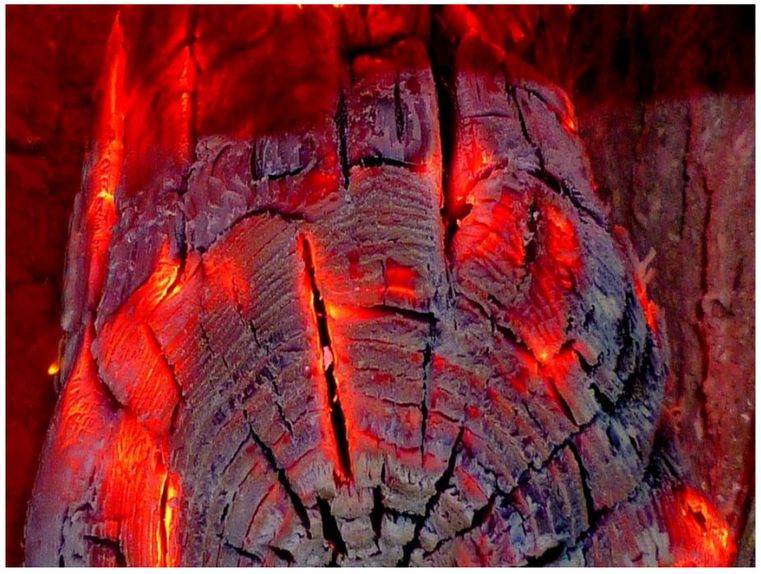
“Small Energy”

New steam engines for combined of heat and power (CHP) systems



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Pavel Batasov
Inventor

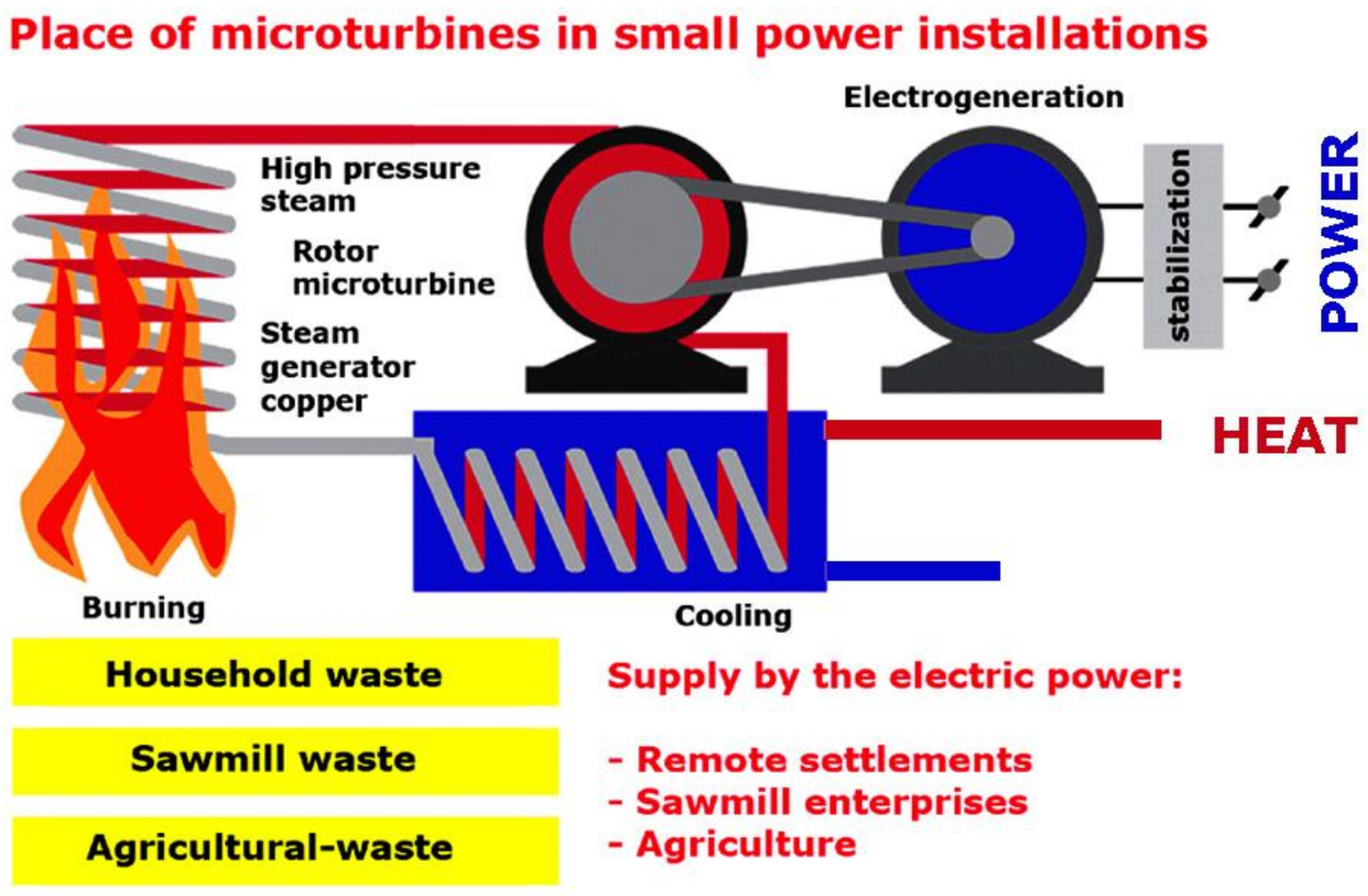
1. Problem

"Although steam turbines are optimal for large systems and operating temperatures between 300°C and higher, smaller engines with different principles and advantages are in a development stage"
(Fraunhofer.de ---- http://www.mss-csp.info/platform/power-generation)

Compact non petrol engine is necessary to the decentralized power.

Biomass should be effectively used with the inexpensive equipment.

COST EFFICIENCY:
More x2 cheaper than traditional fuels
(gas and oil)



2. Solution

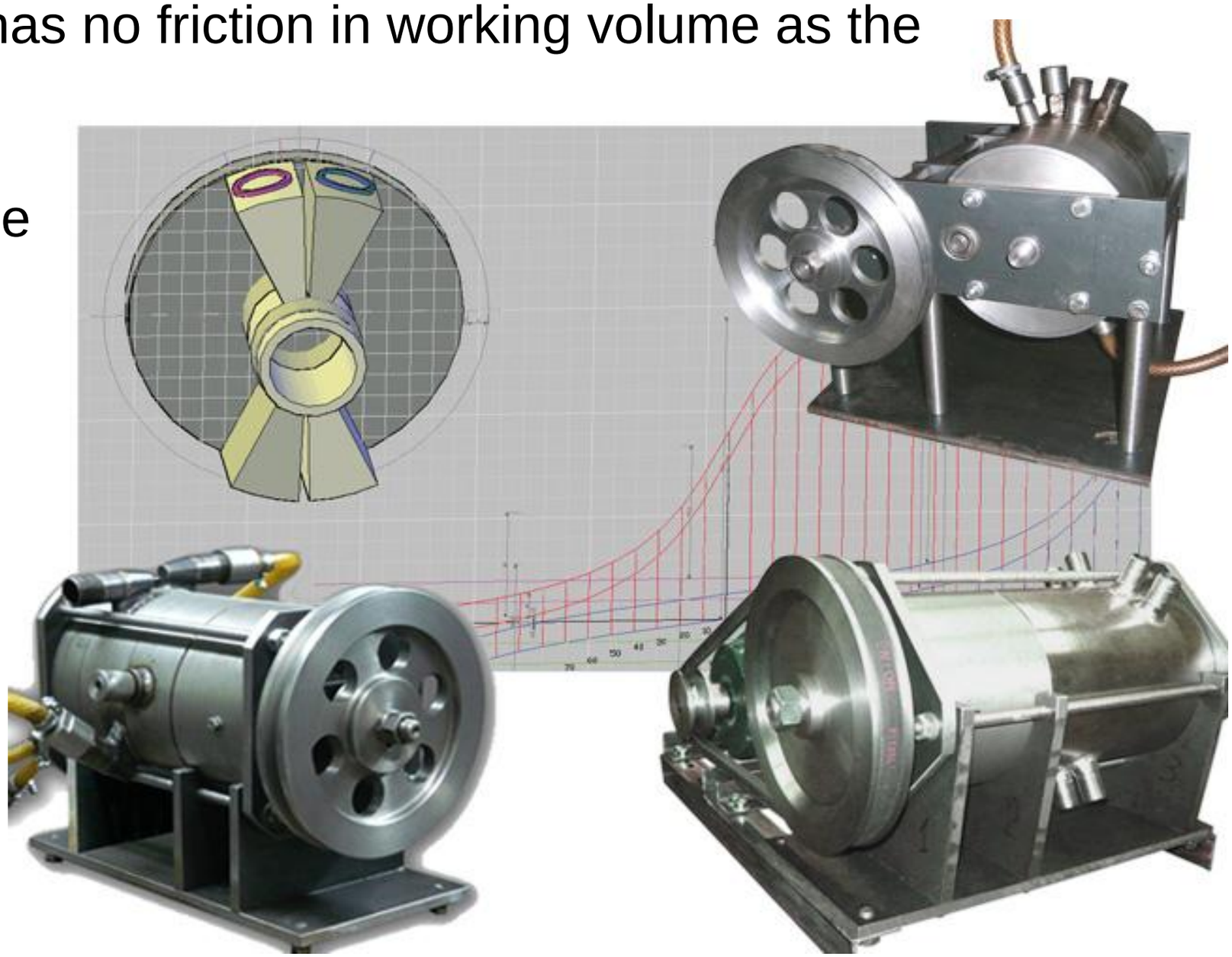
Happy child of Turbine and the piston-type engine – Rotary Vane Engine (RVE) is ready to work.

RVE is compact and has no friction in working volume as the turbine.

RVE stable at pressure and loading changes as the OTTO engine.

RVE is simple in manufacturing and is inexpensive.

Just use it.

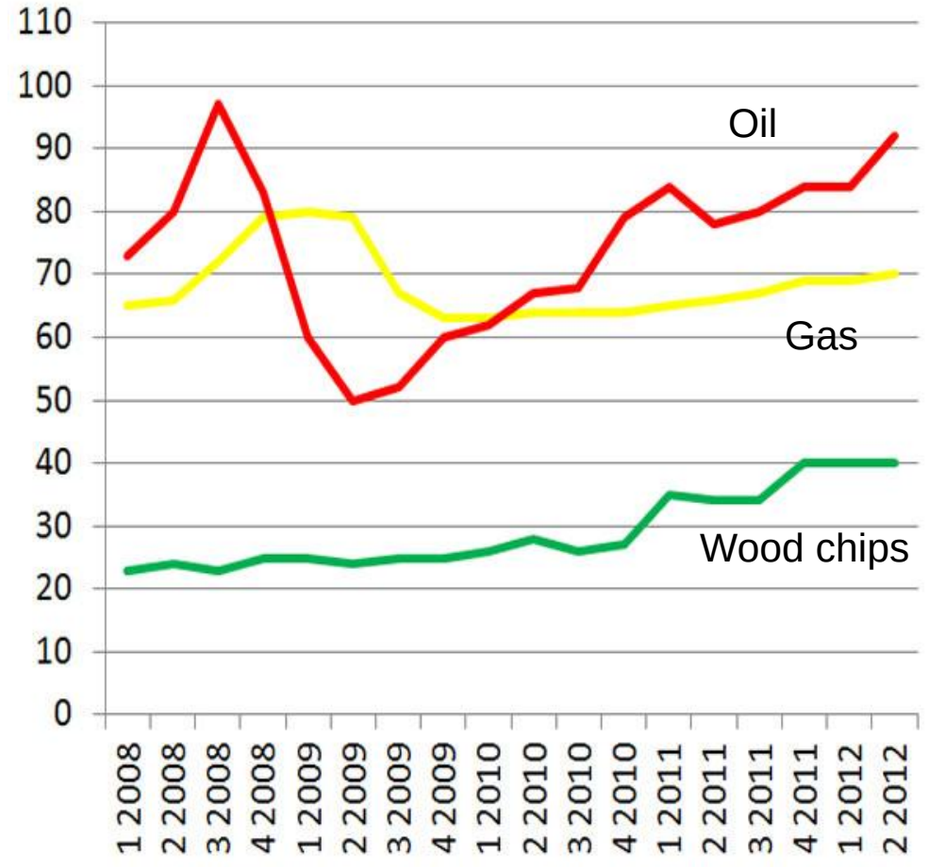


4. Market

The market of energetic production for private households is the biggest in Europe with a tendency of continuous growth.

Private households.
Cogeneration Heat and Power up to 25кВт.

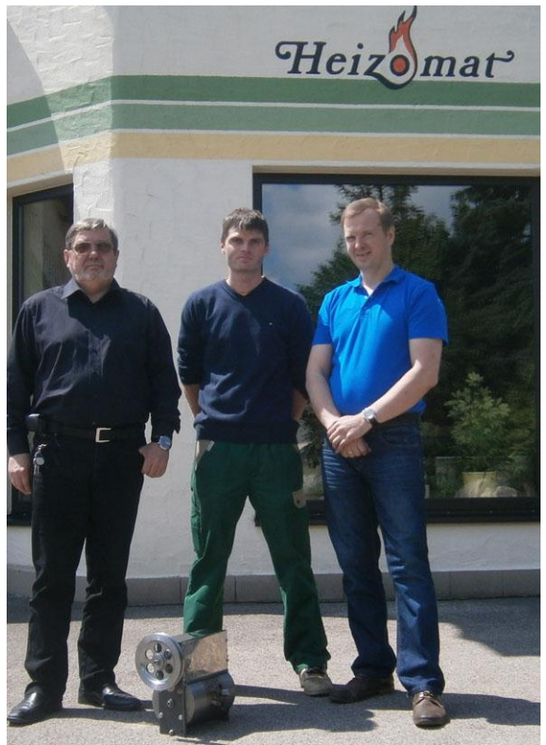
Small plants. Burning of a firm waste with obtaining energy on a place to 250кВт.



SmartGrid. Accumulation of energy of pressure.

1 cubic meter wood chips = 17 Euro
= 70 liters oil = 70 Euro
= 70 Euro

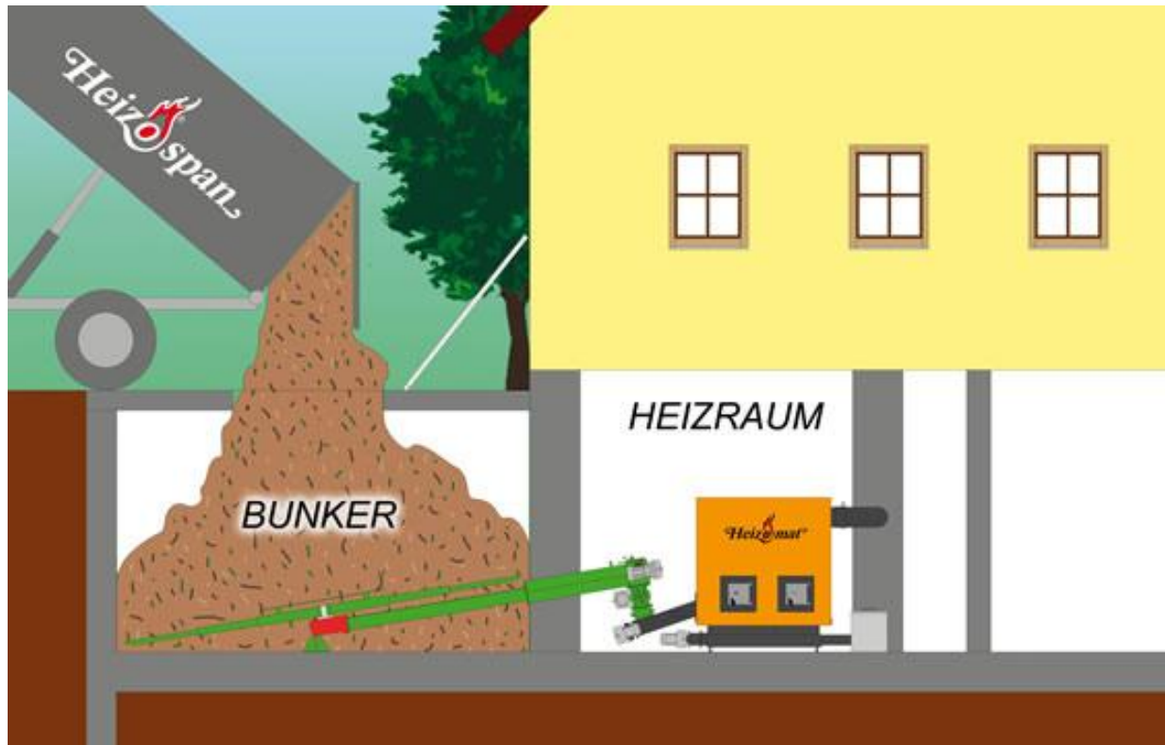
"Heizomat" 11.2012



For Example:

More then 20mln private households in Germany – market for 200 MWt small engines & generators

1% = more then 2000mln Euro



5. Competitive advantages

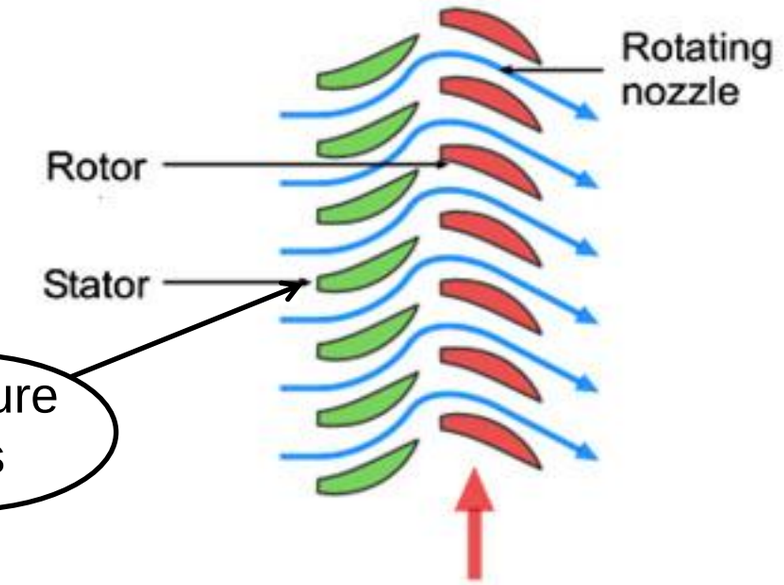
The special motor for work on averages and the small stations using biomass.

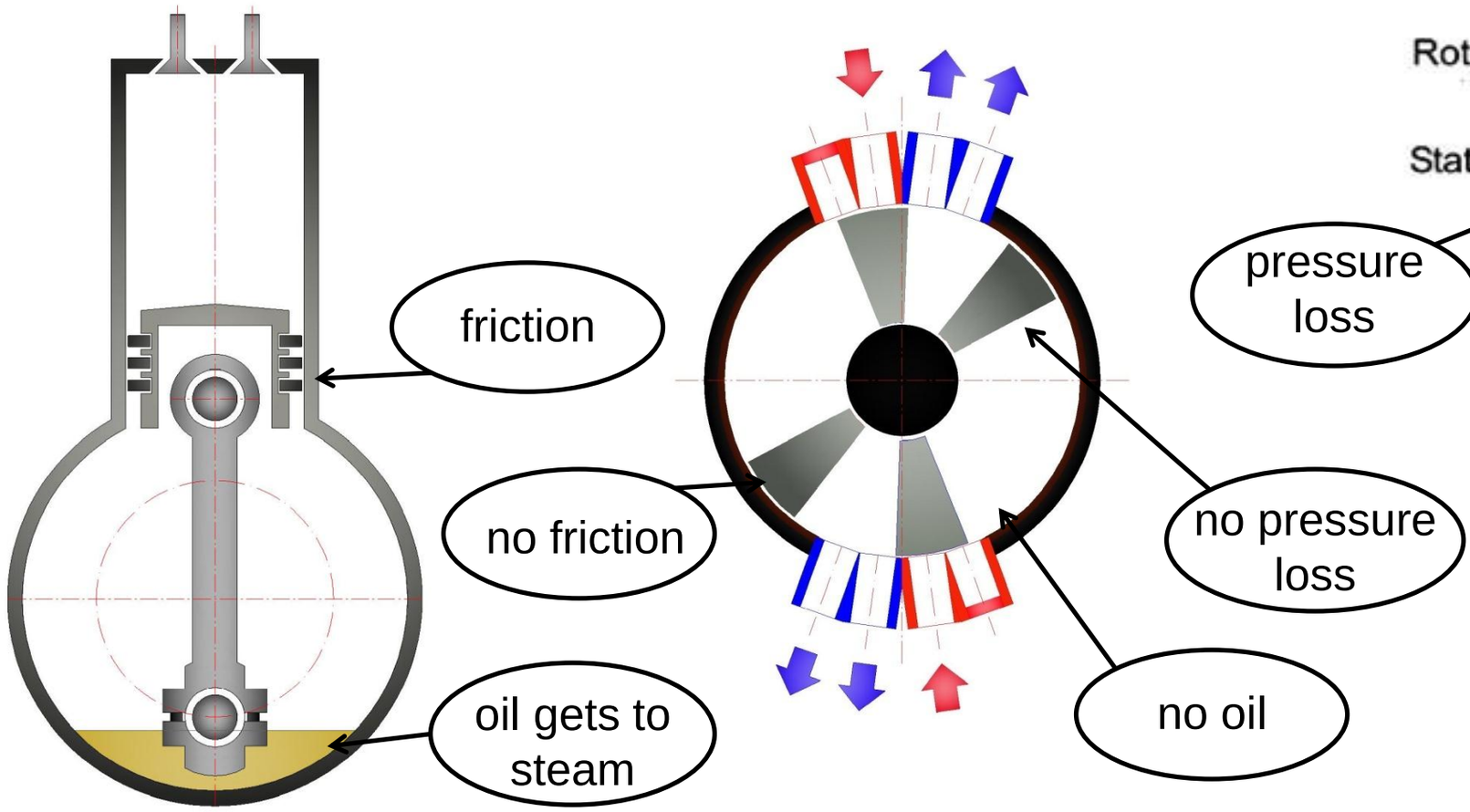
COMPACT:
3-5 times more compact than the piston engine

LONGEVITY:
no friction.

STABILITY:
2 - 8 atm. at changes to 50 %

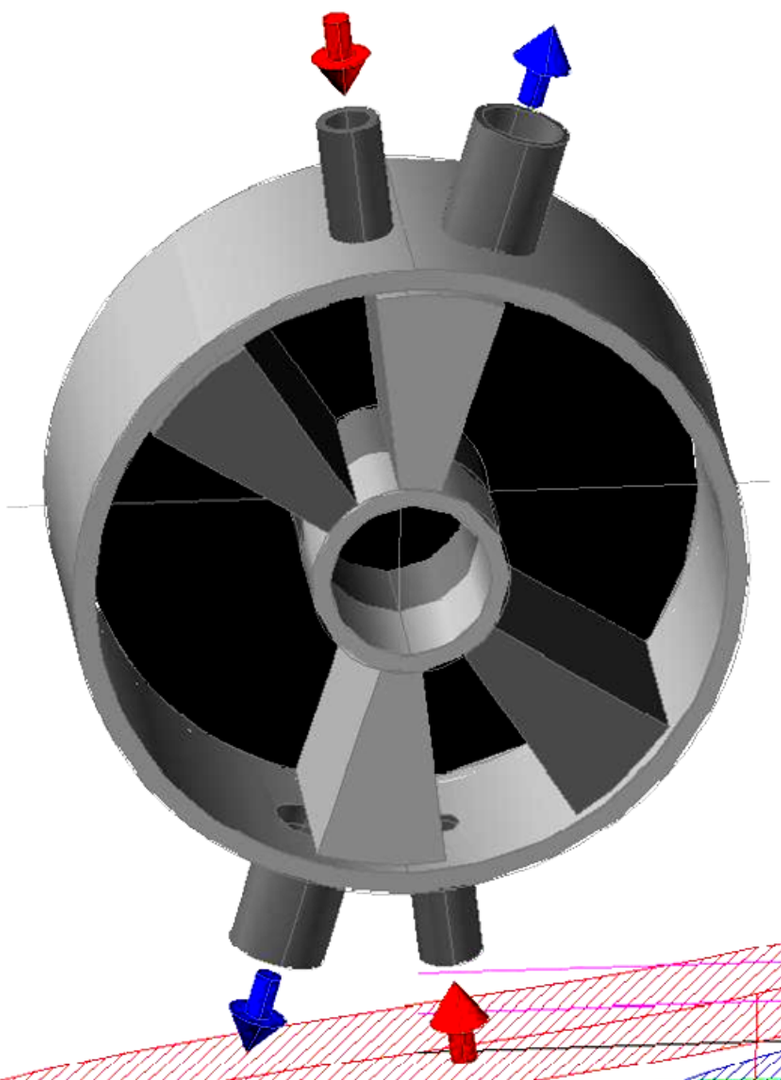
EFFICIENCY:
no pressure loss at small speeds





6. Technology

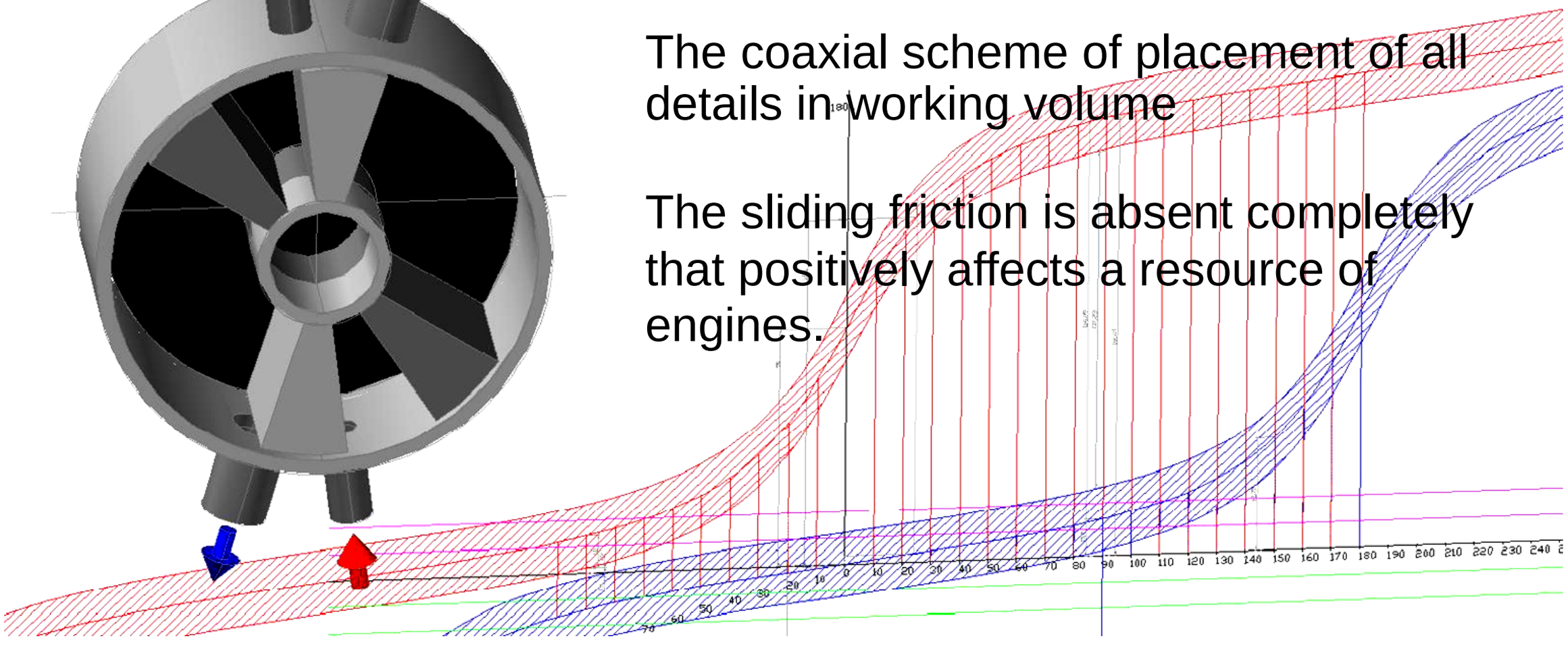
Well-known in a science scheme of Rotary Vane Engine **with new non circular gears kinematic.**



More than 3 versions of new kinematic schemes with non circular gears which are not meeting in patent base

The coaxial scheme of placement of all details in working volume

The sliding friction is absent completely that positively affects a resource of engines.



7. Team

Russia, Belarus, Lithuania, UK

1 Inventor - works with new engines since 1995.
experience ACAD 3D since 1992.

1 professor - Head of the Department
of Mechanics in Belarus University

1 two plants owner - knowledge of production
and market of generators.

1 docent –
Kinematics
& CNC
machines

8. Business model

We do engines.
The rest is done by partners.

"Business-To-Business“. Delivery of engines to producers of the small and average installations for the heat and electric power (CHP-systems) development.

Together we can stop “waste traveling”

9. Current status and next steps

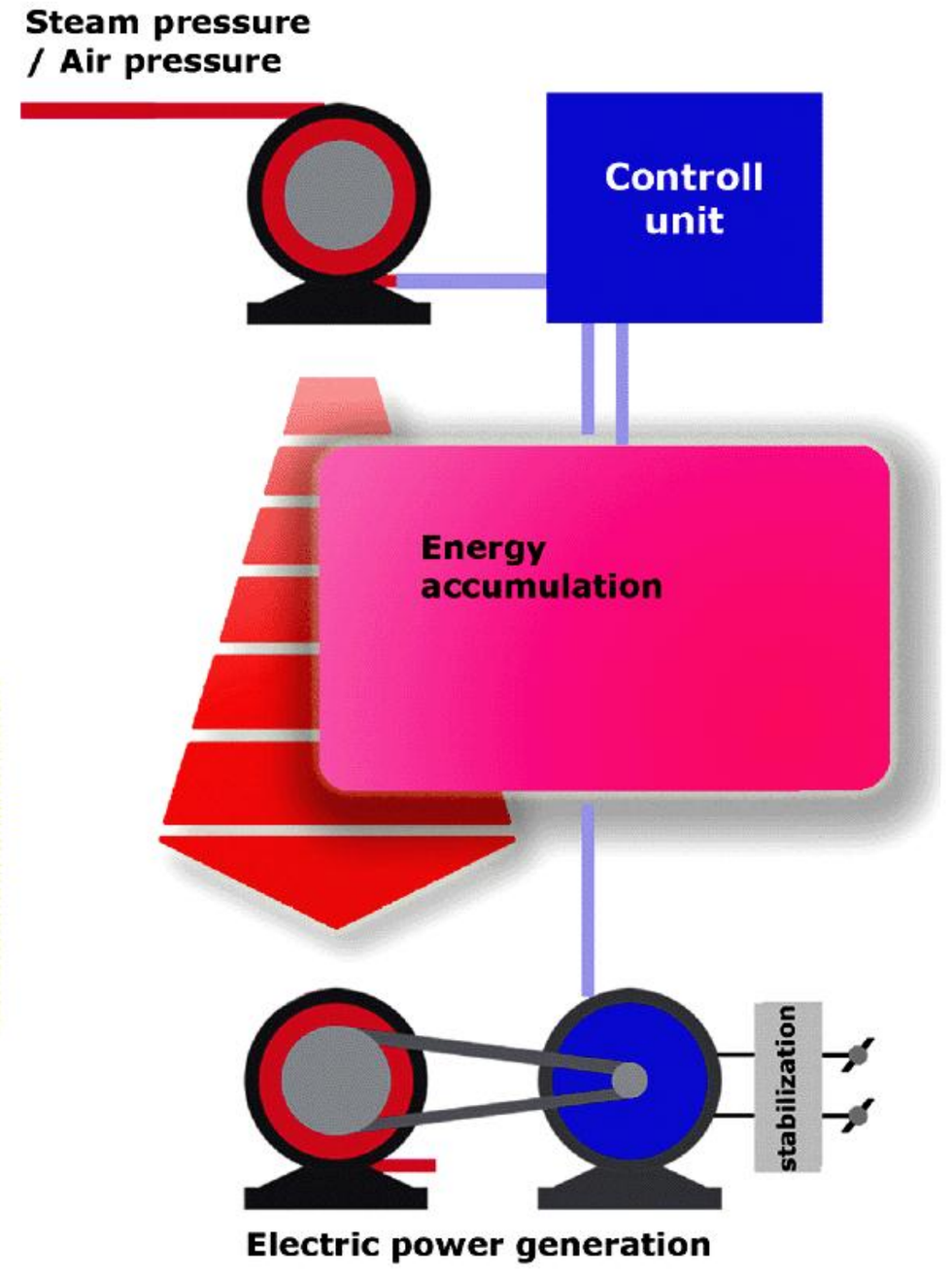
Next new engine model is born each half a year

2008-2012-5 models of engines and pumps are made.

2013-tests of the small engine at the plant making boilers in Germany

The new model prepares
for tests in:
- ISE.Fraunhofer .de
-Energy.KTH.se

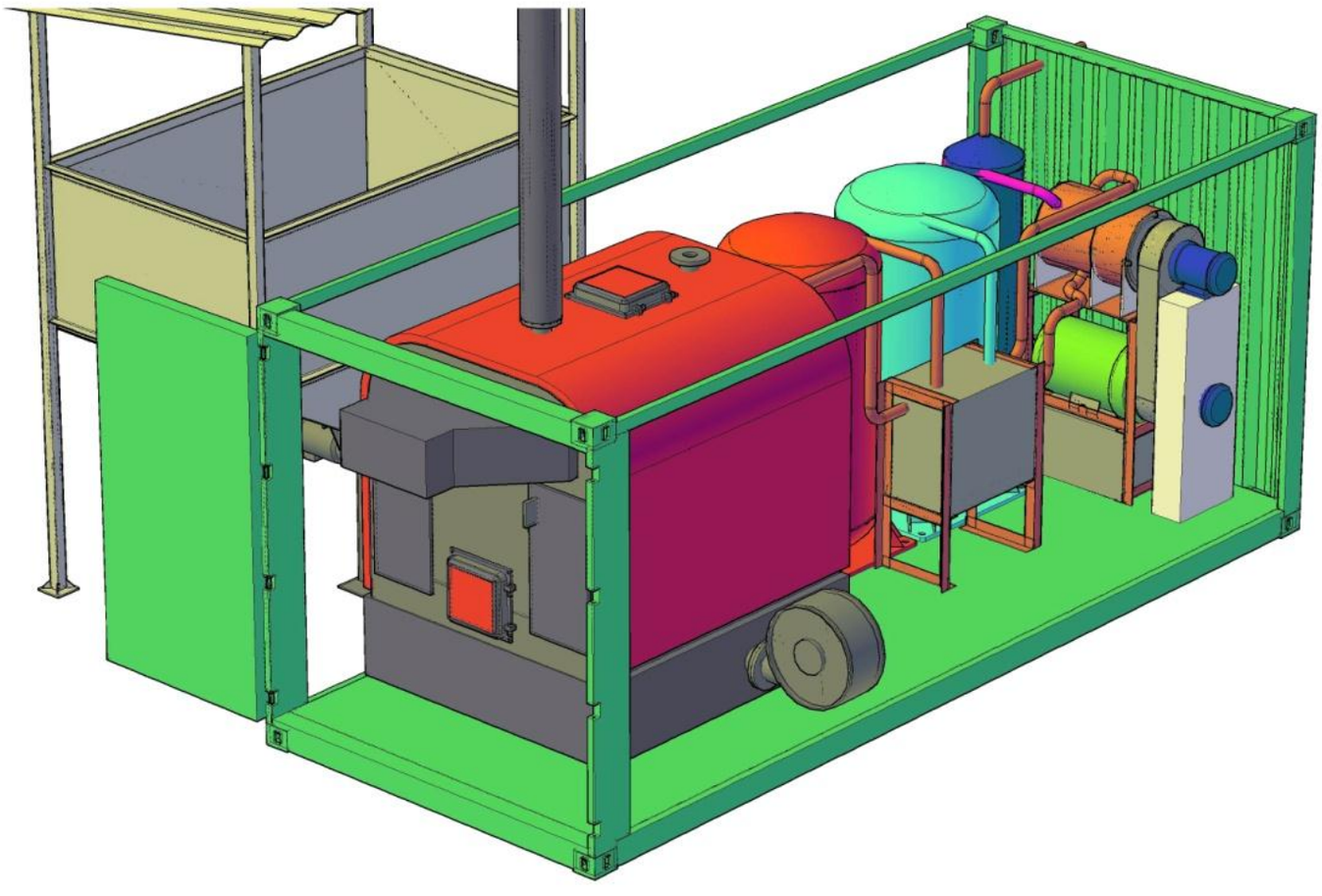
-NEXT STEPS:
- air pressure accumulation
- utilization of small heat (90-50 C)
- Solar termal



10. Investment offer

1) Joint venture on production of the small modular Heat and Power stations (CHP).

New engine = 10-15% modular CHP cost
Electrical energy = + up to 100% price



Compare the prices!

1500 Euro/kWt – small steam turbine price

1000 Euro/kWt – piston type steam engine price

500 Euro/kWt – new engine price

15% - science
5% - operating cost
3% - assembly
5% - metalworking
2% - metals

20% - bearing, seals, lubrication system

2) Cooperation with major manufactures of bearing and seals.

11. Contact Information

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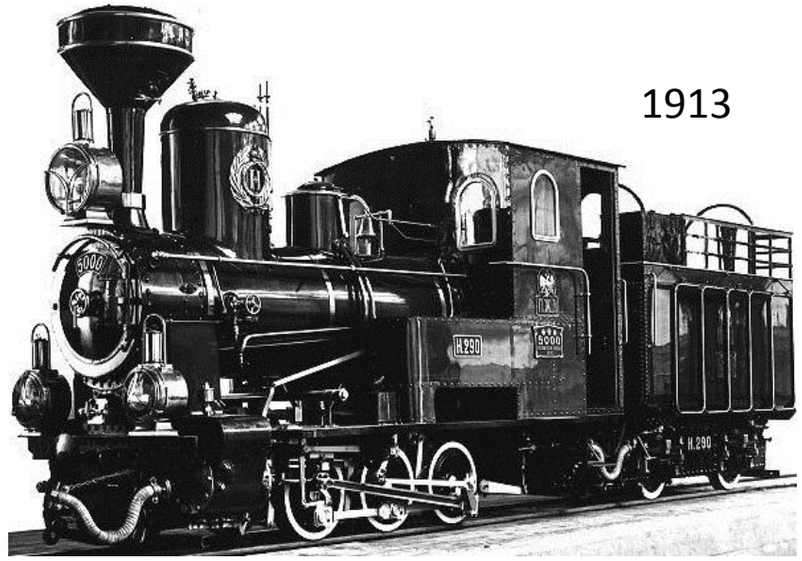
www.SmallEnergy.eu
www.SmallEnergy.lt



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