TrustEE

Financing and realising energy efficiency and renewables in industry

A Horizon 2020 project to finance and realise energy efficiency and renewables in industry

Co-funded by the Horizon 2020 pr
of the European Union

Contents

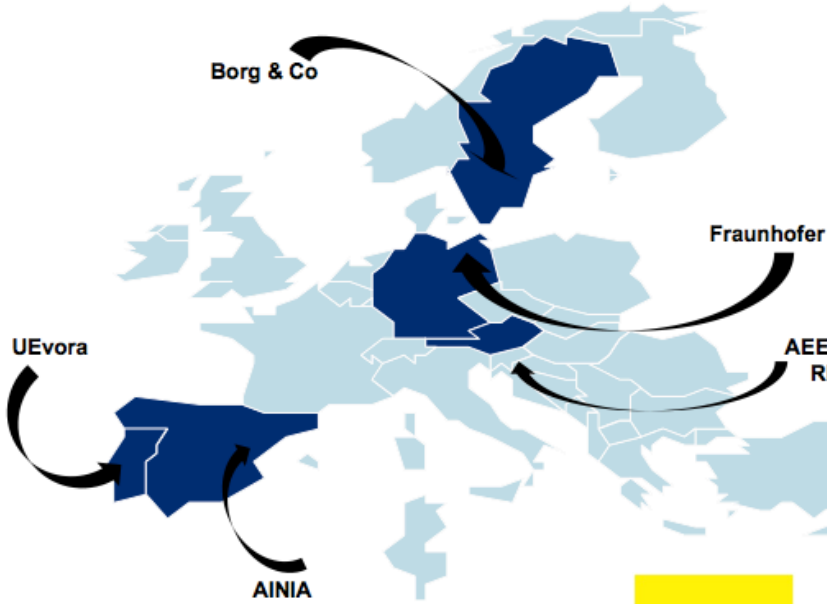
Background & Consortium

Introduction of project and partners

Project background

Goal: Create and implement new and innovative options to develop, finance and implement energy efficiency and renewable energy projects in Europe's industry

- Funding: Horizon 2020 Framework of the European Union
- Duration: Feb. 2016 – Jan. 2019
- Six project partners: AUT, DEU, SWE, ESP, PRT
- Project coordinator: AEE INTEC (AUT)



AEE INTEC (Austria)

AEE – Institute for Sustainable Technologies

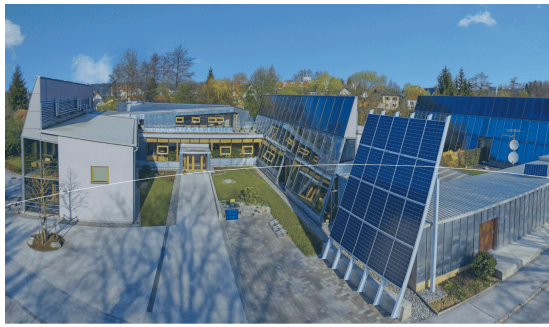
- Non-university research institute est. 1988
- Applied research on renewable energy and resource efficiency

65 researchers in four areas

- Industrial Processes and Energy Systems; Building and Retrofit; Thermal Energy Technologies and Hybrid Systems; Data monitoring and testing

Core topics “Industrial Processes and Energy Systems”

- Energy and Resource Efficiency for industry; Process Intensification and Membrane Distillation, Industry in Energy Systems; Solar Process Heat



REENAG (Austria)

TrustEE

Founded in 2010 by partners with international energy, finance and real estate experience

REENAG and its partners:

- Develop, finance, build and operate small water and wind power plants and
- Design financing solutions for energy efficiency projects in industry

Participation and projects in:

- Austria, Sweden, Romania (wind farms), Bolivia and Peru (small hydropower plants)

Realised projects

	Installed capacity [kW]	Investme costs [EUR 100
Water	7,692	6,000
Wind	140,700	241,000
Biomass	10,550	14,500
PV	496,000	150
Total	**241,000**	**261,650**

FRAUNHOFER Institute for Solar Energy Systems (ISE)

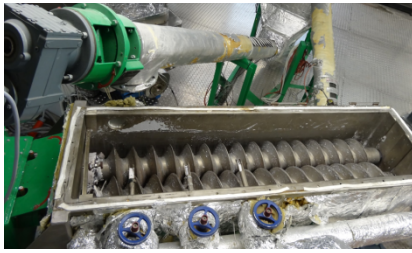
Fraunhofer-Institute for solar energy systems ISE

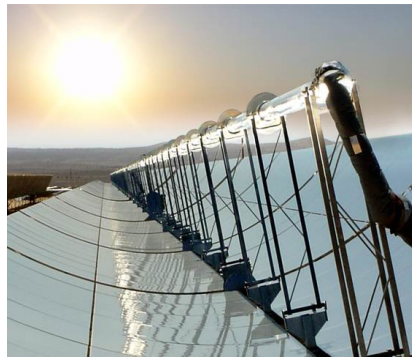
- Applied research on Renewable Energies since 1981
- Largest Solar Research Institute in Europe
  1300 employees incl. 300 PhD and diploma students
- Part of the Fraunhofer Society with 60 institutes and
  22000 employees, largest applied research network

12 business areas focused on Solar PV and Solar thermal technologies and Storage technologies

Group “Solar process heat and industrial systems”

- Energy efficiency in thermal industrial processes; Solar process heat; Thermal storage; Cogeneration and hybridized systems





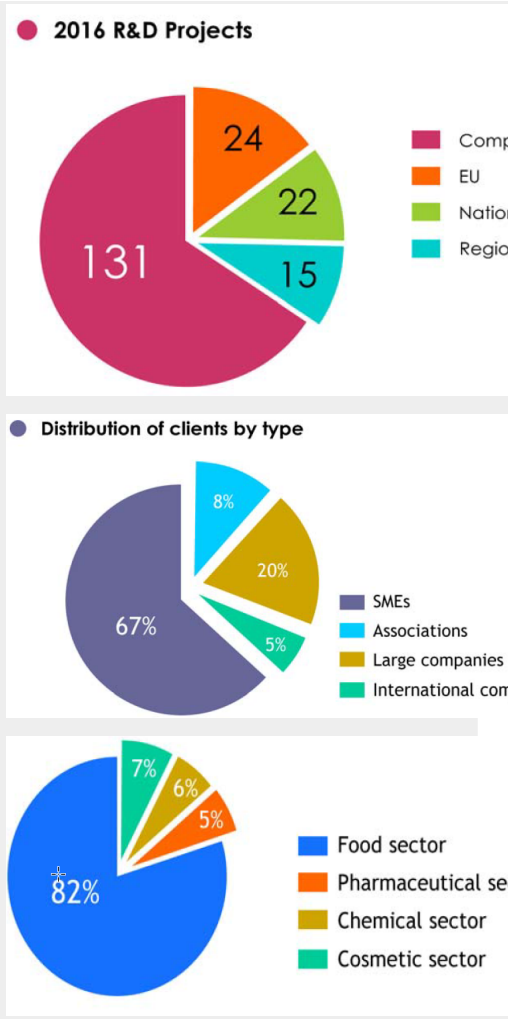
Ainia centro tecnológico (Spain)

1987: Technology centre created to provide food sector focused technology and consulting services

900: Member companies involved

Mission: Add value to companies through responsible, innovative technological development

Expertise: Energy efficiency, best available technology, renewable energy (biogas, waste valorisation), carbon footprint, and ACV assessment



University of Évora (Portugal)

4 Schools:

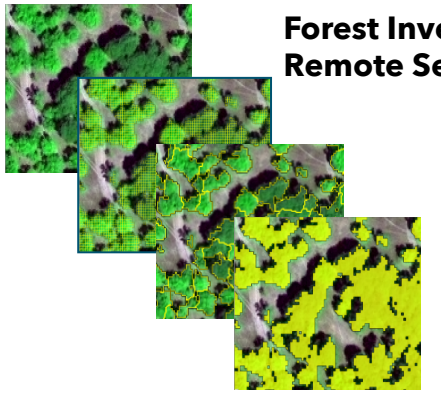
- Science and Technology, Social Sciences, Arts and Nursing - offers 48 undergraduate, 148 postgraduate degrees and 41 PhD degrees

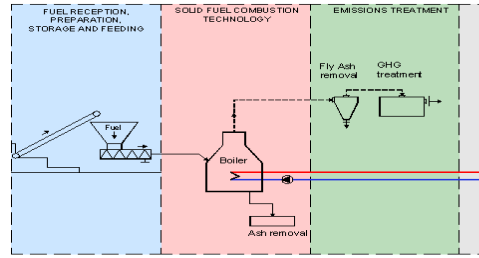
Research and Development (R&D) covers several scientific areas through a network of 21 Research Units.

Three Chairs of excellence: Biodiversity, Renewable Energies and Heritage

Institute of Mediterranean Agricultural and Environmental Sciences is focused on three main research goals:

- Efficiency in the use of production factor; Agri-food products quality and added-value; Ecosystems integrity and landscapes multi-functionality (EILM)





Borg & Co, eceee (Sweden, EU)

Borg & Co: Consultancy based in Stockholm, Sweden

- Founded in 1996, www.borgco.se
- Energy efficiency policy and programmes
- Non-profit and conference management (eceee)
- Communications & graphic design

eceee: Europe's largest member-based organisation focused on energy efficiency

- 6000+ stakeholder network, www.eceee.org
- Evidence-based energy efficiency policy focus
- Biennial industry conference

Challenges & Opportunities

Context for project

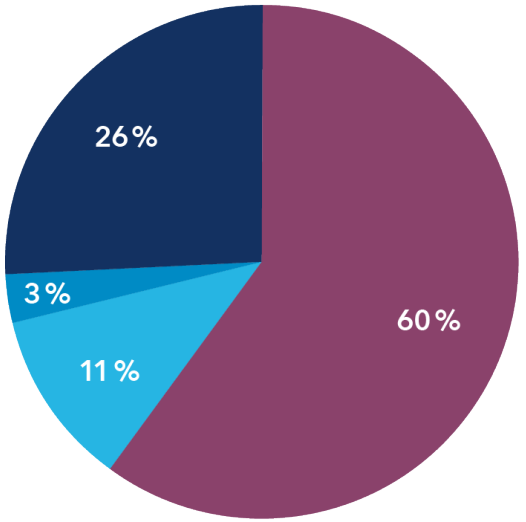
Challenges (1/3)

Process heating accounts for 60% of industrial energy use in EU[1]

- About 1,920 terawatt hours (TWh)
- Equivalent of 18 % of total EU energy demand

1,920 TWh is greater than the combined electricity consumption of France, Germany, Spain and the UK!

Approximately 85% of Europe's industrial process energy is supplied by fossil fuels[1]



Dark = fos
Green =

Sources: 1. Fraunhofer et al. 2016.

Challenges (2/3)

Energy efficiency and renewable energy projects are economical, and could meet the majority of Europe's industrial process heating demand.

However, even well-designed projects fail to attract viable financing due to:

- Risk mitigation problems with innovative projects
- Transaction costs high relative to capital requirements
- Projects developed by or for small and medium enterprises often lack necessary credit and performance guarantees required by financial institutions

Challenges (3/3)

The current approach for evaluating projects:

- Different and specific for each project
- No standardized procedure (technical and economic)
- Time and resource consuming

Project assessment barriers:

- Lack of (technical) know how among banks/investors
- High technical complexity
- Inappropriate preparation of projects
- No industrial standards (only building area)

Opportunities

60% of industrial process heating demand could be supplied by established energy efficiency and state-of-the-art renewables

Energy efficiency:

- 8–10% average savings with 5-year or less payback across industrial sectors[1]

Renewable energy:

- 50% of industrial process heat demand could be met by state-of-the-art solar thermal, biogas and biomass technologies[2]

Sources: 1. "Study on EE and Energy Savings Potential in Industry…" ICF International. 2015
2. Estimate developed based on several sources: "Process heat collectors…" Horta P. 2016; "Process heat in Industry, Suitable Technologies". Fraunhofer ISE presentation. 2017. "Potential for Solar Heat in Ind. Processes." Vannoni C. et al. 2008;

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60% NON-FOS

Dark = fossil sources;
Green = renewable energy;
Transparent = energy efficienc

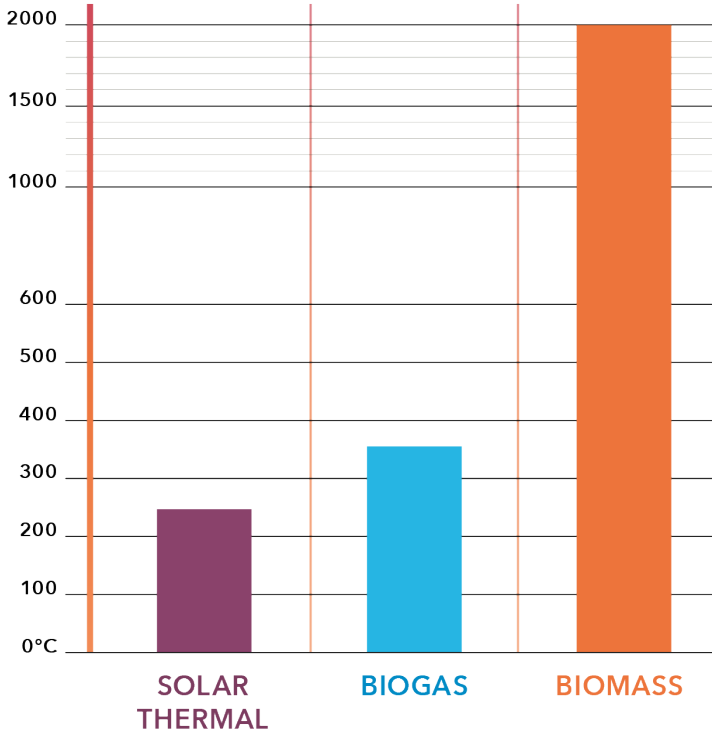
Opportunities (cont.)

Many best practice examples show the technical and economical potential for EE and RE integration across the European industry

- De-risking Energy Efficiency Platform contains 5,000 industrial EE projects
- Mean payback is 2 years! (high economical relevance across sectors)

Learn more:
https://www.trust-ee.eu/discovery/process-heating

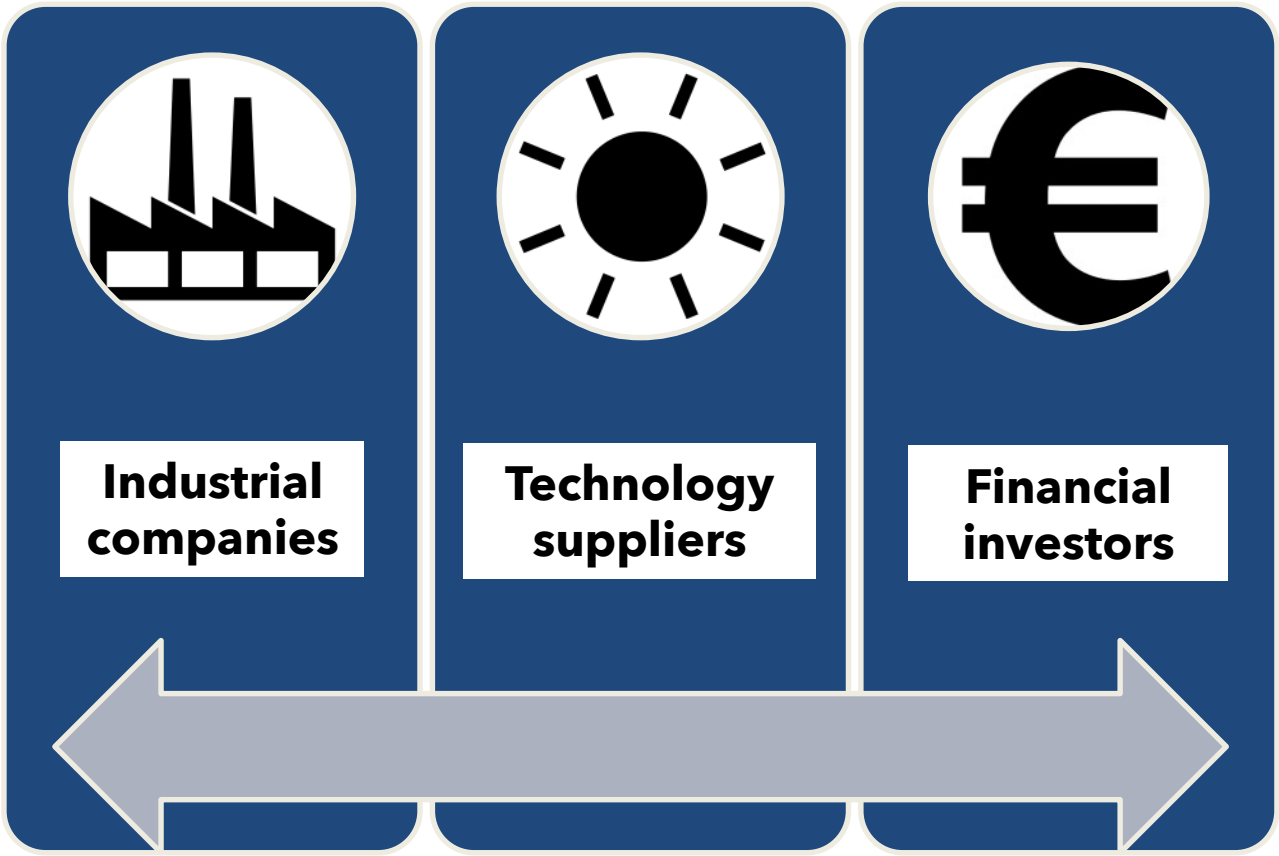
https://deep.eefig.eu/



Today's commercialised renewable technologies can meet many industria heating demands (°C)

TrustEE Scope & Approach

A new model to address project development barriers



In the framework of project development, realization, and financing TrustEE wor with three key stakeholder groups

Project focus & scope

Small to mid-size industrial energy efficiency and renewable energy projects, including:

- Waste heat recovery, solar thermal, biogas, biomass, and heat pumps
- SME-projects sponsored by owners/end-users, engineers and planners, technology suppliers and manufacturers
- Well-developed projects having attractive amortisation times
- State-of-the-art and innovative projects in industrial sectors
- Performance-based project models, such as energy performance contracts or energy sales agreements

Standardised project assessment in three steps

The TrustEE Platform offers a consistent approach to industrial project development

1. Technical and economic evaluation
2. Development:
   - Technical optimization
   - Apply contractual standards
   - Augment risk protection via insurance solutions
3. Offer refinancing after successful commissioning of the plant or measures

Key elements for EE and RE projects

Project assessment via energy audit

- Energy consumption analysis
- Evaluation and assessment of measures
  - process and system optimisation
  - energy savings
  - renewable energies
- Objective: Financing of measures through energy cost savings (monetary)

Project development implementation of measures

- Energy supply (e.g. economizer)
- Energy distribution (e.g. heat exchanger and storage)
- Process optimization (e.g. machines with lower demand)
- Use of renewable energy

Financing from energy cost savings

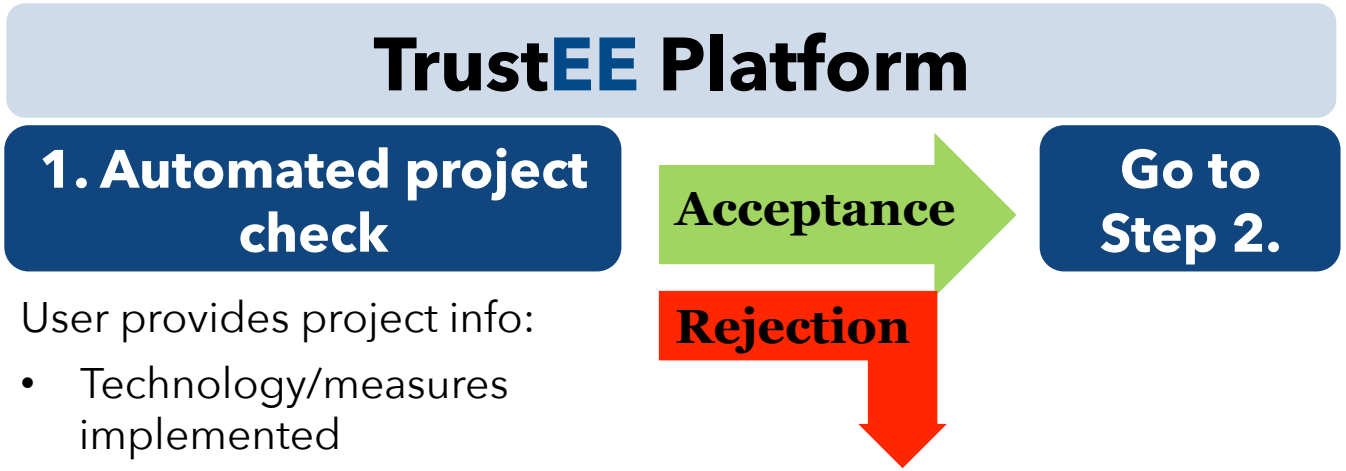
- Fast amortisation (2-4 years)
- Contracting financing
- Reduction of energy costs and price fluctuations

Register for TrustEE provider network

Technology providers sign a framework agreement

- Conditions
  - Fulfill pre-defined quality requirements for products, components, systems, etc.
  - Provide successful reference projects where energy efficiency and renewable energy systems were installed in industry applications
- Advantages
  - “Fast-Lane“ in platform rating
  - Registration of own concrete projects
  - Marketing via TrustEE website and other channels
  - Independent quality endorsement and match-making with industrial customer prospects

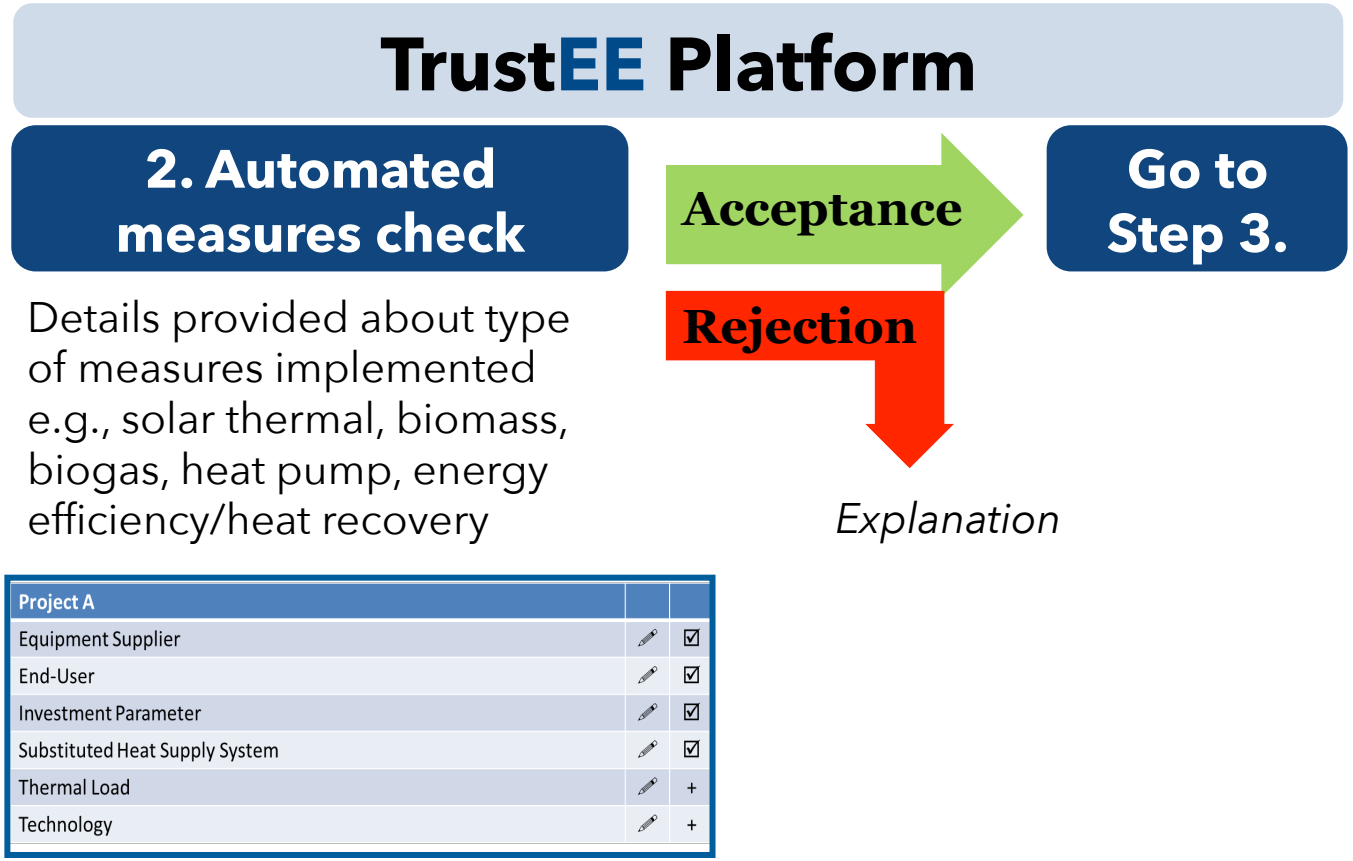
Propose projects in three, easy steps (1/3)



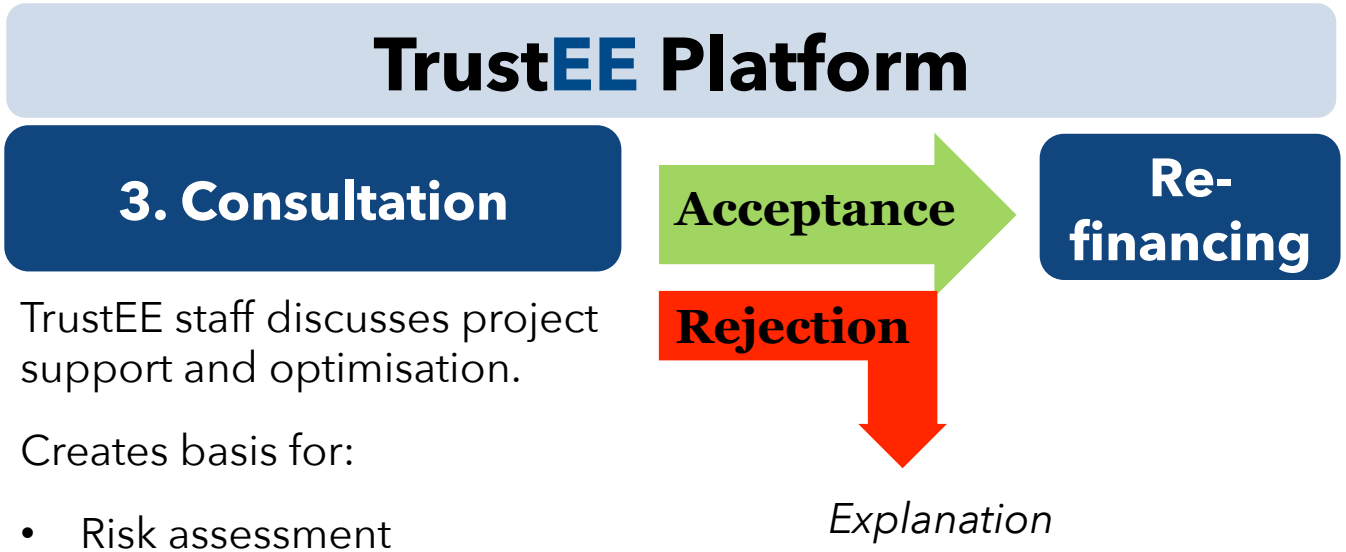
User provides project info:

- Technology/measures implemented
- Savings (energy, €)
- Technical and economic information about end user
- Economic information about the technology provider and planner

Propose projects in three, easy steps (2/3)



Propose projects in three, easy steps (3/3)



TrustEE staff discusses project support and optimisation.

Creates basis for:

- Risk assessment
- Insurance
- Re-financing via Securitisation Vehicle

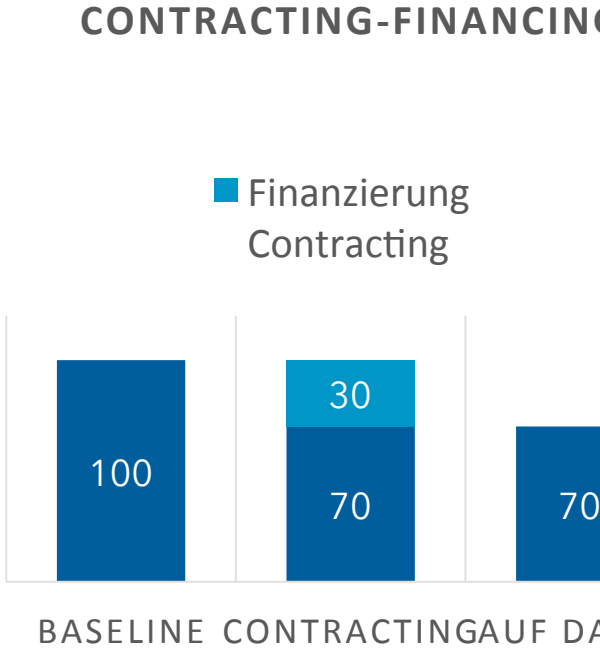
Financing Model

TrustEE refinancing offers payment flexibility

Financing from energy savings

Advantages for customers

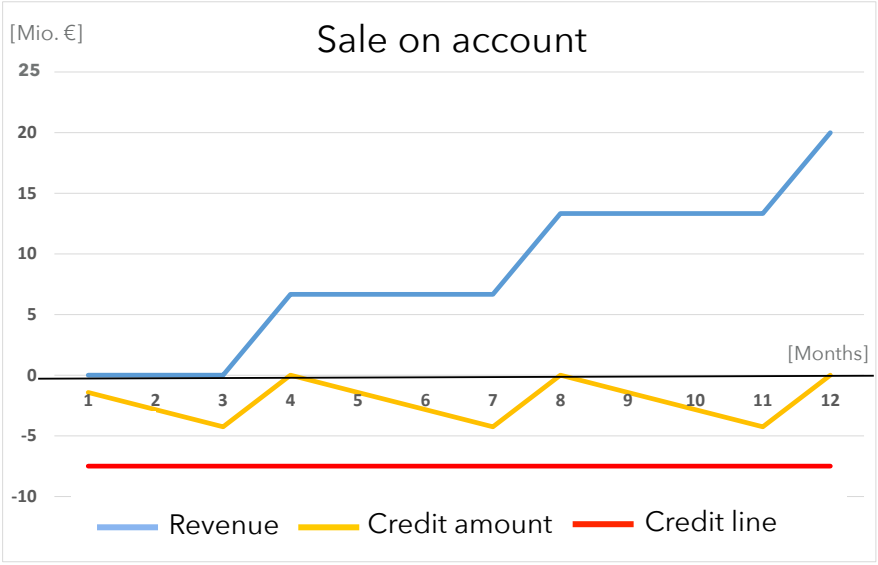
- Technology provider assumes the technical risks
- Protection of the annual investment budget
- Liquidity neutral
- Payments only if savings are made



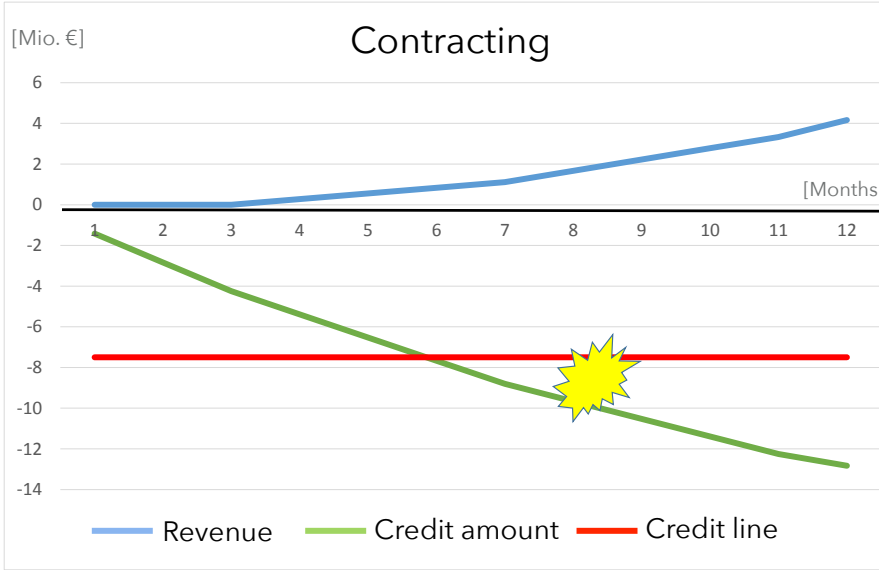
SMEs cannot afford performance-based contracts

Assumption:

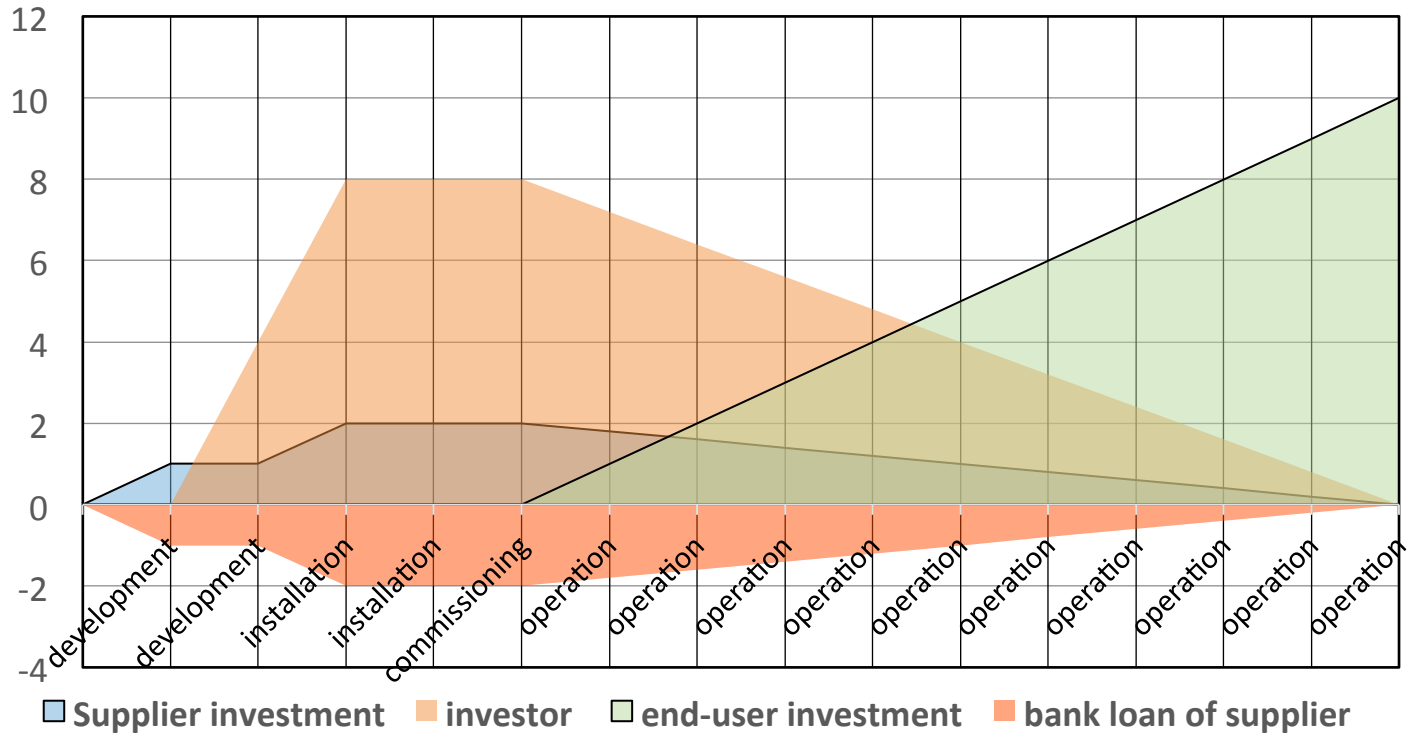
Turnover 20 Mio. € ; EBITDA 15%; project processing time 3 months; 1 month payment target; credit line 7,5 Mio. €



The same company is converting to a contracting offer with **24-month contract duration**

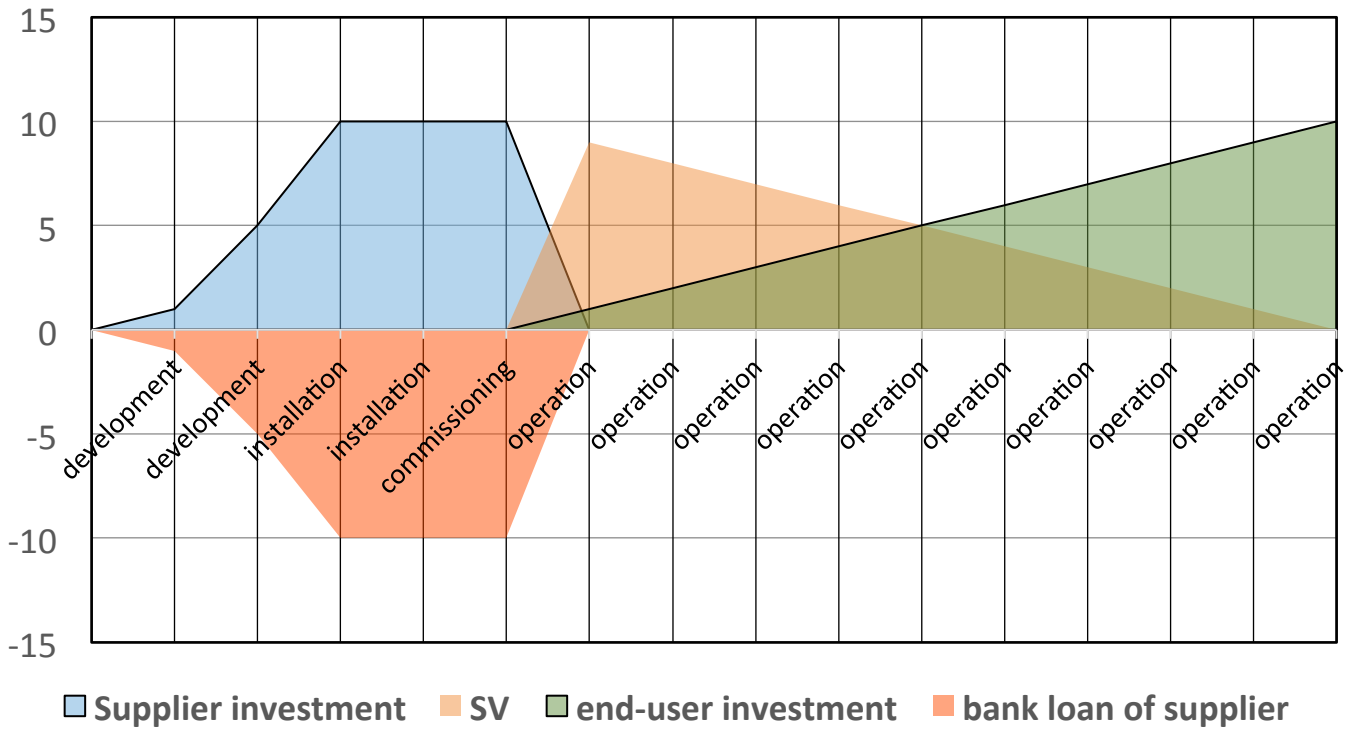


Project financing with project investor not feasible



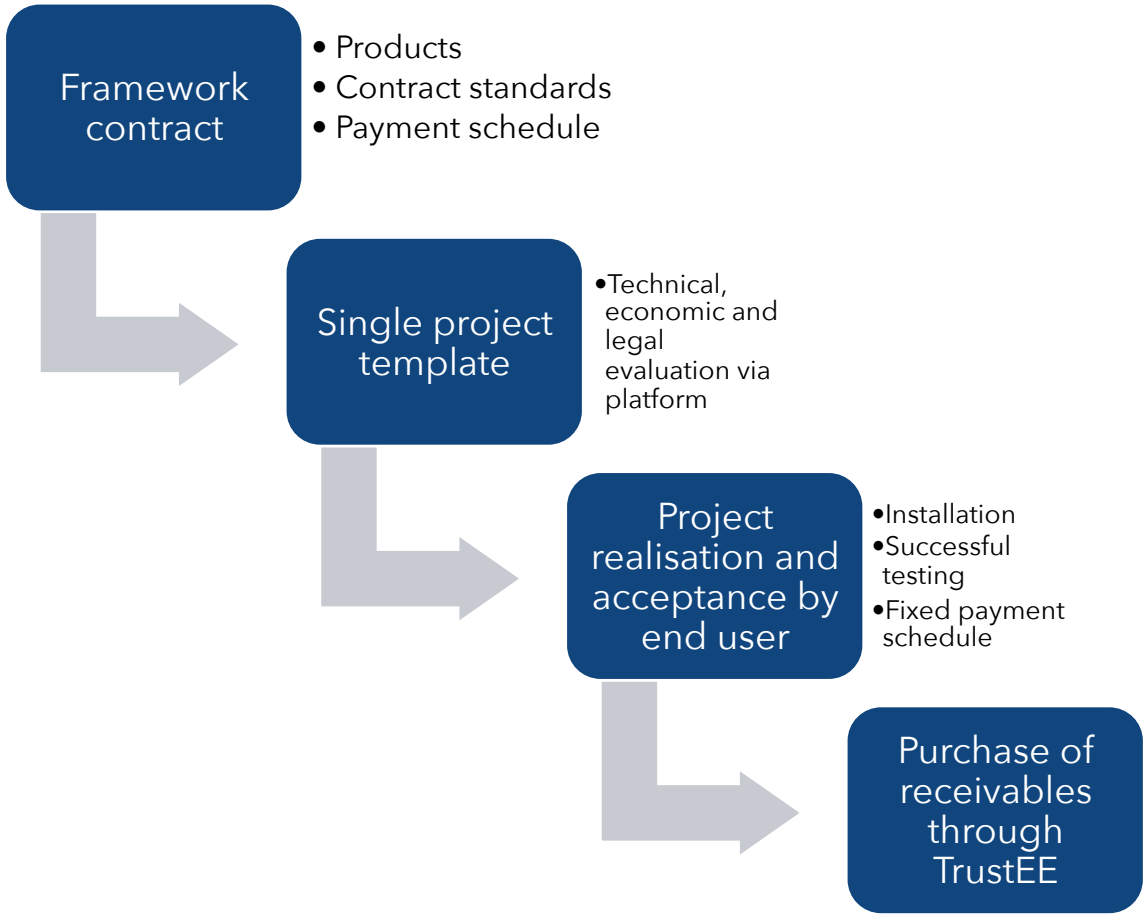
- Project financing requires own project company: only possibl with large projects
- The financial investor bears all risks of the project
- Time-consuming and expensive project financing structure

Refinancing through a securitization vehicle



- Purchase of customer requirements after successful project launch (post commissioning)

Sales financing through TrustEE



The sales financing model

TrustEE

After a successful project start…

The service provider or supplier:

- Receives sum of contracting receivables minus deduction (for return on investment)
- Refinancing offer and rapid return improves creditworthiness

The industrial customer or end user:

- Pays according to fixed payment plan only after successful acceptance
- Technical risks are substantially reduced, guarantees and O&M obligations of the supplier remain
- Has unconditional payment obligation to TrustEE not bounded to energy savings or “baseline”

Note:

- Credit risk of the customer may be secured by credit insurance
- Securitization of purchased receivables by issuing bonds on the capital market "Green Asset backed Securities"

TrustEE Securitization Vehicle

- Subjected to a special capital market regulation
- May only carry out securitizations
- Establishment under the name ***Sustainable Future TrustEE*** (highest level of investor protection in Europe)
- TrustEE – Platform acts as advisor to the Securitization Vehicle and prepares the purchase of receivables
- Refinancing (securitization) of bond purchases or bonds with institutional investors
- Guarantee of the European Investment Fund (EIF) is sought

Summary

TrustEE Summary & Outlook

TrustEE

Target EE and RE project implementation in Europe

- Process heating in energy intensive industry sectors
- Solar thermal, biomass, biogas, heat pumps, energy efficiency (heat recovery)

All key stakeholders involved

- Industry owners, technology providers, and financial investors

Next steps

- Project acquisition
- Create and market technology providers network
- Integrate interested investors

INDUSTRIAL PROCESS HEATING

1920

TERRAWATT HOURS

18 %

OF EU CONSUMPTION

TrustEE

Thank you!

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