

CIRCULAR ECONOMY - A GLOBAL CHALLENGE FOR CONSTRUCTION INDUSTRY.

2ND ECCA CONFERENCE

December 5th, 2017, Kołobrzeg, Poland

**MIĘDZYNARODOWA KONFERENCJA
„BUDOWNICTWO WOBEC
GLOBALNYCH WYZWAŃ GOSPODARKI
O OBIEGU ZAMKNIĘTYM”**

5 grudnia 2017 r., Kołobrzeg



Energy in circular economy – example of Kołobrzeg Energy Cluster

dr inż. Tadeusz Żurek, Sea Development



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of the European Union



In reference to the circular economy,
we can say that:

One of the most important elements of the closed-circuit economy must be to respect not only raw materials but also energy



Therefore, we must improve energy efficiency in various sectors of the economy



Kolobrzeg Energy Cluster

- ▶ **Location:**
 - ▶ **West Pomeranian voivodeship, Kolobrzeg**
- ▶ **Cluster members :**
 - ▶ **Sea Development Sp. z o.o. (Kołobrzeg),**
 - ▶ **Green Scope Sp. z o. o. (Kołobrzeg)**
 - ▶ **The Kolobrzeg Health Resort S.A. (Kołobrzeg SPA),**
 - ▶ **American Systems Sp. z o.o. (Poznań),**
 - ▶ **The Baltic Cluster Association sEaNERGIA (Kołobrzeg)**
 - ▶ **Koszalin's polytechnic (Koszalin),**
 - ▶ **State Higher Vocational School in Elbląg (Elbląg)**
- ▶ **Supporting institutions :**
 - ▶ **Poviat Eldership in Kołobrzeg(Kołobrzeg)**
- ▶ **Coordinator of the cluster:**
 - ▶ **dr inż.Tadeusz Żurek**

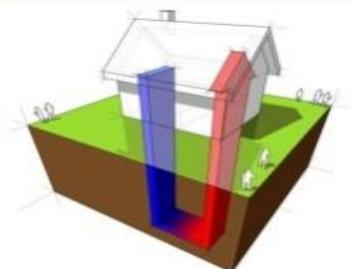


Location of the Kołobrzeg Energy Cluster West Pomeranian voivodeship, Kołobrzeg



The goals and tasks of the Kolobrzeg Energy Cluster

- I. Development of dispersed energy sources using cogeneration and renewable energy sources**
- 2. Introduction of intelligent energy management systems in tourist and health facilities
(to optimize energy efficiency EE)**
- 3. Use of local fuels and energy resources**



The goals and tasks of the Kolobrzeg Energy Cluster

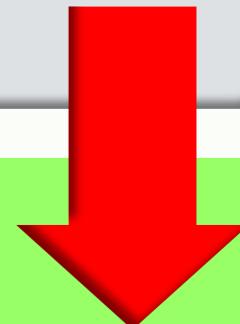
- 4. The development of modern technologies in the micro scale power industry
(technical solutions for improving energy efficiency in Small and Medium-sized Enterprises)**

- 5. Construction of a modern laboratory of Energy related Vocational Education, based on smart grids, artificial intelligence and virtual reality**



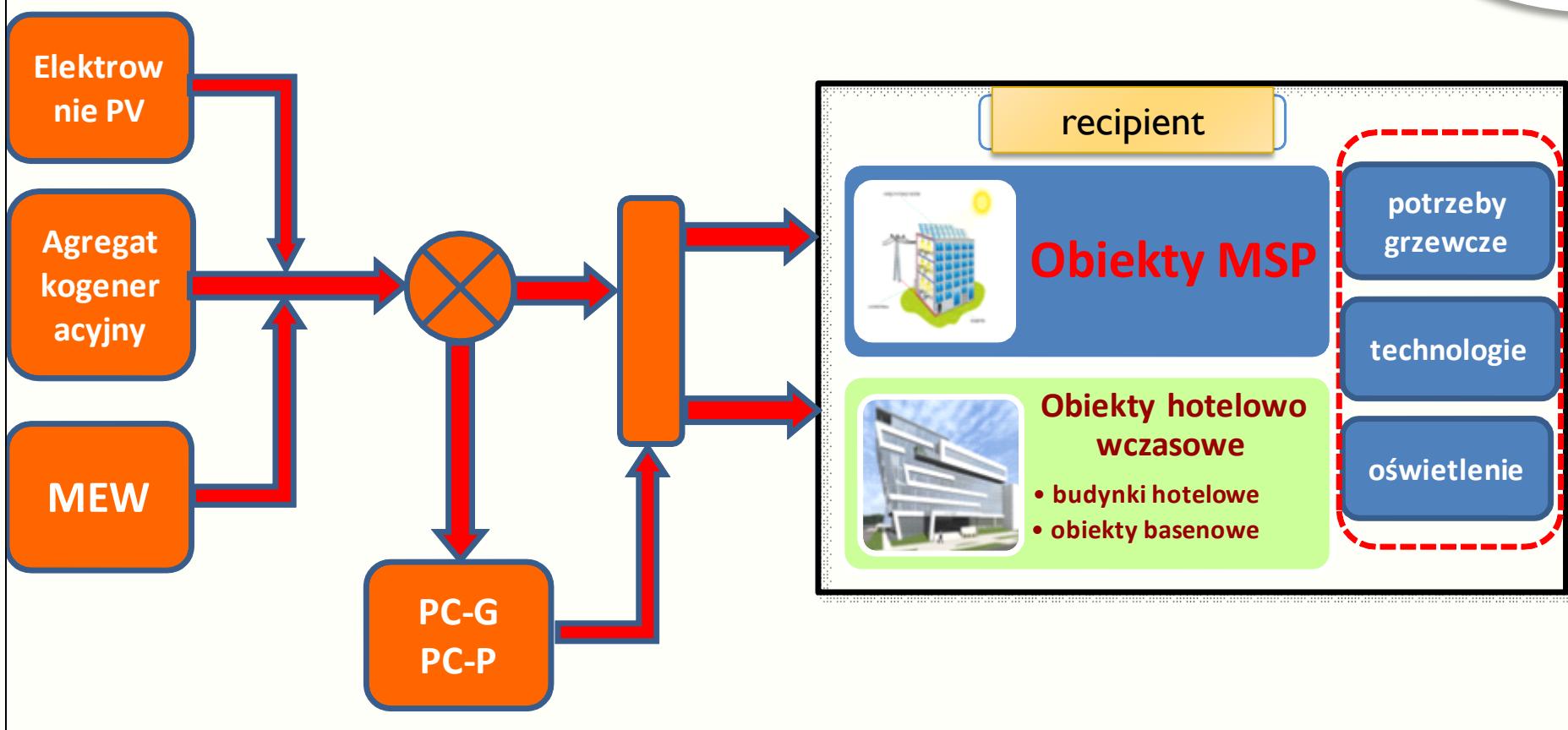
SOURCE OF ENERGY CLUSTER

(THE BASIC SEGMENT OF ENERGY DISTRIBUTION)



independent, locally separated but technically integrated set of devices and energy systems
- grouping a **limited number** of producers, prosumers and consumers

ENERGY CLUSTER CONCEPT OF ENERGY SOURCE



LIST OF INSTALLED EQUIPMENT

1. **Cogeneration unit (CHP) for natural gas, type VITOLOC 200 Typ EM-140/207**
 - electrical power **140 kW_e**,
 - thermal power **207 kW_t**,

cooperates with an absorption aggregate and with heat pumps and a PV power plant
2. **Cooling absorption unit (CAU) type WATER FIRED CHILLER WFC-SC 50 (YAZAKI)**

cooling power **175,8 kW** - cooperates with a cooling tower, enables effective cooperation with a cogeneration unit in the **trigeneration system**

LIST OF INSTALLED EQUIPMENT

3. **Ground heat pump type Vitocal 300-G Pro BW302.C110**
 - heating power **106,6 kW_t**,
works with CHP and CAU blocks and with a PV power plant
4. **Reversible air heat pump type Energycal AWH PRO AT 125.2**
 - heating power **126,8 kW_t**,
 - cooling power **100,7 kW_t**,
 - cooperates with CHP and CAU blocks as well as with PV power plant

LIST OF INSTALLED EQUIPMENT

5. Photovoltaic power plant (PV):

- electrical power **80,0 kW_p**,

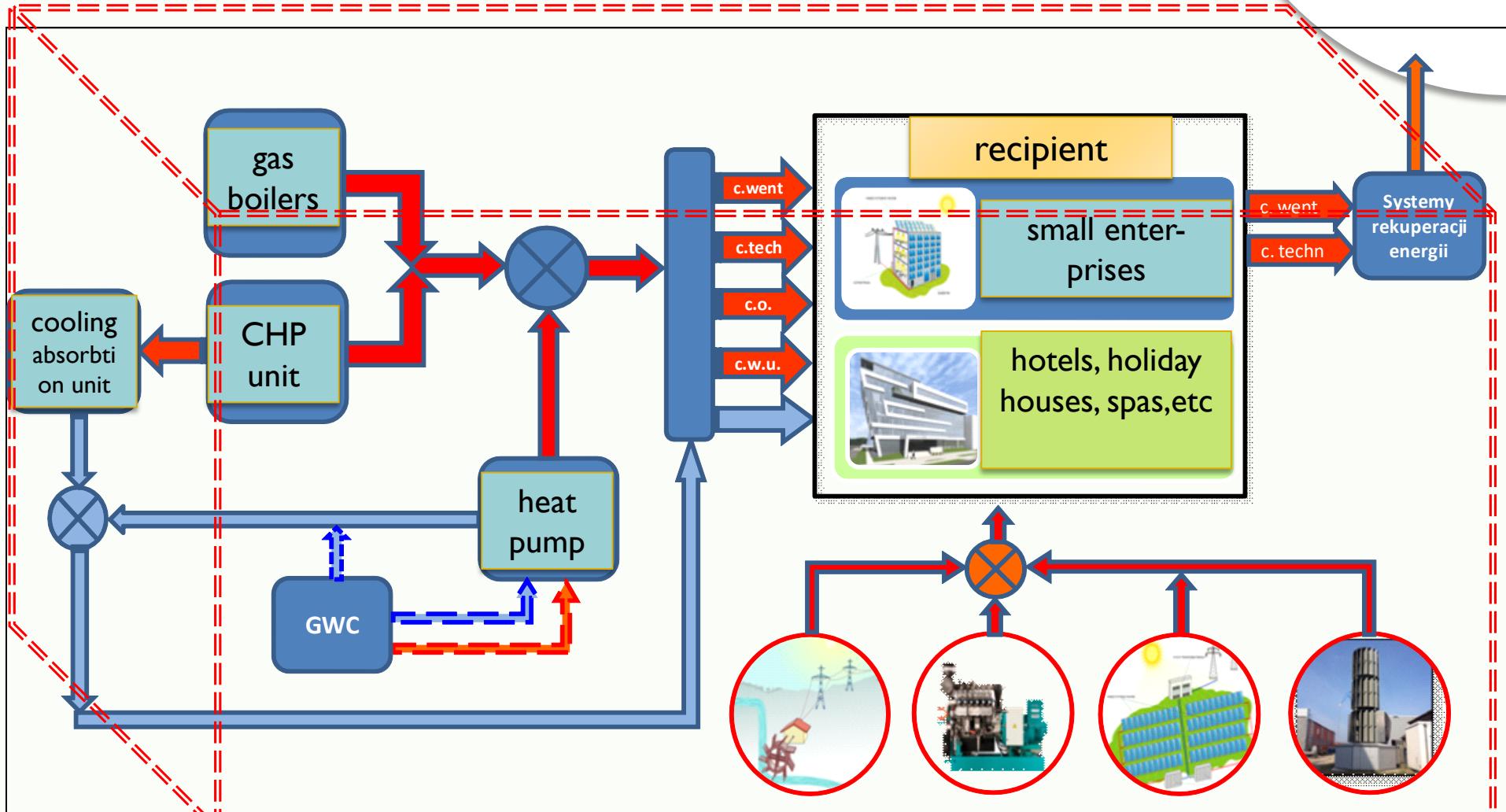
works with the CHP block and heat pumps

6. Three **small wind farms** type **Ecorote 2800**, working in the vertical axis system :

- single electric power - **2,8 kW_e**,
- total electric power **8,4 kW_e**,

cooperates with a PV power plant and heat pumps

SMART ENERGY MANAGEMENT SYSTEM



CHP & RENEWABLE ENERGY SOURCES



**Cogeneration unit
(the basis of the energy system
of the facility)**

**photovoltaic power plant (PV)
small wind farms (SWF)**



The 10 largest CO2 emitters in the EU in 2016 [million tons] (*)

Top 10 der Kraftwerke mit den höchsten Treibhausgasemissionen in der EU im Jahr 2016

Sieben der CO₂-intensivsten Kohlekraftwerke stehen in Deutschland

this applies to professional power engineering



In reference to the circular economy,
we can say that:



*„The cheapest is energy ...
which was not made to cover
unnecessary losses”*

Thank you for your attention

Dziękuję za uwagę

