

TBRC

Domestic LNG regasification stations
with a system for the full recovery of
electricity and thermal energy

Company's goal

Construction of a network of dedicated LNG re-gasification stations that will provide power utilities comprehensively to production plants in Poland and abroad.

Construction of a new business model in the field of energy and gas supply to industrial plants in non-gasified areas through:

- Construction of a network of LNG re-gasification stations.
- Comprehensive, commercial service for entrepreneurs in the field of deliveries:
 - Thermal energy, the so-called low-temperature cold (LNG - temp. approx. $-163\text{ }^{\circ}\text{C}$)
 - Electricity obtained from LNG expansion in the regasification process;
 - Electricity and thermal energy obtained from the combustion of natural gas (high-efficiency cogeneration).



Objectives of the investment

01



Construction of a reference LNG regasification station.

02



Market commercialization of TBRC technology in production plants:

- Meat processing;;
- Fruit and vegetable processing;
- Cryorecycling of elastomers (e.g. Tire crushing)opon);
- lyophilization;
- dairies
- Industrial coolers;
- Ski tourism;
- Industrial power engineering;
- Gas pressing and compressors.

03



Managing and building the value of a company dealing in:

- Station service and sales of energy utilities
- searching for new applications for TBRC technology.

04



Economic activity

Regasification of LNG at the terminal in Świnoujście and island stations - current technology in use

PROBLEM

In the currently used LNG regasification technology, the entire LNG regasification process is carried out by burning a part of LNG in order to change the state of LNG concentration from liquid to gas. This happens with the participation of complex pumping systems that consume large amounts of electricity. Practically all of the "cold energy" is lost as a result - it is released into the environment.

The island stations use regasification technologies, ambiente, on which the cold is completely lost.

01

Loss of the cold energy from LNG

The cold energy accumulated in LNG (-163 ° C) is completely lost into the environment in the regasification process. The estimated annual cost for the terminal in Świnoujście is approx. PLN 2.5 billion.

02

High demand for electricity.

Low energy efficiency of the currently used regasification technologies.

03

Emission of CO₂ into the environment

With the burning of gas, carbon dioxide emissions occur.

04

Higher bills for the final recipient

The gas bill includes the costs of LNG regasification and is charged to every gas buyer.

Solution - TBRC technology

(Totally Browsed Rankine Cycle)

TBRC TECHNOLOGY

The TBRC technology enables the recovery of electricity and thermal energy (the so-called low-temperature chill of approx. -163°C), collectively referred to as "cold energy", in the LNG regasification process for commercial use.

This is a specially designed system of heat exchangers with the installation of electricity and thermal energy production.

It is a Polish solution protected in the international PCT patent procedure and the only such an efficient solution in the LNG regasification area on a global scale.

01

Full recovery of cold energy

The cold energy accumulated in LNG (-163°C) is fully recovered in the regasification process and commercially transferred to the final recipient.

02

Full electricity recovery

Increasing energy efficiency through the production of electricity in the process of gas expansion by a classic engine

03

Zero CO₂ emission



TBRC technology is characterized by zero emission of gases to the environment.

04

Comprehensive service for the final recipient

- Lower bills for all types of energy supplied to the consumer
- Comprehensive service for the entrepreneur by one supplier of all types of energy.

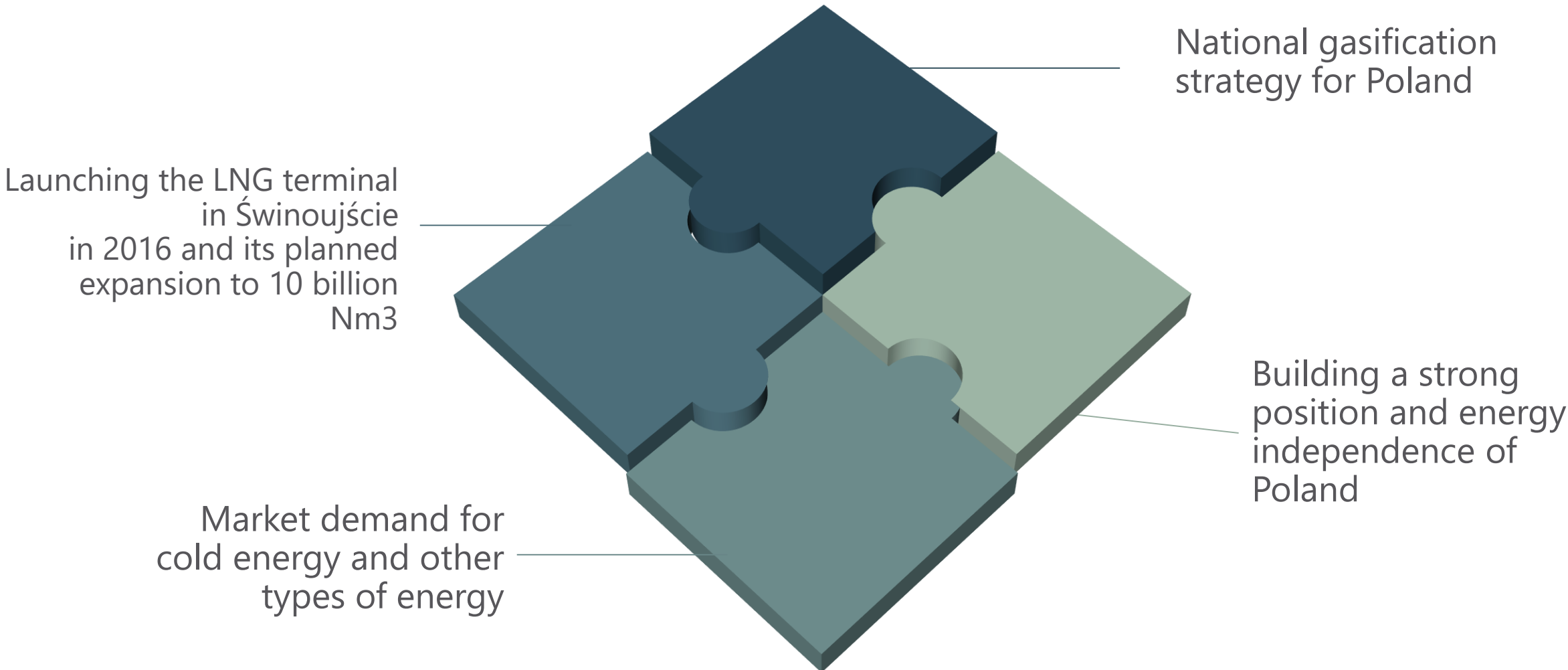
Comparison of LNG regasification technologies in the scope of "cold energy" reception

	Cold energy recovery (thermal)	Electrical energy claim
AAV (<i>ambient air vaporizers</i>)	0	0
STV (<i>shell and tube vaporizers</i>) oraz SCV (<i>submerged combustion vaporizers</i>)	0	0
ORV (<i>open rack vaporizers</i>)	0	0
TBRC		

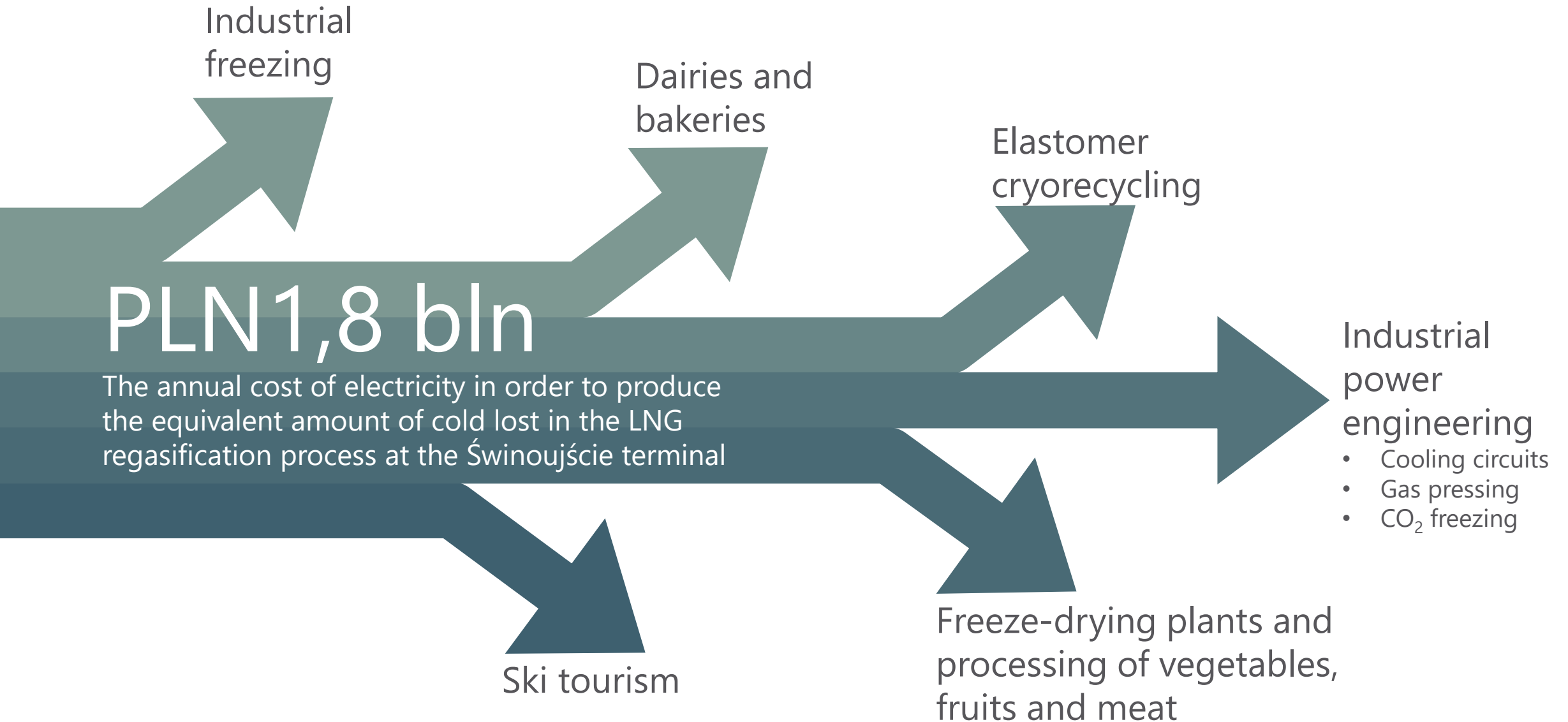
Why now?



Why now?



TBRC technology commercial applications



Competition

Direct competition has not been identified due to the uniqueness of the technology and the patent claim.

On a global scale, a competitor is any entity involved in supplying any form of energy to end users (primarily production plants from the areas identified above).

Market research shows that no energy supplier offers comprehensive supply of thermal energy (cold), electricity, and thermal energy (heat) in a single balancing process on the market based on LNG regasification stations.



TBRC technology product:

Domestic LNG re-gasification station

The "cold" energy from the LNG re-gasification process in TBRC technology is a side effect (it is "free") of the gas expansion process: the cold (-163 ° C, through the heat exchanger system goes directly to the end user) and electricity generated from pressure derived from the gas expansion (using engines and expanders).

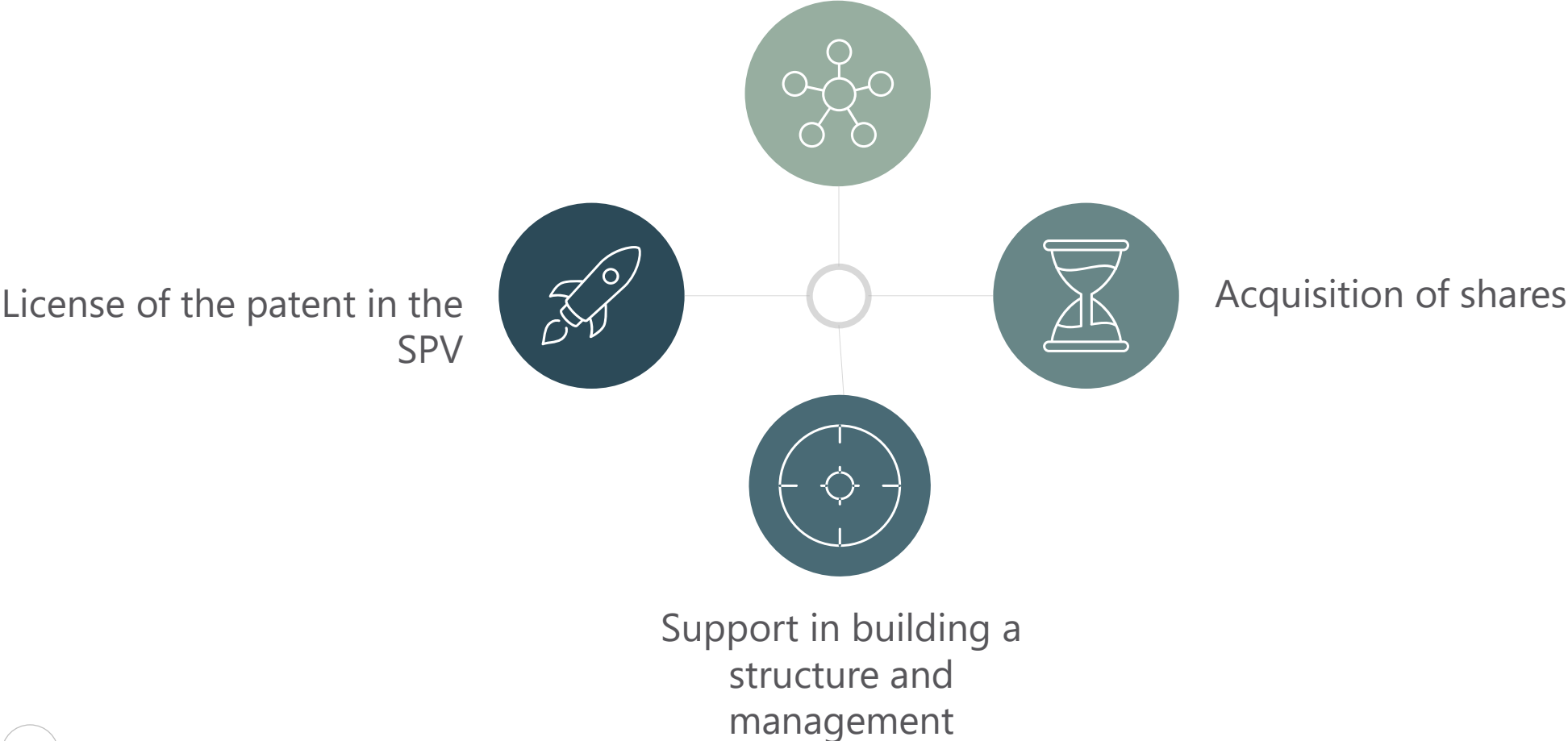
Key benefit

All the gas in the process is left to the benefit of the TBRC operator for further development, eg the production of other types of energy needed by the contractor (heat, steam, electricity) - this is possible to obtain under the TBRC technology. The surplus gas can be resold to the gas grid (eg gasification of nearby communes), as well as compressed into CNG (and then resold with double or triple the profit).

Business model

Cooperation structure with a potential investor

A joint-venture SPV



Financial projections

Financial projections for a typical installation in a selected dairy plant

Conservative scenario

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues	4,5	4,5	4,5	4,5	4,5
EBITDA	3,6	3,6	3,6	3,6	3,6
Net profit	1,967	1,94	2,021	2,048	2,080
Cash flow	2,634	2,661	2,688	2,715	2,747
Cash flow cumulated	2,634	5,295	7,983	10,697	13,444

*PLN mln

Financial projections

Financial projections for a typical installation in a selected dairy plant

Optimistic scenario

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues	18,6	18,6	18,6	18,6	18,6
EBITDA	17,7	17,7	17,7	17,7	17,7
Net profit	13,388	13,415	13,442	13,469	13,496
Cash flow	14,055	14,082	14,109	14,136	14,163
Cash flow cumulated	14,055	28,137	42,246	56,381	70,544

*PLN mln

Team



Tadeusz Bąk
President

TBRC – author and patent holder.
Associated with scientific communities,
involved in energy projects. He deals with
the development of innovative
technological solutions in the power
industry, gas industry and chemistry.



Marek Gościcki
Vice President

TBRC – author and patent holder.
Experienced specialist in electronics and
automation, organizer of many business
ventures and nationwide events.



Radosław Wojak
*Strategy and Business Development
Director*

Economist and specialist
in project management

Gas Engineering sp. z o. o.

Strategic technological partner



Jarosław Korczak
President
Gas Engineering Sp. z o. o.



Kazimierz Markiel
Technologist, constructor, quality control
inspector

A dark, teal-tinted silhouette of a city skyline, featuring several prominent skyscrapers against a lighter sky. The central building has a distinctive spire.

Our coordinates.

Clean World Energy Systems Sp. z o. o.



www.cwes.pl



Ul. Tytusa Chałubińskiego 8,
00-613 Warszawa



505-123-084
515-939-894