

To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

Company Name:

Baltic Renewable Energy http://www.brehgroup.eu/

Developers:

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Address:

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Company details: Registration No. 40103728626

Form of Business:

Combined Heat and Power from waste (CHPfW) pants

Areas of expertise:

Combined Heat and Power from Waste using Advanced Thermal Treatment Technology

Objectives:

Establish CHPfW plants, firstly in Latvia, then in the other Baltic States, then internationally.

Estimated Annual Sales

Funding Requirement:

Use of funds **Capital Expenses** Working Capital

Return on Investment

Investor IRR is projected at 19% under specific conditions, but may prices, investment structure and source of funds.

A comprehensive description and financial forecast is available on request.

OBJECTIVE: To develop a green combined heat and power from waste (CHPfW) business In Latvia using Advanced Thermal Treatment (ATT) Technology.

THE NEED:

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- The current energy crisis calls for additional energy sources.
- EU climate objectives required green energy projects.
- EU landfill directives require reduction of the amount of waste going to . landfill. The Baltic States will have difficulty complying without new thermal treatment capacity.
- Latvia has an underdeveloped waste disposal sector and lacks capacity . for the thermal disposal of residual and hazardous waste.
- Municipalities require low-cost heat.
- Latvia is obligated to increase renewable fuels for energy production.

PROPOSAL: "Baltic Renewable Energy Holdings" SIA (BREH) proposes to establish up to fifteen (15) - 2MWe/4MWth plants using ATT technology in an integrated chain of stand-alone and individually profitable small-scale (CHPfW) plants sited adjacent to a heat user. Power will be supplied to the grid and by direct sale to an end user. The feed stock will be some 220,000 tonnes of Solid Recovered Fuel (SRF) and other wastes.

REQUIREMENT: A funding partner to invest or facilitate an investment up to €115 million for the full project. The principals have invested €730k directly for development costs to date.

INCOME will come from gate fees received for waste processing and the sale of electricity and heat.

GRANTS: Grants may be available.

THE OPPORTUNITY: Conditions favour the development of a steady, secure, and highly profitable business where rising waste disposal costs will result in rising gate fees coupled with high energy prices.

THE DEVELOPERS, SHREWS Ltd. of the UK owned by John Birchmore and "TP Riga" SIA of Latvia owned Ed Kalvins, are environmental projects specialists with extensive experience commissioning start-up projects in Eastern Europe and Russia with the necessary technical expertise, extensive engineering and plant management experience, and local expertise and familiarity with regulations and procedures. The Developers expect to manage both project implementation and operation after commissioning.

THE TECHNOLOGY: The nominated technology selected after extensive research and evaluation is a high temperature process, which achieves efficient energy recovery from a wide range of fuels including biomass and municipal, hazardous, and commercial wastes, and tyres. The technology uses well-proven technologies in a novel manner to produce a robust and commercially competitive technology.

THE BIG ADVANTAGE: The Developers acquired significant experience in preparation for, and in the early stages of the implementation, of a similar project in 2010. The project was aborted with the bankruptcy of the investor in the financial crisis of that period.

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"Baltic Renewable Energy Holdings" SIA

Executive Summary of the Business Plan for a

Small Scale Combined Heat and Power from Waste Project in the Baltic States

March 2, 2023

Baltic Renewable Energy Holdings SIA is not regulated and not registered with any organisation regulating investments. The information in this Investment Proposal is based on personal research

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believed to be correct at the time of writing.

Table of Contents

1	FORWARD	. 4
2	LATVIA	. 7
3	THE COMPANY - BALTIC RENEWABLE ENERGY HOLDINGS	. 9
4	SUBSIDIARY PLANTS	. 9
5	TARGET MARKETS	11
6	OPERATIONS	18
7	MANAGEMENT AND KEY PERSONNEL	23
8	RISKS	26
9	DEVELOPMENT AND EXIT PLANS	27
10	FINANCES	28

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1 FORWARD

1.1 The Opportunity

Latvia offers an opportunity to develop small scale highly flexible Combined Heat and Power from Waste (CHPfW) projects, taking advantage of the rising costs associated with waste disposal and power (heat and electricity) production using modern advanced thermal treatment technology. This proposal sets out a route to take advantage of this opportunity to secure excellent rates of return through low risk investment. Latvia is a net importer of energy with a high dependence on Russia and the Country is keen to diversify its sources of energy and reduce dependence on Russia; hence, it is supportive of innovative projects relying on new source of fuel, especially indigenous sources using modern technologies.

1.2 Project Objective

The objective of the project is to create power generating capacity of 30MWe based on the concept of small local combined heat and power plants operating on residual and hazardous wastes using advanced thermal treatment technology (ATT).

- The capacity of 30MWe, will use waste primarily in the form of solid recovered fuel (SRF) as the fuel. This will involve the installation of 15 stand-alone power units each of 2MWe sited next to a heat user. The national electricity company, Latvenergo, will buy all of the power and the heat sold to adjacent heat users, such as the local municipal heating company or industrial plant. Additional facilities to process hazardous wastes to take advantage of higher gate fees will be installed where appropriate.
- Each unit will generate 2 MWe, (equivalent to16,000 MWhrs/yr), some 5 MWth of useable heat and use some 16,000 tonnes per year of Solid Recovered Fuel (SRF). Different plant configurations of 4 or 6 MWe output may be adopted as appropriate but projections are based on the 2MWe/5MWth model.
- Revenue streams included in the plan therefore come from gate fees for taking in waste, electricity sales to the national electricity company and heat sales to heat users.

Note that the concept, based on stand alone modular units means that number built can be adjusted to the investment requirement of the funder, either more or fewer units. Though the project is based in Latvia the model is applicable world wide.

1.3 Financial Summary

- The forecasts are based on a credit line of €115 million and the construction of 15 plants of 2 MWe capacity. Liabilities to the Promoters and creditors through the sister company First Malpils Power SIA, which will be taken over by BREH, to date are €730k.
- The funding requirement for the first plant, which will carry the design and permitting costs is projected at €9.5 million and each plant thereafter at each 2MWe/5MWth plant is €7.6 million (including capital costs, working capital and contingency). Each plant is a self-sustaining economical business unit and may be set up and financed independently.
- Sales projected to grow rapidly to €38m per year by year 4. The expected EBITDA for each site is positive from when the plant starts to operate.

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- The projected project IRR based on cash flow for the project is 25%.
- The projected terminal value for BREH at year ten is some €273 million.



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

Special Note! Financial calculations are based on pre-February 24, 2022 (Russian invasion of Ukraine) conditions. Updates are currently not available because of price and cost volatility in the market, though energy cost increases are substantially higher than capital cost increases which will make the project considerably more attractive. An update to the financial model will be required prior to the time of project implementation.

1.4 Investment options

Each plant will operate as a commercially viable independent unit.

On some sites the installation of multiple units generating multiples of 2MWe are possible. The ability to sell heat on any given site will determine the project size.

1.5 Background

EU landfill directives require that the amount of waste going to landfill in any EU country be reduced by 2030 to 10% of the 1995-landfill levels. Latvia is very unlikely meet these targets without further increases in currently charged Environment Tax rates and gate fees. By comparison municipal waste landfill tax in Latvia in 2020 was €50 per tonne whereas in the UK in 2021 it is £96.70 (€105.50).

The Baltic States lack energy from waste facilities for the disposal of all forms waste, including hazardous waste, but EU regulations require the Baltic States to reduce the amount of waste going to landfill.

This technology helps to resolve these problems. A combination of landfill charges and other Government taxes will result in rising gate fees to the CHPfW plants, with additional revenues derived from the sale of power and heat.

- The chosen technology permits the efficient conversion of waste into energy (often referred to as Energy from Waste or EfW) on a small scale. As projects will be located adjacent to a heat demand good quality Combined Heat and Power is achieved, so we refer to projects as CHPfW.
- By developing plants at a small scale, local infrastructure upgrade costs, such as grid connections or road upgrades, are minimised or avoided.
- The plants, which have a small footprint, will be built close to heat users, so facilitating a high level of overall energy recovery.
- Waste disposal is a cost and so by using waste as the fuel, the fuel attracts a gate fee, the fuel is a positive income stream
- A lot of residual waste, that waste which remains after the recyclable materials have been extracted, is converted into Solid Recovered Fuel (SRF) and this commodity is readily available in Europe.
- SRF is an ideal fuel for modern small-scale CHPfW plants as it is easily transported and handled.
- Imported SRF from the UK or continental Europe will be used in the beginning but this will be replaced if
 higher gate fees can be achieved from other sources or locally when it becomes available.

Latvia has recently increased landfill taxes from €12/tonne in 2012 to €50/tonnes in 2020 but the working assumption is that Gate fees will increase at 3% per year and environmental taxes at 5% per year over the life of the project. Even at constant and current energy prices and gate fees, the project is profitable. Increases will add to profitability.

From the availability of funding the full 30 MWe of capacity will be delivered and brought on stream over a 30-



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month period. Individual projects take about nine months to commission and projects will be sequenced over the implementation period.

Latvia is a net importer of gas, electrical power and oil. Power prices are now low and Latvia is part of the Nordpool system, which shares power between countries bounding the Baltic Sea. We have projected average daily prices in Latvia to be $\in 60$ /MWh wholesale at the time of commencing the project despite the current average price exceeding $\in 60$ /MWh. Thereafter it is projected that energy prices will increase in real terms at 1.5% per year for 10 years. Heat will be sold under long-term contract to the local town where the plant is located for district heating or other industrial users.

Although forecasts are made over a 10-year period the plant life is projected at 20-25 years.

- 1.6 There are limited local facilities in Latvia for the disposal of hazardous wastes. Hazardous wastes are exported from Latvia mainly to Sweden or Germany for disposal. This is expensive. A later development is to include a steriliser for hazardous wastes and this sterile waste added to the fuel. Sterilization before processing simplifies waste handling. A local facility will attract hazardous waste from within Latvia as well as from the other Baltic States. The addition of this facility will generate a minimum of €1 million per year (assuming a conservative gate fee of €360 per tonne and a modest target of 3,000 tonnes per year). The inclusion of a line for processing hazardous wastes will require further investment in year three of €719k and with a payback of about 1 year.
- 1.7 There are grants available under several European Programmes, such as the Cohesion Fund, Connecting Europe Facility, Horizon Europe, Clean Energy transition, European Regional Development and European Energy Programme for Recovery. Once the project is funded and BREH becomes eligible to apply for grants the management team will make every effort to secure grants. In the forecasts no grants have been included so any successes in securing grants will boost the profitability of the investment.
- 1.8 The Developers: John Birchmore, the owner of SHREWS Ltd. of the UK and Ed Kalvins, the owner of Technical Partners Int'l Inc. (Canada) / "TP Riga" SIA (Latvia), are the Developers. John is an environmental projects specialist with extensive experience commissioning start-up projects in Eastern Europe and Russia. His team provides the necessary technical expertise. Ed is a Canadian-Latvian born in the UK and living in Latvia. He acquired extensive engineering and plant management experience in Canada. His team provides local know-how and familiarity with regulations and procedures. The Developers expect to manage both project implementation and operation after commissioning.
- **1.9** The Technology: The selected technology is a high temperature process, which achieves efficient energy recovery from a wide range of fuels including biomass and municipal, hazardous and commercial wastes, and tyres. However, the project is technology neutral and alternative technologies could be considered if there is a compelling reason to change.



2 LATVIA

- **2.1** Latvia is a good geographical area for the rollout because:
 - the existence of district heating schemes to feed from the combined heat and power from waste plants;
 - the need to divert waste from landfill and shortage of local facilities for processing of hazardous waste;
 - support from local councils to develop the projects in their towns as this provides employment, secures heat for the town and assists with the disposal of residual wastes;
 - the national drive to find alternative energy sources because of the decision to avoid Russian gas and compete on international markets for LNG supplies;
 - a favourable tax regime

2.2 Briefly about LATVIA

Latvia is a western state that is a full member of the European Union and has been a member of NATO since 2004. Latvia joined the € in January 2014 and Latvia's credit rating continues to be upgraded along with comments about its positive outlook. Standard & Poor's credit rating for Latvia stands at A+, and Moody's is A3. This provides a stable and predictable foundation for business.

Latvia regained its independence from the Soviet Union in 1991 and began the difficult process of converting from a planned to a free market economy. In the mid 90's, Latvia was experiencing the challenges of economic transition, including multiple banking crises, economic boycotts by Russia, unfamiliarity with western (particularly European) practices and politically-related development issues.

Since independence, Latvia has also benefited from its history with established traditions in banking, manufacturing, education and development that provide the foundations for future growth and development. The country is also a major trading and transit route for products to Belarus and Russia.

Latvia has favourable company tax rates of 15%. There are no restrictions on the repatriation of profits or the transfer of funds from the country. There are also favourable provisions for new inward investments in Latvia.

The Latvian economy is robust and improving.

See http://www.firstmalpilspower.com/ and http://www.liaa.gov.lv/en for more details.

2.3 Latvia: Energy Supply

Latvia is a net importer of gas, electrical power and oil. Latvia depended on Russian gas for a significant amount of its power and heat. Government policy is to eliminate dependence on Russia and, in line with EU policy, is encouraging the development of renewable energy.

International energy prices influence Latvian energy prices. EU policy is to eliminate dependence on Russia. Though Latvia does have some indigenous power generation, mainly hydro-power from the Daugava River, this is now fully exploited and new energy sources must come from imported energy or renewables from biomass, solar, wind or energy from waste. Latvia is now connected to the regional grid which gives the country the ability to import and export power, but Eastern Europe is generally short of power and this will be exacerbated as coal fired power stations are closed in Poland and power from shale in Estonia is phased out.

Latvia is part of the Nordpool system, which shares electricity power between countries bounding the Baltic Sea. The war in Ukraine has resulted in recent astronomical increases in electricity prices with quoted prices demonstrating a high level of volatility. However, it is expected that pricing will remain high after the market stabilizes because of the emphasis on renewables and the use of LNG.

The drive for renewables is fully supported by the EU and in line with EU policy. Residual waste is considered as a renewable source as typically residual waste contains 60-70% biodegradable materials.



2.4 Latvia and the Combined Heat and Power from Waste Opportunity

In common with all the other EU countries, Latvia is obliged to meet its obligations under the EU Landfill Diversion Directive and divert waste from landfill. Latvia is also obligated to increase renewable fuels for energy production. This sets the stage for a steady and secure business using Advanced Thermal Treatment (ATT) Technology in CHPfW plants that benefit from rising gate fees and the need for renewable energy. Gate fees and all the costs associated with waste disposal are increasing as Latvia acts to reduce landfill.

As a result, Latvia offers an opportunity to develop Combined Heat and Power (CHP) projects based on waste as a fuel in the form of Solid Recovered Fuel (SRF): revenues will come from gate fees, the sale of electricity either directly to users or through the Nordpool and from long-term contracts for the sale of heat for district heating.

Heat prices are tied to gas prices and similarly prices are assumed to be modestly increasing in real terms over the life of the project, however the project remains profitable even if energy prices and gate fees remain constant.

When it comes to fees for taking in waste, the only way they are going is up. Along with all EU member countries, Latvia is obliged to meet EU Landfill Directive 1995 targets. However, on current form, Latvia will struggle to meet its obligations. Consequently, the Environment Tax (Landfill Tax) has increased from €1.03 per tonne in 2007 to €9.96 per tonne in 2012 to €12 in 2013 for MSW and €50 in 2020. Further increases are anticipated.

Currently Tax rates are detailed in section 5.4.

Initially imported SRF will be used as the fuel once appropriate permits are acquired. A waste processing facility to produce SRF is in the implementation stage at Getlini, the main landfill site for Riga. This will lead to the local availability SRF. The gate fee for this is potentially higher than imported wastes so as this becomes available local CHPfW plants will switch to using locally available SRF, so boosting income above that projected in the forecasts which is based on imported SRF gate fees. It is assumed in the model that locally available SRF only becomes available from year 5 onwards.

See more at: <u>http://www.tax-</u> news.com/news/OECD Recommends Tax Reforms For Latvia 68970.html



3 The COMPANY - Baltic Renewable Energy Holdings

"Baltic Renewable Energy Holdings" SIA (BREH) is a Latvian registered company, Registration No. 40103728626, with registered address at Vienības gatve 109, Rīga, Latvia, LV-1058, set up specifically as a holding company and owned by the developers.

The term "SIA" is the short form for "Sabiedrība ar ierobežotu atbildību", or Limited Liability Company.

Each subsidiary operating unit will be a separate entity owned by BREH as the parent company. BREH will act as the management company for the subsidiary plants.

4 Subsidiary Plants

4.1 Early Project

An early project could be at Malpils through an existing company, First Malpils Power SIA, where considerable work has already been undertaken in connection with project preparation and land zoned for industrial use is already owned freehold.

The heat contract with the local district heating company had been agreed some time ago, but will need to be confirmed. Follow on projects will benefit from the work undertaken for the lead project (e.g. the Environmental Impact Statement (EIS) will apply in large part to all sites) and with access to experienced and trained operatives. The follow-on projects will avoid first mover costs. Malpils will form the exemplar for the expanded programme

- 4.1.1 "First Malpils Power" SIA (FMP) is a Latvian registered company formed in 2008 and wholly owned by John Birchmore but over which BREH holds an option to buy the shares at par. The company is capitalised at €14,288. This company was formed to develop a CHPfW project at a site in the Latvian township of Malpils. FMP Registration details are Reg no.40003982825 with registered address at Vienības gatve 109, Rīga, Latvia, LV-1058.
- 4.1.2 Malpils is a community of 4,100 people some 55 km from the capital Riga. The development at Malpils is in keeping with Latvian government policy and has political support at local and national levels within Latvia. At Malpils, the heat will be sold to the local district heating company, but the establishment of a heat using business by a third party to use surplus heat is to be investigated as a possible source of additional revenue. The site is close to the local district-heating scheme. The Municipal Council, based on historical sales, could contract for a minimum of 20,000 MWhrs of heat per year, of a total available of 40,000 MWhrs. Historical sales are based on a restricted heating season of 7 months per year only and restricted by a maximum boiler capacity of 3 MWth. With greater availability of heat for peak demand and throughout the year, higher sales levels are expected.
- 4.1.3 FMP is ready for early implementation. The plant can be operational within 9 -10 months of availability of funding. The developers have funded the preliminary work, acquired the site and thoroughly investigated all aspects of the business.
 - Provisional contracts had been agreed for local heat loads with the local district heating company, but will need to be reconfirmed.
 - Power purchase is by the State power company Latvenergo, who have a decided interest to purchase locally produced power at market prices. A power purchase agreement is possible with a local power distribution company.
 - Waste sources identified and letters of intent received for the full supply.
 - The promoters are working with the Latvian Association of Waste Management Companies <u>http://www.lasua.lv/</u> as well as individual companies. SRF is available from the UK to underwrite the project.
 - A capital-funding plan is developed for the required equipment.
 - There is a strategic partnership with a local construction company experienced in building cogeneration plants.
 - A local team of professionals is available for project management, can obtain the necessary permits and is in a position to operate the facility.
 - Additionally, Malpils can provide the training facility for other plants in cooperation with the Riga Technical University with which the developers plan to develop a working relationship with in order

"Baltic Renewable Energy Holdings" SIA



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

to create a centre of excellence for the further development of small scale combined heat and power waste projects.

- The plant will also require:
 - A class B pollution certificate for biomass. Application for this license is 70% completed;
 - o A class A pollution certificate for waste. This process has been started; and
 - o Demonstration of compliance with all local regulations.
- Operations will commence using local low-grade biomass while data is collected on emissions and operations before the class A license is issued, and then converted to pelletized SRF creating a Combined Heat and Power from Waste (CHPfW) business generating heat and power using an efficient gasification technology.
- The project is based on the concept of
 - generating 2 MWe, or 16,000 MWhrs/yr
 - some 5 MWth of useable heat, some of which will be sold to the local district heating company and the balance available for industries to be developed on available adjacent land, such as for the production on site of wood pellets
 - o processing some 16,000 tonnes per year of pelletized RDF and other higher value wastes
- 4.2 Potential Sites

Potential additional sites have been identified and will be confirmed on receipt of proof of funding. On project implementation, the best potential sites will be acquired freehold or leasehold.

Other sites are available in Lithuania and Estonia as well as outside the Baltic States. Development of these sites is possible once there is an operational reference plant.

The plan is that projects will be commissioned at approximately 2 monthly intervals following on from the lead project at Malpils. The first project will need to initially operate on purchased biomass in order to obtain its full Class A Operating license before switching the SRF. The type certification on the first plant will extend to the sister plants. Data supplied by the manufacturer on emissions resulting from the processing of a range of wastes does not raise any concerns that EU emission standards will not be met.

- 4.3 Hazardous Waste Opportunity
 - Surplus heat from the CHPfW plant is available to support adjacent heat-using industries. The Malpils Project plan includes the installation of a steriliser to sterilise 3,000 tonnes of hazardous waste, using heat from the plant.
 - There are limited local facilities in Latvia for the disposal of hazardous wastes. Latvia exports its hazardous wastes mainly to Sweden or Germany for disposal. This is expensive around €500 per tonne.
 - Such a local facility will attract waste from within Latvia and, possibly, also from the other Baltic States. The addition of this facility will generate a minimum of €1 million per year (assuming a conservative gate fee of €360 per tonne and a modest target of 3,000 tonnes per year). The line for processing hazardous wastes has been included in year 3 and represents a CAPEX spend of €719k, with a payback of about 1 year.
 - This additional facility will substantially boost profitability
- **4.4** The concept of developing CHPfW based on residual non recyclable wastes is repeatable at other sites in the Baltic States or elsewhere whist being compatible with national strategies to implement the waste hierarchy and minimise waste to landfill. The Malpils plant will provide the central support, training and spares facility required to the overall roll out programme.



5 TARGET MARKETS

5.1 Electricity

- 5.1.1 Latvia is a net importer of electricity. The State Power Company, Latvenergo buys its imported electricity through the Nord Pool.
- 5.1.2 Latvenergo, the State-owned power company, will buy the power. Latvenergo has an interest in buying locally produced power at market rates. Local political support will also ensure a contract. However, they will not enter into an agreement until the plant is ready to come on stream. The price will be the Nordpool price.
- 5.1.3 The overall objective of Nord Pool Spot is to share electrical resources in Northern Europe. Latvia joined the system in 2013 and since then the basis for electricity prices is Elspot from Nord Pool Spot (see http://www.nordpoolspot.com/).
- 5.1.4 The region served by Nord Pool Spot (below) includes Lithuania, Latvia, Estonia, Finland, Sweden, Norway, Denmark and the UK. See the chart below and the applicable prices on October 9, 2021. These prices vary continuously and are affected by demand, weather, economic factors, political factors, etc. See https://www.nordpoolgroup.com/maps/#/nordic for current data.



This region is also connected to Central Europe and thus is affected by demands in the region.

The following table shows Nord Pool Spot pricing for years 2014-2021. https://www.nordpoolgroup.com/Market-data1/Dayahead/Area-Prices/LV/Monthly/?view=table.

LT LT LT LT LT LT EE EE LV LV LV LV LV LV LV LV LT LT EE EE EE EE 2021 2014 2015 2016 2017 2018 2019 2020 2014 2015 2016 2017 2018 2019 2020 2021 2014 2015 2016 2017 2018 2019 2020 2021 Jan €42.94 €39.78 €50.01 €35.14 €37.58 €56.62 €30.82 €53.54 €42.95 €39.78 €50.52 €36.88 €37.62 €56.50 €30.82 €53.64 €40.98 €33.84 €37.63 €33.27 €37.11 €55.76 €30.82 €53.55 Feb €42.72 €39.43 €29.65 €36.26 €43.48 €47.28 €28.05 €59.15 €42.73 €39.44 €29.65 €36.45 €43.9 €46.97 €27.77 €59.31 €34.79 €33.42 €28.28 €35.13 €43.36 €47.28 €28.11 €59.15 Mar €41.61 €32.22 €29.87 €30.65 €46.09 €40.07 €24.02 €43.55 €41.61 €32.22 €30.81 €31.27 €46.08 €39.99 €24.00 €48.02 €31.57 €30.31 €29.41 €30.66 €45.32 €40.10 €24.02 €43.55 Apr €44.07 €34.81 €30.71 €31.42 €40.03 €43.52 €23.52 €43.60 €44.07 €35.61 €33.03 €31.42 €40.18 €43.42 €23.31 €44.74 €31.64 €30.50 €29.73 €31.18 €39.88 €42.18 €23.69 €43.60 May €51.49 €37.36 €32.68 €32.46 €43.69 €44.28 €24.53 €48.42 €51.49 €37.36 €32.87 €32.46 €43.69 €44.11 €24.52 €50.35 €36.85 €32.30 €28.26 €30.66 €38.66 €42.32 €25.02 €48.42 Jun €54.90 €42.80 €40.53 €38.36 €50.91 €44.65 €38.66 €76.23 €54.90 €42.80 €40.53 €38.36 €51.95 €44.65 €38.65 €77.74 €35.81 €27.26 €36.22 €30.65 €47.79 €43.46 €37.77 €43.68 €57.34 €44.26 €38.32 €36.27 €54.55 €48.95 €31.08 €88.32 €57.34 €44.26 €39.23 €36.27 €54.56 €48.94 €31.70 €88.32 €44.17 €28.06 €30.97 €34.33 €54.06 €48.92 €30.10 €83.78 Aug 655.31 €46.40 €33.77 €37.33 €50.05 €49.49 €43.41 €87.32 €55.31 €46.40 €33.78 €37.30 €59.03 €49.37 €43.32 €87.74 €39.10 €31.20 €31.38 €36.34 €55.38 €49.08 €40.90 €87.03 Sep €57.49 €44.30 €34.03 €34.03 €37.68 €58.99 €48.85 €39.91 €123.50 €57.49 €44.30 €34.03 €37.79 €59.11 €48.79 €39.50 €123.96 €42.97 €31.70 €32.40 €37.27 €50.93 €48.77 €39.60 €122.40 Oct €53.73 €56.44 €38.47 €33.70 €55.04 €47.33 €37.72 €106.40 €53.82 €56.44 €38.47 €34.35 €55.68 €46.96 €37.72 €108.91 €40.22 €34.97 €37.54 €33.43 €46.36 €47.66 €37.62 €105.61 Nov €50.43 €45.76 €40.47 €34.87 €55.24 €45.26 €41.10 €125.39 €50.44 €45.84 €40.57 €36.20 €55.42 €44.70 €41.19 €127.82 €35.41 €32.88 €40.86 €33.70 €52.62 €47.72 €40.99 €116.78 Dec €48.87 €38.34 €34.18 €32.26 €53.62 €39.05 €44.86 €207.40 €48.87 €38.34 €34.79 €33.06 €53.62 €38.97 €45.75 €212.22 €37.42 €26.72 €34.01 €32.02 €53.05 €39.05 €45.49 €202.65

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To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

	LV	LT	EE
2013		€48.93	€43.14
2014	€50.12	€50.13	€37.61
2015	€41.85	€42.22	€31.08
2016	€36.09	€36.54	€33.06
2017	€34.70	€35.15	€33.22
2018	€49.11	€49.96	€47.04
2019	€46.28	€46.11	€46.03
2020	€33.97	€34.02	€33.68
2021	€88.57	€90.23	€86.52

The following table shows Nord Pool average Spot pricing since the Baltic States joined the system

- 5.1.5 Latvia and Lithuania have traditionally been separated from the rest of the Scandinavian system with minimal imports when needed to meet local demand. Estonia now connects to the Finnish system, and so enjoys reduced rates. Over the next few years, several regional initiatives influence the cost of power in Latvia. These include:
 - 1. A Lithuanian Swedish cable of 700MWe was commissioned in 2016 to help facilitate the development of wind power in the Baltic Sea and provide access to pumped storage schemes being developed in Sweden
 - 2. Latvian Estonian 500MWe connections have been developed to access Estonian power based on oil shale but this source of power, along with coal fired power stations in the region, is being phased out. Estonia is also reliant on Russia but due to political uncertainty Estonia, despite developing wind power and with access to power from Finland, may require the import of power from Latvian and Lithuania. This may affect prices.
 - 3. It is still not yet clear as to whether the Russian, Kaliningrad nuclear power plant project will continue. This will affect the prices in the region if agreement is reached to supply power to the Nordpool, but due to the higher cost of nuclear power compared with other sources, the impact is uncertain and will be affected by political considerations by Russia as to the level of subsidy provided.
 - 4. The Latvian TEC-2 (capacity 800MW) electricity price is around €33 / MWh during the heating season and about €45 / MWh in summer condensing mode. This is a gas-fired plant affected by the price of Russian gas.
 - 5. Latvia had agreed to buy power from the new nuclear power station in Belarus, which is just coming on stream, but this agreement has been cancelled.
 - Latvia has targets in keeping with its obligations under EU Directives, to increase the amount of power and heat from renewable sources. Typically, 65% of the power produced from SRF counts as renewable. Targets and recent actuals, as a percentage of total, are summarised below:

	2016	2020	2030
	Actual	Target	Target
Renewable energy as percentage of	37.2	40.0	45.0
gross energy consumption			
Renewable energy as percentage of	52.0	53.4	-
energy consumption			
Renewable energy as percentage of	51.0	59.8	-
heat use			

7. Targets for greenhouse gas (GHG) emissions were set in 2020 and commitments made are COP26 involve decarbonisation of the transport sector, which will increase demand for electricity as electric cars, buses and trucks are expected to be mainly the chosen option for new vehicles. We are not aware of any plans for green hydrogen production in the Baltic States at this time.



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

- 8. The expectation is that the ending of coal and shale fired power generation in the region will replaced by renewable energy from biomass and wind. The hydropower capability in Latvia is fully exploited.
- 5.1.6 Note that that though the expectation is that power produced will be sold to Latvenergo; this does not preclude the sale of power through direct sales if a buyer can be found at a better price. Transmission costs are 60% of a company's power bill, hence investigations into direct sales are in hand, as this will be an additional source of revenue for the cogeneration plant, and substantial savings for the user. Latvenergo remains the buyer of last resort.
- 5.1.7 The financial model used for this project uses the Nord Pool Spot price averages from pre-Ukraine war.
- 5.1.8 For the purposes of financial planning, an average price of €60 per MWe is used and an annual increase in real prices of 1.5% per year.
- 5.1.9 Connection to the grid, based on recent estimates from the grid connection company, will cost €100,000 and is included in the financial projections. This assumes connection into the existing 11kV or 33kV network and no local upgrades are required.

5.2 Heat

- 5.2.1 The local township will buy heat for district heating.
- 5.2.2 Typical heat tariffs to the consumer effective on August 13, 2019 are shown in the regulator's map in https://infogram.com/siltumenergijas-apgades-pakalpojumu-tarifu-karte-1hxr4zloongo6yo?live.



Siltumenerģijas apgādes pakalpojumu tarifi EUR/MWh (bez PVN)

- 5.2.3 Connection to the district-heating scheme is agreed and a draft contract prepared. The town is supportive of the project, as this will mean they do not have to build a new biomass heating plant. The current biomass boiler plant will act as a standby as heat from FMP, so reducing the risks of any liability costs from no supply.
- 5.2.4 The agreement with Malpils remains provisional until signed and Malpils retains the option of developing alternative sources of heat if a suitable alternative opportunity arises prior to BREH committing to build the CHPfW plant.

The current retail price in Malpils for heat is €59.13/MWh so a wholesale price of €36/MWhrs is achievable, which allows a 38% margin to cover their distribution costs, and contribution to profit. This is under review with significant increases expected in the new year. but the current price assumed in the forecast.

5.2.5 Connection to the municipal heat distribution system and other utilities is estimated to cost €80,000 and is included in the financial projections.



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5.2.6 Outlets for the surplus hear are under investigation.

5.2.7 Heat prices in Latvia

https://infogram.com/sprk-siltumenergijas-apskats-nr2-1h7j4dv7ppjov4n?live



Note again that the model uses pre-Ukraine war prices.



5.3 Waste

BREH will not be involved in waste collection but will provide the lowest disposal option for solid recovered fuel, competitive with existing and project mass burn facilities and landfill.

From European Environment Agency 2013, the main points regarding MSW management in Latvia include:

- Around 90 % of Municipal Solid Waste (MSW) generated in Latvia is still being landfilled;
- Municipalities are responsible for MSW management in their administrative territories;
- Recycling of MSW has increased since 2002, mainly driven by material recycling, but the total recycling rate of MSW is still very low;
- There is one operational and nine planned (but not, as is understood, confirmed) Mechanical Biological Treatment MBT facilities in Latvia;
- There is no infrastructure for the thermal treatment of waste, including waste incineration, in Latvia and this will be required if Latvia is to meet its obligations on avoiding waste to landfill.

The base case relates to processing of **Solid Recovered Fuel (SRF)**. Studies indicate that the waste required to operate the plant is readily obtainable from waste companies (with which negotiations have started) in Europe, such as Germany, and Holland, and the UK.

Total waste arising in Latvia is 758,000 tonnes per annum, of which 574,000 goes to landfill, against a base figure of 460,000 tonnes for 1995. As with all EU countries, Latvia has obligations under the EU Landfill Directive (99/31/EC) to divert specified quantities of municipal waste from landfill by certain target dates, the key dates being 30% by 2020 10% by 2030. Landfill tax rates are progressively rising and risen to €50 tonne in 2020. The development of facilities to produce SRF in Latvia are currently under active consideration.

Waste management and disposal of residual waste is becoming more problematical in Latvia, hence the pressure for gate fees to increase. Real increases in disposal costs are a realistic expectation. The Table below shows, with translations, current tax rates. The variable tax rates indicate that processing higher value wastes, all of which the technology is capable of processing, is a feasible route to increase revenues.

As mentioned above, higher value wastes than SRF can be added to the fuel. This includes hazardous wastes, which will first be sterilised using surplus heat from the CHPfW plant.

The following has been extracted from the Natural Resources Tax Law (Dabas resursu nodokļa likums) <u>http://likumi.lv/doc.php?id=124707</u>.

			1	· · · · ·	1
Dabas resursu nodokļa likuma 3.pielikums	Natural Resources Tax Law Appendix 3		Rate		
(Pielikums 15.12.2013. spēkā 01.01.21.)	(Appendix 06.11.2013. effective		EUR		
	01.01.2020.)				
Nodokļa likmes par atkritumu apglabāšanu	Tax rates for the disposal of waste		2021	2021	2023
Sadzīves atkritumi un ražošanas atkritumi, kas	Municipal waste and industrial waste that	MT	65.00	80.00	95.00
nav uzskatāmi par bīstamiem atkritumiem	is not considered hazardous waste in				
atbilstoši normatīvajiem aktiem par atkritumu	accordance with the regulatory				
klasifikatoru un īpašībām, kuras padara	enactments on waste classification and				
atkritumus bīstamus	properties that make waste hazardous				
Bīstamie atkritumi un ražošanas atkritumi, kas	Hazardous waste and industrial waste	MT	70.00	85.00	100.00
ir uzskatāmi par bīstamiem atkritumiem	which is considered to be hazardous waste				
atbilstoši normatīvajiem aktiem par atkritumu	in accordance with the legislation on waste				
klasifikatoru un īpašībām, kuras padara	classification and properties that make				
atkritumus bīstamus	waste hazardous				
Ražošanas atkritumi	production waste	MT	21.34		
Dabas resursu nodokļa likuma, 6.pielikums	Natural Resources Tax Law Appendix 6				
(Pielikums 15.12.2016. spēkā 01.01.2017.)	(Appendix 15.12.2016. effective				
	01.01.2017.)				
Nodokļa likmes par videi kaitīgām precēm	Tax rates for environmentally harmful				
	goods				

"Baltic Renewable Energy Holdings" SIA

BR-05 101 230302-0 IM 30MWe 115 eur.docx

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To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

Visu veidu riepas	All types of tires	kg	0.66	
Smēreļļas	Lubricating oils	kg	0.17	
Eļļas filtri	Oil filters	piec	0.33	
		е		
Dabas resursu nodokļa likuma 7.pielikums	Natural Resources Tax Law Appendix 7			
(Pielikums 06.11.2013. likuma redakcijā ar	(Appendix 06.11.2013. Law, as amended,			
grozījumiem, kas izdarīti ar 23.05.2018. likumu,	as amended by the 23.05.2018. Effective			
kas stājas spēkā 01.07.2018.)	01.07.2018.			
Nodokļa likmes par preču un izstrādājumu	Tax rates on goods or products packaging			
iepakojumu un vienreiz lietojamiem galda traukiem	and disposable tableware and accessories			
No plastmasas (polimāru) izcimatoriāliem	Of plastic (polymor) row materials with the	ka	1 22	
no plastinasas (polimeru) izejinaterialieni,	or plastic (polymer) raw materials, with the	кg	1.22	
lizijemot no pioplastinasas vai oksisaualamas	distributable plastic polystyropo raw			
plastifiasas, polistifola izejifiaterialieni	materials			
No koksnes, napīra un kartona vai citu dabisko.	Wood paper and cardboard or other	kσ	0.24	
škiedru un bioplastmasas izeimateriāliem	natural fibber and bio plastic raw materials		0.21	
No polistirola izeimateriāliem	From polystyrene raw materials	kg	2.20	
		0		
Dabas resursu nodokļa likuma 8.pielikums	Natural Resources Tax Law Appendix 8			
(Pielikums 19.09.2013. stājas	(Appendix 06.11.2013. effective			
spēkā 01.01.2014.)	01.01.2014.)			
Nodokļa likmes par radioaktīvajām vielām	Tax rates on radioactive substances	m³	From	
			711.44	
			to	
			14228.7	



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16 - 31



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology



Useful links:

http://www.recobaltic21.net/downloads/Public/Meetings/Workshop%20The%20art%20of%20Procurem ent%20in%20Waste%20management/6-waste_management_in_latvia_ruta_bendere.pdf

www.eea.europa.eu/...solid-waste/latvia-municipal-waste-management

5.4 Other Sales

- 5.4.1 A by-product of the process is a small amount of vitreous slag, which will go to inert landfill or used for road building.
- 5.4.2 Note that in mass burn incinerators a by product is fly ash which has to be disposed of at hazardous landfill sites. As there is no fly ash produced though the technology to be used this cost is avoided.



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

6 OPERATIONS

6.1 Fuel

The concept small stand-alone plants using biomass and/or waste materials, is sound. Solid Recovered Fuel (SRF) is becoming increasingly available as greater recycling throughout Europe takes place and pressures on the diversion of residual wastes from landfill increase. The availability of technologies suitable for processing SRF and other wastes into energy which operate at a small scale and with low capital and operational costs make the concept of local combined heat and power projects, which do not face huge regulatory issues and achieve high overall energy recovery, very viable and quick to build.

6.2 Technology Selection:

A large number of providers/manufacturers suitable for operating at a local scale have been considered, considering:

- sound engineering principles
- proven experience
- reduced risk and competitive cost
- high-energy recovery efficiency
- robust supplier
- capital and operating costs.

The project is technology neutral but the nominated technology. offers very competitive system costs and is based on well proved techniques so technology risks are low. The, capital and operating costs are competitive with other technologies and result in a much better Project IRR. Other technologies evaluated are more suited for larger scale projects, rather than the specific niche of small-scale local plants.

Information about the nominated technology is available on request in power point format.

6.3 Technology

The nominated technology is a modular, continuous process and classed as advanced thermal treatment. It has a low plant footprint. The emissions are well within EU guidelines.

- The modules selected are the 2 MWe capacity. The technology is available in several module sizes <u>(the manufacturer advises that models are available from 1MW to 5Mwe)</u> but the best option to start is one unit of 2 MWe output. This provides a sound basis for expansion at Malpils and other sites. The plant will be operational for 8000 hours per year, an availability of 91%
- On sites where the heat load justifies it, multiple units can be installed in parallel, matching heat output of demand. Whilst the nominated technology concept is relatively new, it uses well-proven and established technologies combined in a clever way. The technology risk is considered low. The company has tested its equipment and has operational data on a wide range of wastes. The company will supply the first plant on very favourable payment terms.
- A small proportion of the equipment cost is project engineering and specialist components, but the bulk of equipment is from established suppliers and original manufacturers guarantees will apply. The use of off the shelf equipment reduces the financial and technical risks.
- Technical risk is further reduced by the plants being assembled and fully tested in the assembler's factory before shipment. The plant is skid mounted so on-site engineering works are kept to a minimum. The equipment is supplied virtually "plug and play".



6.4 Technical Due Diligence

6.4.1 Operating Concept of the Technology

The technology company has developed a plant using well established technologies put together in a novel way, resulting in a very cost-effective plant with low technology risk. The technology has been proven on operational models, though BREH will be the lead customer on the 2MWe output size. Scaling is not seen as an issue due to the use of proven technology components.

The manufacturer has decided to focus on 2 MWe / 5 MWth capacity units as he believes there is a substantial market for this size of unit. This provides economies of scale for this particular unit, both for manufacturing and providing spare parts.

The plant comprises 3 stages:

- a. The cyclonic combustor which oxidises the wastes at high temperature and any residual material is withdrawn as a non-leachable vitreous slag.
- b. The heat is used primarily to super heat compressed air, so raising the pressure further. The now cooled air is passed over secondary heat exchangers before being passed though gas clean up filters. As the air is free from any hazardous materials, destroyed during the thermal combustion phase and free from ash, the gas clean-up is quite straight forward using well proven industry standard techniques.
- c. The super compressed air is released through a modified gas turbine which drives a generator. As the air from the turbine is compressed atmospheric air this can be used directly for industrial processing, such a wood chip drying, or used to raise more heat.

6.4.2 Due diligence:

- A formal technical due diligence report is not available. Our engineers have visited the manufacturer's plant and reviewed the design and operation of the unit. In reviewing their conclusions, we have elected to use this technology for our projects, and offer it for sale to others. Our specialists have concluded that scaling from 1.0 to 2.0 MWe is not an issue.
- Where larger heat and power output is required units will be installed in parallel.
- Our administrative personnel have reviewed the manufacturer's administrative and financial capabilities and have concluded that the company is sound and capable of delivering.
- Of the many technology options evaluated the nominated technology achieves the highest overall acceptance.

6.4.3 Adoption of 2MWe units

Whereas the 1 MWe unit is proven the economics of the technology indicate that a 2 MWe unit offers a significantly higher return on investment. This is not considered as a risk as:

- 1. PLC and instrumentation are common to both,
- 2. Because changes in dimension have a squared or cubic effect, the 2MW unit is not physically 2x the size in every dimension,
- the various compressors have been upgraded to deal with the increased gas flows for the 2MWe unit,



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

- 4. pipe diameters have been increased to cope with increased gas flows to cope with double the flow area,
- 5. the gas turbine and the generator are readily available as 2 MWe units.
- 6.4.4 Acceptance Criteria

There are currently no existing 2MWe plants. This is why the following payment terms are offered:

- The plant commissioned in the manufacturer's factory according to our equipment qualification protocol. After 7 days continuous operation payment for the first instalment is released,
- Second payment is released when the plant, along with all other equipment in the system, is commissioned in in Latvia and been operating for 28 continuous days. Since all individual components of the plant use established and tried technology, there is no reason to believe that there is undue risk in continuous operation,
- The original manufacturer's warranties apply after this period and are for 3 years from acceptance,
- BREH intends to use the first plant in Malpils as the proof of concept plant, and training centre for Europe and Worldwide.

Acceptance procedures include:

- User Requirement Specification that sets the requirements (completed)
- Equipment acceptance procedures which includes:
 - o during acceptance at the factory passing formal equipment qualification protocol
 - during commissioning at site
 - passing formal equipment qualification protocol
 - 30-day operations criteria before acceptance/final payment.
- 6.4.5 Additional considerations:
 - 1. The technology uses well-proven and established concepts put together in a novel way,
 - 2. The manufacturer has a good track record as an engineering company,
 - 3. The management are making sensible decisions, such as they will produce primarily 2 MWe units and larger outputs will be based on putting units in parallel. This means they will be operating within their comfort zone and not trying to extend the technology into areas that may result in problems. Scaling up is not always straight-forward,
 - 4. The technology is the most cost effective currently on the market,
 - 5. It is simple and offers good reliability and low maintenance costs,
 - 6. They have taken the decision to require a prepared fuel, which though adding some up-front costs, removes many of the issue related to a variable fuel, so improving reliability.



6.5 Plant Supply and Installation

The contracts with the manufacturer will be a supply install and commission. The units will be fully assembled and tested before delivery. The units are supplied complete on skids for onsite installation.

The use of an EPC contractor is not necessary as the project is technically simple with all major components being "plug and play". Using an EPC contractor would add substantially to the cost. The manufacturer will in effect be the EPC contractor.

A local, established construction company will undertake the building and site development work under the supervision of Ed Kalvins who is located in Latvia.

6.6 Plant rollout

The development of further plants is timed to meet the capacity of the team to manage the schemes, the capacity of the manufacturer to supply the plants and the desirability of avoiding having to run these plants on biomass – which can be avoided once the first plant has passed local tests.

Pellet production of solid fuels is a well-established process. The process will require the densification of the SRF into large diameter pellets. Higher value wastes, such as sterilised clinical wastes, can be added to the SRF before densification.

There is increasing pressure in Latvia to divert residual wastes from landfill. There will be an increasing supply of SRF from within Latvia and the other Baltic States. The opportunity of integrating a plant in a waste processing plant is being explored, with the waste that being used in the preparation of the SRF. This will help secure the supply chain while reducing handling costs.

SRF is dry and easy to transport. Unlike raw wastes and there are no issues over the smell of vermin. SRF can be stored in hoppers and easily handled mechanically.

6.7 Technology Involvement Strategy

There is the opportunity to acquire an equity share in the manufacturer is an option to be investigated. There is funding provision for this, if deemed a good investment, in the contingency element of the funding provided.

6.8 World Potential Small Scale CHP from Waste Plants

According to a World bank Report (https://www.worldbank.org/en/news/press-release/2018/09/20/globalwaste-to-grow-by-70-percent-by-2050-unless-urgent-action-is-taken-world-bank-report) global waste production is expected to rise to 3.2 billion tonnes per year by 2050. Of course, waste reduction strategies and improved recycling, we hope will considerably reduce this amount of wastes which is classified as residual. Much of this waste will be in the less developed areas where effective waste management is problematic and there is no effective waste disposal route coupled with a local demand for renewable heat/cooling and power.

The same issues as face Latvia now apply in many areas, how to safely dispose of residual waste without putting it to landfill? how to connect to the grid at low cost? how to use the heat?

The proposed approach offers a solution in many circumstances. BREH have already identified



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

opportunities in other Baltic States and Eastern Europe as well as UK, Kazakhstan, Brazil, India, Chile. The solution is applicable on islands and in areas where grid connection is poor or not existent.

No formal research has been undertaken to identify the potential market size beyond it being substantial. Exploitation of this market is hampered by lack of a reference or lead commercial plant. Funding from the private sector is also hampered by the lack of a reference plant and with such a plant access to considerable private sector funds we believe will be unlocked.

The concept has wide applicability both in developed countries where there is a demand for renewable power from embedded CHP projects as well as in developing countries smaller communities, including island communities, which rely heavily on diesel or other non-renewable sources of energy and have poor or non-existent power distribution networks as well as having poor or limited facilities for disposal of wastes. The heat can be used to provide cooling if required through absorption cooling systems. The disposal of residual waste is a universal problem. Small-scale local uses for non-recyclable wastes and hazardous wastes are an obvious solution.

The concept provides base load power, and this can be integrated into other renewable technology programmes. For example, with small local power grids the matching of power demand to supply can present problems. As this is base load continuous power it will complement say solar power which helps meet peak daytime demands and any surplus power overnight can be used to recharge batteries, such as in electric cars or other storage devices, or be used to create cold in refrigeration units.



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

7 MANAGEMENT and KEY PERSONNEL

- 7.1 John Birchmore, the owner of SHREWS Ltd. of the UK, and Ed Kalvins, the owner of Technical Partners Int'l Inc. (Canada) / "TP Riga" SIA (Latvia), are the current developers. John is an environmental projects specialist with extensive experience commissioning start-up projects in Eastern Europe and Russia. John's experience in Latvia includes establishing Riga Timber, Babite Homes and Riga International Business Park, of which he is a shareholder and Director. His team provides the necessary technical expertise. Ed lives in Latvia with extensive engineering and plant management experience from Canada, and 20 years' experience in Latvia. His team provides local expertise and familiarity with regulations, procedures, etc.
- 7.2 The proposed board will include:
 - John Birchmore (Chairman): Nearly 40 years' experience in the forestry and wood processing industry and renewable energy, with 20 years' experience in Eastern Europe, especially Latvia. He has established several start-ups in the Baltics and Russia as well as the UK and acts as an advisor to UNDP and EBRD on development.
 - Ed Kalvins (Chief Operating Officer) is a chemical engineer with nearly 40 years of Project Management, Manufacturing and Engineering Management experience in Canada and Latvia. His 20 years' experience in Latvia provides for a deep understanding of local conditions.
 - Representative(s) from the investors.
- **7.3** Staff have been identified for the operation of the Company but will not be appointed until funding is secured.
- 7.4 The proposed board will include:
 - John Birchmore (Chairman): Nearly 40 years' experience in the forestry and wood processing industry and renewable energy, with 20 years' experience in Eastern Europe, especially Latvia. He has established several start-ups in the Baltics and Russia as well as the UK and acts as an advisor to UNDP and EBRD on development.
 - Ed Kalvins (Chief Operating Officer), is a chemical engineer with nearly 40 years of Project Management, Manufacturing and Engineering Management experience in Canada and Latvia. His 20 years' experience in Latvia provides for a deep understanding of local conditions.
 - Representative(s) from the investors.
- 7.5 Key Personnel

The project is supported by:

7.5.1 Technical and Financial

SHREWS Ltd (UK) <u>www.shrews.co.uk</u> Key person John Birchmore, (CEO) <u>https://www.linkedin.com/in/johnbirchmore/</u>

"TP Riga" SIA (Latvia) / Technical Partners International, Inc (Canada) <u>http://tpriga.lv/</u> Key person Ed Kalvins, (COO) <u>https://www.linkedin.com/in/ed-kalvins-6b4874a/</u>

7.5.2 Legal

Kronbergs Čukste Levin (Latvia) <u>https://levinlaw.lv/</u> Key person Walter Kronbergs

Kronbergs Čukste Derling are a leading local legal company specialising in company and environmental law.



Investment Proposal To develop a green energy from waste business In Latvia

based on Advanced Thermal Treatment Technology

7.6 Project support and/or operational staff

Both "TP Riga" SIA in Latvia, and SHREWS Ltd, based in the UK are well established companies and through their personal contacts and data bases have access to the required technical and administrative personnel. Staff and consultants have been identified for project implementation and the operation of the Company and will be hired or retained subject to availability when funding is secured.

Both companies have considerable experience in project start up and commissioning, including staff recruitment and training, to ensure the long-term successful operation of the project.

7.6.1 Through SHREWS Ltd

John Acton: expert on advanced thermal treatment technology (ATT) and waste processing.

David Jackson (Sweden): waste supply specialist

Colin Hiscock: contaminated land, demolition and civil engineering project management specialist.

Richard Cooke: specialist on high quality complex, automated, electromechanical systems.

7.6.2 Through "TP Riga" SIA (Latvia)

Alvis Līdums – BA – Economics – Manufacturing, BA – Business Administration, MA – Public Administration (University of Latvia). Project Manager. Industrial Engineering and Project Management experience. Cogeneration specialist for CHP plants.

Andris Pumpurs – B.Sc.Env and M.Sc.Env (University of Latvia). Environmental projects specialist. Management, personnel administration, environmental and project administration.

Anita Boldane – BA - Economics (University of Rezekne, Latvia). EU certificate in Project Management. Project Group Manager. Project coordination with municipal institutions.

Pēteris Kurms – an independent construction services consultant, entrepreneur, and businessman. Originally from Malpils, and has been a member of Malpils municipal council. As such, he will be responsible for coordinating all local activities related to construction of CHPfW plants.

Aina Valtmane – BSc – Food Technology (Jelgava Agricultural University, Latvia). Environmental Specialist. Applications relating to pollution controls for A, B and C category certification, as well as for completing the technical requirements and procedures for environmental impact assessments (EIA).

Uldis Kurms – BA (Riga Technical University). Logistics specialist.

Aleksandrs Cars - BSc – Thermal Power Engineering (Riga Polytechnic Institute, Latvia). MSc – (Academy of Sciences of University of Physical Power, Latvia). PhD – Technical Sciences (Technical University of Tallinn, Estonia). Energetics Expert. Heat power industry. Published many publications and possess patents.

Jānis Zvirbulis – MSc - Electrical and Power Engineering (Riga Technical University, Latvia). Electrical Systems Design Specialist. Substation, air conduits, aerial cables, and transmission line design; interior installations and lighting design; cogeneration station construction design.

Vladimirs Čamāns – Dr.Sc.Ing. (dynamics, special purpose manipulators, docking operations) (Riga Technical University, Latvia), Industrial Development Projects Consultant - operational management, new business and market development, process improvements, business efficiency improvement, organisational restructuring, strategy formulation and business planning, project management.

Aleksandrs Aksjonovs - BSc - Civil Engineering (Riga Technical University, Latvia). Fire Safety Specialist. Expert in fire-prevention, construction monitoring; building trade certificate.

Maris Ozols – BASc (Mohawk College, Canada). Installations Engineer. General management, production, mechanical installations. Paint line installations, production line installations, machinery design, project and production management. Equipment re-building, commissioning, and Preventative Maintenance specialist.

Einars Priede – BSc - Construction (Riga Construction College), BSc in Chemical Engineering (Riga Polytechnic Institute). Certified Construction Inspector. Construction management, supervision, inspection.



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

Valers Mitins – BSc - Civil Engineering (Riga Technical University, Latvia). Certified Structural Engineer. Structural design experience of metal, wood and monolith concrete constructions.

Ivars Grislis – BSc - Mechanical Engineering (Riga Polytechnic Institute, Latvia). BA - Economics (Riga Polytechnic Institute, Latvia). Senior Engineer. System maintenance specialist.

Raimonds Lilienfelds – BSc - Chemical Engineering (Riga Polytechnic Institute, Latvia). Manufacturing Processes specialist. Plant and project management.

Indra Sproge-Kalvina - BA - Management Studies (University of Latvia). Sales and customer service specialist.

Inta Cinite - MBA, Management (State University of New York), PhD, Management (Carlton University, Canada) Organizational behaviour consultant, organizational programs, strategic planning and organizational changes.

Further local specialist support may be provided by:

"SZMA V" SIA <u>http://www.szma-v.lv/en/</u>. "ARMS Group" SIA <u>http://armsgroup.lv/en.html</u>

BREH considers working with "SZMA V" and/or the "ARMS Group" because of their overall construction experience and in particular, their recent experience in building CHP plants the size of those planned and anticipated.



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

8 RISKS

The project design minimises the risks associated with a new project development. Considering each risk area in turn:

	Risk	Mitigating factor
1	Power Purchase	This is with the State Power Company.
	Agreement	
2	Revenues for power	Power prices in Latvia are expected to increase in real terms over the life of
		the project. Prices are low at the moment and the current low price has been
		used in the forecasts
3	Revenues for heat	The principle heat contract, if the plant is developed at Malpils or other
		municipalities, will be with the town and the plant will be the sole source of
		heat for the district heating system.
		There are other opportunities for the development of demand for the surplus
		heat, such as the production of wood pellets or at sawmills.
4	Waste supplies	The disposal of wastes is a problem in Latvia. FMP have identified collectors
		of waste, both for municipal and commercial waste as well as hazardous
		wastes and will be entering into contracts of supply to the plant. Initially the
		waste effering a particular expertunity is the processing of bazardous wastes
		There is the opportunity to install a steriliser for high value clinical wastes and
		the sterilised wastes added to the pellets
5	Project team	The key personnel for the project are identified. The team leader will be
Ŭ		dedicated exclusively to the project and the support team has strong
		experience in project development and have a strong incentive to ensure the
		project is a success. Additional operations staff have provisionally been
		identified but will only be confirmed once the project is underway
6	Training	A key element of the operational staff will be the level of training. Training will
		be provided in the first instance by the technology supplier supported by a
		training programme that will be developed as part of the Malpils project.
		Malpils will then be a training centre for new personnel in other projects.
7	Technology	The choice of technology has been made after a great deal of research and
		chosen because of its simplicity, price competitiveness and working
		examples which can be inspected. The units will be fully commissioned in the
		factory before shipment and will be shipped completed. Balance of plant is
		from established manufacturers. The manufacturer is a substantial and
		established engineering company.
8	Sites no longer	If it becomes necessary, say due to heat load no longer available, the
	viable	equipment can be relocated to another site.
8	Political risks	Latvia is an EU country and NATO member and a member of the Euro zone.
		Political risk is low.



9 DEVELOPMENT and EXIT PLANS

9.1 Development

The establishment of a network of highly efficient, local CHPfW plants will bring about the **opportunities** for economies of scale in terms of the purchase and distribution of SRF and other fuels.

9.2 Wider Development

The concept has wide applicability both in developed countries where there is a demand for renewable power from embedded CHP projects as well as in developing countries smaller communities, including island communities, which rely heavily on diesel or other non-renewable sources of energy and have poor or non-existent power distribution networks. The heat can be used to provide cooling if required through absorption cooling systems.

The disposal of residual waste is a universal problem. Small-scale local uses for non-recyclable wastes and hazardous wastes is an obvious solution.

The concept provides base load power and this can be integrated into other renewable technology programmes. For example, with small local power grids the matching of power demand to supply can present problems. As this is base load continuous power it will complement say solar power which helps meet peak daytime demands and any surplus power overnight can be used to recharge batteries, such as in electric cars or other storage devices, or be used to create cold in refrigeration units.



10 Finances

- 10.1 General Financial Parameters
- 10.1.1 The total investment is €115 million for 30 MWe output and annual sales of some €38 million once fully operational.
- 10.1.2 The total project cost (capex, working capital consenting and contingencies) for the first project is €8.7 million (including contingencies) of which the Developers have invested €650k to date and there are €80k of third-party liabilities. The €8.7 million is the maximum exposure including contingencies at the point where the project becomes cash generative.
- 10.1.3 The first unit will carry the costs of permitting and initial design costs and projected to cost €9.5 million but thereafter the average plant costs are €7.6 million per project reflecting synergies of repeating projects of the same size.
- 10.1.4 The forecasts for the full project are based on to the provision of a credit facility of €115 million.
- 10.1.5 Costs are either firm quotations or best estimates against designs and subject to tender from construction companies. There is a contingency allowance on plant and construction costs of 25%.
- 10.1.6 There are opportunities for improved revenues, such as from:
 - Gate Fees in Latvia the Environment Tax (equivalent to the UK Landfill tax) Landfill Tax is expected to increase
 - Energy revenues heat and power prices are projected to increase in real terms;
 - Waste Mix SRF is used as the basis of forecasts but there is the opportunity to process other wastes, such as hazardous wastes, which attract a higher gate fee.
 - Energy Price the wholesale price of power generated is €60MWh but the possibility of a direct sale to a consumer, which will give a high price, is being investigated.
 - Carbon Credits there is the possibility of selling carbon credits. This is disregarded at the moment as this is uncertain.



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

10.2 Investment Protection

It is understood that appropriate insurances can be arranged to underwrite the projects. Details available on request.

10.2.1 Insurance Options

- a. Property insurance including reinstatement (fire, theft, natural disaster)
- b. Revenue protection
- C. Business interruption
- d. Extended equipment warranties beyond manufacturer's warranties
- e. Third party cover including environmental damage

Note: equipment insurance provided by supplier and items b, c and d only come into effect once equipment is commissioned on site and accepted from supplier – acceptance being **28 days continuous operation** on site following delivery, plus three months. A rigorous equipment qualification process will be in place. The equipment must be approved for shipment after operating at the manufacturer's site to meet qualification protocol, then requalification takes place after installation at the client's site and includes the 28-day continuous operation.

10.3 30MWe Capacity Consolidated Financials

The bases for figures are the assumptions of a €115 million credit facility. Interest will accrue on funds drawn down until month 24 with interest payments from month 25. Capital repayments will be monthly over 72 months from month 31.

The projected IRR for the project is 25% over 10 years.

Depreciation is based on plant and equipment over 10 years (though it has a design life of 20 years) and buildings 20 years (with a design life of 40 years).

Interest on loans charged at 5% annually.

10.3.1	Consolidated Financial	Forecast - P&L	for the full 30MWe	e capacity relying on	market supplied SRF

Financial Projections (€'000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Profit and Loss										
Sales	160	11,320	35,072	38,037	41,999	42,829	43,678	44,546	45,434	46,341
Total Waste Revenue	(66)	2,638	8,634	9,839	13,377	13,778	14,192	14,618	15,056	15,508
Heat	94	3,648	12,261	13,141	13,338	13,538	13,741	13,947	14,156	14,369
Electricity 1	0	0	0	0	0	0	0	0	0	0
Electricity direct sale	0	0	0	0	0	0	0	0	0	0
Electricity wholesale	132	5,034	14,176	15,058	15,284	15,513	15,746	15,982	16,221	16,465
ERUs	0	0	0	0	0	0	0	0	0	0
Operating Costs	(326)	(3,559)	(9,638)	(10,019)	(10,178)	(10,211)	(10,245)	(10,280)	(10,315)	(10,352)
Gross Profit	(166)	7,761	25,434	28,018	31,821	32,618	33,433	34,267	35,119	35,990
Overheads excl dep	(1,512)	(3,029)	(4,211)	(4,262)	(4,262)	(4,262)	(4,262)	(4,248)	(4,238)	(4,238)
EBITA	(1,678)	4,732	21,223	23,756	27,558	28,356	29,171	30,018	30,880	31,751
Depreciation	(1,617)	(8,811)	(12,463)	(12,569)	(12,569)	(12,569)	(8,882)	(8,091)	(8,091)	(8,091)
Operating Profit	(3,295)	(4,078)	8,760	11,187	14,989	15,787	20,289	21,927	22,789	23,660
Interest and grant	(906)	(4,436)	(5,866)	(5,051)	(4,075)	(3,105)	(1,945)	(691)	156	226
Profit before tax	(4,201)	(8,514)	2,894	6,136	10,914	12,682	18,344	21,236	22,945	23,886
Operating profit % to sales	-2060.7%	-36.0%	25.0%	29.4%	35.7%	36.9%	46.5%	49.2%	50.2%	51.1%
Profit after tax	(4,201)	(8,514)	2,894	6,136	9,277	10,779	15,592	18,051	19,503	20,303
Projected closing cash	956	913	1,627	2,096	6,974	8,391	-7,901	4,155	30,745	31,434
Projected dividend distribution	0	0	0	0	0	3,974	5,391	0	1,155	27,745
based on retention of cash € 3,000						*			*	,
Cash generation before interest and capital repayments	(61)	13,543	33,686	36,325	40,127	40,925	38,053	38,110	38,972	39,843



To develop a green energy from waste business In Latvia based on Advanced Thermal Treatment Technology

10.3.2 Consolidated Financial Forecast - Balance Sheet - 30MWe

Table 1										
Financial Projections (€'000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Profit and Loss										
Sales	137	10,018	34,830	37,792	41,750	42,577	43,422	44,286	45,170	46,073
Total Waste Revenue	(66)	1,574	8,634	9.839	13,377	13,778	14,192	14.618	15.056	15,508
Heat	71	3,410	12,020	12,896	13,089	13,285	13,485	13,687	13,892	14,101
Electricity 1	0	0	0	0	0	0	0	0	0	0
Electricity direct sale	0	0	0	0	0	0	0	0	0	0
Electricity wholesale	132	5.034	14.176	15.058	15.284	15.513	15.746	15.982	16.221	16.465
ERUs	0	0	0	0	0	0	0	0	0	0
Operating Costs	(325)	(3,499)	(9.628)	(10.010)	(10.168)	(10.201)	(10.235)	(10.269)	(10.305)	(10.341)
Gross Profit	(187)	6.519	25.202	27.783	31.582	32.376	33,187	34.017	34,865	35,732
Overheads excl den	(1.512)	(3.029)	(4 211)	(4 262)	(4 262)	(4, 262)	(4 262)	(4 262)	(4 256)	(4 238)
FBITA	(1,700)	3 490	20 991	23 520	27 320	28 113	28 925	29 755	30,609	31 494
Depreciation	(1.617)	(8,811)	(12,463)	(12.569)	(12,569)	(12.569)	(8.882)	(8.091)	(8.091)	(8.091)
Operating Profit	(3 316)	(5,321)	8 528	10.951	14 751	15 544	20.043	21 663	22 517	23 403
Interest and grant	(911)	(4,515)	(6.020)	(5,196)	(4.205)	(3.214)	(2.227)	(1.243)	(270)	167
Profit before tax	(4.227)	(9.836)	2.508	5.755	10.545	12.330	17.816	20.420	22.247	23,569
Operating profit % to sales	-2412.1%	-53.1%	24.5%	29.0%	35.3%	36.5%	46.2%	48.9%	49.9%	50.8%
Profit after tax	(4,227)	(9,836)	2,508	5,755	8,964	10,481	15,143	17,357	18,910	20,034
		(7111)	1	- /	-)	., .	- / -	. /	-)	.,
Projected closing cash	1.952	717	1.795	589	4,598	5,595	7.124	8.112	13,542	29,222
Projected dividend distribution	0	952	0	795	0	3 598	4 595	6 124	7 112	12 542
based on retention of cash $\in 1.000$	Ű	<i>,</i> ,, <u></u>	Ŭ	150	Ŭ	5,570	1,000	0,12	/,112	12,012
Table 2										
Projected Balance Sheet (€'000s)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fixed assets										
Equipment:	24,300	64,419	61,498	53,983	46,467	38,952	31,436	23,921	16,405	8,890
Buildings	5,966	13,340	13,328	12,752	12,176	11,600	11,024	10,448	9,873	9,297
Contingency	7,245	17,393	14,223	9,746	5,268	1.065	1 0 (5	0	0	0
Land Capitalised pre-expenses	840	1,065	1,065	1,065	1,065	1,065	1,065	1,065	1,065	1,065
Capitalised pre-expenses	0	0	0	0	0	0	0	0	0	0
Debtors	36	2,535	3,951	4,059	4,545	4,639	4,736	4,835	4,936	5,039
Term loans inc accrued interest	(44,571)	(114,100)	(107,785)	(89,155)	(70,525)	(51,895)	(33,265)	(14,635)	0	0
Bank	1,952	717	1,795	589	4,598	5,595	7,124	8,112	13,542	29,222
Trade creditors	(69)	(458)	(657)	(659)	(670)	(672)	(674)	(676)	(678)	(681)
Grants	0	0	0	0	0	0	0	0	0	0
	(4,302)	(15,090)	(12,582)	(7,621)	1,342	8,225	18,774	30,007	41,804	49,297
Initial equity	3	3	3	3	3	3	3	3	3	3
New equity	3	3	3	3	3	3	3	3	3	3
Share premium account	0	0	0	0	0	0	0	0	0	0
Profit and Loss account	(4,307)	(15,095)	(12,588)	(7,627)	1,337	8,220	18,768	30,001	41,799	49,291
-	(4,302)	(15,090)	(12,582)	(7,621)	1,342	8,225	18,774	30,007	41,804	49,297
Debt Repayments (€'000s)	0	0	9,315	18,630	18,630	18,630	18,630	18,630	14,635	0

10.3.3 Consolidated Financial Forecast - Cash Flow - 30MWe

Cash flow										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Overheads other than depreciation	(1,512)	(3,029)	(4,211)	(4,262)	(4,262)	(4,262)	(4,262)	(4,262)	(4,256)	(4,238)
Issue of New Equity	3	0	0	0	0	0	0	0	0	0
Receipt of long term loan	43,650	65,000	3,000	0	0	0	0	0	0	0
Grants	0	0	0	0	0	0	0	0	0	0
Bank overdraft/deposit interest	11	13	25	15	27	40	49	55	66	167
Term loan interest paid	0	0	(6,046)	(5,210)	(4,232)	(3,254)	(2,276)	(1,298)	(336)	0
Capital expenditure	(39,967)	(66,677)	(6,360)	0	0	0	0	0	0	0
Receipts from sales in :										
current month	0	0	0	0	0	0	0	0	0	0
previous month	22	4,112	16,938	18,869	20,712	21,256	21,678	22,109	22,550	23,001
month before	0	3,407	16,476	18,816	20,552	21,226	21,648	22,078	22,519	22,969
Payment of creditors out;	0	0	0	0	0	0	0	0	0	0
current month	(65)	(700)	(1,926)	(2,002)	(2,034)	(2,040)	(2,047)	(2,054)	(2,061)	(2,068)
previous month	(191)	(2,410)	(7,503)	(8,006)	(8,124)	(8,159)	(8,186)	(8,213)	(8,241)	(8,270)
month before	0	0	0	0	0	0	0	0	0	0
Corp tax	0	0	0	0	(1,582)	(1,850)	(2,672)	(3,063)	(3,337)	(3,535)
Term loan repayments	0	0	(9,315)	(18,630)	(18,630)	(18,630)	(18,630)	(18,630)	(14,635)	0
Dividends	0	(952)	0	(795)	0	(3,598)	(4,595)	(6,124)	(7,112)	(12,542)
Cash b/f	3	1,952	717	1,795	589	4,598	5,595	7,124	8,112	13,542
Cash c/f	1,952	717	1,795	589	4,598	5,595	7,124	8,112	13,542	29,222
Investor cash flow	(43,653)	(64,524)	12,361	24,238	22,862	23,683	23,204	22,990	18,528	6,271
Cumulative	(43,653)	(108,177)	(95,816)	(71,578)	(48,716)	(25,033)	(1,829)	21,161	39,689	45,959
Cash generation after interest before			10,392.9	18,218.7	24,220.7	25,074.6	27,425.9	28,805.3	30,513.5	31,757.8

capital repayments, taxes and dividends

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Investment Proposal To develop a green energy from waste business In Latvia

based on Advanced Thermal Treatment Technology

10.4 Terminal Value

The projected terminal value of BREH after 10 years is €273 million.

10.5 Sensitivity Analysis

10.5.1 Core pricing assumptions of price

There are significant upward pressures on pricing for all the income streams.

- Russian gas sales policy, which is not friendly to Latvia, is expected to see supplies from Russia increase in cost.
- The project diverts waste from landfill so reduces greenhouse gas emissions from methane and displaces the use of fossil fuels; as a result, on-going support is expected.
- EU directives affect gate fees and environmental taxes and Latvia is not meeting its targets. There is thus upward pressure on gate fees.

There are risks which have been evaluated but the project remains profitable. Risks modelled include:

- Operational hours are 7,000 hours and not the 8,000 projected
- Power prices remain static
- Gate fees remain static
- 10.5.2 Additional Revenue streams: additional revenue streams will be explored once the project is operational, such as:
 - Introducing higher value wastes into the waste mix, such as pelletized waste oils or other hazardous wastes, possibly combined with SRF as a carrier
 - By attracting heat-using industries to locate on adjacent land to use spare heat.
 - Seeking opportunities for direct sale of power.