressions are intended to identify forward-looking statements, which are generally predictive but, not historical in nature.

The intent here is to combine those statements with reasoned prediction – helpful in a broad, macro sense, that can point to potential alternatives to traditional thinking and allow one to fulfill market demand, address climate change issues, reinvigorate forest industry revenue, enhance local and international economies and build enduring strategic alliances globally.

THANK YOU FOR YOUR TIME AND INTEREST

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