Funding Requirement Explanation

for a lead commercial plant in Latvia
based on Advanced Thermal Treatment Technology
for "Green Energy production"

Company Name:
Baltic Renewable Energy Holdings
http://www.brehgroup.eu/

Developers:
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Company details:
Registration No. 40103728626

Form of Business:
Distributed Combined Heat and Power

Areas of expertise:
Combined Heat and Power from Waste using Advanced Thermal Treatment Technology

Objectives:
Provide a f-of-concept CHPfW plant that will serve as the basis of an expanded project in Latvia and then in the other Baltic States and internationally, with a projected life of at least 20 years

Estimated Annual Sales
3.16 million in year 4

Funding Requirement:
€9.5 million loan

Use of funds
Capital Expenses
Working Capital

A comprehensive description and financial forecast are available on request for both the lead commercial facility and the extended project.

Long term objective: "Baltic Renewable Energy Holdings" SIA (BREH) aims to establish an integrated chain of stand-alone small-scale combined heat and power from waste (CHPfW) plants in Latvia. The project will use Advanced Thermal Treatment (ATT) Technology processing Solid Recovered Fuel (SRF) and other wastes. To facilitate the full investment an operational lead commercial plant in Latvia is necessary.

Main benefits of the project:

- green energy production processing wastes which have a high content of contaminated biomass
- significantly reduces waste to landfill thereby meeting EU regulations,
- reliable and growing income streams,
- serves communities with locally generated heat and power ,
- establish Latvia as an international centre of excellence for waste processing and management.

Challenges facing the project:

- uses proven but innovative technology not meeting standard financing criteria,
- country risk associated with regulations and contracts relating to heat and power sales, and source of waste (SRF) supply,
- lack of lead commercial plant

The solution and immediate requirement: Build a lead commercial plant in Latvia which will:

- demonstrate the efficacy of the technology,
- acquire the necessary regulatory permissions to obviate risk,

Background: BREH has initiated a €115 million investment project for the construction of fifteen, 2MWe/5MWth plants. Three agreements have been signed with parties interested in funding the project, all of which have accepted the proposed technology. Having a profitable operating plant in Latvia will facilitate the release of these funds and allow Latvia to become a centre of expertise and potentially supplier of plant and skills to other countries.

Funding: €9.5 million is required to cover capital costs, working capital, independent monitoring, and contingency. The model is based on a loan repaid in 8 years if the interest rate is 5% per annum. A positive debt service cover ratio is maintained throughout. Subsequent plants will benefit from avoided one off costs incurred on the lead project and so will be significantly less expensive.

Income will come from gate fees received for waste processing and the sale of electricity and heat. Prices for heat and power are based on pre-Ukraine war but these are now considerably higher, albeit very volatile.

The National Need: There is a need to reduce waste going to landfill, develop better solutions for the disposal of hazardous wastes, to reduce the reliance on foreign gas and reduce the cost of heat and electricity.

The Developers: Ed Kalvins of Technical Partners Int'l Inc. (Canada) / "TP Riga" SIA and John Birchmore of SHREWS Ltd. of the UK and (Latvia), are the Developers. 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 expertise and familiarity with regulations and procedures. 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. The Developers expect to manage both project implementation and operation after commissioning.

THE TECHNOLOGY: The nominated technology is a high temperature process, which achieves efficient energy recovery from a wide range of carbonaceous fuels The plant uses well-proven technologies in a novel manner to produce a robust and commercially competitive technology. There is the possibility for the plants to be assembled in Latvia using a high proportion of EU supplied components.

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"Baltic Renewable Energy Holdings" SIA

Executive Summary
of the
Business Plan
for a

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

7th November 2022

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 believed to be correct at the time of writing.

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1 FORWARD

1.1 The Opportunity

Worldwide there is the problem of the disposal of waste. Though more and more countries are working to implement the waste hierarchy there remains the problem of the disposal of residual wastes and contaminated wastes in an environmentally safe way. Landfill is not the solution as this is wasteful of resources and creates too many environmental problems. Mass burn incinerators are not the solution as they are expensive to build and operate, inflexible, and very inefficient in terms of overall energy recovery potential. .

The solution lies in the development of small-scale combined heat and power plants using local wastes or residual wastes from recycling operations, and matched to local demands for heat, with power being supplied to the grid. Such plants offer a lower cost option, greater flexibility, and much higher efficiencies in terms of overall energy recovery than mass burn incineration.

Advanced thermal treatment (ATT) technologies operating a small scale are now available that meet demanding environmental control parameters, but their widespread application is limited by the lack of operational lead commercial plants. BREH have spent several years evaluating the options for small-scale combined heat and power from residual wastes and identified a commercially acceptable technology. The technology could be assembled in Latvia with some 80% or more of the equipment being EU supplied or even manufactured in Latvia if there was a lead commercial plant installed in Latvia.

Latvia offers an opportunity to develop small scale highly flexible Combined Heat and Power from Waste (CHPfW) projects due to access to suitable heat loads, favourable arrangements for power purchase agreements, the need for new disposal routes for residual and hazardous wastes coupled with a strong manufacturing and engineering base. The lead commercial plant would take advantage of the rising costs associated with waste disposal and power (heat and electricity) production.

This project 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 is keen to diversify its sources of energy and reduce dependence on Russia.

1.2 Overall Objective

To take advantage of this opportunity, "Baltic Renewable Energy Holdings" SIA (BREH) aims to establish an integrated chain of stand-alone and individually profitable small-scale combined heat and power from waste (CHPfW) plants in Latvia based on Advanced Thermal Treatment (ATT) Technology using Solid Recovered Fuel (SRF) and other wastes as the feedstock.

Each plant 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) and hazardous wastes. Different plant configurations of 4 or 6 MWe output, using 2MWe capacity plants in parallel, may be adopted.

1.3 Implementation

There are two phases to the BREH plan:

Phase 1 will establish a lead plant which will demonstrate to investors that there are considerable advantages of developing the project in Latvia, and that Latvia is an appropriate location from which to expand its expertise internationally. The lead plant will also facilitate the raising of funds to undertake the expanded project.

The lead commercial plant will need to initially operate on purchased biomass before obtaining its full Class A Operating license before switching the SRF. Securing the Class A license will remove a major perceived risk for investors. The type certification on the first plant will extend to the sister plants both in Latvia and elsewhere. Data supplied by the manufacturer on emissions resulting from the processing of a range of wastes shows the plant will operate well within EU emission standards.

This Phase requires funding of €9.5 million. The scenario modelled is for a loan at 5%, repayable over 8 years, with interest accrued for 12 months and a repayment holiday of 24 months. The funding structure is open to discussion.

BREH intends to implement the project in conjunction with the Riga Technical University which would be retained to help monitor performance, participate in the training programs for both local and international personnel, and help in further developing this technology.

The lead plant will demonstrate the efficacy of the technology, full compliance with local regulations, the economic viability of the operational model, and set the stage for the expanded project.

Phase 2, the expanded project, will install a further 14 units in Latvia to increase capacity to 30 MWe based on the concept of small local combined heat and power plants operating on residual and hazardous wastes using advanced thermal treatment technology (ATT).

Note that the concept, based on stand-alone modular units means that number built is not limited to 15 but can be amended to match the number of opportunities for installing such plants. Though the project is based in Latvia the model is applicable worldwide.

1.4 Sources of Income

Revenue streams included gate fees for processing waste, electricity sales and heat sales.

- The national electricity company, Latvenergo, will buy all the power. Power may also be sold to individual users such as industrial plants.
- Heat is sold to adjacent heat users, such as a local municipal heating company or industrial plant.
- Additional facilities to process hazardous medical wastes to take advantage of higher gate fees will be installed where appropriate.

1.5 Benefits of the Expanded Project

The main benefits to Latvia include:

1. Diversion of wastes from landfill – meeting EU regulations and reducing methane emissions,
2. Lower cost heat for district heating and industry,
3. Overseas investment of €115 million into Latvia,
4. Local manufacture of plant equipment creating additional jobs and export potential,

5. Jobs created, 155 in direct employment, to run the plants. Many of the jobs will be skilled or semi skilled and most located in rural areas,
6. Additional renewable energy,
7. Development of training facilities which will bring international students later,
8. Opportunity for local Universities to develop new expertise.

Due to the benefits accruing to Latvia there is considerable local political supporrt for the projects.

1.6 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 generated 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. Therefore, the fuel is a positive income stream
- A lot of residual waste separated from municipal solid waste, that waste which remains after the recyclable materials (e.g., glass, plastics) have been extracted, is converted into Solid Recovered Fuel (SRF). 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. It also avoids the unpleasant odors and visuals associated with raw municipal solid waste.
- Imported SRF from the UK or continental Europe can be used in the beginning but 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.

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 €60/MWh wholesale at the time of commencing the project despite the current average price exceeding €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 a local town under competitive terms or business where the plant is located for district heating or other industrial users.

1.7 Financial Summary (Phase 1 - lead commercial plant)

The following table demonstrates the realistic scenario for the anticipated financial performance of the lead plant.

Opt. No	Feedstock option	Power Sale	Heat offtake	Invest (mil EUR)	Invest criteria	T/O Yr4 €000's	Pretax profit yr 4, €000's	Cash end year 4 €'000s	Cash end year 10 €'000s	Payback of loan year	Terminal value year 10 €'000s	investor Interest income €'000s	Investor Equity Income €'000's	Total investor income €'000's	Investor IRR	Project IRR %
1-2	Biomass (year 1), then SRF	grid	district heating	9.5 €	Loan @ 5%	3,161	960	1,232	3,144	8	24532	2612	0	2612	5.0%	23.7%

- The forecasts for the lead commercial plant are based on a loan at a 5% annual interest of €9.5 million to cover capital costs, working capital during start-up and permitting. This reflects the full costs up to the point where the plant becomes cash generative.
- Sales are projected to grow rapidly to €2.6m per year by year 4. The expected cash flow is positive from the start of commercial operations once a full Class A operating license is obtained.
- The projected project IRR based on cash flow for the project is 23.7% including a terminal value of the project.
- The loan will be repaid in full by no later than the end of year 8.

The payback period and financial performance of the plant will depend on numerous factors and can be significantly improved. These scenarios are shown in the financial section of this document.

The financial summary for phase 2 – expanded project is provided in the documentation for the expanded project which is available to potential investors.

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.

2 LATVIA

2.1 Latvia offers the ideal place for the development of the lead commercial plant and establishment of a manufacturing base as:

- The national electricity company, Latvenergo, will buy all the power at the prevailing wholesale (Nordpool) price
- Plants can be installed adjacent to heat users, such as district heating schemes, sawmills or other industrial uses. The heat can also be used to create cooling such as is required at data centres.
- Latvia has an established engineering base suitable for the fabrication of such plants. Preliminary discussions on this have been held with the developers of the technology but clearly subject to being able to be a major customer.
- Latvia does not have an established thermal waste disposal facility and so is not burdened with historical or legacy issues.
- Latvia is part of the EU so can access plant and equipment from other EU countries as required. The plants will be built and operated to be fully compliant with all current EU operational and emissions regulations.
- There are local Universities which can be called upon to provide training for both local and international personnel, supply the necessary engineering skills to monitor the plant and participate in projects involving improvements in efficiency or cost reduction.
- The plants will be economically viable in Latvia so there will be revenue streams from the sale of power and heat as well as the gate fees for the receipt of wastes.

2.2 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 as well as other heat users, such as sawmills and wood pellet mills;
- 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 has the potential to reduce heat costs, 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

2.3 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) and other wastes: 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 or industrial 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.

Forecasts are all based on prices prevailing prior to the recent surge in gas and electricity prices.

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.

See more at: http://www.tax-news.com/news/OECD_Recommends_Tax_Reforms_For_Latvia____68970.html

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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.

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 lead plant and subsequent subsidiary plants, both in Latvia and elsewhere internationally.

Latvia will become the international headquarters of a potentially major company.

4 Subsidiary Plants

4.1 Potential Sites

Potential 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 or lead commercial plant.

The plan is that that once funding for the extended project is secured, projects will be commissioned at approximately 2 monthly intervals.

Other projects are under discussion elsewhere which are showing considerable promise, such as in Kazakhstan, and these could proceed quickly once a lead project, providing data on compliance to EU standards and a base for training operatives, is operational.

4.2 Hazardous Waste Opportunity

Waste is considered 'hazardous' under environmental legislation when **it contains substances or has properties that might make it harmful to human health or the environment**.

An effective way of making this waste safe is to treat it at high temperature, ensuring all harmful chemicals are destroyed. The technology which will be used in the lead commercial plant operates at a high temperature in the cyclonic combustor so able to treat hazardous materials. At present Latvia does not have adequate facilities for the treatment of such wastes.

In many cases the wastes can be directly fed to the plant. In other cases, some pre-treatment is required.

These wastes include clinical and veterinary wastes which offer a biohazard.

- Surplus heat from the CHPfW plant is available to support adjacent heat-using industries. Once the lead commercial plant is fully operational it is intended to pursue the installation of a steriliser to sterilise 3,000 tonnes of hazardous medical wastes, using heat from the plant. This will be funded separately from the lead commercial plant but will benefit the core operation by providing the opportunity for higher gate fees as well as reducing the costs of medical wastes disposal in Latvia.
- 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.

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- 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 of the lead commercial plant beyond the forecasts provided.

4.3 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 lead commercial plant will provide the central support, training and spares facility required to the overall roll out programme.

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5 TARGET MARKETS

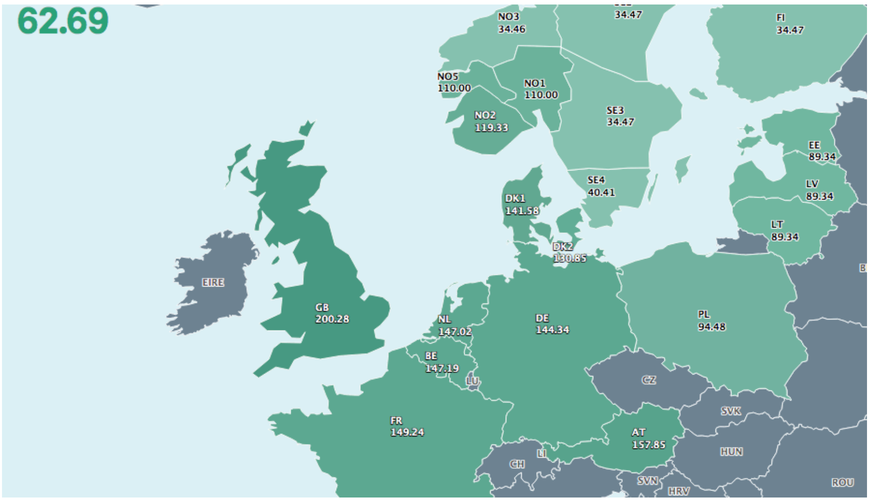
5.1 Electricity

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.

	LV 2014	LV 2015	LV 2016	LV 2017	LV 2018	LV 2019	LV 2020	LV 2021
Jan	€42.94	€39.78	€50.01	€35.14	€37.58	€56.62	€30.82	€53.54
Feb	€42.72	€39.43	€29.65	€36.26	€43.48	€47.28	€28.05	€59.15
Mar	€41.61	€32.22	€29.87	€30.65	€46.09	€40.07	€24.02	€43.55
Apr	€44.07	€34.81	€30.71	€31.42	€40.03	€43.52	€23.52	€43.60
May	€51.49	€37.36	€32.68	€32.46	€43.69	€44.28	€24.53	€48.42
Jun	€54.90	€42.80	€40.53	€38.36	€50.91	€44.65	€38.66	€76.23
Jul	€57.34	€44.26	€38.32	€36.27	€54.55	€48.95	€31.08	€88.32
Aug	€55.31	€46.40	€33.77	€37.33	€50.05	€49.49	€43.41	€87.32
Sep	€57.49	€44.30	€34.03	€37.68	€58.99	€48.85	€39.91	€123.50
Oct	€53.73	€56.44	€38.47	€33.70	€55.04	€47.33	€37.72	€106.40
Nov	€50.43	€45.76	€40.47	€34.87	€55.24	€45.26	€41.10	€125.39
Dec	€48.87	€38.34	€34.18	€32.26	€53.62	€39.05	€44.86	€207.40
Ave.	€50.08	€41.83	€36.06	€34.70	€49.11	€46.28	€33.97	€88.57

	LT 2014	LT 2015	LT 2016	LT 2017	LT 2018	LT 2019	LT 2020	LT 2021
Jan	€42.95	€39.78	€50.52	€36.88	€37.62	€56.50	€30.82	€53.64
Feb	€42.73	€39.44	€29.65	€36.45	€43.49	€46.97	€27.77	€59.31
Mar	€41.61	€32.22	€30.81	€31.27	€46.08	€39.99	€24.00	€48.02
Apr	€44.07	€35.61	€33.03	€31.42	€40.18	€43.42	€23.31	€44.74
May	€51.49	€37.36	€32.87	€32.46	€43.69	€44.11	€24.52	€50.35
Jun	€54.90	€42.80	€40.53	€38.36	€51.05	€44.65	€38.65	€77.74
Jul	€57.34	€44.26	€39.23	€36.27	€54.56	€48.94	€31.70	€88.32
Aug	€55.31	€46.40	€33.78	€37.30	€59.03	€49.37	€43.32	€87.74
Sep	€57.49	€44.30	€34.03	€37.79	€59.11	€48.79	€39.50	€123.96
Oct	€53.82	€56.44	€38.47	€34.35	€55.68	€46.96	€37.72	€108.91
Nov	€50.44	€45.84	€40.57	€36.20	€55.42	€44.70	€41.19	€127.82
Dec	€48.87	€38.34	€34.79	€33.06	€53.62	€38.97	€45.75	€212.22
Ave.	€50.09	€41.90	€36.52	€35.15	€49.96	€46.11	€34.02	€90.23

	EE 2014	EE 2015	EE 2016	EE 2017	EE 2018	EE 2019	EE 2020	EE 2021
Jan	€40.98	€33.84	€37.63	€33.27	€37.11	€55.76	€30.82	€53.55
Feb	€34.79	€33.42	€28.28	€35.13	€43.36	€47.28	€28.11	€59.15
Mar	€31.57	€30.31	€29.41	€30.66	€45.32	€40.10	€24.02	€43.55
Apr	€31.64	€30.50	€29.73	€31.18	€39.88	€42.18	€23.69	€43.60
May	€36.85	€32.30	€28.26	€30.66	€38.66	€42.32	€25.02	€48.42
Jun	€35.81	€27.26	€36.22	€30.65	€47.79	€43.46	€37.77	€71.68
Jul	€44.17	€28.06	€30.97	€34.33	€54.06	€48.92	€30.10	€83.78
Aug	€39.10	€31.20	€31.38	€36.34	€55.38	€49.08	€40.90	€87.03
Sep	€42.97	€31.70	€32.40	€37.27	€50.93	€48.77	€39.60	€122.40
Oct	€40.22	€34.97	€37.54	€33.43	€46.36	€47.66	€37.62	€105.61
Nov	€35.41	€32.88	€40.86	€33.70	€52.62	€47.72	€40.99	€116.78
Dec	€37.42	€26.72	€34.01	€32.02	€53.05	€39.05	€45.49	€202.65
Ave.	€37.58	€31.10	€33.06	€33.22	€47.04	€46.03	€33.68	€86.52

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

	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

5.1.5 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 and other wastes counts as renewable as the waste comes from biodegradable sources and balance, in the form mainly of non-recyclable plastics, from fossil fuels. Targets and recent actuals, as a percentage of total, are summarised below:

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

Targets for greenhouse gas (GHG) emissions were set in 2020 and commitments made at 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.

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. However, Latvenergo remains the safe and predictable buyer.

5.1.7 The financial model used for this project uses the Nord Pool Spot price averages from pre-Ukraine war.

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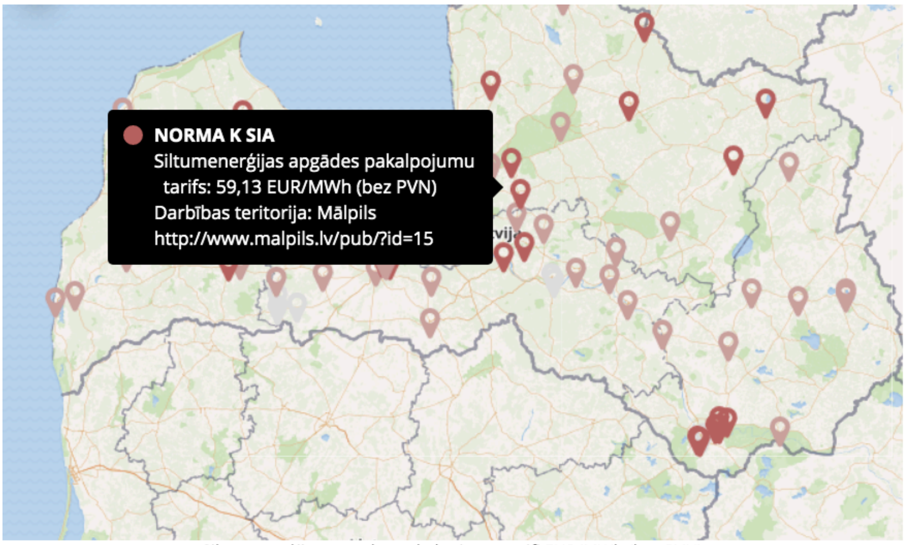
5.2 Heat

5.2.1 Local townships could buy heat for district heating. The municipality of Malpils is one such candidate and is the basis of the financial model for the lead commercial plant.

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.



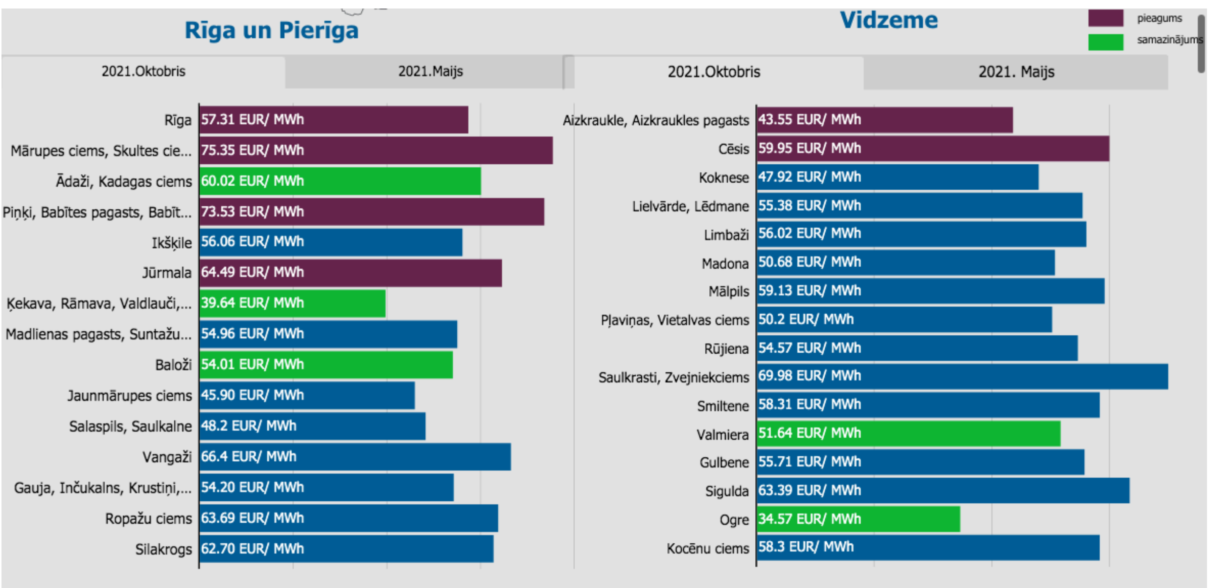
Siltumenerģijas apgādes pakalpojumu tarifi EUR/MWh (bez PVN)

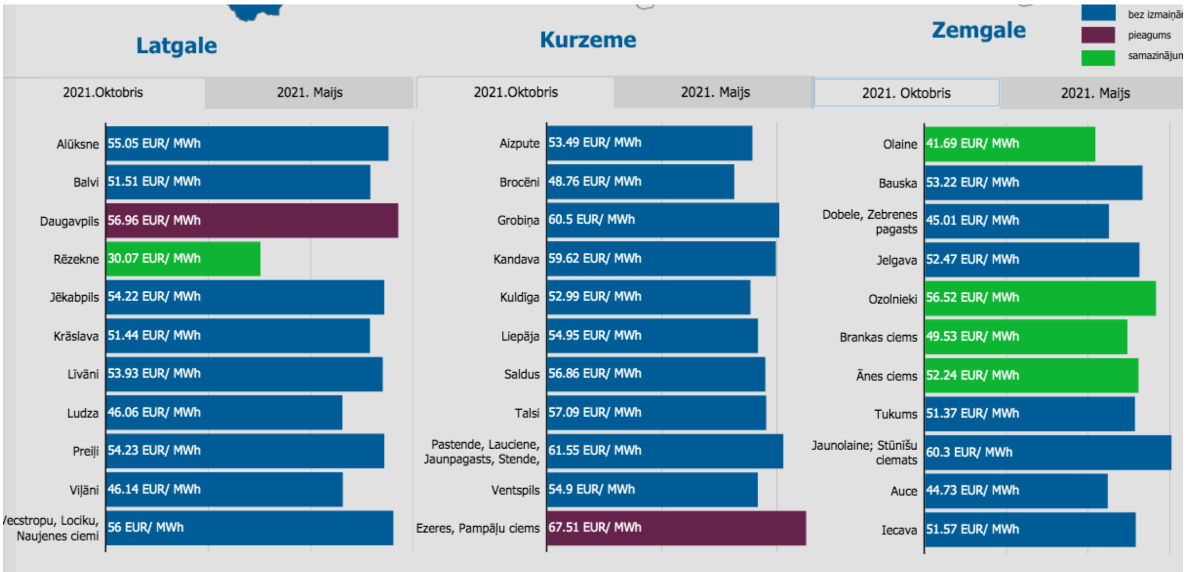
5.2.3 The current retail price in Malpils for heat is €59.13/MWh so a wholesale price of €36/MWhrs is achievable, which allows a 38% margin to cover their distribution costs, and contribution to profit. This is under review with significant increases expected.

5.2.4 Outlets for the surplus heat are under investigation.

5.2.5 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 projected mass burn facilities outside Latvia 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 principally **Solid Recovered Fuel (SRF**) with some additional hazardous wastes which are banned from landfill**.** Studies indicate that the SRF required to operate the plant is readily obtainable from waste companies in Europe, such as Poland, Germany, the Netherlands, and the UK, pending the availability from local supplies. Other wastes will be locally sourced.

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 medical 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) http://likumi.lv/doc.php?id=124707.

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

Ražošanas atkritumi	production waste	MT	21.34		
Dabas resursu nodokļa likuma, 6.pielikums (Pielikums 15.12.2016. spēkā 01.01.2017.)	Natural Resources Tax Law Appendix 6 (Appendix 15.12.2016. effective 01.01.2017.)				
Nodokļa likmes par videi kaitīgām precēm	**Tax rates for environmentally harmful goods**				
Visu veidu riepas	All types of tires	kg	0.66		
Smēreļļas	Lubricating oils	kg	0.17		
Eļļas filtri	Oil filters	piece	0.33		
Dabas resursu nodokļa likuma 7.pielikums (Pielikums 06.11.2013. likuma redakcijā ar grozījumiem, kas izdarīti ar 23.05.2018. likumu, kas stājas spēkā 01.07.2018.)	Natural Resources Tax Law Appendix 7 (Appendix 06.11.2013. Law, as amended, as amended by the 23.05.2018. Effective 01.07.2018.				
Nodokļa likmes par preču un izstrādājumu iepakojumu un vienreiz lietojamiem galda traukiem un piederumiem	Tax rates on goods or products packaging and disposable tableware and accessories				
No plastmasas (polimēru) izejmateriāliem, izņemot no bioplastmasas vai oksisadalāmās plastmasas, polistirola izejmateriāliem	Of plastic (polymer) raw materials, with the exception of the bio plastic or oxy distributable plastic, polystyrene raw materials	kg	1.22		
No koksnes, papīra un kartona vai citu dabisko šķiedru un bioplastmasas izejmateriāliem	Wood, paper and cardboard or other natural fibber and bio plastic raw materials	kg	0.24		
No polistirola izejmateriāliem	From polystyrene raw materials	kg	2.20		
Dabas resursu nodokļa likuma 8.pielikums (Pielikums 19.09.2013. stājas spēkā 01.01.2014.)	Natural Resources Tax Law Appendix 8 (Appendix 06.11.2013. effective 01.01.2014.)				
Nodokļa likmes par radioaktīvajām vielām	Tax rates on radioactive substances	m^3	From 711.44 to 14228.7		

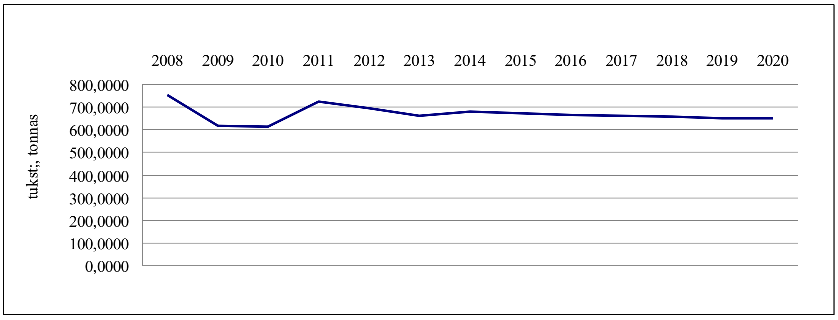


Figure 32. Generated municipal waste projections in (tonnes) 32.attēls. Radīto sadzīves atkritumu daudzuma prognoze (tonnas)

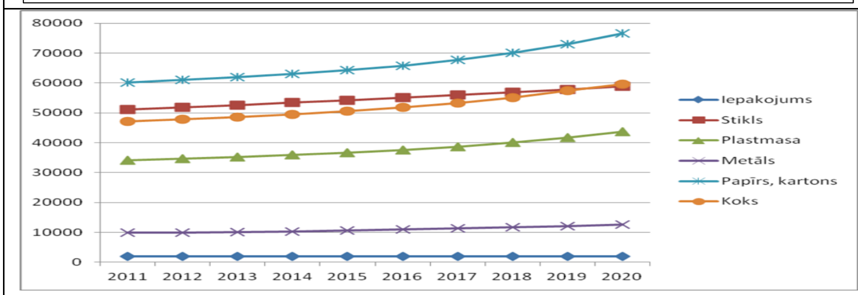
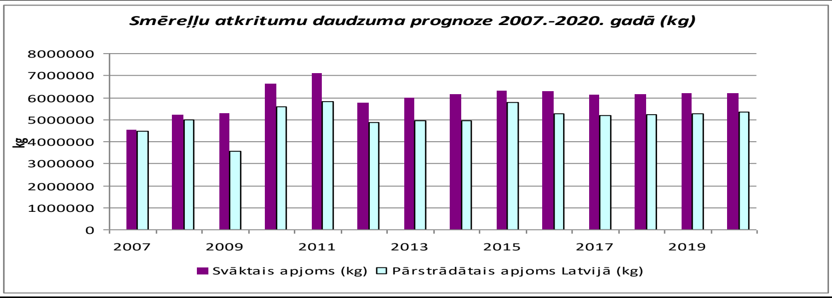
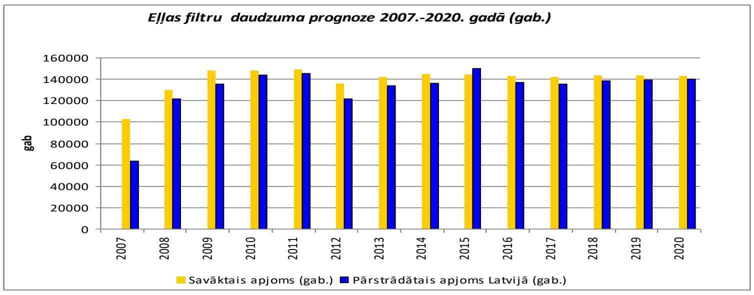


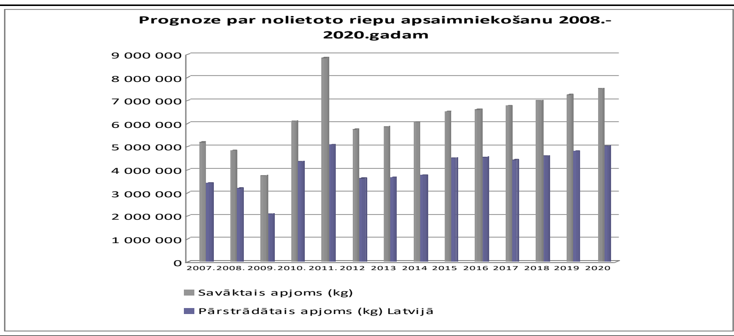
Figure 33. Quantities of packaging waste projections per year 33. attēls. Izlietotā iepakojuma daudzuma prognoze 2011.-2020. gadā



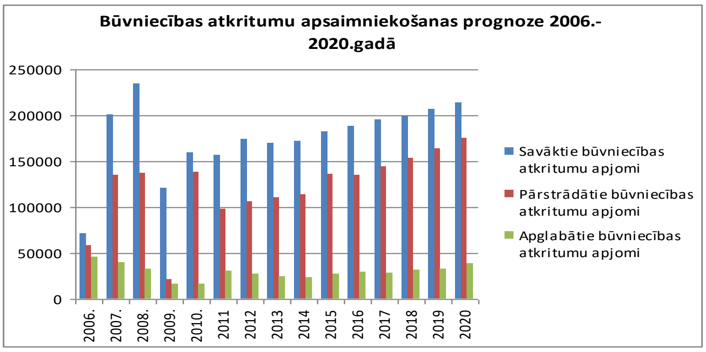
Lubricating oil waste projections per year
Smēreļļu apsaimniekoto atkritumu daudzuma prognoze 2007.-2020. gadā



Oil filter waste projections per year
Eļļas filtru apsaimniekoto atkritumu daudzuma prognoze 2007.-2020. gadā



Worn tire amount projections per year
Nolietoto apsaimniekoto riepu daudzuma apjomu prognoze 2007.-2020. gadā



Construction waste projections per year
Apsaimniekoto būvniecības atkritumu apjoma prognoze 2007.-2020. gadā

Useful links:

http://www.recobaltic21.net/downloads/Public/Meetings/Workshop%20The%20art%20of%20Procurement%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 the problem of fly ash does not arise and so this cost is avoided.

5.5 Production of SRF in Latvia

A potential development model being considered for a number of overseas projects is the use of an embedded CHPfW plant in a waste treatment facility where the power produced is used to operate the plant and surplus sold to the grid and the heat used to dry the residual wastes post sorting and extraction of recyclable materials to produce SRF. Some SRF is to be used on site in the CHPfW plant and the balance distributed to satellite plants located close to heat offtakes. Such a model offers the opportunity to encourage recycling as well as make efficient use of residual wastes and could be applicable in Latvia.

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.

Though the project is technology neutral, the Developers have opted for the nominated technology following extensive research as it offers very competitive system costs and is based on well proven techniques. The technology risks are low. The capital and operating costs are competitive with other technologies and result in much better Project returns.

Information about the nominated technology is available on request.

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 technology supplier developed the technology with the support of Australian government funding. At the current time, three units have been manufactured:
  - a 0.25 MWe unit at the manufacturer's site which has been used for testing materials and collecting waste processing environmental data. This unit is available for inspection and further testing.
  - a 1.0 MWe production unit sold to a client in the Philippines. The status of this unit is unknown.
  - a 1.0 MWe production unit sold to a client in Australia to be commissioned shortly. This unit will be available for inspection

- The modules selected are the 2 MWe capacity. The technology is available in several module sizes (the manufacturer advises that models are available from 1MW to 5Mwe) but the best option to start is one unit of 2 MWe output. This provides a sound basis for expansion at the lead commercial plant 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 2MWe 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. Many of these suppliers will be EU based.

- 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.

The technology operates in several stages:

a. The feedstock is compressed in large pellets
b. The pellets are fed into a cyclonic combustor operating at 1200ºC, so all organic matter is fully oxidised and all hazardous materials are destroyed.
c. The heat from the combustor is used to heat compressed air to a high pressure
d. The heated compressed air is released through a modified gas turbine which drives a generator
e. The air from the exhaust of the gas turbine is clean atmospheric air and can be used directly, say to dry wood chips, of passed through a boiler to create hot water or steam

f. The cooled exhaust gasses from the combustor are passed through a conventional and widely used gas clean-up equipment to remove any volatile metals (e.g. mercury) and halogens (e.g. chlorine). There are no fly ashes, so the gas clean-up is simple and low cost
g. The waste from the combustor is a vitrified slag in which heavy metals are encapsulated in a non- leachable form

Whilst the technology is sound and reliable the absence of a lead commercial plant operating in Europe which demonstrates unequivocally that the functions at 2MWe size in accordance with the manufacturer's specifications and has proven compliance with all relevant EU operational and emissions standards, funding of the larger project is constrained. Of course, until the full project is implemented the other benefits which can flow from the project implementation, such as assembly in Latvia, cannot ensue.

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. Specifying the larger unit 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 that much larger.
3. the various compressors have been upgraded to deal with the increased gas flows for the 2MWe unit,
4. pipe diameters have been increased to cope with increased gas flows to cope with double the flow volume,
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 as the lead commercial plant, and training centre for Europe and Worldwide.

Acceptance procedures include:

- User Requirement Specification that sets the requirements (completed)
- Equipment acceptance procedures which include:
  - 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.
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 an unprocessed fuel which can vary considerable in moisture content, constituency, and size mix.

The development of the lead commercial plant opens the opportunity for investment from the private sector, both equity and debt finance.

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 increase recycling and divert residual wastes from landfill. The production of SRF, that part of the waste which cannot be usefully recycled, is part of the solution and it expected that there will be an increasing supply of SRF from within Latvia, the other Baltic States and more widely in Europe and elsewhere. The opportunity of integrating a plant in a waste processing plant is being explored, with the waste being used in the preparation of the SRF by supplying power to run the plant and heat to dry the waste. 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 or vermin. SRF can be stored in hoppers and easily handled mechanically.

6.7 Technology Manufacturing Strategy in Latvia

As part of the lead commercial programme arrangements will be reached with the Australian manufacturing company to assemble the plant in Latvia with a view to establishing a production line in Latvia for the roll out programme. The Australian company will continue to manufacture the combustor and core engine parts in Australia and supply them to Latvia for integration into the overall plant assembly.

Assembly in Latvia will be to supply the EU and other export markets.

Note that apart from some proprietary parts associated with the modifications to the gas turbine input the balance of the equipment can be EU supplied.

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/global-waste-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 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.

7 MANAGEMENT and KEY PERSONNEL

7.1 The developers are Ed Kalvins and John Birchmore . Ed Kalvins is owner and Managing Director of TP Riga SIA in Latvia and is a qualified engineer. Ed has 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. John Birchmore, the owner and Managing Director of SHREWS Ltd. of the UK. 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, His team provides additional technical expertise

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 Key Personnel

The project is supported by:

7.3.1 Technical and Financial

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

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

7.3.2 Legal

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

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

7.4 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.

7.4.1 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.

7.4.2 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.

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 http://www.szma-v.lv/en/.
"ARMS Group" SIA http://armsgroup.lv/en.html

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.

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 Agreement	This is with the State Power Company.
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 another municipality, 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 plant will pelletize RDF from either UK or Germany to supply the plant. One waste offering a particular opportunity is the processing of hazardous 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 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 viable	If it becomes necessary, say due to heat load no longer available, the 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 by investors is low, so this combined with other benefits of Latvia as the ideal location for the first projects in what will be come an international business helps make Latvia a suitable location for investment in this concept. .

9 DEVELOPMENT OF LEAD COMMERCIAL PLANT and EXIT PLANS

9.1 Development

The lead commercial plant will absorb major, one-time development costs that will either be eliminated or reduced for subsequent plants. The first unit will carry such costs as:

- preliminary studies and investigations,
- financial modelling,
- the pre-feasibility study,
- the feasibility study,
- the business plan,
- the establishment of an administrative and operations structure and related procedures,
- sourcing of wastes and equipment,
- permitting and,
- initial design costs

9.2 Loan Repayment

The loan will be repaid within the agreed time period. The financial forecast shows that the project will maintain a positive debt service cover ratio during its period of operation. The repayment of the loan is not dependent on further finance being raised but we believe will facilitate the securing additional finance to considerably expand operations and facilitate the development of an assembly facility in Latvia.

It is envisaged that once the expanded project is commenced then the lead commercial project will become a core part of the expanded project group and become the centre for staff training for local and overseas staff.

10 Finances

10.1 General Financial Parameters

10.1.1 The total project cost (capex, working capital consenting and contingencies) for the lead commercial plant is €10.2 million, of which the Developers have already invested €730k to date. The €9.5 million is required to complete the project and is the maximum exposure at the point where the project becomes cash generative.

10.1.2 The financial forecasts are based on the provision of credit facility of €9.5 million at an annual interest of 5% and is repayable monthly over 8 years from month 25.

10.1.3 The Developers are prepared to consider other funding models / criteria based on investor requirements, in which case, the financials will be recalculated.

10.1.4 Costs are either firm quotations or best estimates against designs and subject to tender from construction companies and suppliers.

10.1.5 Use of funds for the lead commercial plant:

• Total project cost:		€ 8.710.2 mil
Costs to date	€ 0.7 mil	
• Loan requirement		€9.5
a. Equipment/Process related	€ 5.4 mil	
b. Building costs and infrastructure	€ 1.5 mil	
c. Contingency	€ 1.6 mil	
d. Working capital and monitoring	€ 1.0 mil	

10.1.6 For the expanded project, the average plant costs are projected at €7.7 million per project reflecting synergies of repeating projects of the same size and using the data from the lead project. The main extra costs are associated with the permitting required for the lead commercial project with the permitting information largely applicable to later projects.

10.1.7 Annual sales on the lead project are projected to be €3.1 million once fully operational.

10.1.8 The financial model uses the Nord Pool Spot price. For the purposes of financial planning, an average price of €55 per MWhrs is used and an annual increase in real prices of 1.5% per year.

10.1.9 The following table indicates projected incomes for the base case:

• Annual Sales after start-up period		€ 3.1 mil
a. Electricity	€ 0.9 mil	
b. Heat	€ 1.1 mil	
c. Waste	€ 1.1 mil	

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10.1.10 There are opportunities for improved revenues, such as from:

The payback period and financial performance of the plant will depend on numerous factors and can be significantly improved.

- 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 and some hazardous waste is used as the basis of forecasts but there is the opportunity to process other wastes, such as with additional investment clinical wastes, which attract a higher gate fee.
- Energy Price – the wholesale price of power generated is €55/MWh but the possibility of a direct sale to a consumer which will give a higher price, is possible but not included currently.
- Carbon Credits – there is the possibility of selling carbon credits. This is disregarded at the moment as this is uncertain

  The possibility of increased revenues is mentioned as there is the potential to reduce any risk to the funder of not meeting the proposed repayment schedule.

- The total investment for the extended project is €115 million for 30 MWe output and annual sales of some €38 million once fully operational.

The following table demonstrates various performance scenarios, including a worst-case scenario, realistic scenario, and several others.

Opt. No	Feedstock option	Power Sale	Heat offtake	Invest (mil EUR)	Invest criteria	T/O Yr4 €000's	Pretax profit yr 4, €000's	Cash end year 4 €'000s	Cash end year 10 €'000s	Payback of loan year	Terminal value year 10 €'000s	investor Interest income €'000s	Investor Equity Income €'000's	Total investor income €'000's	Investor IRR	Project IRR %
1-1	Only Biomass (worst case)	grid	district heating	9.5 €	Loan @ 5%	2,030	(731)	(2,111)	(8,266)	8	-160	2614	0	2614	5.0%	neg
1-2	Biomass (year 1), then SRF	grid	district heating	9.5 €	Loan @ 5%	3,161	960	1,232	3,144	8	24532	2612	0	2612	5.0%	23.7%
1-3	Biomass (year 1), then SRF + 20% high value waste	grid	district heating	9.5 €	Loan @ 5%	3,359	1,152	1,584	3,350	8	27111	2612	0	2612	5.0%	25.1%
1-4	Biomass (year 1), then SRF + 20% medical wastes	grid	district heating	10.3 €	Loan @ 5%	4,030	1,327	1,332	3,919	8	33459	3461	0	3461	5.0%	27.6%
2-1	Only Biomass	direct	industrial	9.5 €	Loan @ 5%	3,323	614	1,010	2,640	8	18229	2614	0	2614	5.0%	21.1%
2-2	Biomass (year 1), then SRF	direct	industrial	9.5 €	Loan @ 5%	4,370	2,215	2,450	4,309	8	39135	2612	0	2612	5.0%	32.9%
2-3	Biomass (year 1), then SRF + 20% high value waste	direct	industrial	9.5 €	Loan @ 5%	4,657	2,406	2,613	4,515	8	41713	2612	0	2612	5.0%	33.9%
2-4	Biomass (year 1), then SRF + 20% medical wastes	direct	industrial	10.3 €	Loan @ 5%	5,327	2,582	2,791	5,084	8	48061	3461	0	3461	5.0%	35.7%
3	Biomass (year 1), then SRF	grid	district heating	9.5 €	equity €3 mil loan €6.5 mil	3,161	1,091	1,958	3,277	9	24553	1554	3673	5227	14.9%	22.5%
4	Biomass (year 1), then SRF	direct	industrial	9.5 €	equity €3 mil loan €6.5 mil	4,459	2,344	2,344	4,442	7	39156	1554	8149	9703	22.0%	31.7%

10.2 Investment Protection

It is understood that appropriate insurances can be arranged to underwrite the lead commercial project to mitigate risks.

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

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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 Lead commercial plant financial forecasts

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	91.7	1,810.1	3,091.6	3,160.9	3,232.2	3,305.5	3,381.0	3,458.5	3,538.4	3,620.6
Total Feedstock Cost/Revenue	*(25.6)*	*(155.6)*	*1,096.4*	*1,135.8*	*1,176.7*	*1,219.2*	*1,263.3*	*1,309.1*	*1,356.7*	*1,406.2*
District heating company	*125.4*	*1,088.6*	*1,104.9*	*1,121.5*	*1,138.3*	*1,155.4*	*1,172.7*	*1,190.3*	*1,208.2*	*1,226.3*
Heat residual	*(54.5)*	*(4.9)*	*(5.0)*	*(5.1)*	*(5.1)*	*(5.2)*	*(5.3)*	*(5.4)*	*(5.4)*	*(5.5)*
Heat direct sale	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Electricity 1	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Electricity direct sale	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Electricity wholesale	*46.3*	*882.0*	*895.3*	*908.7*	*922.3*	*936.2*	*950.2*	*964.5*	*978.9*	*993.6*
ERUs	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Operating Costs	(158.3)	(393.8)	(446.0)	(448.8)	(451.7)	(454.6)	(457.6)	(460.7)	(463.9)	(467.2)
Gross Profit	(66.7)	1,416.4	2,645.5	2,712.1	2,780.5	2,850.9	2,923.3	2,997.8	3,074.5	3,153.4
Overheads excl dep	(377.1)	(495.1)	(409.1)	(409.1)	(372.9)	(390.1)	(385.1)	(385.1)	(385.1)	(385.1)
EBITA	(443.8)	921.2	2,236.4	2,303.0	2,407.7	2,460.8	2,538.2	2,612.7	2,689.3	2,768.2
Depreciation	(638.1)	(935.2)	(935.2)	(935.2)	(935.2)	(701.4)	(594.6)	(594.6)	(594.6)	(594.6)
Operating Profit	(1,081.9)	(14.0)	1,301.2	1,367.8	1,472.5	1,759.4	1,943.6	2,018.1	2,094.7	2,173.6
Interest and grant	(355.6)	(521.5)	(485.4)	(407.9)	(330.4)	(255.9)	(181.4)	(106.9)	(36.5)	18.2
Profit before tax	(1,437.5)	(535.5)	815.8	959.9	1,142.1	1,503.5	1,762.2	1,911.2	2,058.2	2,191.8
Operating profit % to sales	(1,180.4%)	(0.8%)	42.1%	43.3%	45.6%	53.2%	57.5%	58.4%	59.2%	60.0%
Profit after tax	(1,437.5)	(535.5)	815.8	959.9	970.8	1,278.0	1,497.9	1,624.5	1,749.4	1,863.0
Projected closing cash	524.0	602.9	833.5	1,232.1	1,580.6	1,536.7	1,634.1	1,805.8	1,998.3	3,144.2

Table 2

Projected Balance Sheet	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Fixed assets										
Equipment:	4,970.0	4,470.4	3,933.5	3,396.5	2,859.6	2,322.6	1,785.7	1,248.7	711.8	174.8
Buildings	1,399.6	1,341.9	1,284.3	1,226.6	1,168.9	1,111.2	1,053.6	995.9	938.2	880.6
Contingency	1,459.7	1,128.4	787.9	447.3	0.0	0.0	0.0	0.0	0.0	0.0
Land	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2
Capitalised pre-expenses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debtors	91.7	407.0	440.9	450.4	460.2	470.2	480.4	491.0	501.9	513.0
Term loans	(10,505.8)	(10,540.8)	(9,053.7)	(7,566.5)	(6,079.4)	(4,592.2)	(3,105.1)	(1,679.7)	(322.6)	0.0
Bank	524.0	602.9	833.5	1,232.1	1,580.6	1,536.7	1,634.1	1,805.8	1,998.3	3,144.2
Trade creditors	546.1	539.8	539.1	538.9	538.7	538.5	538.3	538.0	537.8	537.6
Grants	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	(1,500.6)	(2,036.1)	(1,220.4)	(260.5)	478.2	1,175.6	2,136.8	3,127.3	4,070.9	4,935.6
Initial equity	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
New equity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Share premium account	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Profit and Loss account	(1,514.9)	(2,050.4)	(1,234.7)	(274.8)	463.9	1,161.3	2,122.5	3,113.0	4,056.6	4,921.3
	(1,500.6)	(2,036.1)	(1,220.4)	(260.5)	478.2	1,175.6	2,136.8	3,127.3	4,070.9	4,935.6

10.4 30MWe Capacity Consolidated Financials

A full financial forecast based on all 15 plants with €115 million credit facility has been prepared and shows an attractive return. This investment proposal is being actively pursued by BREH. The chances of success with this funding will be greatly enhanced if the risks associated with:

- A plant of 2MWe being operational
- The first plant is permitted so permitting risks a permission to process both SRF and hazardous wastes through having a Class A License is proven

10.5 Sensitivity Analysis

10.5.1 Price projects have been conservatively made but note that

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.

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

- Operational hours are 7000 hours and not the 8000 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 more higher value wastes into the waste mix, and adding a sterilising line to process clinical wastes
- By attracting heat-using industries to locate on adjacent land to use spare heat.
- Seeking opportunities for direct sale of power.