

**BUSINESS  
FINLAND**

# **SMART ENERGY**

**Bioenergy and Waste to Energy**

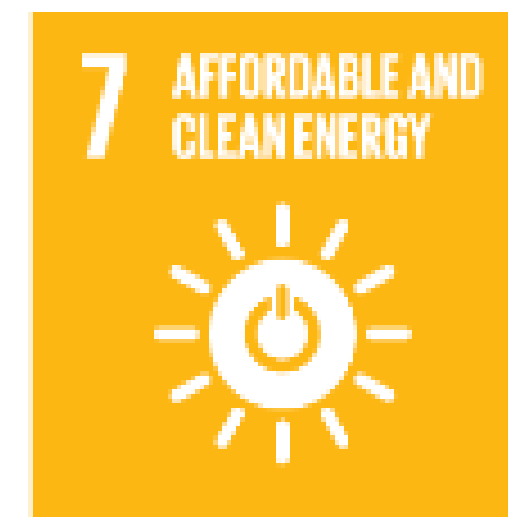
**FINLAND**





# WORK WITH FINNS TO

- Reach ambitious climate targets
- Generate cleanest energy in the world and do it cost efficiently
- Utilize your own renewable energy sources to the most
- Benefit from Finland's extensive waste and bioenergy R&D&I and world leading expertise.





# SDGs IN IMPLEMENTATION



- Decades of experience in innovating & implementing clean energy solutions globally
- Utilization of local fuels to full extent
- Legislation & regulation development



- Happiest country in the world (2017, 2018, 2019)
- Cleanest country of the world (2018)
- Helsinki No 1 city in the world for families in 2020




- Coal-free by 2029
- Carbon neutrality by 2035
- Carbon negativity by 2050



# WHY WE ARE FORERUNNERS?

- Exceptionally strong forest sector
- Finland's extensive waste and bioenergy R&D&I and world leading expertise since the 1980s.
- Finland coal-free by 2030 and carbon neutral by 2035
- Already 40% of Finnish energy is produced by renewable energy
- Åland Island society scale demo of an energy system running 100 % renewables
- We work globally – energy sector contributes to major share of the Finnish industries
- Finland has technologies to produce biofuels from various biomasses and waste streams
- Finland has leading waste-to-energy/value solutions





# SUSTAINABLE & EFFICIENT USE OF RAW MATERIALS

- Best available technologies
- Holistic solutions from raw material collection to energy production
- Decades of experience in utilizing woody biomasses, agro waste and municipal solid waste (MSW)
- Sustainability covers the whole value chain from raw materials to end-products
- Most advanced solutions for both large-scale centralized and small-scale decentralized units
- 53% domestic raw materials in Electricity Generation



# Key figures from Finland

99%

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of municipal solid waste is recovered either as energy or by material recycling

2035

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Finland will go carbon neutral

51%

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Share of Renewables in Electricity Generation (66 TWh)



# BEST PRACTICES FROM FINLAND – Municipal Solid Waste (MSW)

99%

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of MSW is recovered either as  
energy or by material  
recycling

1%

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In 2006, 52% to landfills  
In 2018, 1%

50

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SO<sub>2</sub> emissions  
EU air emission standard 50  
mg/Nm<sup>3</sup>  
For coal: 400 mg/Nm<sup>3</sup>



# BEST PRACTICES FROM FINLAND - Renewables

51%

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Share of Renewables in Electricity  
Generation (66 TWh)

55%

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Share of domestic raw  
materials in Electricity  
Generation

85%

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CO<sub>2</sub> Free Electricity  
Generation



# BEST PRACTICES FROM FINLAND - Bioenergy

47%

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Share of Renewables in Electricity  
Generation (67 TWh)

80%

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Share of bioenergy in  
renewable energy  
production

73%

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Share of wood-based energy  
in renewable energy  
production



# BEST PRACTICES FROM FINLAND - Biogas

47%

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Share of Renewables in Electricity  
Generation (67 TWh)

0%

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Organic waste forbidden to  
take landfills

1 TWh

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Biogas energy production in  
2016. Mostly with landfill  
gases.



# WHAT DO WE OFFER

## MUNICIPAL SOLID WASTE TO VALUE

- Smart Waste Management
- Waste pre-treatment & separation
- Waste to Energy (W2E) solutions for landfill reduction

## SUSTAINABLE BIOENERGY SOLUTIONS

- Sustainable & Fire Smart Forestry
- Combined Heat & Power (CHP) generation
- Hybrid off-grid solutions
- Modern technology and OEM solutions for biomass plants

## ADVANCED BIOFUELS

- 2<sup>nd</sup> generation liquid biofuels
- Waste based biogas for vehicle fuel
- Circular economy solutions

## HIGH EFFICIENCY POWER PLANTS

- Fuel receiving & handling systems
- Boilers, burners, micro turbines
- Turn-key solutions including O&M services

## CIRCULAR ECONOMY SOLUTIONS FOR INDUSTRIES

- Slaughterhouse waste
- P&P side streams, e.g. green liquor, sludges
- Bioenergy plant ashes
- Agro-related industry residues



# WASTE COLLECTION & PROCESSING

From logistics to recycling

Collection

Logistics

 **EUROPRESS**

**MOLOK**<sup>®</sup>

**EPSE**  
Global Ecoprocess Services

**SOIL  
FOOD**

 **RecTec**  
Engineering

Volume reduction via  
mechanical processes

**BETOLAR**

**UNJS**

**WIMAO**  
RECYCLING TECHNOLOGIES

 **LARISSO**  
ympäristötekniikka

**ALLU** 

Crushing and shredding

**CROSS**  **WRAP**<sup>®</sup>  
WRAPPING THE WORLD

 **KIVISAMPO**

 **PINJA**

**MariMatic**<sup>®</sup>

Recycling technologies

**TANA**  
From Waste to Value<sup>®</sup>

 **STR TECOIL**

**TAMTRON**

 **KUUSAKOSKI**  
RECYCLING

**TRACEGROW**  
grow with us

**ZENROBOTICS**<sup>®</sup>

**ECOSIR**  
GROUP

**enevo**

**HABA**  
YOUR FINNISH PARTNER

 **ECOMOND**

**CLEWAT**  
SAVING THE SEAS



# ENERGY FROM WASTE

Turning waste into energy

Biogas production

Methanisation

Pyrolysis

Biofuels production

RDF

Fuel handling systems

Heat recovery

Boilers

Burners

Flue gas treatment





# SERVICES

Waste management design and waste efficiency in industrial processes

Planning

Research

Engineering and consulting

Processes energy efficiency

HONKAJOKI



crtec

CALEFA

Delete<sup>+</sup>

VTT

Verte



CALIGO  
CLEAN EFFICIENCY

FCG.

APILA  
GROUP

SITRA

ENVITOP

FINESS

I&T

Chemitec  
consulting oy



Clean Steel

TCA FINLAND

Luke  
LUONNONVARAKESKUS



# MUNICIPAL SOLID WASTE TO VALUE

- Only 1% of MSW end up in landfills (2019)
- Valuable end products include recycled materials, energy, biofuels, fertilizers
- Proven results from efficient Public Private Partnership (PPP)

#214408631





# BMH TECHNOLOGY

## MATERIAL HANDLING SOLUTIONS FOR POWER PLANTS, PULP & PAPER INDUSTRY, CEMENT KILNS AND WASTE MANAGEMENT COMPANIES

### Solid fuel handling – Underlining availability

Turnkey solutions for handling all solid fuels, such as wood chips, round wood, stumps and other forest residues, energy willow, olive kerns, peat, pellets, bark and SRF/RDF.

### Waste refining and handling – Recovering value from waste

Fully integrated, industrial scale TYRANNOSAURUS® process for turning solid waste (MSW, ICW) into high-quality SRF/RDF, which can replace fossil fuels.

Automated process with excellent availability and high capacity producing sustainable fuel and simultaneously separating metals and other valuable materials for recycling.

### Life Cycle Services – Maximising process life cycle

A large scale of services and know-how from spare parts supply and preventive maintenance to service agreements and modernisation of entire production lines.

## BENEFITS FOR THE CUSTOMER

- Improved boiler efficiency and lower emissions.
- Increased recovery of recyclable materials and reduced landfilling.

## REFERENCES

- Hundreds of reference plants around the world since 1960s
- All activities comply with ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018.





# CROSS WRAP OY

## WRAPPING, OPENING AND DEWIRING SOLUTIONS FOR BALES AND PACKAGES

- Cross Wrap's offering includes a broad selection of solutions for bale wrapping, bale opening, bale dewiring and board packaging.
- Cross Wrap's mission is to help companies around the world to operate smarter when it comes to bale or package handling, wrapping, opening or dewiring.

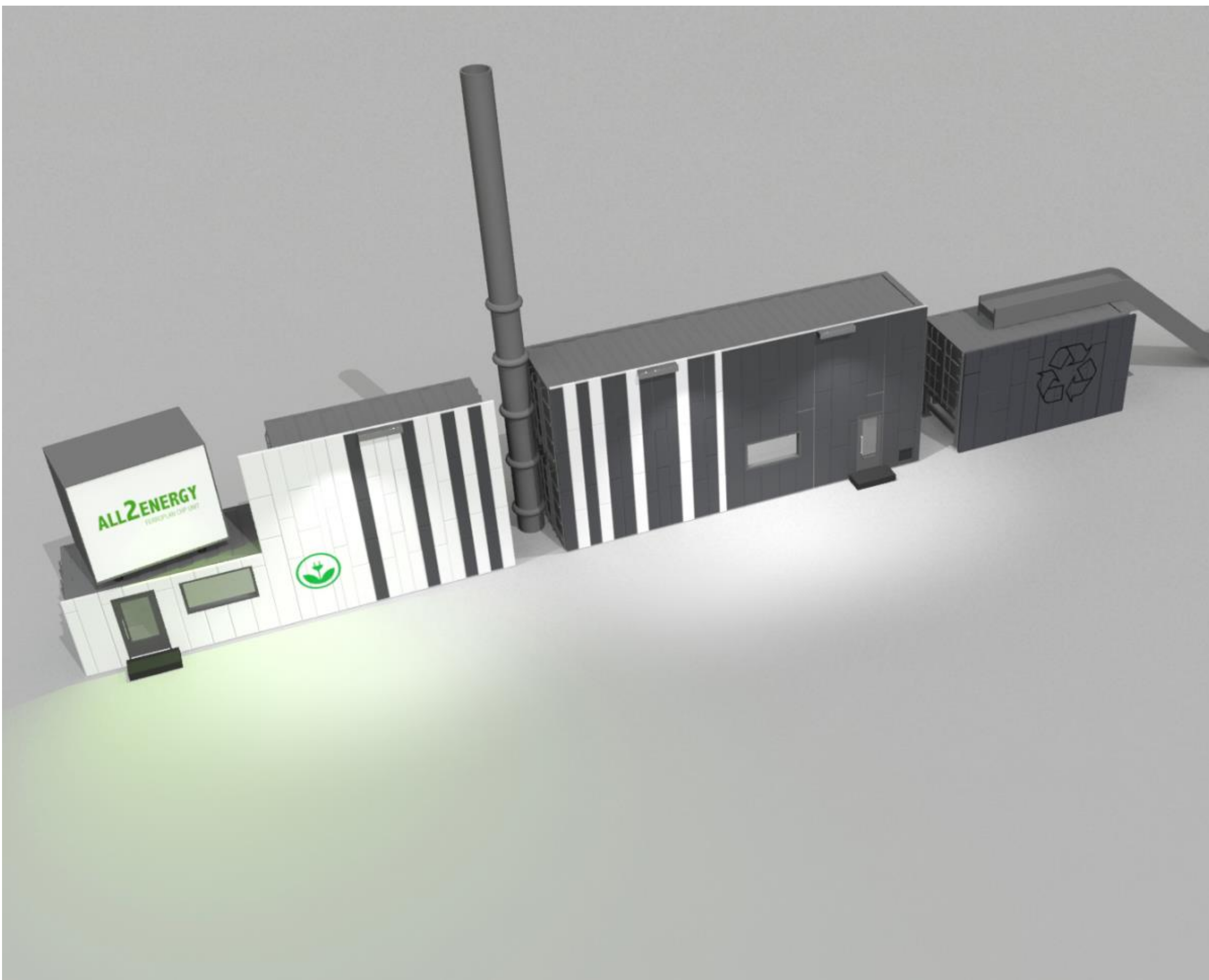
## BENEFITS FOR THE CUSTOMER

- Cross Wrap machines are built and engineered to last and perform. They are the industry standard in waste management and in waste to energy.
- CW Bale Wrappers are compatible with all balers and with all bale sizes and capacities.
- CW Bale Opener is fully automatic, high capacity solution for bale opening.
- Automatic CW Dewiring machine is revolutionary solutions that improves work safety and operational efficiency, by cutting and removing bale wires. It has been engineered to work in plastic and paper recycling.
- CW Board Packaging Lines can pack different size boards all on the same line fully automatically, fast and with fully recyclable packaging materials. This all sides covering wrapped protection helps in transporting and gives weather protection.
- Cross Wrap has over 25 years of experience manufacturing the industry's most effective bale wrapping machines for over 55 countries worldwide.

## REFERENCES

- Powerday, UK is using CW 2200 Bale Wrappers to wrap RDF and SRF fuels.
- Sonoco Alcore, Finland is using CW Bale Dewiring machine to open recycled cardboard bales for manufacturing core board
- Lafarge Holcim, Spain is using Cw Bale Opener to feed their cement manufacturing with SRF fuel.
- Sveza, Russia is using Cw Board Packaging Lines to wrap their plywood boards in many locations





# FERROPLAN

## INNOVATIVE SOLUTION FOR LOCAL ENERGY PRODUCTION

- FerroPower is a power station, developed by Ferroplan, that utilizes recoverable waste directly at the source. It is a movable, modular power plant that is built in containers. FerroPower is suitable for utilizing local energy sources.
- Both the design and construction of this highly efficient power station is based on state-of-the-art technology. It can be used to produce either electricity, heating, cooling or steam, or all of these together, and its multi-fuel boiler is suitable even for the disposal of hazardous waste. Nominal capacity is 1 MW, and the fuel treatment capacity about 300–700 kg/h.
- Fuel types: by-products from industry, circular economy, agriculture and health care as well as sewage, sludge and manure.

## BENEFITS FOR THE CUSTOMER

- Modular power plant: built in containers.
- No solid foundation: can be moved to a new location within a week.
- Remote use and control.
- Can produce electricity, heating, cooling, and steam, depending on the need.

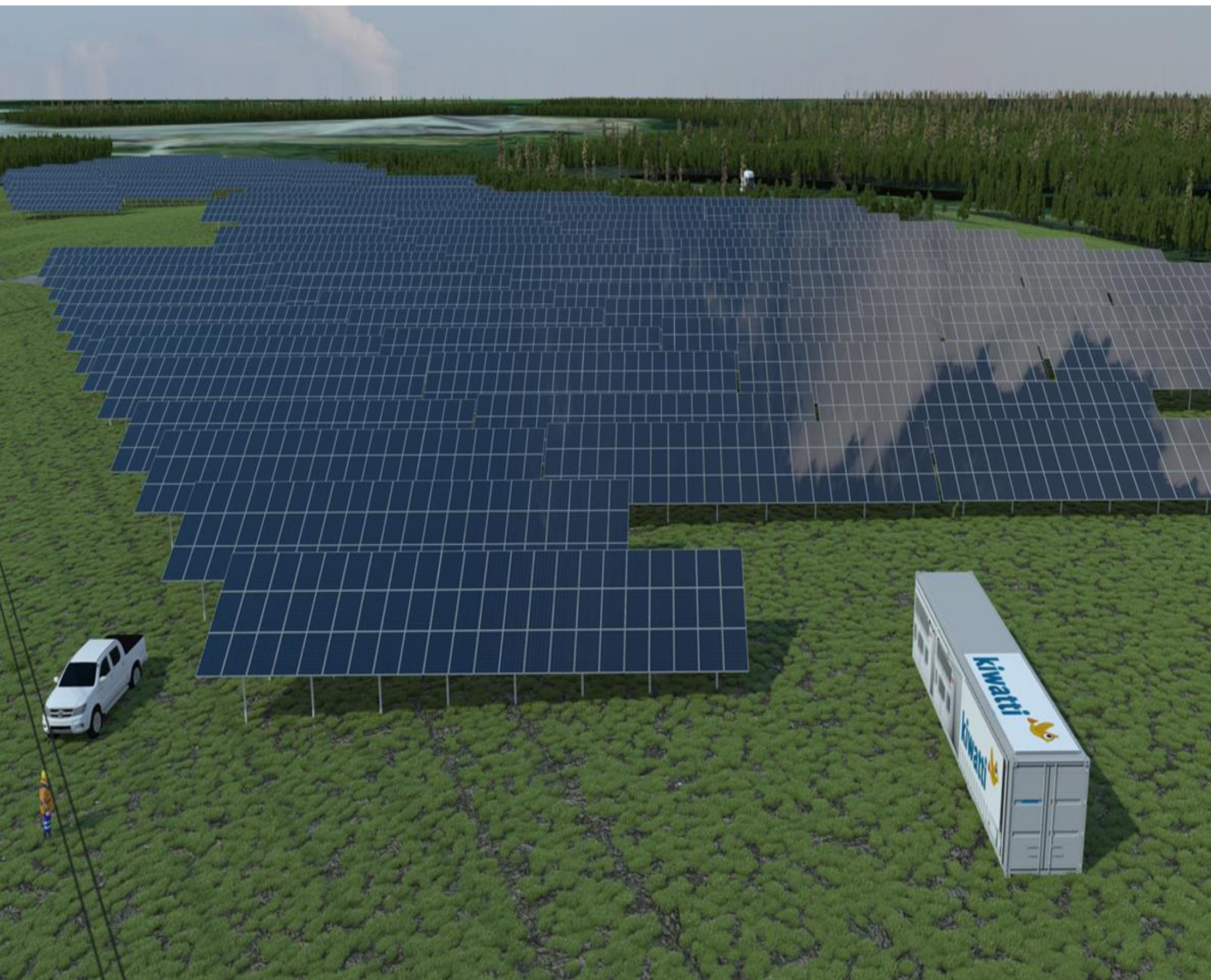
## REFERENCES

- Ferroplan has started a collaborative project with a local company during the spring 2019: the surplus heat generated by the FerroPower prototype plant is transferred to the local district heating network.



# KIWATTI

Energy. It's in the Air.



## KIWATTI

### TURNKEY SOLUTIONS FOR RENEWABLE ENERGY PRODUCTION

- Kivatti provides solar energy, wind energy and hybrid solutions for companies, utilities and public sector.
- Kivatti's scope covers energy harvesting analysis, feasibility evaluation of different renewable energy production technologies, planning, sourcing, erection and installation of PV, wind energy and hybrid power plants and energy storages.

### BENEFITS FOR THE CUSTOMER

- Kivatti is an independent EPC contractor that co-operates with classified Tier 1 PV, wind generator, inverter and mounting system manufacturers around the world
- Kivatti selects together with client the most feasible components and technology suppliers for each and every business case separately
- Kivatti provides cloud based energy production monitoring, analysis, remote controlling and malfunction alarm system as a part of the turnkey delivery
- Kivatti provides thorough training at commission stage for the client are they smaller or larger
- Kivatti provides preventive maintenance schemes and recommendations for preferable spare parts selection for each plant
- Kivatti can provide extended warranty schemes if considered necessary

### REFETENCES

- Lemene 2000kW ground based solar power plant in Lempäälä, Finland
- Laurea collage 120kW roof top solar power plant in Vantaa, Finland
- Ahlman vocational school 110kW roof top solar power plant in Tampere, Finland
- Jubilee Group 100kW roof top solar power plant in Helsinki, Finland
- Several wind turbine deliveries to weather stations, tele links around EU





# MAB Powertec

## CUSTOMER-CENTRIC PROJECT MANAGEMENT AND ENGINEERING

- We ensure that your project is completed with high quality and with sustainable solutions. We are an experienced and wide-ranging expert organization based on customer-centric service.
- We provide project, expert and environmental services for the energy industry as well as other industries. We assist our customers with life cycle management and we're developing an analysis tool for strategic decision-making.
- The ISO 9001:2015 quality certificate covers all our operations

## BENEFITS FOR THE CUSTOMER

The high level of proficiency, versatility and openness of our experts produce high quality results and build strong customer trust.

- Truly added value for all stakeholders: We want to ensure the well-being of our employees, our customers and our environment .
- Trust your project with us: We help our clients accomplish even the most demanding projects on the principles of sustainable development and strive for responsible actions throughout the supply chain.

## REFERENCES

**Lounavoima waste-to-energy plant**, introduction summer 2021

- will convert annually max. 120 000 tons of unrecyclable municipal solid waste into energy
- MAB Powertec is responsible for Owner's project and engineering services of the project

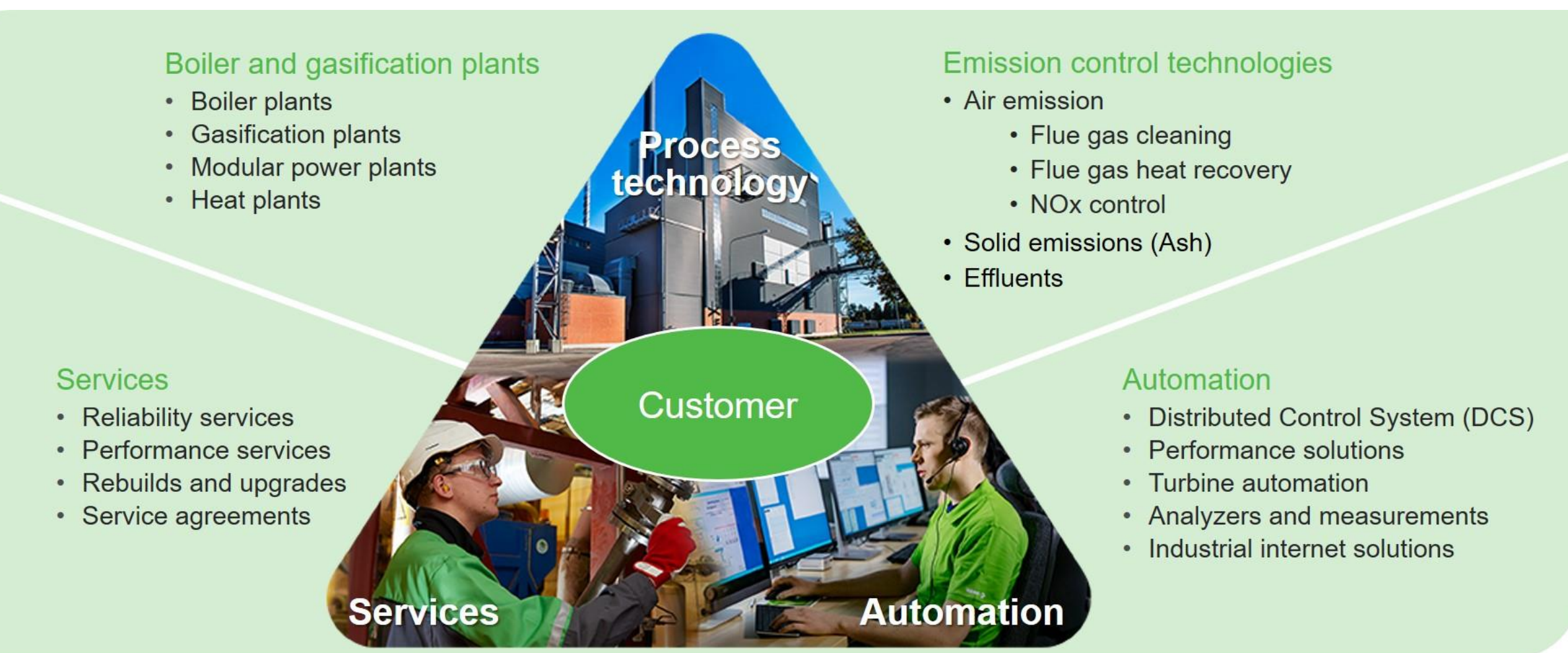
**Haapajärven Lämpö bioheat plant**, introduction 2020/12

- new hybrid, environmentally friendly plant with a heating power efficiency of 20MW
- MAB Powertec is providing an Owner's project and engineering service

**Valdivia district heating project**, 2019 onwards

- MAB Powertec is operating as the project and engineering provider for the pilot project with Austral University in Valdivia, Chile
- The aim is to replace building-specific diesel boilers with biomass-based district heating networks





# VALMET

Resource efficient, flexible and clean energy solutions for power generation and industrial customers globally.

Valmet is the leading global developer and supplier of technologies, automation and services for the pulp, paper and energy industries.

## RELIABLE TECHNOLOGY PARTNER IN CHANGING ENERGY MARKETS

- We know how to combine energy solutions based on biomass, waste, industrial side streams and fossil fuels.
- Together we can develop innovative solutions based on our decades of experience and wide offering covering process technologies, automation and services.

## OFFERING

- Biomass to energy plants
- Waste to energy (RDF, SRF) plants
- Multifuel to energy plants
  - Co-firing biomass, waste (RDF, SRF), side streams and fossil fuels
- Emission control technologies
- Automation
- Services

## REFERENCES

- Over 200 bubbling fluidized bed boilers (BFB) since 1979
- Over 100 circulating fluidized bed boilers (CFB) since 1980
- Over 30 modularized biomass power plants since 1999
- Hundreds of emission control systems
- Over 1200 power plant DCS systems



# WOIMA Finland Oy

## TURNING YOUR WASTE INTO WELLBEING

WOIMA is a Finnish modular **waste-to-energy power plant** supplier with the aim to mitigate waste-related problems in emerging countries. We offer a turn-key solution that simultaneously

- Significantly reduces waste landfilling
- Delivers a variety of energy commodities
- Cuts down waste logistics costs

## OUR MODULAR WASTEWOIMA® POWER PLANT

- Has bankable proven technology
- Can handle a wide variety of fuels (MSW, RDF, bio, gas, etc.)
- Offers excellent energy efficiency
- Supports distributed power generation scheme
- Fits perfectly in off-grid solutions and fits to small space
- Has a quick roll-out time
- Is easily scalable and easy to relocate
- Has excellent ROI
- Matches perfectly with future environmental regulations







# SUSTAINABLE BIOENERGY SOLUTIONS

- Large-scale centralized power plants
- Off-grid solutions for remote communities
- Finland is #1 in combined heat and power (CHP) technology



# GENESET POWERPLANTS

Innovation for Sustainable Power & Energy

## HYBRID SMART OFF-GRID SYSTEM

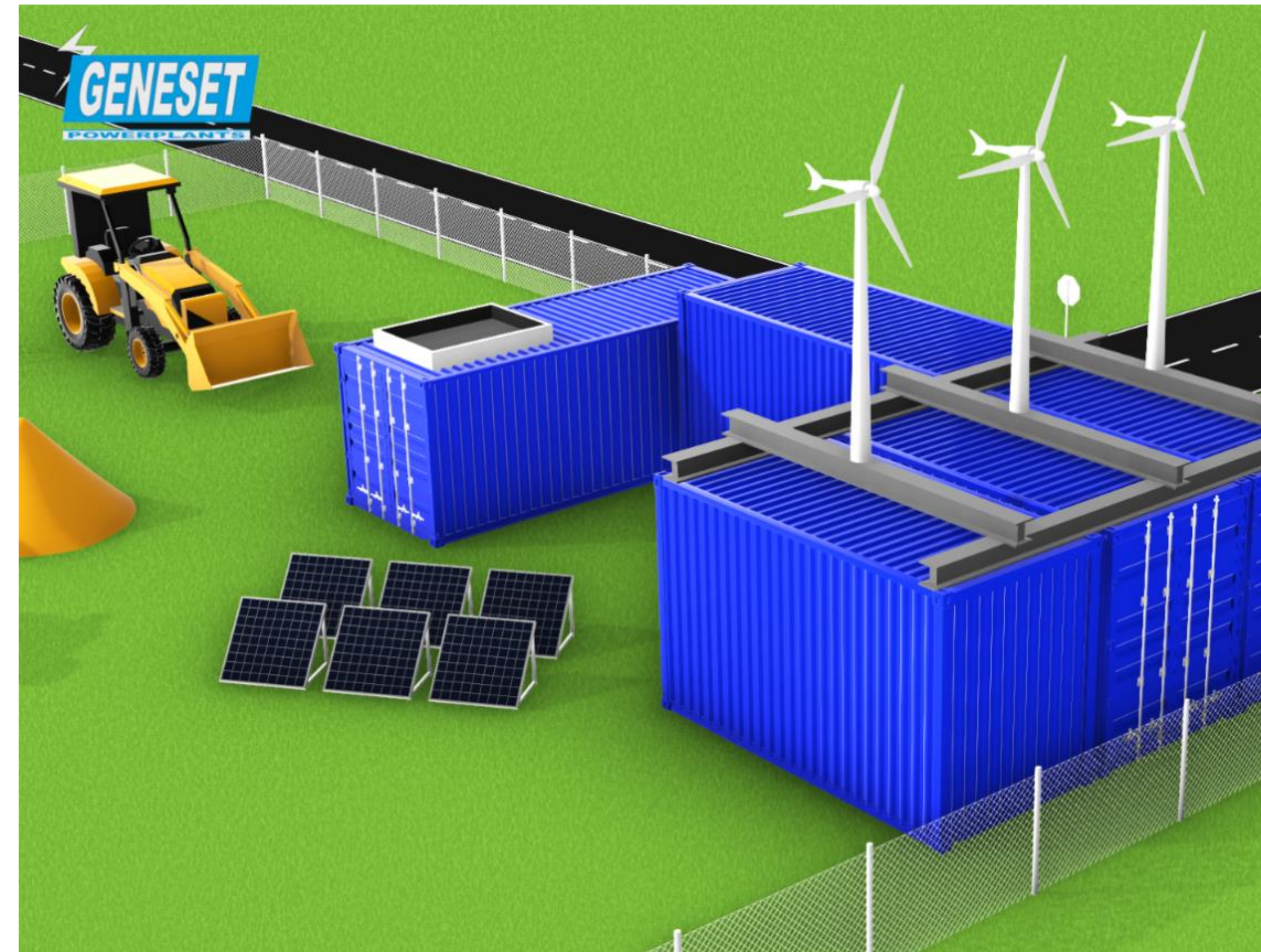
- Core system - biomass gasification solution, integrated with solar, wind to be independent off-grid CHP
- Power an island network with grid quality electricity from renewable sources
- Possible to inject to national grid as IPP
- Standard and scalable system generates 150kWe and 250kWth, cooling as optional

## ATTRIBUTES:

- Efficiency - waste to power and energy output
- Reliability - even short or long periods without sun and wind power
- Energy cost - effective, reduce remarkably traditional fuel dependency and emission

## APPLICATION:

- Industries, agricultures, communities, hospitals, schools, smart cities etc





# PROTACON ONCE®

## COMPLETE SUPPLY CHAIN MANAGEMENT AND REPORTING SYSTEM FOR ENERGY AND CIRCULAR ECONOMY COMPANIES

- Protacon Once® system manages the supply chains and material flows for energy and circular economy companies in real-time.
- Once allows you to manage your entire material flow and supply chain in one system, streamlining and speeding up your entire supply chain management and reporting, saving your money, time and effort.

## BENEFITS FOR THE CUSTOMER

- Cost-efficient material flow management to the entire supply chain ecosystem
- Save resources and manage your entire material flow and supply chain in one system, in real-time
- Up-to-date information and accurate asset management
- Streamline reporting and ensure traceability and sustainability of the raw materials
- Improve the efficiency and quality in supply chain, reduce hidden costs, manual work and risk of human error
- Share information and create transparency in the entire supply chain ecosystem

## REFERENCES

- Over 30 years of experience, >300 locations and >3,000 users in Scandinavia, Central Europe, Baltic Countries and Russia
- Customers: Energy companies, waste-to-energy, biogas production, biofuel production, pellet production, forest industry, recycling and waste management
- Our customers include leading energy and circular economy companies such as Fortum, UPM, Gasum, Vapo etc.
- Easy to scale to large and smaller production environments





## SOLID FUEL AND BIOMASS HANDLING

Fuel receiving, screening, crushing, storage, reclaiming & conveying systems

## WOOD HANDLING

Fuel receiving, screening, crushing, storage, reclaiming & conveying systems

## SERVICE

Retrofits, service audits, field services, maintenance, repairs, overhauls

## BENEFITS FOR THE CUSTOMER

Since its founding, Raumaster has listened carefully to its customers' wishes, using them to develop a comprehensive design and service process.

During over three decades we have completed over 3,300 material handling projects in the world's most significant markets. Cooperation with our customers, who work in demanding markets and fields of business, has taught us more than we could have imagined.

Our ability to understand our customers and apply the latest innovations to demanding fields of conveying systems has made us a worldwide mark





# KPA UNICON



*KPA Unicon is a Finnish family-owned company, which has been a strong advocate of clean, renewable energy since 1990. KPA Unicon creates and implements clean energy solutions around the world. It renews existing production systems with technologies utilizing renewable energy sources and equips energy producers with innovative digital tools. The company aims to lead the debate on clean energy, and to take initiatives that produce value to its partners.*

## OFFERING

Turnkey clean-energy solutions for a variety of fuels:

- Bio & Waste
- Heat Recovery
- Liquid & Gaseous

Cleantech plant upgrades

Digital insight & control – Digital service platform PlantSys

## BENEFITS FOR THE CUSTOMER

- Turnkey solutions with an option for long term O&M services
- Modular, price competitive technology with high efficiency and availability
- Robust and proven technology
- Capability to arrange financing for the projects through our partners

## REFERENCES

- 315 Biomass boiler plants
- 38 Biomass power plants
- 1650 Oil and gas boiler plants
- 87 PlantSys deliveries





# ADVANCED BIOFUELS

- Finland has technologies to produce alternative fuels from various biomasses and waste streams
- New waste refinery and biorefinery concepts in operation in Finland
- Open access pilots and demonstration platforms





# DORANOVA

## NEXT GENERATION BIOGAS PLANTS FOR IMPURE WASTE FRACTIONS

- Doranova has developed a dry digestion biogas plant concept, Hardferm biogas plants to process the most demanding organic fractions, such as OFMSW
- Plants are modular and can process 10-150,000 tons of waste annually

## BENEFITS FOR THE CUSTOMER

- Suitable for all waste fractions
- Patented technical solutions ensure the best in class cost-efficiency
- Scalability ensures agile production ramp-ups
- Local sourcing reduces initial capital expenditures

## REFERENCES

- Over 20 years experience in biotechnology
- Several biogas and landfill gas plants executed after year 2010
- First Hardferm plant built to Jypia, Finland in 2019/20
- Several other Hardferm projects under negotiations



## EVERYONE HAS RIGHT TO CLEAN WATER



## Econet Group

### SLUDGE AND BIOGAS TREATMENT

We supply biogas boiler plants and biogas engine plants as turnkey deliveries. Waste treatment creates refinery sludge, which is thickened and dried either mechanically or thermally.

In certain cases the sludge is digested after being thickened.

### BENEFITS FOR THE CUSTOMER

Close cooperation between the client and Econet Group at an early stage of the project ensures an end result of the highest quality that fully meets the client's needs.

We continuously develop our operating methods and cooperation models in order to offer our clients the best possible service during the project, and in the future.

### REFERENCES

Finnish Econet Group's unique water expertise and commitment can be seen in our 800 international projects in over 80 countries.

Our services cover the entire life cycle of a biogas plant investment from planning through to implementation, plant maintenance, and repair services.



# FUELCONTROL

*by Inray*



## INRAY

### FUELCONTROL® - SOLID FUEL QUALITY CONTROL SYSTEM

The system measures in real-time the quality of solid fuels using X-ray technology. It produces real-time moisture and foreign matter data that can be utilized in e.g. fuel pricing, process optimization and protecting of process equipment. The system is ideal for medium-sized and large power plants, fuel suppliers, and bio-refineries who wish to improve their production.

### BENEFITS FOR THE CUSTOMER

- Savings in fuel expenses
- Improved plant efficiency
- Reduced O&M costs
- Reduced manual work

### REFERENCES

- Systems are in use several biopower plants with the size range of 50 to 400 Mwth





# PROMETEC TOOLS OY

**FULLY AUTOMATED TURNKEY SAMPLING SOLUTIONS FOR THE BIOMASS USERS** e.g. power plants, bio-refineries, pellet manufactures, biomass supplies

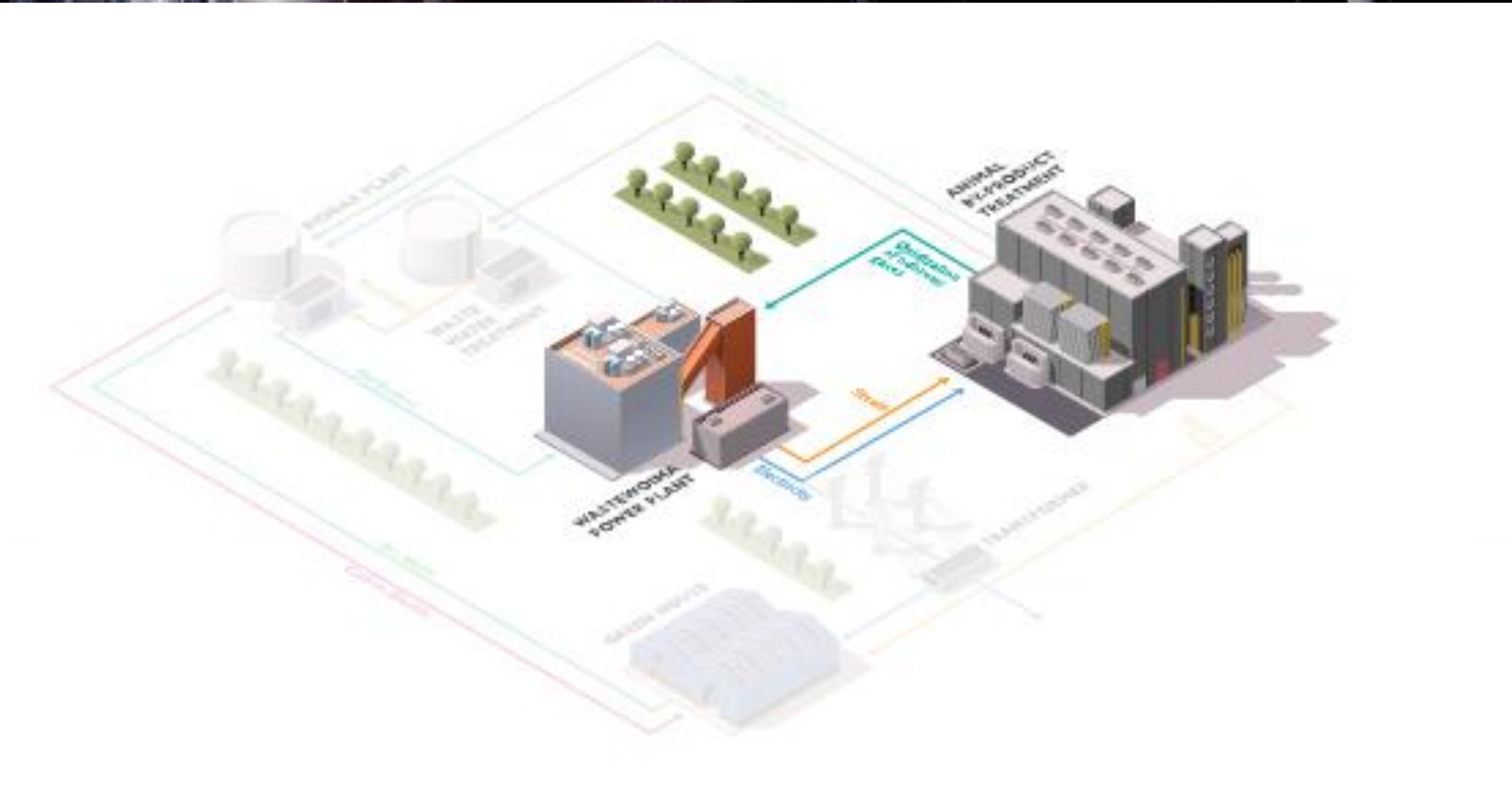
## BENEFITS FOR THE CUSTOMER

- Improved energy efficiency
- Representative samples from each load before unloading
- Real-time moisture information for the optimizing processes and logistical purposes
- Improved working safety
- Fast sampling sequence

## REFERENCES

- Kuopion Energia, Napapiirin energia ja vesi, Fortum Joensuu, Kainuun Voima, St1, Vapo, Stockholm Exergi
- High availability rate
- CE mark
- Team with tens of years of experience in automation, process technology, product development and customer value creation





# RECOMILL

## PROFITABLE AND ECOLOGICAL ANIMAL BY-PRODUCT RECYCLING

Honkajoki and WOIMA have established RECOMILL, a joint venture delivering complete circular economy solutions called Honkajoki Concept. We offer all the services from feasibility study to equipment and EPC project delivery, including all the life cycle services.

## RECOMILL BRINGS TOGETHER DECADES OF KNOW-HOW IN

- rendering technology
- international project deliveries (EPC or EEQ) world-wide

## PRODUCTS & SERVICES

RECOMILL renders animal by-products into valuable commodities with world market prices and demand in

- fertilizer industry
- animal feed industry
- biofuel industry
- cosmetics industry



# HIGH EFFICIENCY POWER PLANTS

- Finland has a long experience in forest industry and a strong machinery cluster
- Sustainability covers the whole value chain from raw materials to end-products
- Scalable energy efficient boiler plants including Circulating Fluidized Bed Boilers (CFB) and Bubbling Fluidized Bed Boilers (BFB)



# Aurelia Turbines Oy

## THE MOST EFFICIENT SMALL GAS TURBINES IN THE WORLD

- Aurelia Turbines develops, manufactures and commercializes durable and efficient small gas turbines, especially for small-scale processes and the SME industry.
- Aurelia's main product, Aurelia®A400, has a nominal output of 400 kWe and an electrical efficiency of 40%.

## BENEFITS FOR THE CUSTOMER

- Energy efficient
- Fuel flexibility
- Low emissions and noise
- No need for lubricants -> long maintenance intervals
- Faster payback

## REFERENCES

- Several patents.
- Team with years of relevant experience.
- Technology is based on 30+ years R&D by Lappeenranta University of Technology (LUT), Finland.
- Energy Efficient Award winning PERPETUUM 2017.
- Awarded financing from the EU H2020 –program.
- Multiple authorized distributors and marketing partners.
- Strong ties to a wide range of technology suppliers.



© Aurelia Turbines



# Clean Steel

## FOULING CONTROL SERVICES FOR HEAT TRANSFER SURFACES

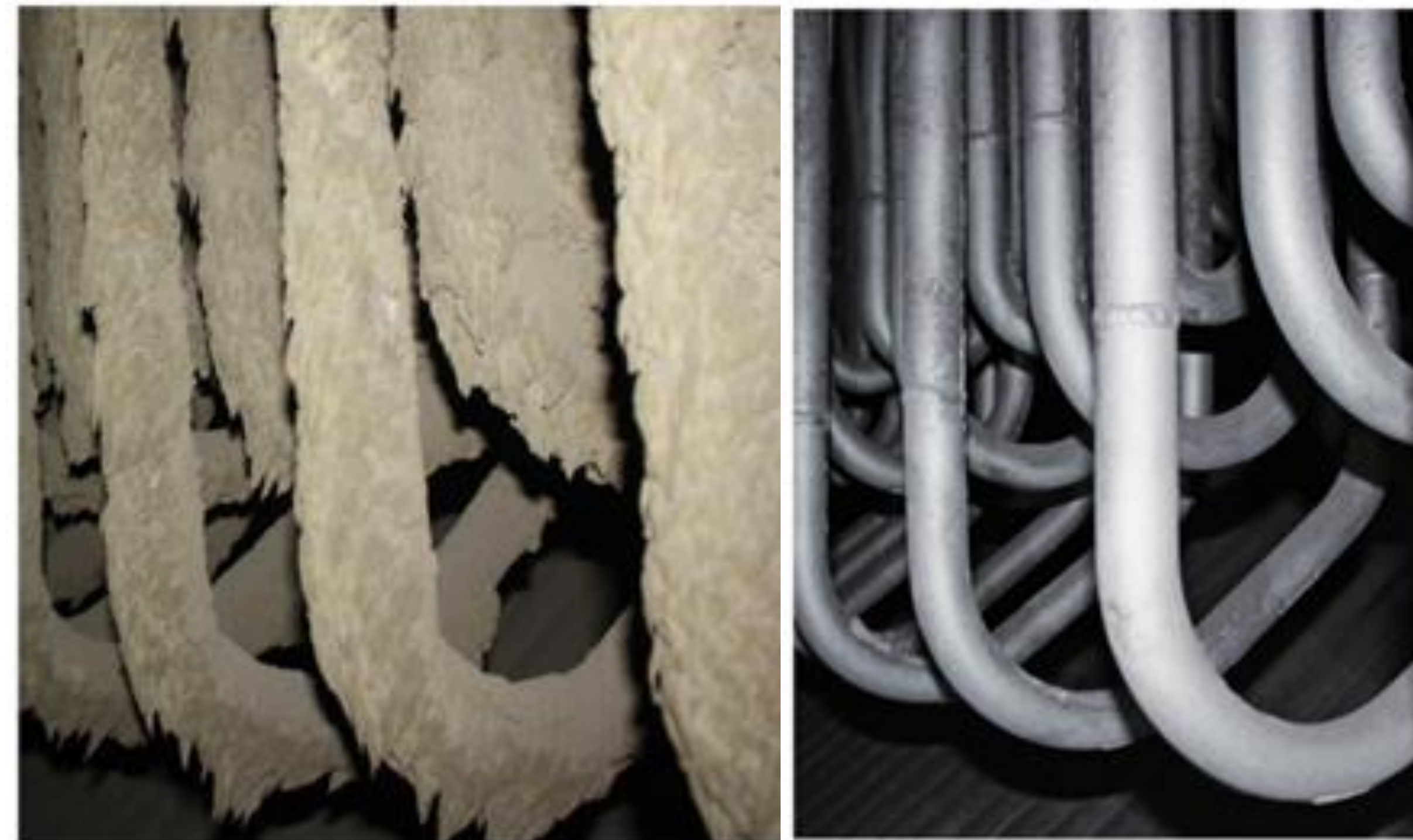
- Offering includes offline and online solutions for all boiler types
- Patented methods: Smart Blasting for offline cleaning and Clean by Explosives (CBE) for online cleaning

## BENEFITS FOR THE CUSTOMER

- Fast & effective (100 % cleaning result, improved efficiency ratio)
- Even flue gas flow (minimizes corrosion & erosion problems)
- Slows down further fouling (high efficiency during the whole running season)
- Avoid extra shutdowns (helps you to make more money!)

## REFERENCES

- UPM (Rauma, Tervasaari)
- Stora Enso (Anjalankoski, Heinola, Imatra, Uimaharju)
- Metsä Group (Äänekoski, Kaskinen, Simpele)
- SCA Munksund (Swe)
- Klabin Telemaco (Brazil)





# Delete Demolition Oy

## DELETE OFFERS A WIDE RANGE OF ENVIRONMENTAL SERVICES WITH AN EMPHASIS ON DEMOLITION IN THE CIRCULAR ECONOMY

- Demolition of constructions and industrial sites
- Special Demolition including hazardous materials removals
- Consultation Services for complex demolition projects

## IN ADDITION TO BENEFITTING THE ENVIRONMENT, DELETE IS A VALUE ADDED DEMOLITION COMPANY

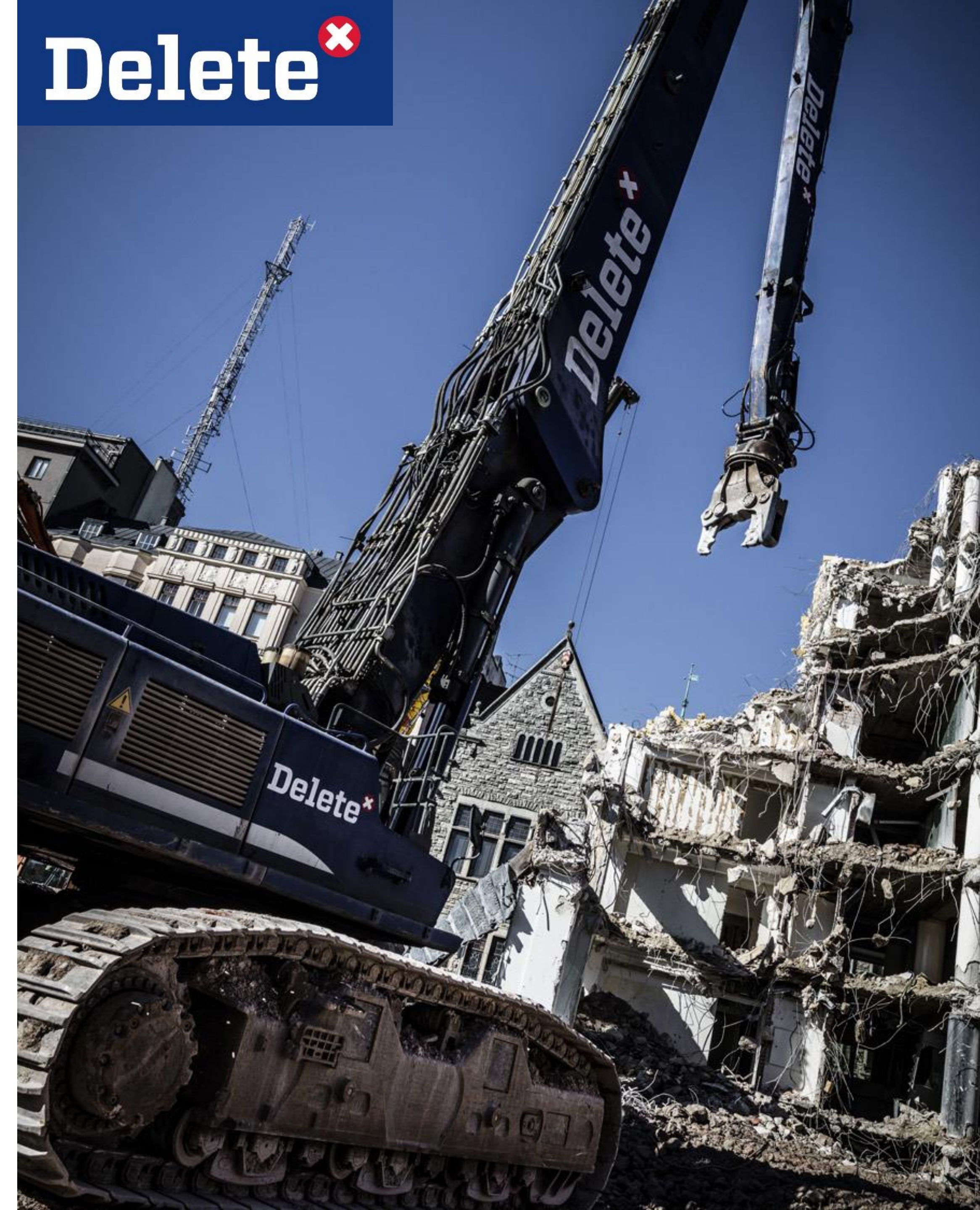
- In some cases Delete can pay for the right to demolish industrial facilities
- Second hand sales of reuseable industrial equipment part of our core knowledge and business process
- Delete has a negative carbon foot print

## DELETE HAS EXPERIENCE IN ALMOST ALL TYPES OF DEMOLITION

- Delete has retained inhouse knowledge of over 50 industrial boiler demolitions
- Yearly revenue generated in demolition close to 100M€
- Nearly 300 employees and 2000 assignments per year

**Delete – We Delete your problems!**

BUSINESS  
FINLAND





# ENVIROBURNERS

## INDUSTRIAL BURNER SOLUTIONS FOR ALTERNATIVE FUELS

- With Enviroburners solutions customer are able to switch from fossil to biofuels and utilize waste streams for energy production with high productivity
- Enviroburners products can be used in all industries where thermal energy is needed and usable process waste / side streams are available for example pulp and paper, petrochemical and food processing industry

## BENEFITS FOR THE CUSTOMER

- Modular plug and play solutions including all safety- and control equipment
- All burner systems are optimized according to customer process requirements
- Fast start up of equipment after installation<sup>[SEP]</sup>
- Prevent toxic / odorous emissions to environment<sup>[SEP]</sup>
- Quick ROI for biofuel investment<sup>[SEP]</sup>

## REFERENCES

- Over 40 years experience including more than 600 deliveries to all continents
- Supplier for: Andritz, Outotec, Sumitomo, Valmet
- Products meets the current EU / BAT Low-NOx limits for flue gas emissions
- Compliance with EN and ASME manufacturing standards





# Marioff

## WATER MIST FIRE PROTECTION SYSTEMS

HI-FOG® water mist fire protection system safely suppresses fires using significantly less water than conventional sprinkler systems, reducing water damage, operational downtime and building infrastructure requirements.

Typical applications to protect are turbines, cable infrastructure, power transformers, machinery spaces and electrical rooms.

## BENEFITS FOR THE CUSTOMER

Safe for people, equipment and climate

Less requirements on building infrastructure (water feed, drainage, space, etc.)

High performance fire suppression

## REFERENCES

HI-FOG® water mist fire suppression technology safeguards hundreds of gas turbines, power plants and substations globally.

<https://www.marioff.com/references/>





# Nirafon Oy

## ACOUSTIC CLEANING SYSTEMS

Nirafon Oy provides customized acoustic cleaning systems for industries around the world. The company has over 30 years of experience in supplying cleaning systems for processes in various types of applications, from boilers to channels, heat exchangers, SCR's, silos, and much more. Nirafon acoustic cleaning system removes soot, ash and other particulate matter deposits from surfaces by an acoustic pressure shock and is a cost effective, environmentally friendly and gentle way of keeping the plant clean, causing no interruptions to the process, no harm to structures, no erosion, corrosion or mechanical wear.

## BENEFITS FOR THE CUSTOMER

- Can be used where there is no steam or a shortage of steam. The NCSD can be used with molten forms of ash in high temperatures.
- Continuous cleaning during process. SCR's, Filters, fans, heat transfer and other surfaces to stay continuously clean and the process can continue without interruptions, rendering expensive shut-downs unnecessary
- Higher efficiency ratio of the plant, better productivity more environmentally friendly. Reduces the need of water
- Also cleans the shadow areas and around the corners, better overall cleaning. Can help to solve a certain cleaning problems. Can be used together with other cleaning methods
- Easy and quick installation. Acoustic cleaners require little space, the maintenance and operating costs are low
- Reduced downtime and reduced manual labor cleaning costs. Doesn't cause any harm to structures or filter bags
- No mechanical wear, no corrosion or erosion
- Over 30-years of experience in customized cleaning solutions

## REFERENCES

Over 30-years of installations in power plants and process industry plants in Europe and around the world. Different types of boilers: corner fired, grate fired, BFB, CFB, fire tube boilers etc.. A wide variety of fuels: biomass, coal, lignite, waste derived fuels etc..

Representatives in Sweden, Spain, Poland, Turkey, Iran, Malaysia, China and Uruguay.

# THE MOST ENERGY EFFICIENT CLEANING FOR VARIOUS INDUSTRIES

## COST-SAVING NIRAFON ACOUSTIC CLEANING SYSTEMS

Nirafon Cleaning Sound Device (NCSD®) is an innovation for the acoustic cleaning of the high temperature areas of boiler plants.

The Nirafon pneumatic/air-driven acoustic cleaners for lower temperatures cleaning. They keep the super heaters, economisers, air preheaters, flues, filters and fans of the boiler plants clean and prevents vaulting of particles in the silos and cyclones.

**SUPERHEATER/FURNACE**  
**NCSD**

**SELECTIVE CATALYTIC REDUCTION**  
**NI-60 / NI-100 / NI-250**

**EVAPORATOR/ECONOMIZER**  
**NI-60 / NI-100**

**AIR PREHEATER**  
**NI-100 / NI-250**

**ESP**  
**NI-60 / NI-100**

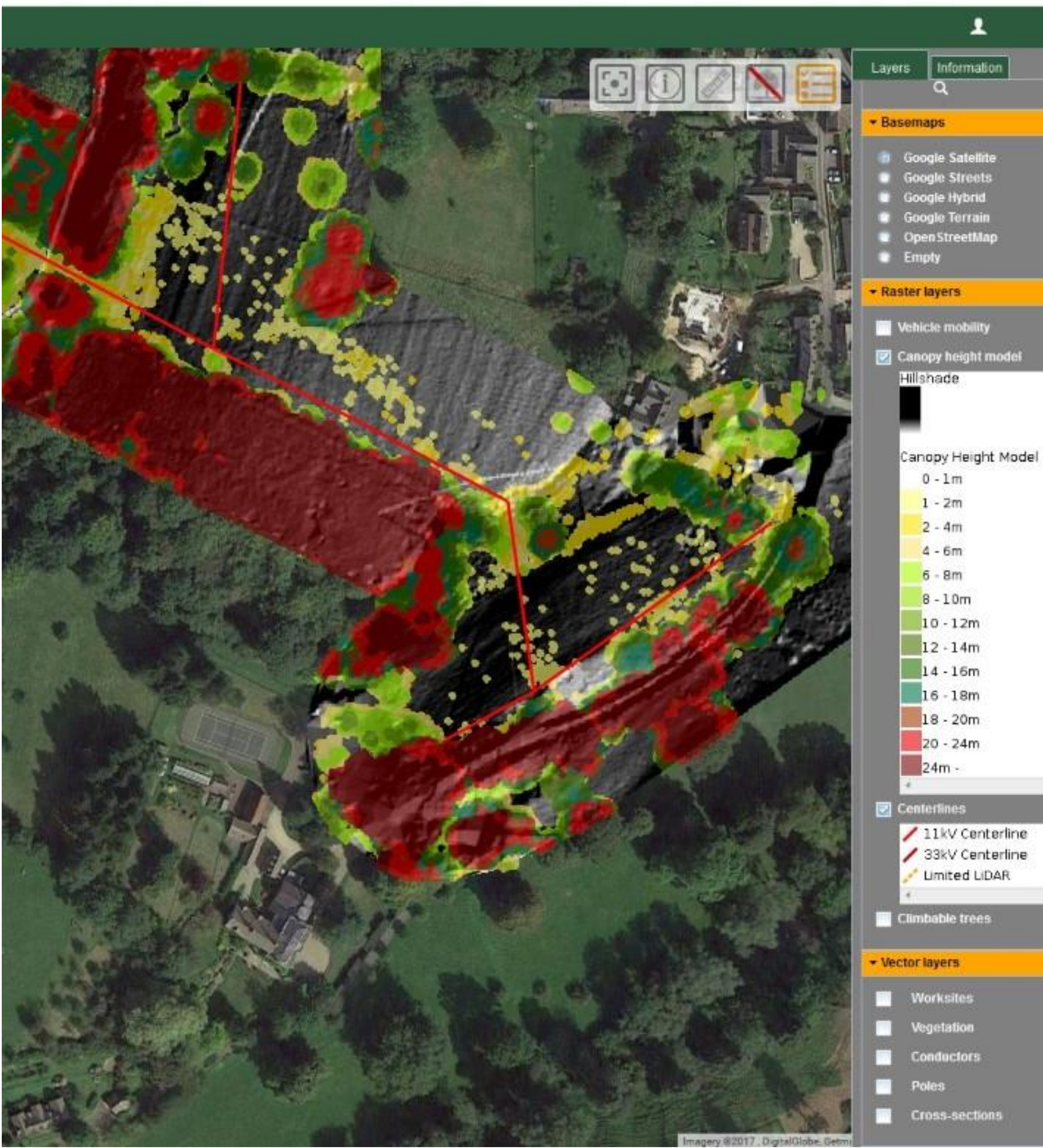
**BAG HOUSE**  
**NI-100 / NI-250**



# CONSULTING SERVICES

- Feasibility studies
- Tailored educational packages
- Heat entrepreneurship and biomass value chain consulting





## Arbonaut

### HIGH QUALITY INTELLIGENCE FOR NATURAL RESOURCE MANAGEMENT

Arbonaut is a Finnish technology company specialized in safety analysis for corridor objects. We use LiDAR-based remote sensing technology to identify and manage dangerous objects situated close to powerlines – helping you in securing uninterrupted supply of electricity!

### BENEFITS FOR THE CUSTOMER

- Accurate and timely information to support decision making
- Classification of objects according to clearance urgency and priority, as well as detailed information of vegetation census around targeted objects
- Efficient maintenance and vegetation management planning for powerlines through our project management system ProMS

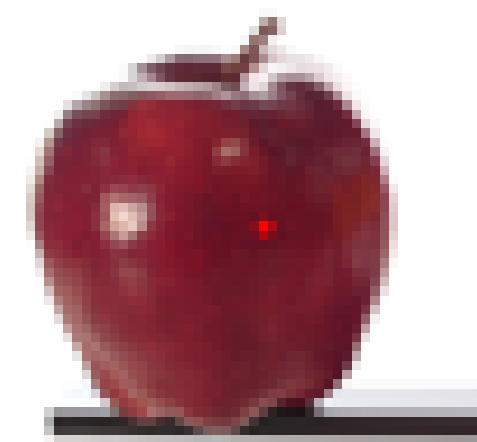
### REFERENCES

- More than 100 000 km of analyzed high voltage transmission lines based on LiDAR for multiple large operators in the USA
- Vegetation and infrastructure mapping based on LiDAR for Western Power Digital medium voltage lines in the UK
- Distribution line mapping and vegetation management in Australia
- Delivering a web-based project management platform for viewing processed data for customers both in Finland, as well as internationally



**High-performance for investment appraisals:  
Maximise your gains with Invest for Excel® software!**

unlimited number of calculations



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## DataPartner

### GLOBAL BRANDS TRUST US FOR YEARS IN FINANCIAL MODELLING, INVESTMENT APPRAISALS AND VALUATIONS

- We provide high-performance plug-and-play software "Invest for Excel®" for financial modeling, capital budgeting, investment appraisals and valuations in a well-known Microsoft Excel environment
- Training programs and consulting
- Partnerships: Microsoft Partner Gold; Partner of Dubai SME - an agency of Dubai Government - in the Innovation Attraction Program

### BENEFITS FOR THE CUSTOMER

- Screen investment opportunities effectively and maximise your gains!
- Compare investment options like apples to apples
- Make confident decisions on your capital allocation
- Ensure transparency and compliance with your own standards

### REFERENCES

- Over 30 years of international experience
- Over 1700 Customers in over 55 countries
- Private and public entities in all industries and of all sizes globally
- References i.e. Daimler (automotive); NESTE, Emirates National Oil Company (oil and gas); Stora Enso (pulp and paper); Helsinki Energy (energy), AALTO (higher education) and many more





# Natural Resources Institute Finland (Luke)

## LUKE PROVIDES HOLISTIC PLANNING OF SUSTAINABLE FOREST BIOMASS SUPPLY FOR BIOREFINING AND BIOENERGY

- Biomass inventory and availability assessment combined with supply chains
- Technology proposals and cost assessments
- Business model design
- Socio-economic effects and sustainability assessment

## CUSTOMER BENEFITS

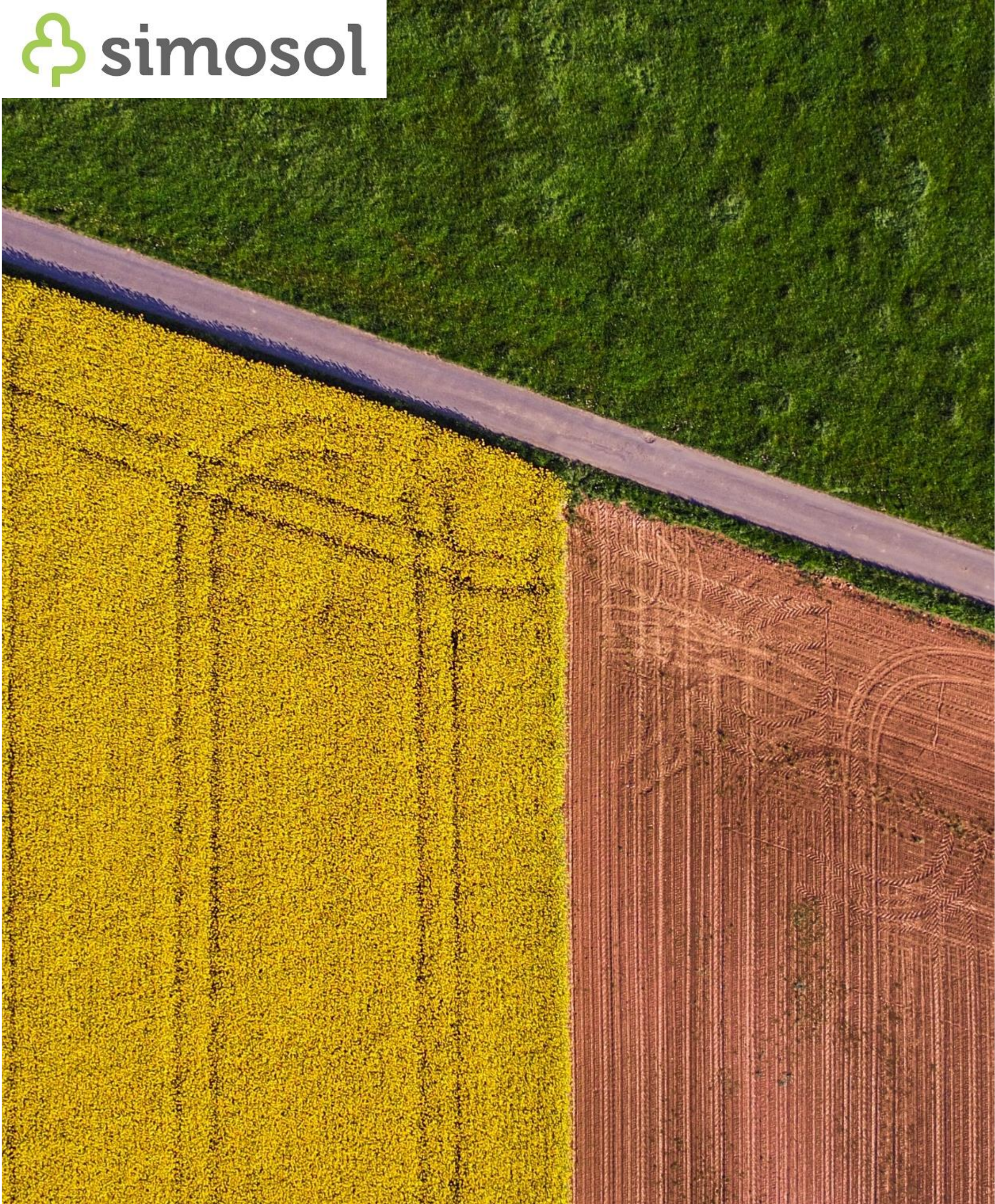
Efficient use of sustainable resources for economic growth and climate change mitigation

- Ready-to-Go feasibility study to support decision making and financial engineering.
- Holistic view of the system based on leading edge scientific knowledge
- Over 20 years of expertise to help you in your development project

## REFERENCES

- Similar projects implemented in Finland, Spain, Portugal, Poland, UK, Iceland, Laos and Canada.
- Forest Inventory development in Myanmar, Vietnam, Nepal, Kenya, Tanzania and used in FAO Openforis





# SIMOSOL

## SMART SOLUTIONS FOR BIOMASS BASED ENERGY PRODUCTION

- Simosol is the leading provider of services for forest management and supply chain optimization, mapping and monitoring of forests, crops and carbon, and valuation and appraisals of forest and biomass resources.
- We help our clients to run the whole value chain in the most sustainable and efficient way possible by combining deep expertise in sustainable management of biological resources with modern technological solutions.

## BENEFITS FOR THE CUSTOMER

- What, where, and when? - Our scalable mapping and monitoring solutions enable cost-efficient and up-to-date quantification of the biomass resources available.
- From where and when? - Once the resources have been mapped, we provide optimized raw material sourcing strategies to maximize long-term sustainability as well as profitability.
- By building integrated and dynamic systems, we can also optimize energy production and its value as a part of the wider value chain e.g. in the forestry sector.

## REFERENCES

- As a whole, our solutions support 15 million hectares timberland valued in 40 billion EUR with active projects in Europe, Latin America, Africa and Asia.
- We mapped available bioenergy sources in the whole country of Pakistan as well as Vietnam, and by leveraging spatial optimization, delivered a platform for finding the most suitable locations for new bioenergy plants considering raw material quantity, quality, and existing infrastructure.





# VTT TECHNICAL RESEARCH CENTRE OF FINLAND LTD.

## VTT PROVIDES TECHNOLOGICAL BACKGROUND FOR BUSINESS RELATED TO NEW SOLUTIONS AND EXISTING ASSETS

- Small scale CHP+C for industry, off-grid and rural areas
- High efficiency Waste-to-Energy and metals recovery
- Optimized boiler operation, lifespan extension and plant economy

## CUSTOMER BENEFITS

Efficient use of available, sustainable resources for heat power and cooling secure the profitable energy supply in changing policy environment and challenging grid conditions

- Double your income in W-t-E
- World class piloting facilities available for your testing
- Top class technology know how with 50 years experience of boiler development