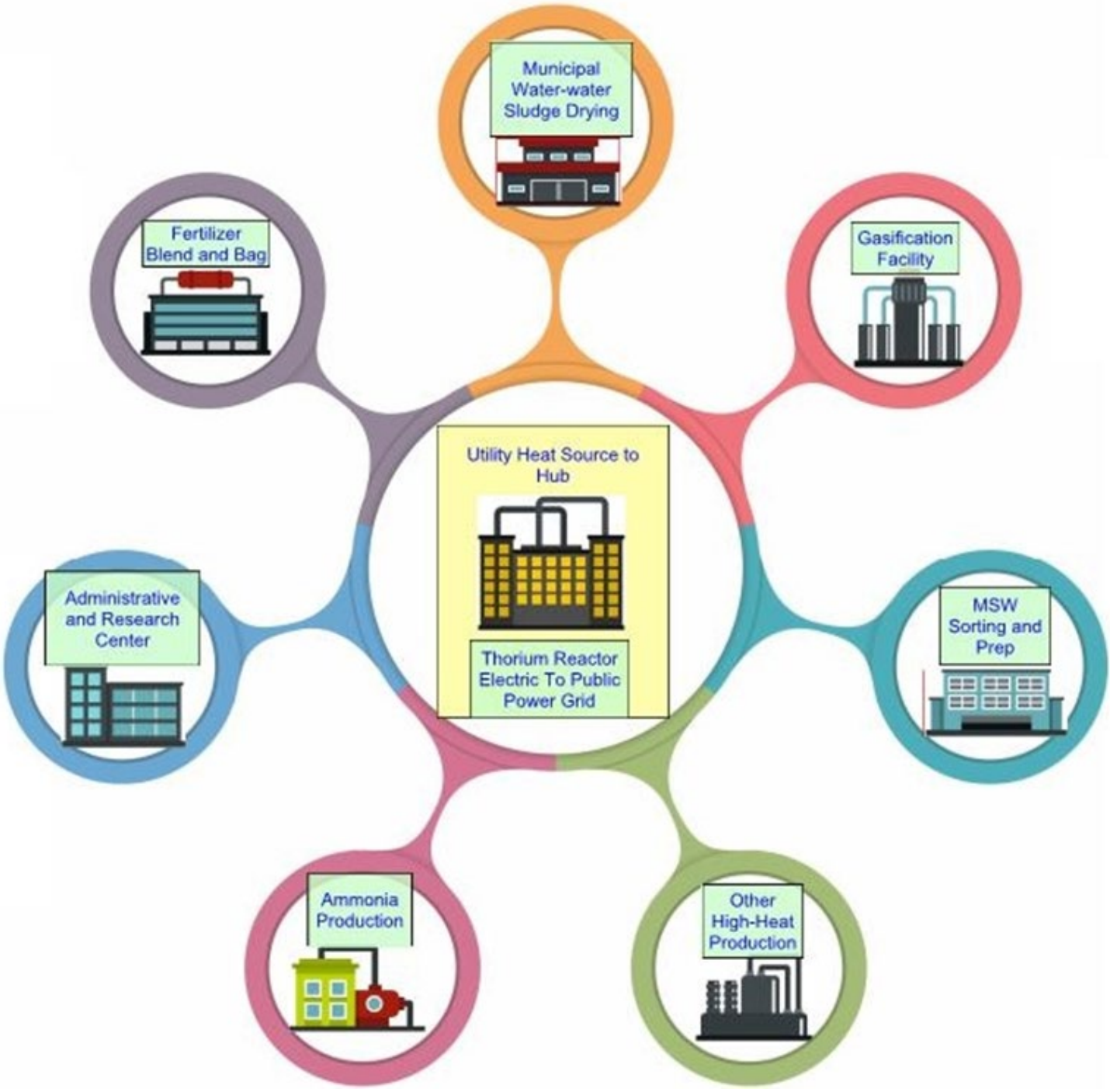
A Modern Energy – Industrial Hub
In the Modern Urban Environment

Including the – Thorium Molten Salt Reactor

Bart's ongoing Notes and Workplace
Last Updated 3-25-22



Corporate Vision

We are engaged in the highest level of environmentally responsible conduct, preserving our planet earth and the daily comfort and wellbeing of every occupant.
Decisions in all our affairs are based solely on responsible environment and the quality of life for all occupants of Earth.
Political, religious, and other indoctrination is never to place leverage in our decisions.
The accepted ethical and moral standards passed on and communicated amongst humankind over the millennium from ancient philosophers through our current great thinkers.
Labor wages and benefits, including paid time-off, shall always reflect our commitment to stable, high-quality family life.

- Nova Terra shall be a union enterprise including tenants and subcontractors
    - In the event of unruly union behavior, we shall maintain the right to leave the union and install a new union
- All tenants shall pay their employees the highest union wages per work sector.
- Benefits shall include:
    - Full health care for the employee and family, including elderly dependents
    - Full vision, dental, hearing benefits
    - 2-weeks paid vacation and up to 4-weeks
    - 8-personal days and up to 12-days
    - 6-weeks parental leave for the mother and 6-weeks for the father working from home part-time
    - Childcare assistance for working parents

Project Description

The HUB.

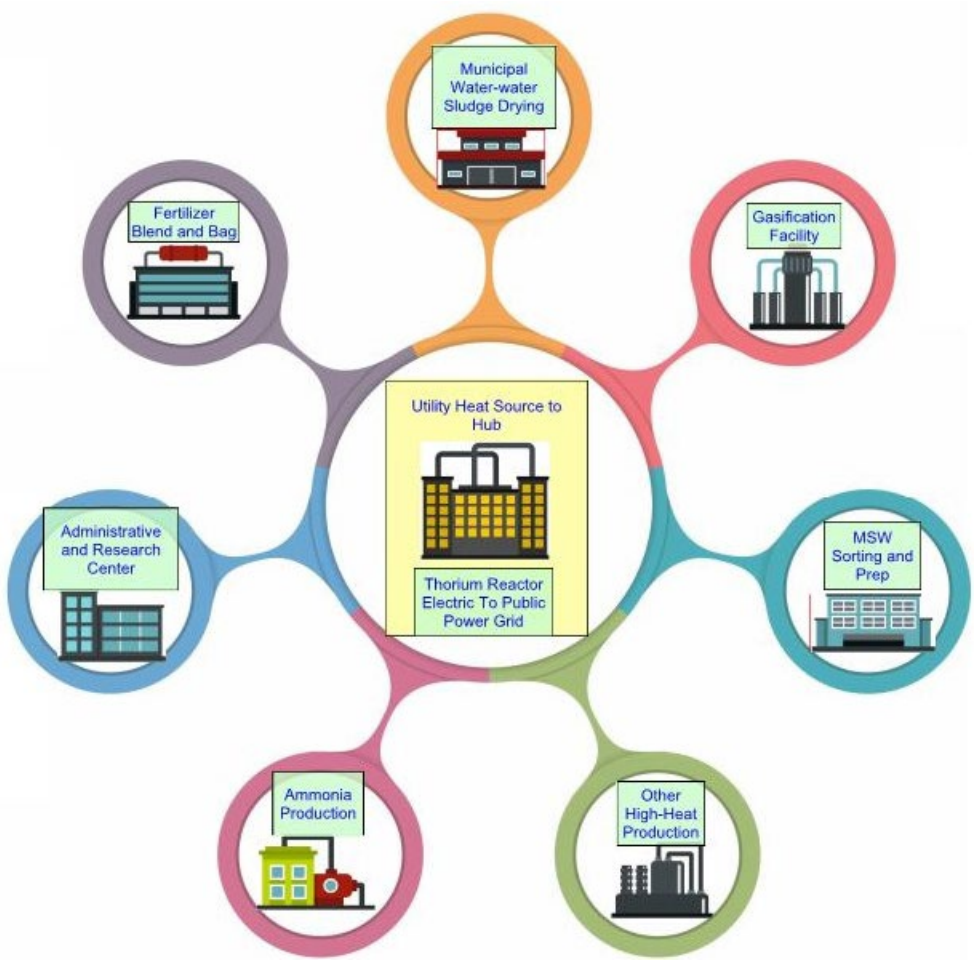
The Nova Terra Energy/Industrial park is an independent development team leasing land parcels to each Module's independent development teams.
Nova Terra Park is a development concept of a HUB, Modules, and Units concept. As a whole, the HUB benefits from each Module in a symbiotic relationship.
Each Module, on its own, has proven technical and financial success. Key modules Pre-Forma is enhanced with proximity to other key modules.

The Modules

Each Module represents an independent development team.
The HUB consists of multiple heat/energy-dependent industrial manufacturing modules. Each Module's financial pro forma is dependent on the cost of heat energy. We are utilizing the low-cost waste heat available from the Thorium Reactor to enhance the financial viability of each enterprise.

Unit Expansion

Each Module will start with an economically viable single manufacturing unit. As each unit is commissioned and successfully commissions, we add additional units, meeting marketplace demands



Benefits of Terra Park:

1) Safe electric power generation using the "Liquid Fluoride Sodium Salt Thorium Reactor."
    a. The big advantages:
        i. The chances of a nuclear accident are estimated at XXX. The current +/- 450-cold water reactors have an incident rate of 1 in 3704 reactor years. (BULLETIN OF THE ATOMIC SCIENTISTS, 2016 VOL. 72, NO. 2, 112–115)
        ii. Sustainability - Sustainability measures how efficiently a system can use natural resources.
    b. Increasing and decreasing the Thorium reactor's power output is more closely compared to natural gas power generation than currently utilized cold water nuclear reactors.
    c. Refueling does not require lengthy plant shutdowns—thorium reactor refueling during continuous plant operations.
    d. Thorium does not require expensive, environmentally risky enrichment
    e. Thorium is available in great abundance without engaging in any new mining. Thorium is readily available from the spoils of ongoing mining operations worldwide.
    f. Thorium Reactors can utilize the spent nuclear fuel from our current cold-water reactors.
    g. The fuel rods in the Thorium reactor are more efficiently and thoroughly utilized, returning easily separated and desirable quantities of rare-earth metals.
    h. There is near zero chance of nuclear accidents from
        i. Nuclear Meltdown
        ii. Hydrogen explosion
    i. Waste is radioactive for mere hundreds of years, vs. multiple 10,000's years when using current reactor models.
    j. The Th-U fuel cycle has intriguing capabilities over the traditional U-Pu cycle.
2) Moving forward with a zero-landfill concept. Refine and make usable, refuge derived inputs from:
    a. Municipal solid waste (MSW.)
    b. All waste plastics
    c. Digested wastewater dry cake sludge (DWDCS)
3) Refuge Derived Syngas production converted to multiple commonly utilized carbon-based fuels and new plastics utilizing
    a. Bubbling Fluidized Bed Gasification Vessel
    b. Catalyst conversion of Syngas into Liquid fuels
    c. Lanzatech's conversion process of Syngas into liquid fuels
4) Sustainable reuse of common "Dried Cake Wastewater Digested Sludge" into either
    a. Quality Balanced Fertilizers
    b. Refuge Derived Fuel
5) The creation of long-term high-paying jobs with significant benefits. This concept is a cornerstone ethical concept embraced by our organization.

Secondary Benefits

1) With the production of excess Thorium reactor heat:
    a. The harvesting and sale of rare earth metals from the Thorium spent fuel rods
    b. Deliver to and enhance the pro-Forma of MSWS drying process, eliminating the expense of fuel required at the driers.
    c. Assist the Gasification process in enhancing its stand-alone Pro Forma.
2) Shorten and make economically feasible transportation costs associated with all the processes operating within the Park.
3) Development of new and developing Co2 sequestration techniques.

a. Utilize Lanzatech's innovation to engage in the circular carbon economy
b. Utile _____ sequestering Co2

Land Requirement

The land requirement of the HUB

We estimate Nova Terra Park will consist of 8-modules, each requiring 90,000-sf (+/- 16-acres).

The land requirement for Public use

We anticipate a public park setting with walking paths, baseball fields, walking paths, etc.
The concept would require 35 to 60-acres.

The Thorium Reactor Module

Our Dilemma

"***Companies say they have private investors lining up. but public money is needed to send a signal to the market."***
From - C.B.C./Radio-Canada https://www.cbc.ca/news/canada/new-brunswick/feds-millions-small-nuclear-reactors-1.5955274

"If we let the entire fleet go down the toilet and expect that 20 years from now we can turn on our nuclear expertise like a switch, we're delusional," he says. ***"You need to maintain that capability."*** From 2022 American Association for the Advancement of Science; MAY 20 2020BYADRIAN CHO.

He devastating 1972 Evaluation of the Molten Salt Breeder Reactor US Dept of Energy, Office of Science and Technical Information - https://www.osti.gov/biblio/4372873 and https://www.osti.gov/servlets/purl/4372873

Web Sites
https://www.nrc.gov/docs/ML1920/ML19205A386.pdf

Brief History of Thorium Reactors

After World War II, the US government built an experimental molten salt reactor using U-233 fuel, the fissile material created by bombarding Thorium with neutrons. The reactor, built at Oak Ridge National Laboratory (Oak Ridge, Tennessee), operated critical for 15,000 hours from 1965 to 1969.
In 1968, Nobel laureate and discoverer of Plutonium Glenn Seaborg officially announced to the Atomic Energy Commission, of which he was chairperson, that the thorium-based reactor had been successfully developed and evaluated:
"So far, the molten-salt reactor experiment has operated successfully and has earned a reputation for reliability."
During this time, Alvin M. Weinberg was the Oak Ridge National Laboratory (ORNL) administrator. He innovated the first-generation designs used presently in most commercial reactors. Weinberg recognized the advantages of liquid Thorium over the light water reactor (LWR) designs but received stiff opposition from the political powers in Washington. Death of the promising technology boiled down to Cold-War era politics.

Concept of factory-built small modular reactors

Thorium Reactor Plants running and Under Construction.

Existing Proven Thorium Reactor Technologies

- From – World Nuclear Association Updated 2020: "Prior thorium-fueled electricity generation, there have been several significant demonstrations of the use of thorium-based fuels to generate electricity in several reactor types. Many of these early trials used high-enriched uranium (HEU) as the fissile 'driver' part, which would not be considered today.
- The three hundred MWe Thorium High-Temperature Reactor (THTR) at Hamm-Uentrop in Germany operated with thorium-HEU fuel between 1983 and 1989 when it was shut down due to technical problems. Over half of its 674,000 pebbles contained Th-HEU fuel particles (the rest comprised graphite moderators and some neutron absorbers). These were continuously moved through the reactor as it operated, and on average, each fuel pebble passed six times through the core.
- The 40 MWe Peach Bottom HTR in the USA was a demonstration thorium-fueled reactor that ran from 1967-74.2. It used a thorium-HEU fuel in microspheres of mixed thorium-uranium carbide coated with pyrolytic carbon. These were embedded in annular graphite segments (not pebbles). This reactor produced 33 billion kWh over 1349 equivalent full-power days with a capacity factor of 74%.
- The 330 MWe Fort St Vrain HTR in Colorado, U.S.A., was a larger-scale commercial successor to the Peach Bottom reactor and ran from 1976-89. Almost twenty-five tons of Thorium was used in fuel for the reactor, much of which attained a burn-up of about 170 GWd/t. It also used thorium-HEU fuel in the form of microspheres of mixed thorium-uranium carbide coated with silicon oxide and pyrolytic carbon to retain fission products. These were embedded in graphite 'compacts' arranged in hexagonal columns ('prisms').
- A unique thorium-fueled light water breeder reactor operated from 1977 to 1982 at a Shipping port in the USA3 – it used uranium-233 as the fissile driver in special fuel assemblies that had movable 'seed' regions, which allowed the level of neutron moderation to be gradually increased as the fuel aged. The reactor core was housed in a reconfigured early PWR. It operated with a power output of 60 MWe (236 MWt) and an availability factor of 86% producing over 2.1 billion kWh. Post-operation inspections revealed that 1.39% more fissile fuel was present at the end of core life, proving that breeding had occurred. A 2007 NRC report quotes a breeding ratio of 1.01. Chemically reprocessing the fuel was not attempted. India's heavy water reactors (PHWRs) have used thorium-bearing fuel bundles for power flattening in some fuel channels – especially in initial cores when special reactivity control measures are needed.

What Is LFTR

Thorium reactors are a unique way to generate electricity that could benefit the world. More efficient than their fossil fuel counterparts, safer than a conventional nuclear plant, and generating no carbon emissions as a byproduct, LFTRs are a viable solution for the future of our world's energy needs.
The capital costs of thorium reactors would be lower than conventional nuclear reactors; a 1-gigawatt (GW) thorium power plant would cost at most an estimated $780 million compared to capital costs currently of $1.1 billion per GW for a uranium-fueled reactor.

https://www.youtube.com/watch?v=oB1IrzDDI9g
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https://www.youtube.com/watch?v=tyqYP6f66Mw&list=RDCMUCXIdM7ABQ8b9FI495vbsHkA&index=3
https://www.youtube.com/watch?v=UqYPsKYz8-w

Informational Web Pages

LFTR Overview https://energyfromthorium.com/lftr-overview/

The Municipal Solid Waste Sorting and Feedstock Preparation Module

A Brief History of Solid Waste Sorting and Feedstock Preparation

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Solid Waste Sorting and Feedstock Preparation Under Construction

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Existing Proven Solid Waste Sorting and Feedstock Preparation Technologies

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Solid Waste Sorting and Feedstock Preparation Operating and Under Construction.

1. Enerkem's Edmonton, Alberta, waste-to-cellulosic ethanol plant
2. The Rotterdam plant, Advanced Methanol Amsterdam (AMA), near the city of Rotterdam, in the province of South Holland in the Netherlands

Existing Proven Solid Waste Sorting and Feedstock Preparation Technologies

1. HTW biomass-gasification technology (originally developed by RWE and Thyssenkrupp)
2. AkzoNobel Specialty Chemicals
3. Air Liquide

The Gasification Module

A Brief History of Gasification

Gasification is the process of breaking down solid biomass fuels by using heat in an oxygen-starved environment to produce a combustible gas. Various biomass materials, including woody biomass and agricultural residues, are suitable feedstocks for biomass gasification.

More specifically, the biomass feedstock is fed into a reactor (an enclosed pressurized container), which is simultaneously heated, and the amount of oxygen in the reactor is limited. As the biomass is heated in this oxygen starved container, volatile gases (CO, H2, and O2) are released from the wood. The exact composition of the gas varies among processes and feedstocks. Still, in general, between the temperatures of 395- and 535-degrees Fahrenheit (F), about 60 to 80 percent of the heat content inherent in the biomass is driven off in the form of combustible gases. The gases driven off are called "producer gas," It typically contains about 20 to 50 percent of the energy as an equivalent amount of natural gas (i.e., about 200 to 500 Btu per cubic foot of producer gas).
The gas obtained through gasification can theoretically generate power more efficiently than steam. This means that a major potential advantage of gasification is greater efficiency in power production than power production using direct combustion. In addition, gasification technology allows for the utilization of feedstocks (especially certain agricultural residues) that can otherwise be problematic in direct combustion systems. In other words, fuels with a low ash melting point are complex in direct combustion systems because the melted ash fouls boiler tube surfaces. The lower operating temperatures of gasification systems eliminate this problem.
The cooling, cleaning and filtering gas before combustion gives back much of the potential efficiency advantage over steam generation systems. When the producer gas generates electrical power, the systems are called power gasifiers. When the producer gas is used to fuel a burner that produces heat, the systems are called heat gasifiers. The distinction is important because, in a power gasifier application, the producer gas must first be filtered, cooled, and mixed in a gas conditioning system before being combusted in an internal combustion engine. On the other hand, a heat gasifier combusts the producer gas in an external burner, which requires little or no cleaning or conditioning of the producer gas. As a result, the heat gasifier systems are simpler to design and operate and less costly than power gasifiers.

Converting energy by gasifying organic material has been around for more than 180 years. Coal and peat were the primary fuels used to power gasification plants during much of that time. In the US, gasification technology was used to produce gas from coal or coke for municipal lighting and cooking. By 1850, the major cities of the world had "gaslight." About 1880, the internal combustion engine was invented, and "Producer Gas" was used to make electricity. Eventually, natural gas pipelines displaced the municipal plants. Gasification became popular again during the world wars, especially World War II when gasoline became scarce. Wood gas generators helped to power about a million vehicles worldwide in 1945. In the late 1990s, the Department of Energy contracted CPC and three other companies to develop a new small modular biopower systems generation. CPC was the first to deploy a system under the program and is the world leader in small modular biopower systems. (Community Power Corporation 2016).
The Gasification process offers a near-zero emission by minimizing overall waste throughout the entire value chain and process integration.
There are three broad gasification types: entrained flow, fluidized bed, and moving bed, each having its pros and cons. No need to go into each of the technologies; we will be focusing on a

Pro Forma - Investment Cost Analysis

Biomass procurement

Forest biomass procurement cost was determined based on a final

Grinding, Storage, and Compacting

The operating costs were classified into fuel and maintenance, and repair expenses. The latter was assumed to be 50% of their depreciation costs (Brinker et al. 1989). These operating costs were assumed to increase by 5% per year. These machines were assumed to have 10-year operating lives.

Biomass drying

The maintenance and repair expense was assumed to be 1% of the purchase and increase by 5% per year, but its fuel cost was assumed to be zero as 40% of its heat production is self-consumed for drying. The dryer was assumed to have a 10-year operating life.

Gasifier

Annual maintenance and repair expense of a gasifier was assumed to be 1% of the purchase and increase by 5% per year. Still, its fuel cost is zero as 10% of electric power production is self-consumed for operating over its 20-year life.

Generator

Annual maintenance and repair expense of a generator was assumed to be 4% of the purchase and increase by 5% per year, but its fuel cost to be zero as gas produced from a generator is used for its operating. The generator was assumed to have a 7-year working life.

Land and Construction

The land area for the plant was 2500 m2 in the study, and construction cost was for the whole facility of the plant and included costs for office, access road, fence, and pavement work. Annual maintenance and repair expense was assumed to be 1% of the construction cost and increased by 5% per year. The land is not depreciable under South Korean tax law. The terminal value of the land was its original cost plus inflation. The buildings were depreciated over 20 years using straight-line depreciation. It was assumed that the plant and office would have no residual value at the end of the 20-year project life.

Labor and office management

Labor cost (i.e., wages and benefits) was based on eight full-time workers (8 hours per day), including one for moving and chipping logs, one for management and administration, and six for power plant operation with a three-shift system. Also, insurance expense was applied at 0.4% of the facility cost. Other miscellaneous expenses included water and electrical power charges etc.

Financing

Financing includes both debt and equity. To reduce the early-stage negative cash flow due to the initial investment, it was assumed there was a bank loan of ₩1,500,000 thousand (Korean won) at a nominal (i.e., including inflation) fixed interest rate of 6% and a 10-year redemption period. If desired, the model allows this interest rate to be set directly or as a function of the inflation rate. The bank's loan initiation fee was paid only at the start of the loan, which represented 47% of the total initial investment.

Loans are commonly repaid in Korea using regular principal repayments, which means that the interest payments and total loan payments vary each year. However, to allow flexibility in financing and repayment options, the spreadsheet model is constructed so that the loan may also be repaid using regular loan repayments. The interest payments and principal loan repayments vary with each loan payment, but each total annual loan payment is identical. In both cases, while interest expenses are deducted from revenues for tax purposes, principal repayments are not deducted.

The before finance and tax weighted average cost of capital is the minimum acceptable return rate on equity investment in the plant, set at 10.0%. This is a nominal pre-tax rate; that is, it includes inflation. The before finance and tax discount rate were used in the discounted cash flow analysis. The before-tax weighted average cost of capital (8.0%) was calculated by weighting the equity discount rate (10.0%) by the portion of the equity in the initial financing and the bank's loan interest rate (6.0%) by the portion of debt in the initial financing. The after-tax weighted average cost of capital (7.3%) was calculated by adding the cost of equity to the after-tax cost of debt, with both costs weighted according to the initial equity-debt mix.

Tax

National and local income taxes were incorporated at the rates of 10% and 1% respectively when income was ₩0to₩0.2 billion, and 20% and 2% when income was between₩0.2 billion and ₩2 billion.

Revenue analysis

The primary market for heat and electricity produced from the power plant was assumed to be the rural town in which it was built. Table 2 shows annual revenues from heat and power production, and details are as follows.

Revenues from selling electricity power

Before calculating electricity sales revenue per year, a calculation was needed for the unit selling price of power, which comprises the system marginal price (SMP) of electricity and the market price of a REC. The (SMP) is an official power price of the Korea Power Exchange. To promote the use of renewable energy, the government enacted RPS)in 2014, under which a plant producing power from renewable sources such as biomass and water can issue the REC that can be traded in the market. When a forest biomass REC is sold to Korea Electric Power Corporation (KEPCO), the REC is provided with a 1.5 weight factor (i.e., £ 1.5) above the SMP to determine its market price (Korea Ministry of Trade, Industry and Energy 2014). This REC weighting factor helps to make the production of biomass-generated energy financially feasible.

Revenues from selling heat

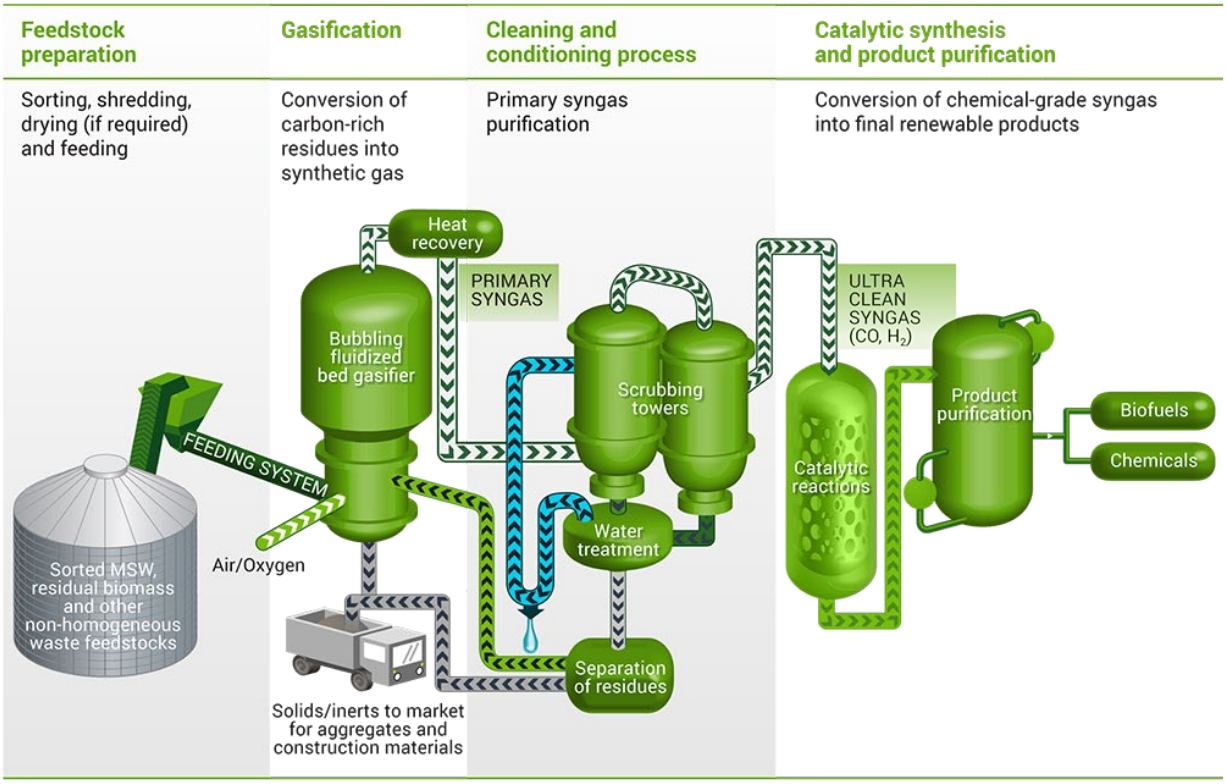
This study's combined heat and power generator produced 1436 Mcal of heat energy and 500kW of electricity per hour. The unit selling price of heat for the household was collected from Korea District Heating Corporation and used in the cost analysis. Unlike electricity, selling heat requires facilities to be built for sending heat to households, which usually involves prohibitive costs. However, additional distribution infrastructural investment may be required to realize these heat sales revenues.

Other assumptions used for the economic analysis

The other assumptions are as follows:

- Inflation was 3% and fixed over a 20-year project period.
- A working capital fund required for running the plant was set at 2% of total annual revenue and recovered at the end of year 20.
- Capital costs, including wood grab loader, chipper, dryer, gasifier, generator, Construction, and land, begin at year 0, and other costs including forest biomass, labor and office management, interest, and reserved fund begin at year 1.
- Straight-line depreciation is used for all depreciable assets.
- No capital gains taxes were assumed. Also, no tax allowances were made for capital loss carrybacks or carryforwards.
- No capital equipment would be replaced in year 20.
- Total costs and revenue occurred at the end of each year over 20 years.
- Assets with residual values at the end of year 20 are valued at a book for financial feasibility calculations.

Basic Process Flow Diagram



* *Municipal solid waste*

Arlene Karidis | Jul 17, 2018

The Municipal Sludge Drying Module

A Brief History of Municipal Sludge Drying

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Municipal Sludge Drying Plants are operating and Under Construction.

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Existing Proven Municipal Sludge Drying Technologies

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The Fertilizer Blending & Bagging Module

A Brief History The Fertilizer Blending & Bagging

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Fertilizer Blending & Bagging Plants operating and Under Construction

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Existing Proven Fertilizer Blending & Bagging Technologies

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Partners and Resources

Market Share – Sources and Data

Markets and Markets Research Private Ltd.

https://www.marketsandmarkets.com/Thanks/subscribepurchaseNew.asp?id=108290678

Venture Radar Ltd, 20 Red Lion Street, Holborn, London, UK, WC1R 4PQ

https://www.ventureradar.com/keyword/Gasification
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https://about.ventureradar.com/?utm_source=VR&utm_medium=Website&utm_campaign=WebsiteCT

Homepage XPRT

XPRT Home Page https://xprt.com/
Energy XPRT https://www.energy-xprt.com/companies/keyword-biomass-gasification-6406/location-usa
Environmental XPRT https://www.environmental-expert.com/?_gl=1*czvh1n*_ga*MTI1Nzc0MTI2OC4xNjQ2NzA4Njgx*_ga_DLBBK9CE5N*MTY0NjcwODY4MC4xLjEuMTY0NjcwOTAwOS4w&_ga=2.229295135.2081642767.1646708681-1257741268.1646708681
Agriculture XPRT https://www.agriculture-xprt.com/?_gl=1*12wqbsc*_ga*MTI1Nzc0MTI2OC4xNjQ2NzA4Njgx*_ga_DLBBK9CE5N*MTY0NjcwODY4MC4xLjEuMTY0NjcwOTIzMC4w&_ga=2.229295135.2081642767.1646708681-1257741268.1646708681
Medical XPRT https://www.medical-xprt.com/?_gl=1*1e1u7a9*_ga*MTI1Nzc0MTI2OC4xNjQ2NzA4Njgx*_ga_DLBBK9CE5N*MTY0NjcwODY4MC4xLjEuMTY0NjcwOTAwOS4w&_ga=2.158043193.2081642767.1646708681-1257741268.1646708681

Investing News Network

https://investingnews.com/company-profiles/#toggle-gdpr

Energy and Capital

3 E Read Street
Baltimore, MD 21202
Tel: (877) 303-4529
https://www.energyandcapital.com/about
https://www.energyandcapital.com/resources/thorium-investing/51975

Nanalyze

700 Canal St
Stamford, CT 06902
https://www.nanalyze.com/2015/10/6-nuclear-energy-companies-building-molten-salt-reactors/

ANSYS, Inc

This Web Page Offers Partners of various sectors
https://www.ansys.com/resource-center#t=ResourceCenterTab&sort=relevancy
INVESTOR CONTACT
Kelsey DeBriyn
Vice President, Investor Relations
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kelsey.debriyn@ansys.com

Developers – All or Misc.

Private equity and venture capital firms

Private equity firms manage funds or pools of capital that invest in companies that represent an opportunity for a high rate of return.

Private equity funds invest for limited time periods. Exit strategies include IPOs, selling to another private equity firm, etc.

Private equity funds are typically split **into two categories:**

1 **Venture capital funds typically invest** in early stage or expanding businesses that have limited access to other forms of financing.

- Sequoia Capital
- Y Combinator
- Andreessen Horowitz

2 **Buyout or LBO funds typically invest** in more mature businesses, usually taking a controlling interest and leveraging the equity investment with a substantial amount of external debt. Buyout funds tend to be significantly larger than venture capital funds.

- Blackstone
- KKR
- Carlyle Group

Aracia Partners

901 S. MoPac Expy. Building 1, Ste 300
Austin, Texas 78746
https://acaciapartnersllc.com/
BRAD JOHL Partner, bjohl@acaciapartnersllc.com, 214-927-2373 (c), 512-329-1925 (o)
JEFF SOKOL Partner, jsokol@acaciapartnersllc.com, 713-376-5768 (c), 205-414-7587(o)
GREG MALETSKY, Partner, gmaletsky@acaciapartnersllc.com, 847-722-3576 (c), 847-550-3101 (o)

Founders Fund - Peter Thiel's

Very Powerful Capital Company
https://foundersfund.com/the-future/
Team Members - https://foundersfund.com/our_team/

Venrock

Ray Rothrock, partner emeritus
Venrock consists of two separate investment programs: a traditional venture capital program, focused on early-stage investing in healthcare and technology companies; and a later-stage healthcare program, which implements a venture capital-like long-term approach to investment opportunities in small capitalization public late-stage private healthcare companies. Click here for the later-stage healthcare program website.
https://www.venrock.com/about-venrock/
Team Web Site – https://www.venrock.com/team/

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Fax 650 561 9180

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Phone 212.444.4100
Fax 212.444.4101
Use ctrl + scroll to zoom the map

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Phone 617.995.2000, Fax 617.995.2001
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Essel Group

18th Floor, A Wing,
Marathon Futurex,
N. M. Joshi Marg, Lower Parel, Mumbai 400013, India

Developers – Land Developers

ANSYS, Inc

This Web Page Offers Partners of various sectors
https://www.ansys.com/resource-center#t=ResourceCenterTab&sort=relevancy
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Developers – Thorium Nuclear Plant

Terrestrial Energy Inc.

Canada | 2275 Upper Middle Rd. East, Suite 201
Oakville, ON L6H 0C3 | +1 905 766-3770
U.S.A. | 9319 Robert D. Snyder Rd., Portal 316
Charlotte, NC 28223 | +1 646 687-8212
UK | D5 Culham Science Centre
Abingdon, Oxfordshire OX14 3DB | +44 203 608 1281
https://www.terrestrialenergy.com/about-us/our-team/

ThorCon Power

Thorium Power Canada owns the Intellectual Property and has the completed engineering to build and operate a scalable thorium nuclear reactor.
Thorcon has spent four years designing a simple molten salt reactor that requires no new technology. The Company claims their pilot was already proven through the Molten Salt Reactor Experiment (MSRE), which began in 1959 and ended in 1969. They need to scale that original design simply and believe that there is no technical reason why a full-scale 250 MWe prototype cannot be operating within four years. Based on this design, their packaged nuclear power plant units will be buried 30 yards underground and "walkaway safe." Production is expected to start by 2020.
The USA.
ThorCon US, Inc.
142 Lyons Road
Stevenson WA 98648 USA
Indonesia
Bob Effendi, Chief Representative
ThorCon International Reps Office

World Trade Center 5, floor 3A
Jalan Jenderal Sudirman Kav. 29 – 31
Jakarta 12920. INDONESIA
Tel. 62-21-2598-5027
Fax.62-21-2598-5001
info@thorconpower.com
https://thorconpower.com/

TerraPower

Founded in 2008, TerraPower counts Bill Gates as an investor and their Chairman. The Company's technology is called the "traveling wave reactor" (TWR) and uses depleted uranium which greatly simplifies the nuclear fuel cycle. Just last month, they signed a "memorandum of understanding" with the China National Nuclear Corporation (CNNC), which they called "the next step towards developing a prototype."
15800 Northup Way
Bellevue, WA 98008
Phone: (425) 324-2888
https://www.terrapower.com/contact-us/

Moltex Energy

Founded in 2012, Moltex has developed a genuinely new reactor concept that parts ways from the conventional MSR design. Named the "Stable Salt Reactor," this reactor uses molten salt fuel held in static fuel tubes rather than conventional 'pumped circulation' designs. Protected by worldwide patents, this British invention is expected to reduce engineering complexity and regulatory burden. The Company's next step is to carry out a preliminary safety assessment with nuclear regulators, after which they can then begin to look at economic feasibility.
Canada office:
75 Prince William Street, Unit 102
Saint John, New Brunswick, E2L 2B2
US office:
Farmers Bank Building
301 North Market Street, Suite 1414
Wilmington, Delaware, 19801
UK office:
Suite 1, Ground Floor, East Wing, Rutherford House
Warrington Road
Birchwood, Cheshire, WA3 6ZH
info@moltexenergy.com
https://www.moltexenergy.com/costs-less/

Flibe Energy

Founded in 2011, Flibe proposed to use Thorium as a nuclear fuel instead of uranium. The founder Kirk Sorensen, both a nuclear engineer and rocket scientist, claims that corporate interests have prevented Thorium from being used as a nuclear fuel. Flibe's liquid fluoride thorium reactor is expected to cost several hundred million dollars to build.
136 Honor Way
Madison, AL, 35758-6279 United States
Phone: (256) 679-9985
www.flibe-energy.com
info@flibe-energy.com
Kirk Sorensen Principal

Chad Shenk Programmer
Chris Wend Senior Process Engineer
David Hanson Board Member

TRANSATOMIC POWER

Transatomic Power Corporation
One Broadway, 14th Floor
Cambridge, MA 02142
info@transatomicpower.com
DR. LESLIE DEWAN CO-FOUNDER, CHIEF EXECUTIVE OFFICDr. Leslie Dewan graduated from MIT with a Ph.D. in Nuclear Engineering, focusing on computational nuclear materials. She also holds SB degrees from MIT in Mechanical Engineering and Nuclear Engineering. Before starting her Ph.D., Leslie worked for a robotics company in Cambridge, MA. She designed search-and-rescue robots and equipment for in-field identification of biological, chemical, and nuclear weapons. Leslie has been awarded a Department of Energy Computational Science Graduate Fellowship and an MIT Presidential Fellowship. She was named a TIME Magazine "30 People Under 30 Changing the World", an MIT Technology Review "Innovator Under 35," and a Forbes "30 Under 30" in Energy. ER
MARK MASSIE CO-FOUNDER, CHIEF TECHNOLOGY OFFICER, Mark Massie, holds an SM degree in Nuclear Engineering from MIT and an SB degree in Nuclear Engineering from Tennessee. He has worked at TerraPower in Bellevue, WA, where he developed and implemented a method for calculating high-fidelity fuel compositions in traveling wave reactors. He has also worked at the Oak Ridge National Laboratory, where he developed code for analyzing sodium fast reactors. Mark was a Department of Energy Nuclear Energy University Program Fellow and a Department of Energy Advanced Fuel Cycle Initiative Fellow and was named a Forbes "30 Under 30" in energy.

Copenhagen Atomics

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Want to purchase products from Copenhagen Atomics? Please contact:
sales@copenhagenatomics.com
Interested in doing a research project at Copenhagen Atomics? Please contact:
projects@copenhagenatomics.com

Andrew Yang – Assistance with Political needs

PO Box 214
Midtown Station
New York, NY 10018
https://www.citizenscount.org/candidate/andrew-yang
https://www.facebook.com/andrewyang2021

Southern Company

30 Ivan Allen Jr. Blvd. NW
Atlanta, GA 30308
Phone 404-506-5000
https://www.southerncompany.com/innovation.html

Advanced Reactor Demonstration Program

Office of Nuclear Energy
1000 Independence Ave. SW
Washington DC 20585
202-586-5000
https://www.energy.gov/ne/advanced-reactor-demonstration-program

Commonwealth Fusion Systems

Commonwealth Fusion Systems
148 Sidney Street
Cambridge, MA 02139
General Inquiries
info@cfs.energy

LeadCold

Stockholms Lan,
Sweden
http://www.leadcold.com/
LeadCold Reactors (Blykalla Reaktorer) was founded in 2013 by J. Wallenius, P. Szakalos, and J. Ejenstam as a joint-stock company, with its basis in Stockholm.
LeadCold is a spin-off from KTH Royal Institute of Technology in Stockholm, where J. Wallenius carried out research on design and safety analysis on lead-cooled reactor systems since 1996. The competencies of the LeadCold team include fast reactor design, transient analysis, corrosion and materials science, nuclear fuel development, lead coolant chemistry, radiation damage, severe accident analysis, nuclear Construction, and operation of nuclear power plants.
Industrial partners
The purpose of" Swedish Modular Reactors AB" is to design and construct an electrically heated prototype of LeadCold's SEALER reactor on the premises of OKG in Oskarshamn, Sweden. In 2021, LeadCold formed a joint venture with Uniper, the majority owner of the Oskarshamn nuclear power plant. Moreover, LeadCold collaborates with TSP Engineering in Workington, UK, to design and manufacture a compact steam generator for SEALER.
info@leadcold.com

Thorium Vendors and Suppliers

FLIBE ENERGY, INC

136 Honor Way Madison
AL, 35758-6279
Kirk Sorensen
President, Technologist
Executive
Management, Operations
https://www.linkedin.com/company/flibe-energy/

eGeneration Foundation

PO Box 770963

Cleveland, OH 44107
United States of America
(419)-602-4425
Email: jonpaulmorrow@egeneration.org

Thorium Producers

http://www.elementinvesting.com/investing_in_thorium.htm

Lightbridge (NASDAQ: LTBR) - Formerly Thorium Power Ltd (OTC: THPW)

W.R. Grace (NYSE: GRA) - http://www.grace.com/

Rhodia Electronics & Catalysts - La Rochelle rare earth separation plant

Municipal Solid Waste Developers

Lakeshore Recycling

Lakeshore Recycling
6201 Canal Bank Road
Forest View, IL 60402
https://www.lrsrecycles.com/about/management-team/

Gasification Developers

Air Liquide (France)

orem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna. Nunc viverra imperdiet enim. Fusce est.

Vivamus a tellus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci. Aenean nec lorem.

In porttitor. Donec laoreet nonummy augue. Suspendisse dui purus, scelerisque at, vulputate vitae, pretium mattis, nunc. Mauris eget neque at sem venenatis eleifend. Ut nonummy.

Bakken Energy

PO Box 2035 117 W. Front Ave
Bismarck, North Dakota 58504
844.823.2664
contact@bakkenenergy.com
https://www.bakkenenergy.com/
from Thomas Publishing Company https://www.thomasnet.com/insights/mitsubishi-power-americas-bakken-energy-announce-collaboration-on-new-2-billion-hydrogen-hub/
"Energy infrastructure provider Bakken Energy and power generation company Mitsubishi Power Americas have announced a collaboration to redevelop a natural gas plant into a hub for renewable energy production."

Biogreen

A Subsidiary of ETIA SAS.
ETIA SAS.
https://etia-group.com/
Carrefour Jean Monnet
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Tel: +33 3 44 86 44 20
https://www.biogreen-energy.com/what-is-pyrolysis

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United States
+1 (423) 949-9771
https://www.carbonblackglobal.com/ n
info@carbonblackglobal.com
Owner of **Landaira Technology**
https://www.landaira.com/contact/

Community Power Corporation

A wholly owned subidiary of Afognak Native Corp.
Afognak Native Corporation
300 Alimaq Drive
Kodiak, AK 99615
800.770.6014 Toll Free
907.486.6014 Phone
Owner of SynTech Bioenergy, LLC
And the **BioMax 100 Gen2 Technology**
SynTech Bioenergy, LLC
14800 Grasslands Drive
Englewood, CO 80112
Tel: (303) 933-3135
Call: (815) 942-2466
Email: CustomerRequests@gocpc.com
http://www.gocpc.com/contact-us.html
A subsidiary of:

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14800 Grasslands Drive
Englewood, CO 80112
https://www.syntechbioenergy.com/
(815) 942-2466
info@syntechbioenergy.com

CValmet

Keilasatama 5
PO Box 11. FI-02150 ESPOO, FINLAND Tel. +358
https://www.valmet.com/media/articles/all-articles/vaskiluoto---the-worlds-largest-biomass-gasifier-exceeds-expectations/
Valmet is the leading global developer and supplier of process technologies, automation, and services for the pulp, paper, and energy industries.
Valmet was the developer for the Vaskiluodon Voima Oy Gasification Plant

Feb 1, 2022 — Vaskiluodon Voima Oy is a Electric utility company in Vaasa, Finland jointly owned by EPV Energia Oy and Pohjolan Voima Oy. It operates two combined heat and power (CHP)

EPV Energia Oy
Electric utility Finland
Kirkkopuistikko 0, 65100 Vaasa, Finland
Phone: +358 10 5055000
https://www.epv.fi/en/project/power-to-x-to-power-hydrogen-system/

Pohjolan Voima Oy
Pohjolan Voima Oy is the second biggest Finnish energy company, which owns hydropower and thermal power plants. Wikipedia

Ecoremedy

960 Penn Ave, Ste 400
Pittsburgh, PA 15222
412-904-4690
info@ecoremedyllc.com
https://ecoremedyllc.com/technology/
DAVID MOONEY President and Chief Technology Officer
The Rest of the Team - https://ecoremedyllc.com/about/meet-the-team/
Local Seattle Contact
Brian Novak - bnovak@ecoremedyllc.com

General Electric (GE)(US.)

orem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna. Nunc viverra imperdiet enim. Fusce est.

Vivamus a tellus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci. Aenean nec lorem.

In porttitor. Donec laoreet nonummy augue. Suspendisse dui purus, scelerisque at, vulputate vitae, pretium mattis, nunc. Mauris eget neque at sem venenatis eleifend. Ut nonummy.

MITSUBISHI HEAVY INDUSTRIES, LTD.

Developed the Process - *MITSUBISHI MUNICIPAL SOLID WASTE (MSW.) GASIFICATION AND ASH MELTING SYSTEM*
From "Upstream" - https://www.upstreamonline.com/hydrogen/mitsubishi-teams-up-with-bakken-energy-in-2-billion-us-hydrogen-hub/2-1-1054667
"Mitsubishi teams up with Bakken Energy in a $2 billion US hydrogen hub Plant that currently creates Syngas from coal is expected to start producing blue hydrogen from 2026. US clean energy developer Bakken Energy is teaming up with a subsidiary of Japanese giant Mitsubishi Heavy Industries to develop, what they claim will be, the largest and lowest-cost blue hydrogen production facility in the US."
From - Power Technology https://www.power-technology.com/marketdata/nakoso-large-scale-igcc-project-japan/
Nakoso Large Scale IGCC Project, Japan – *"The project was developed by Nakoso IGCC Power GK Mitsubishi Heavy Industries, Mitsubishi Corp Energy Solutions, Banpu Power Investment, Mitsubishi Electric, JERA, and Joban Joint Power are currently owning the project having an ownership stake of 40%, 26.6%, 13.4%, 10%, 5%, and 5% respectively."*

Royal Dutch Shell (The Netherlands)

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SEDIN Engineering Company Limited (China)

orem ipsum dolor sit amet, consectetuer adipiscing elit. Maecenas porttitor congue massa. Fusce posuere, magna sed pulvinar ultricies, purus lectus malesuada libero, sit amet commodo magna eros quis urna. Nunc viverra imperdiet enim. Fusce est.

Vivamus a tellus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Proin pharetra nonummy pede. Mauris et orci. Aenean nec lorem.

In porttitor. Donec laoreet nonummy augue. Suspendisse dui purus, scelerisque at, vulputate vitae, pretium mattis, nunc. Mauris eget neque at sem venenatis eleifend. Ut nonummy.

SunGas Renewables

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1700 S Mount Prospect Rd
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AUSTIN, TX, 78701
https://www.sungasrenewables.com/
Daniel LeFevers
Vice President, Business

David LaMont
Senior VP, Business Operations
Scott Sexton
Program Director
Operating Plant – Skive, Denmark
Location Skive, Denmark
Partner Andritz-Carbona
End Product District Heating and Electricity
Operating Fuel Biomass
First Syngas Production 2008
Status Operating

Thorium Power Canada Inc.

Thorium Power Canada Inc., in partnership with DBI, has designed a class of Thorium reactors that have significant commercial advantages:
TPC's Thorium reactors are more efficient and faster to build than conventional nuclear reactors and other Thorium based reactors
TPC's reactors are a low cost, scalable, modular source of energy
Thorium is an abundant worldwide resource
TPC's Thorium reactors reduce radioactive waste, which has no use in nuclear weapons
The TPC Thorium Reactor is a one-of-a-kind technology whose modular design can achieve any output desired at significantly reduced capital and carrying costs. The cost to build a reactor is estimated at $2.0 million per MW and can be built in 18-24 months versus conventional reactors at 5-7 years.

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Board of Directors Web Page - http://www.thoriumpowercanada.com/management-team/board-of-directors/
China Development Team Web Page - http://www.thoriumpowercanada.com/management-team/chinese-development-team/

Gasification Vendors and Suppliers

Fluid Components International (FCI.)

1755 La Costa Meadows Drive
San Marcos, CA 92078 USA
Business Type: Manufacturer
Industry Type: Energy Monitoring and Testing
Market Focus: Globally (various continents)
Year Founded: 1964

MSW Sorting and Prep

From – Fortune Business Insights

https://www.fortunebusinessinsights.com/municipal-solid-waste-management-market-103979
Municipal Solid Waste Management Market report summaries detailed information by top players such as A2Z Group, Clean Harbors, Progressive Waste Solutions Ltd, among others... Read More at-
https://www.fortunebusinessinsights.com/municipal-solid-waste-management-market-103979

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Knowledgeable – Soils and Nutrients
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DPH Biologicals

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Phone: 1.800.648.7626
https://douglasplanthealth.com/

Other Key Soils Experts

Dave Larson – Agriengery energy resources
Dr. Ken Scal

Dr. William Albres
Dr. Albreck
Dr. Henery Reams

References.

1. Community Power Corporation (CPC), established in 1995, is an owned subsidiary of SynTech Bioenergy LLC.
2. Waste 360, AkzoNobel Specialty Chemicals, Jul 17, 2018
3. FastOx System Installed at US Army Garrison Fort Hunter Liggett in California.
4.
5.

Web Page References

1. https://www.waste360.com/waste-energy/enerkem-make-methanol-through-gasification-netherlands
2. https://www.yosemiteclean.com/
3. https://www.wastetodaymagazine.com/article/sierra-energy-system-installed-at-army-base/
4.
5.