



Advanced Torrefaction Systems, LLC

“Making BIOCOAL Commercially Viable”

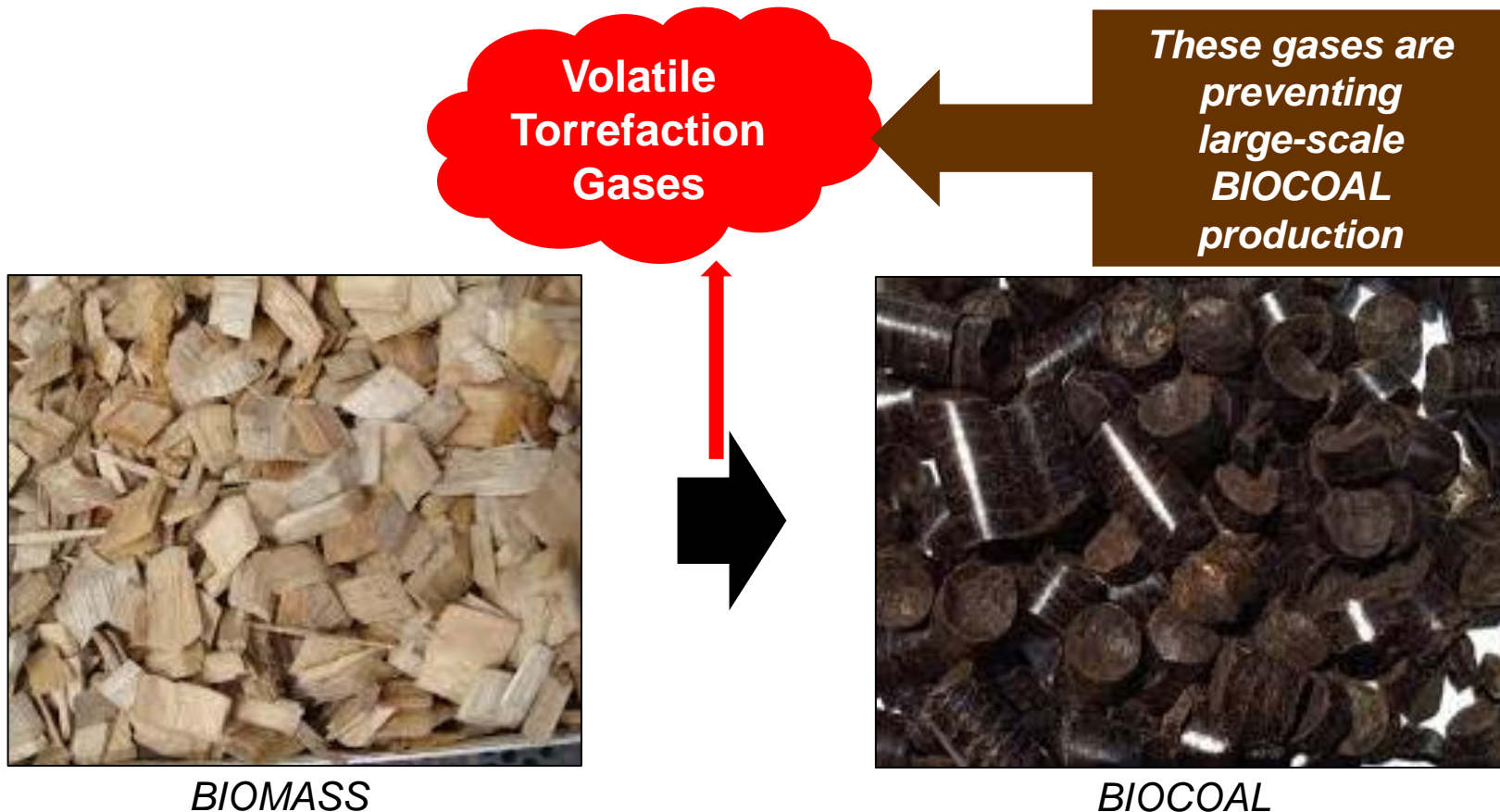
Torrefaction 2.0

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The Problem with BIOCOAL

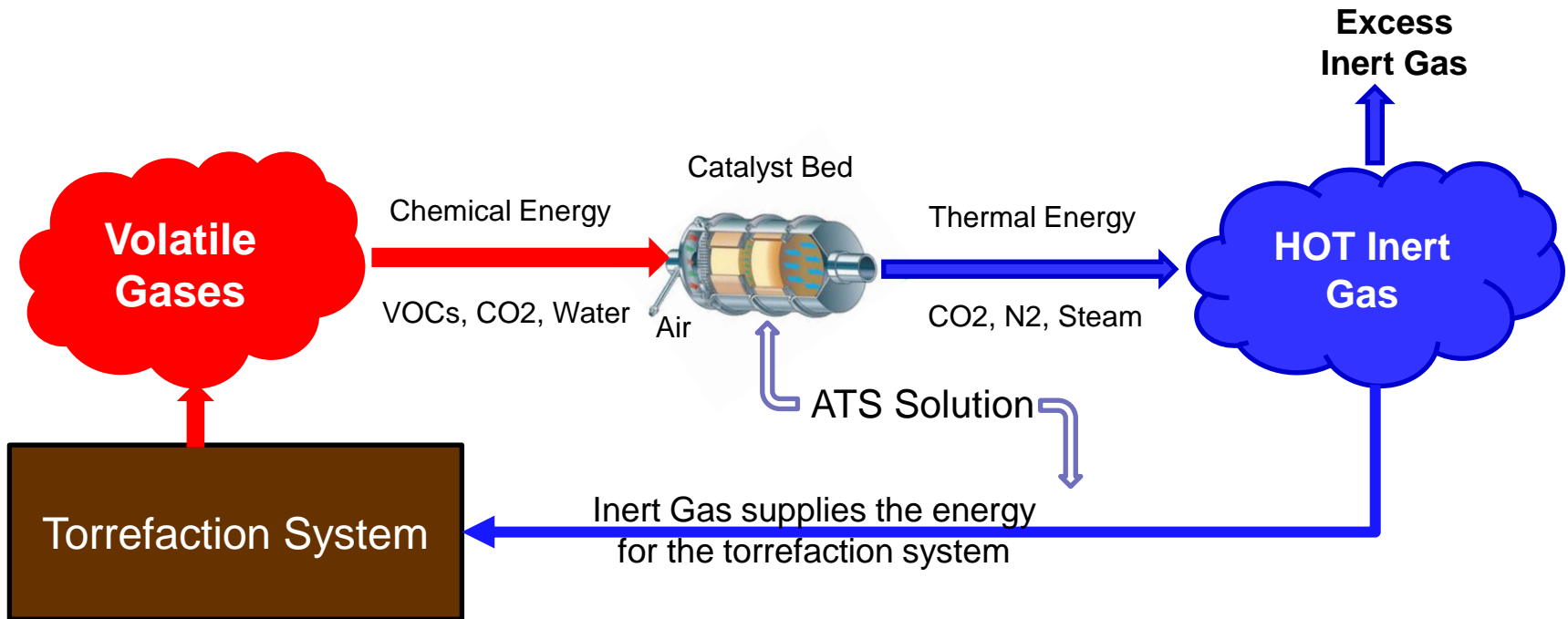
BIOCOAL is a carbon-neutral biomass fuel that can substitute for coal at power plants.

BIOCOAL is produced by a process known as torrefaction. For over 20 years attempts at commercial scale torrefaction have failed due primarily to an inability to effectively treat the highly volatile gases released during the process.



The Solution—ATS Technology

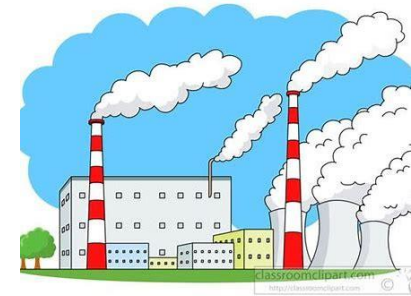
ATS TorreCat™ Technology (patented) effectively treats torrefaction gases and, in so doing, generates large volumes of hot, essentially inert gas.



Inert gas is indispensable to viable commercial torrefaction

What is the Market for ATS Technology?

ATS provides technology to torrefaction plant developers who produce BIOCOAL.



*Low Carbon
Electrical Generation*

Developers of torrefaction plants include:

- Companies with access to large quantities of biomass
- Solid fuel energy suppliers
- Other torrefaction technology developers

ATS doesn't make BIOCOAL

ATS makes BIOCOAL possible

Market Size

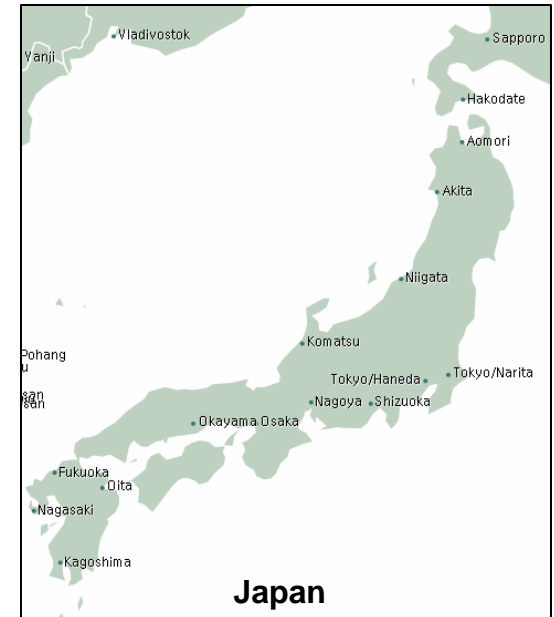
Worldwide, in 2021 23.5 million metric tonnes (approx. \$4 billion) of pellets were consumed at power plants to produce electricity. **2030 projection: 47.1 million metric tonnes (approx. \$8 billion).**

Interest in torrefaction is worldwide, but currently there is an intense focus in Japan.

Japanese government mandates will result in the use of BIOCOAL at existing power plants.

Projected BIOCOAL demand to meet mandates:

**6.2 Million Metric Tonnes Per Year
by 2030**



One Japanese energy supplier informed ATS that it will need 3 million metric tonnes of BIOCOAL per year by 2030. That will require 60 torrefaction production units.



ATS Competition

- Other torrefaction technology developers
- Steam explosion technology developers
- Industrial white wood pellet manufacturers

ATS Competitive Advantage

- Compared to Other Torrefaction Technology Developers: The ability of ATS TorreCat™ Technology to produce inert gas results in a safer, more efficient, more reliable, process at lower cost.
- Compared to Steam Explosion Technology Developers: ATS TorreCat™ Technology produces a superior product at a lower cost.
- Compared to Industrial White Wood Pellet Manufacturers: ATS TorreCat™ Technology produces a superior product with greatly improved useability characteristics.



Business Model

ATS will design, manufacture via 3rd party fabricators, install, and commission ATS Torrefaction Gas Treatment Systems (based on ATS TorreCat™ Technology) through engagement with firms that have experience providing catalytic oxidation systems.

ATS revenues will be derived from:

- Sale of ATS Torrefaction Gas Treatment Systems
- Upfront License Fees
- Ongoing Royalty Fees

ATS currently has no revenues.

Customer Acquisition; Marketing Strategy

Current Situation:

ATS has received interest from all over the world, but potential customers are hesitant to proceed without (i) demonstration of ATS TorreCat™ Technology and (ii) production of BIOCOAL samples using the customer's feedstock.

Proposed Solution:

ATS proposes to build a mobile, small-scale torrefaction unit that can be utilized in an ATS facility or shipped to a customer's site to demonstrate ATS TorreCat™ Technology using the customer's feedstock to produce BIOCOAL samples for testing.

Expected Results of this Strategy:

Given the level of demand for BIOCOAL and recognition that ATS TorreCat™ Technology is indispensable to commercial-scale torrefaction, successful demonstration will drive demand for ATS Torrefaction Gas Treatment Systems.

Customer Acquisition; Marketing Strategy

In addition to utilizing the mobile demonstration unit, ATS will:

- Attend and make presentations at trade conferences
- Attend face-to face meetings with potential customers
- Develop marketing materials
- Prepare and publish articles in trade publications
- Advertise in trade publications
- Upgrade the ATS website

Sharing the torrefaction technology solution

Company Team

Dan Herren. Dan is Founder, President and Chief Executive Officer of ATS. He is an attorney with 35+ years of experience in corporate and real estate law. Dan has been involved in torrefaction since 2010. [JD; BBA (Accounting and Finance)]

Thomas P. Causer. Tom is Vice President and Chief Operating Officer of ATS. He has a broad background having served as VP Refining, refinery manager, and Director of Quality in the petroleum refining and specialty chemicals industry. Tom has been involved in torrefaction since 2008, including designing and building a small-scale torrefaction unit in 2014. [MBA; BS, Physical Sciences (Chemistry, Physics, and Mathematics)]

Mark Leonhardt. Mark is Founder, Vice President and Chief Technology Officer of ATS. He has extensive experience as an executive and plant manager in the plastics industry. Mark has over 25 years of experience working with oxidation catalysts. He has been involved in torrefaction since 2010. [MS, Chemical Engineering; BS, Chemical Engineering]

Current Status/Milestones

- The Idaho National Laboratory has verbally committed to incorporating ATS TorreCat™ Technology into a new small-scale pyrolysis unit that will be used to torrefy conventional and non-conventional feedstocks.
- ATS has executed a Memorandum of Understanding with a Malaysian company that plans to build a 1.5 metric tonne per hour Proof-of-Concept torrefaction facility utilizing bamboo as feedstock.
- ATS has had extensive discussions with a large Japanese energy company regarding incorporation of ATS TorreCat™ Technology in that company's torrefaction demonstration unit(s).
- A US torrefaction developer has committed to incorporating ATS TorreCat™ Technology into a torrefaction plant it is planning to build in Arizona utilizing forestry residues as feedstock.

Financial Projections

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Revenues | 1.3 | 3.8 | 4.4 | 8.1 | 13.9 | 20.5 | 25.6 |
| COGS | <u>2.0</u> | <u>3.0</u> | <u>3.0</u> | <u>5.5</u> | <u>9.5</u> | <u>14.0</u> | <u>17.5</u> |
| Gross Profit | (0.7) | 0.8 | 1.4 | 2.6 | 4.4 | 6.5 | 8.1 |
| Operating Expenses | <u>(0.6)</u> | <u>(0.8)</u> | <u>(1.6)</u> | <u>(1.6)</u> | <u>(2.1)</u> | <u>(2.6)</u> | <u>(3.2)</u> |
| Income (EBITDA) | (1.2) | 0.0 | (0.2) | 1.0 | 2.3 | 3.9 | 5.0 |
| Equipment Sales, number of units | - | 2 | 2 | 5 | 7 | 9 | 10 |
| Margin % on equipment sales | 35% | | | | | | |
| IRR | 31% | | | | | | |

NOTES: Equipment sales are expected to increase rapidly in subsequent years



Financing Requested

ATS is seeking \$1.5M in funding for the following:

- \$750,000 to build and operate the mobile demonstration unit
- \$750,000 to provide working capital to market and develop ATS TorreCat™ Technology.

Exit Strategy

Within 5 to 7 years after completion of the first commercial torrefaction plant ATS will be purchased by either a large technology company or one of its customers.