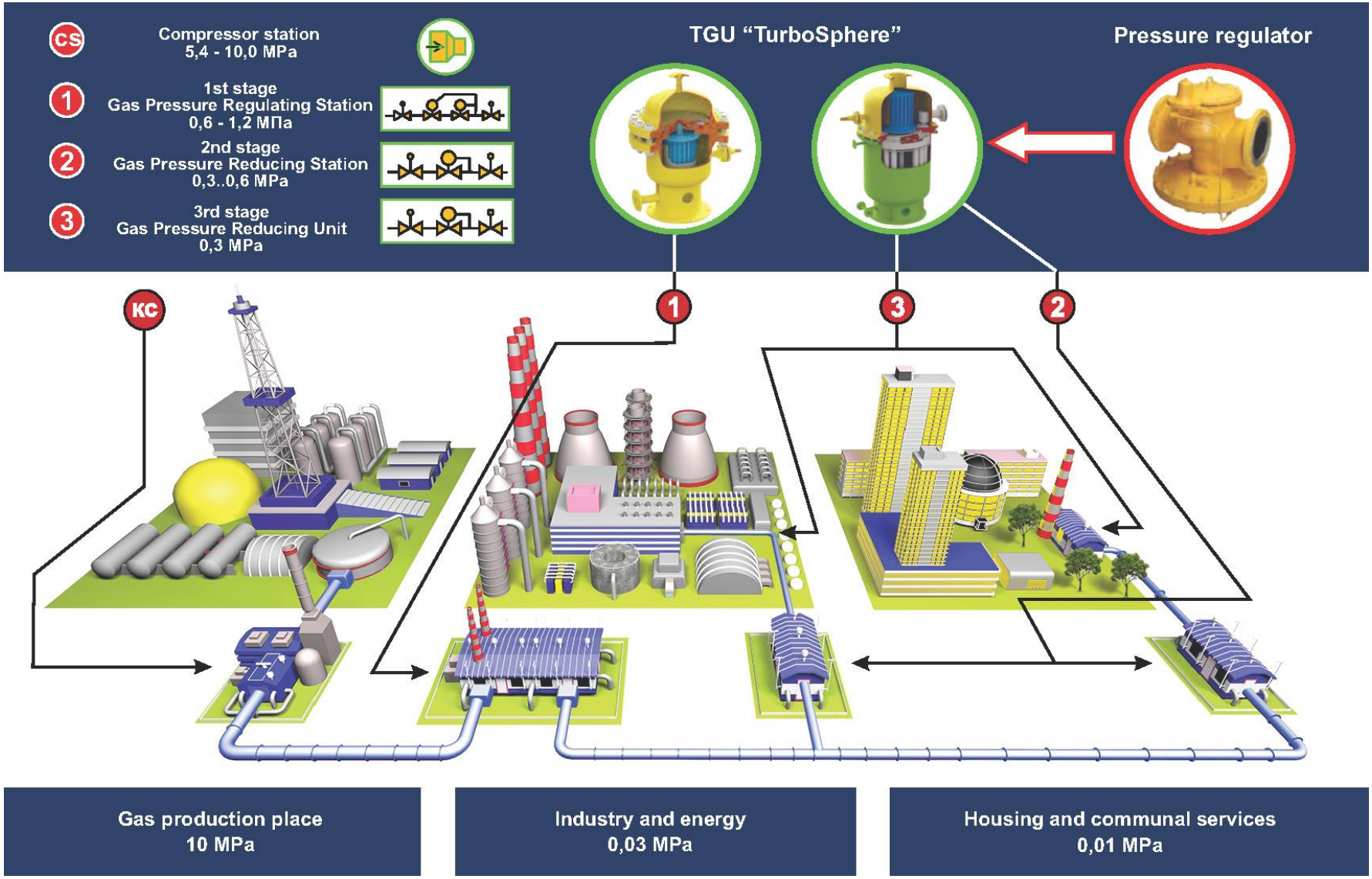
TurboSphere

Utilization of natural gas excess pressure energy

The group of innovation companies
“TurboSphere”
CEO and Co-founder
Kiril Levkov

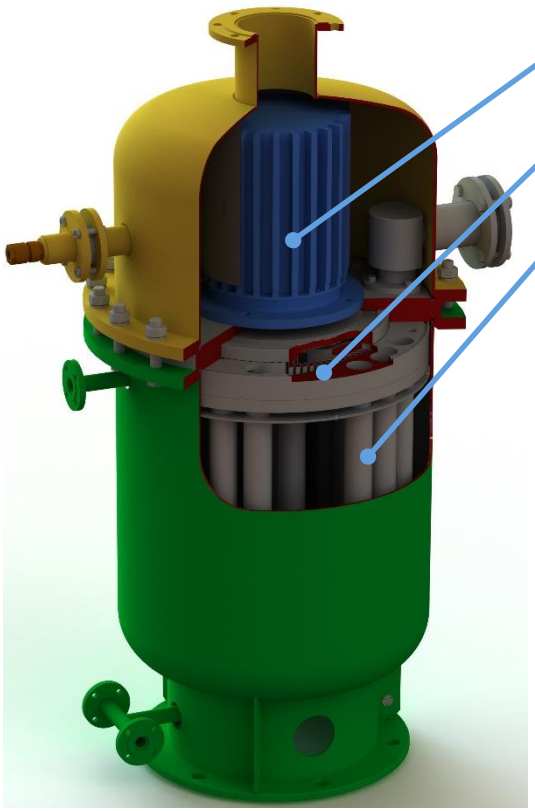
Gas transmission system



Unit arrangement

Excess pressure energy
0,3 – 5,5 MPa
>500 m^3/h

Low-temperature heat carrier
20 - 40 °C



Electricity
5-400 kW

- **«3 in 1»: turbine + heat exchanger + electric generator**
- **multi-stage expansion and heating between stages**
- **single blade wheel with partial supply**

Pilot project together with MinskHeatingNetworks

MINI-CHP at:
Minsk, Vodolazhskogo, 14

Automatic control system for energy-saving unit

Operating more than 4000 hours at the moment

Advantages

Reliability and endurance
(simple design, low speed, standard components)

Wide operational range
(various gas consumption and pressure)

Operates without any fuel consumption
(built-in gas heating system by low-grade streams)

Independence
(simple service and maintanance)

Multi-stage expansion and gas heating
(with a single blade wheel)

Deployment at GDS, GDU and GDP

Existing turbo-expanders	**from 1000 kW**	**Limited facilities**
TurboSphere	**from 5 kW**	**Thousands of facilities!**

Our own manufacture and test infrastructure

TurboSphere testing laboratory

- compressed air

(up to 1500 m3/hour 7.5 bar)

- 0..100 Hz recuperate driver
- Heating by water – up to 60C
- Electricity recuperates to the grid
- Autonomies 30 kW grid
- All experiments in digital

TurboSphere's main parts production

- More 350 sq. meters
- CNC 5 axial milling center
- CNC vertical turning center
- Water cut machine
- Equipment for assembly
- etc.

Generated electricity can be used for …

Own needs of
object or enterprise

Transfer to other facilities, enterprises or to the grid

Creation of a new electric consumer:

- electric charging station for cars and urban transport
- battery station for traction and conventional batteries
- data center *
- industrial refrigerator *
- other consumers *

* it is possible to supply cold by decreasing the temperature of the gas

Advantages for consumers

Parameter	Reference stand	Amount
Cost of energy of excess pressure of natural gas	euro	0
The cost of waste heat energy	euro	0
Cost of electricity, from	cent/ 1 kW·h	2,0
Annual Savings in Conditional Fuel	t/1 kW	2,2
Annual emission reductions CO_2	t/1 kW·h	2,4

Parameter	period	Poland Europe
Profit on electricity production for every 10 kW of power	year	20..26k euro
Payback period	years	from 2

Main consumers

Markets

Gas transmission companies

Transmission lines

GAZ system

GASCADE

NET4GAS

GAZPROM

Distributing lines

PGNiG

ERDGAS

POLSKA SPÓŁKA GAZOWNICTWA

GAZPROM

Natural gas consumers

Industry

Grupa Azoty

ArcelorMittal

Cargill

Severstal

Power generation

PGE Polska Grupa Energetyczna

eco ENERGETYKA CIEPLNA OPOLSZCZYZNY SA

bpc GROUP ENGINEERING

SPBEC

Heat generation

PGNiG

EDF

TAURON POLSKA ENERGIA

MKTS

Product 1– Energy-efficient TurboSphere system for gas regulating points and units

Purpose: electricity production by means of natural gas excess pressure energy utilization
Installation site: gas regulating points and units (2nd and 3rd stages)

Equipment set:

- TurboSphere “3 in 1” PN16;
- Gas supply system;
- Warming heat carrier supply system;
- Power recuperation system;
- Power control room (if necessary).

Performance capability:

- Input pressure – 1,2/0,6/0,3 MPa;
- Output pressure 0,6/0,3/0,03 MPa;
- Gas flow rate 500-50000 m^3/h;
- Number of expansion stages 4-8;
- Gas heating type – built-in;
- Engine speed – up to 3600 rpm;
- Electric output from 5 to 400 kW

Advantages:

- Reliability and effectiveness;
- Built-in gas heating system by low-grade streams;
- Operates without gas combustion;
- No service required.

Economy:

- Lifetime – from 15 years;
- Cost of energy from 2¢/ kW·h.

TGU-15-6-H

Product 2 – Autonomous power supply system for Gas-regulator station based on TurboSphere

Purpose: provision gas-regulator stationwith autonomous uninterruptable power supply

Installation site: gas-regulator station (1st stage)

Equipment set:

- TurboSphere turbogenerator PN54;
- Gas supply system;
- Power recuperation system;
- Storage system;
- Emergency diesel-generator;
- Power control room (if necessary).

Performance capability:

- Extreme pressure – up to 5,4 MPa;
- Test pressure 8,1 MPa;
- Output pressure 0,3/0,6/1,2 MPa;
- Gas flow rate 400-1000 nm^3/h;
- Number of expansion stages 3-8;
- Gas heating type – boiler of the station;
- Engine speed– up to 3600 rpm;
- Electric power 5-11 kW.

Advantages:

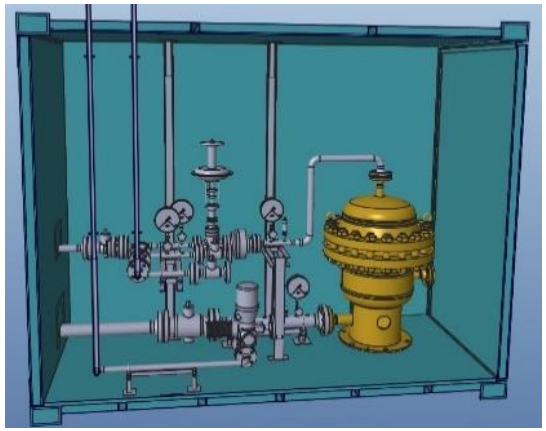
- Reliability and effectiveness;;
- Block-modular power plant installed on a turnkey basis;
- Operates from pressure differential;
- Constant power supply;
- Independence.

Economy:

- Lifetime – from 15 years

TGU-11-54

TGU delivery



TGU “TurboSphere” making

3 month

Formation of the complex on the basis of TGU "TurboSphere"

3 month

Construction, installation and commissioning works at the facility

3 month

Contact information

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“TurboSphere”

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