



Industrial waste heat recovery and decentralized energy supply

New key technology - B2B | B2C Energy Solutions

THERMOELECTRIC Industrial Solutions GmbH



www.spire2030.eu

SPiRE
Sustainable Process Industry through
Resource and Energy Efficiency

Who is not scared of increasing energy costs?

**25 billion
€**



value of unused
industrial waste heat
in Germany every year

Wasted heat is paid already, but very restricted to reuse

Ressource **HEAT**



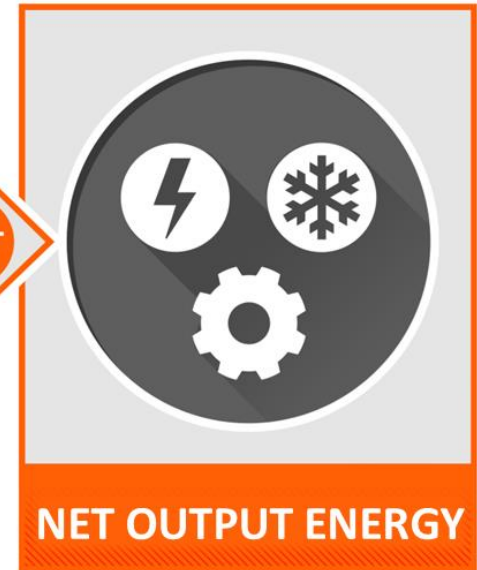
- Waste heat from industrial processes and combustion
- Biomass, solar heat, geothermal energy
- Fossil fuels (Coal, CH₄, H₂)

Technology **AQS**



- Thermodynamic system
- Temperature differences conversion
- Combined heat/cold and power



Demand **ENERGY**

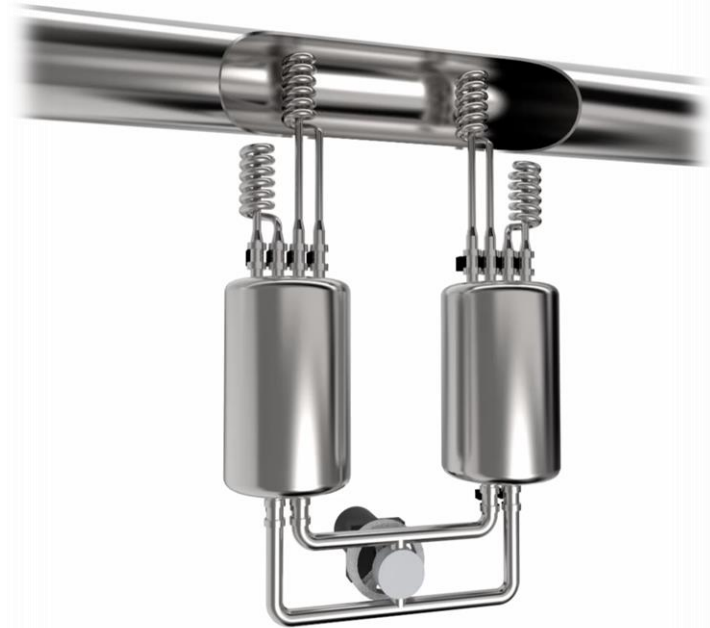


- Direct machine drive
- Electricity in connection with a generator
- Production of cold or compressed air

Key technology to convert temperature differences into mechanical / electrical energy / cold / compressed air

Significant advantages



- ! Converting technology covering full temperature range
-  Flexible output energy & Environmentally friendly
- % High efficiency range
e.g. COPel/cold-9 (ΔT 300°K)
- € Pay-back periods <5 years
-  EU-Patent application & Split production

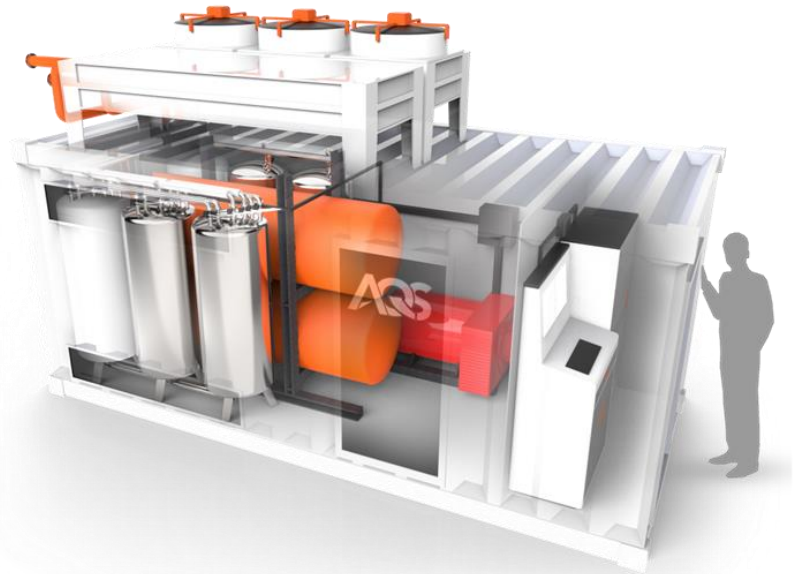


AQS Energy Converter Unit

Key technology to convert temperature differences into mechanical / electrical energy / cold / compressed air

Significant advantages

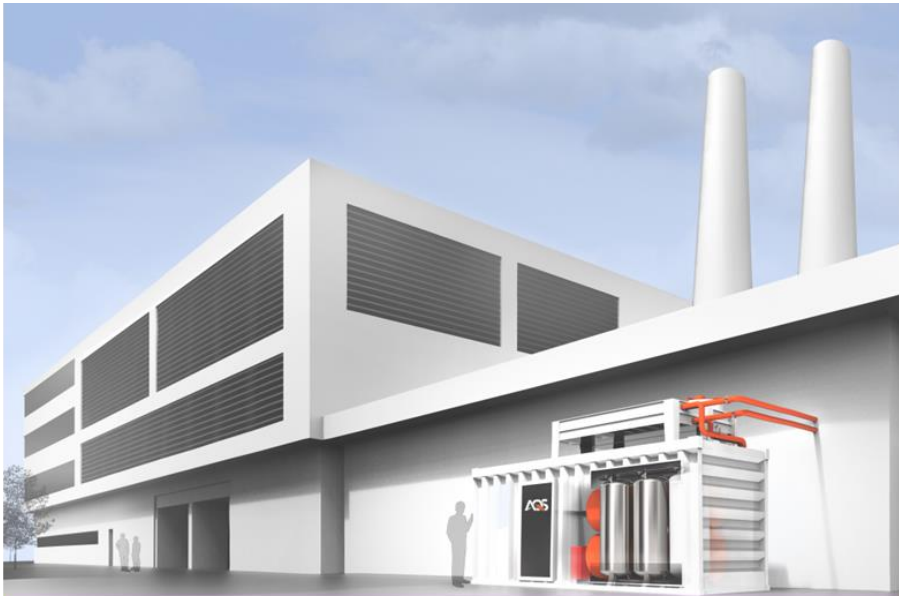
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AQS ALPHA QUATTRO SOLARIS

AQS Energy Converter Unit

Individual industrial applications and B2B/B2C series applications based on AQS energy converter core



AQS Industry
industrial waste heat recovery > 30 kW

AQS Renewables
solarthermal, biomass, geothermal



AQS Home
decentralized energy supply < 30 kW

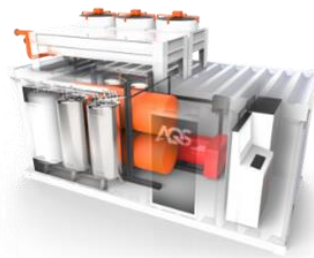
AQS Mobility
maritime, rail, truck

Serviceable Obtainable Market – SOM – 10 years (2025)

Industrial waste heat recovery market

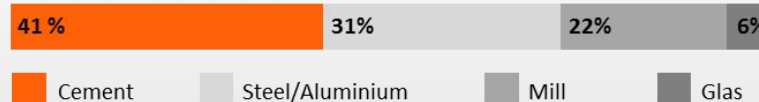


PILOT CUSTOMER

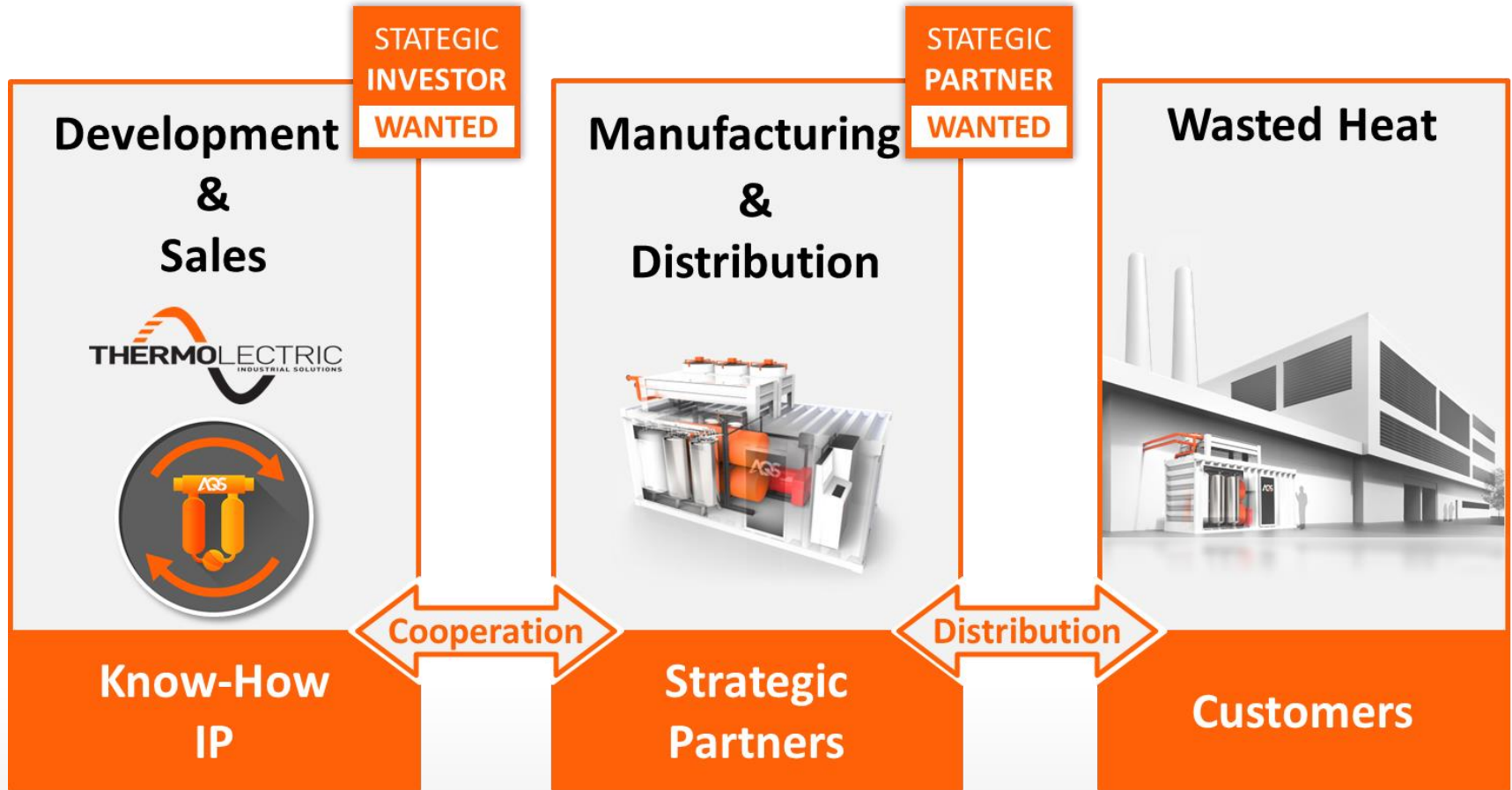


	PILOT	TOTAL PILOT	TOTAL EUROPE	ALL
	1st Cement plant	29 Cement plants Europe	259 Cement plants Europe	Energy intensive Industry Europe
Waste heat potential (MW thermal)	6	580	5.740	14.010
Waste heat recovered (MW thermal)	6	480	675	1.020
Installed systems (AQS-Module ~300kW)	4	320	450	680
Installed capacity (MW electrical)	1,2	96	135	204
Revenue (Mio €)	3	225	316	477
Share of recovered heat (%)				6,81

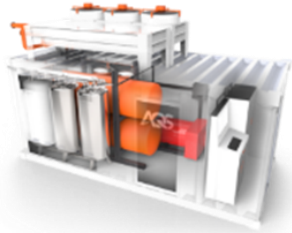
High Energy Industry Europe



Business model – based on strategic partnership



To get market ready we look for strategic partners and investors



STRATEGIC PARTNER WANTED

STRATEGIC INVESTOR WANTED

01/2013 **Seed Funding 0.6 Mio EUR**

11/2013 **Proof of Principle**
Scientific assessment of AQS, Chemnitz University

03/2014 **Prototyping I – Proof of Concept**
Technology Readiness Level 5, Monitoring Chemnitz Univ.

First set of **Strategic Partners**

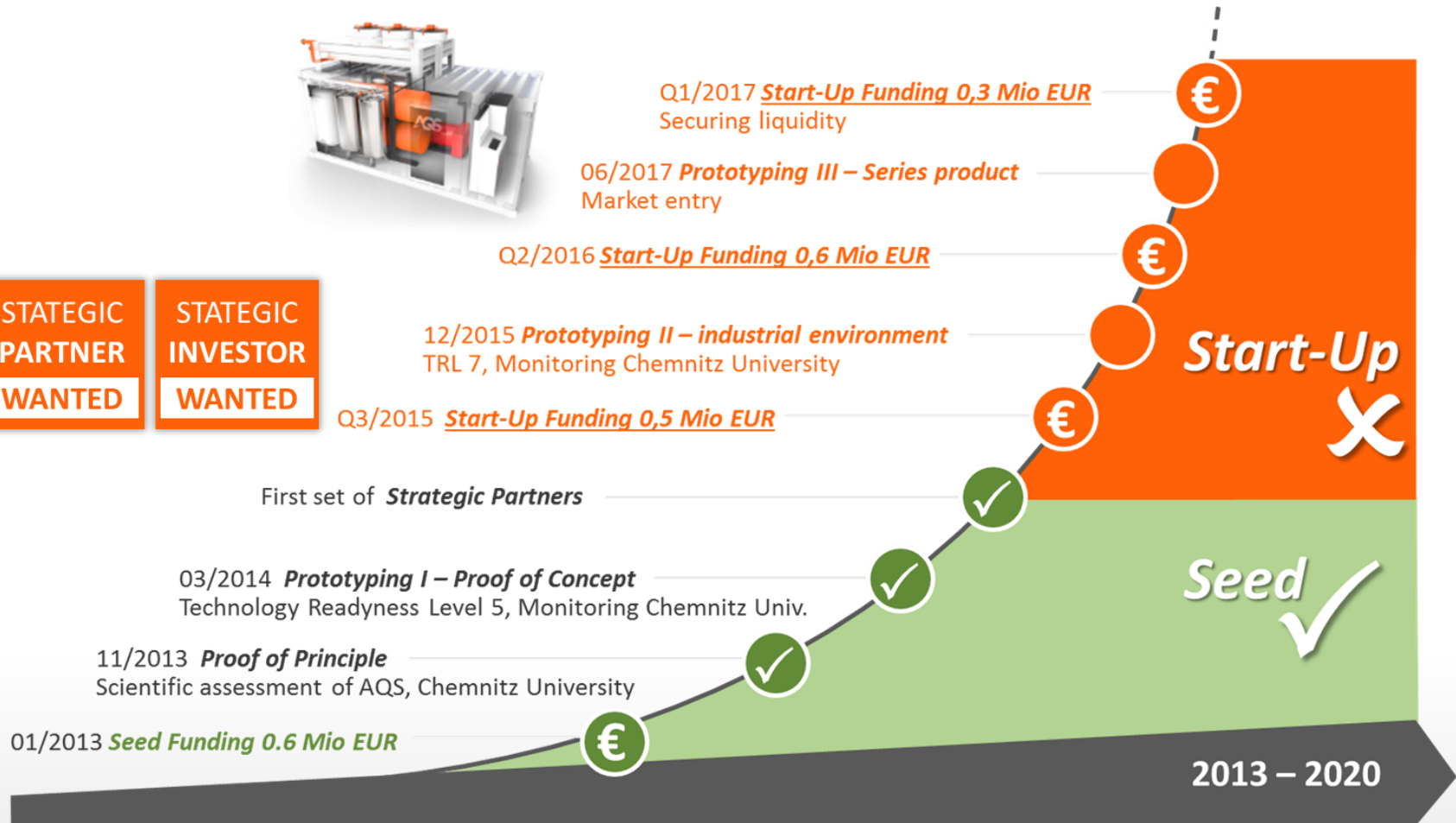
Q3/2015 **Start-Up Funding 0,5 Mio EUR**

12/2015 **Prototyping II – industrial environment**
TRL 7, Monitoring Chemnitz University

Q2/2016 **Start-Up Funding 0,6 Mio EUR**

06/2017 **Prototyping III – Series product**
Market entry

Q1/2017 **Start-Up Funding 0,3 Mio EUR**
Securing liquidity



Contact Details

ALEXANDER LOOS

Chief Executive Officer

Mail: a.loos@thermoelectric.com

Phone: +49 (0) 351 41 89 34 57-0

Fax: +49 (0) 351 41 89 34 57-9

THERMOELECTRIC Industrial Solutions GmbH

Spitzwegstrasse 66a

01219 Dresden

Germany



www.thermoelectric.com