

The UrbanBiogas Project Business Models for Biomethane Plants



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Training course on business models and agreements
in the biogas sector

Content

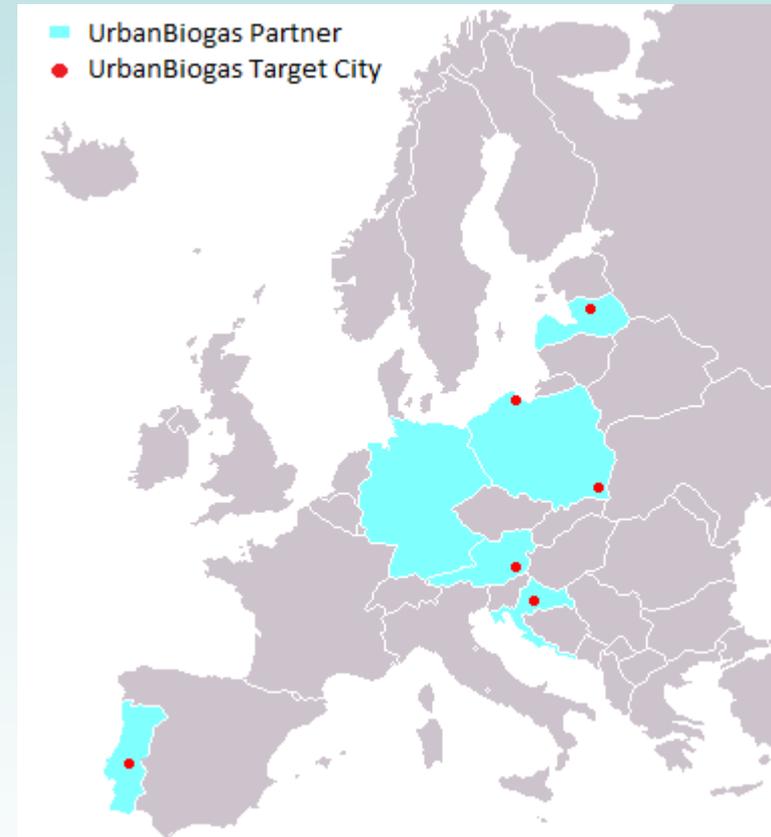
- **The UrbanBiogas Project**
- The use of waste as feedstock for biogas production
- Business models of biogas/biomethane projects

Project Summary

- **Objective:**
to promote the use of organic urban waste for biogas production in 5 target cities in order to inject biomethane in the natural gas grid and to use it in transport.

→ Development of WtB concepts
in 5 EU Cities

- **Target cities:**
 - City of Zagreb (Croatia)
 - City of Graz (Austria)
 - Municipality of Abrantes (Portugal)
 - City of Gdynia/Rzeszow (Poland)
 - City of Valmiera (Latvia)



Project Partners

- **WIP – Renewable Energies**, Germany
- **Fraunhofer IWES Institute**, Germany
- **Energy Institute Hrvoje Požar**, Croatia
- **City of Zagreb (Zagrebački Holding)**, Croatia
- **Polish Biogas Association**, Poland
- **IrRADIARE**, Portugal
- **Municipality of Abrantes**, Portugal
- **EKODOMA**, Latvia
- **North Vidzeme Waste Management Company**, Latvia
- **Graz Energy Agency**, Austria
- **Podkarpacka Energy Management Agency**, Poland



Selected Activities and Outcomes

Main objective:

- **5 concepts** for the target cities on urban waste management, biogas and biomethane production and use
- **5 business agreements** for WtB projects in the target cities

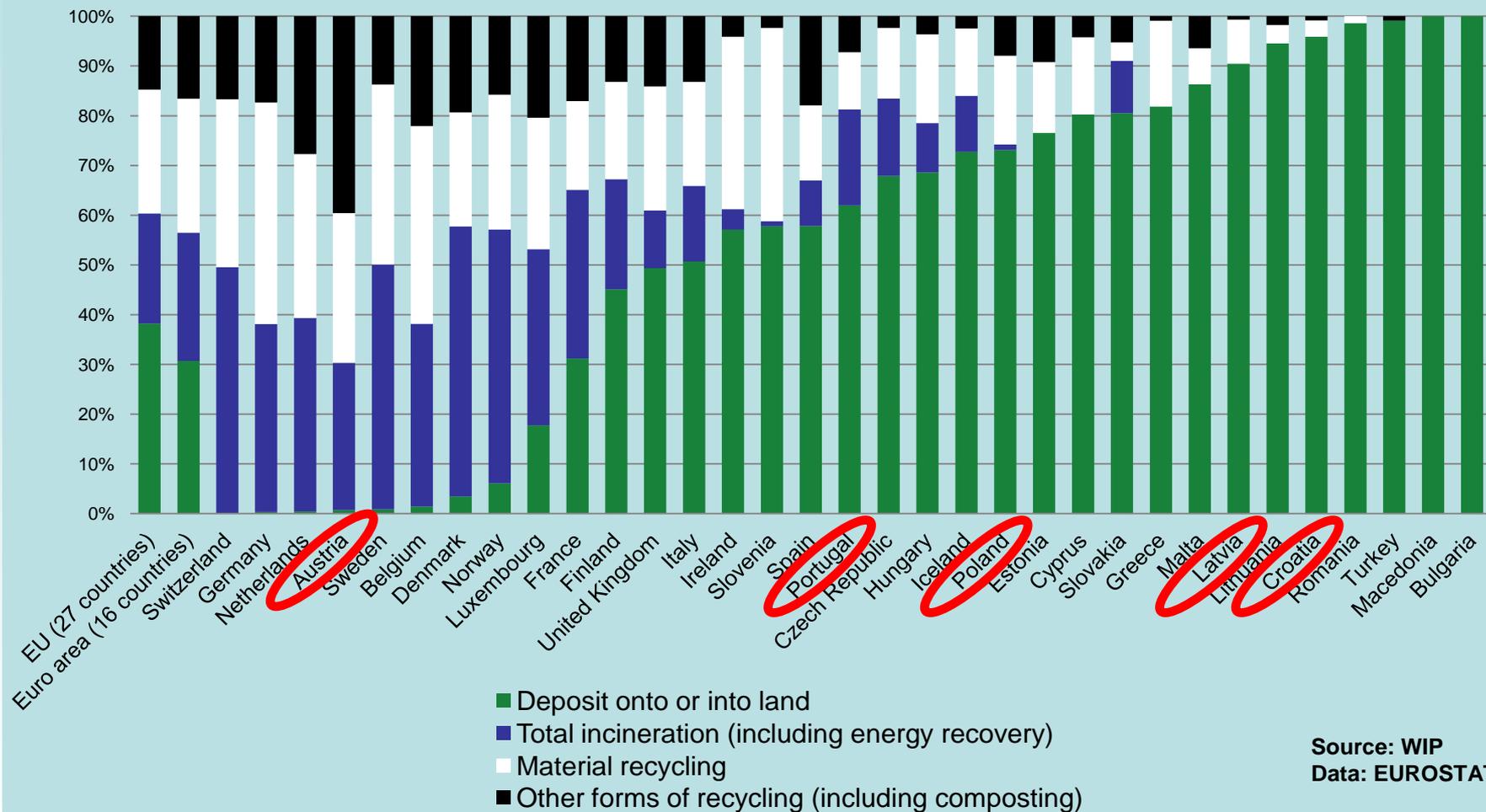
Main activities:

- **90 Task Force meetings** in the 5 target cities to elaborate concepts
- **15 training courses** on urban waste management, biogas and biomethane production and use for city representatives
- **5 events for biogas plant companies** to promote their technologies
- **5 National expert consultation meetings** on the use of biomethane
- **9 WtB promotion events for other European Cities**

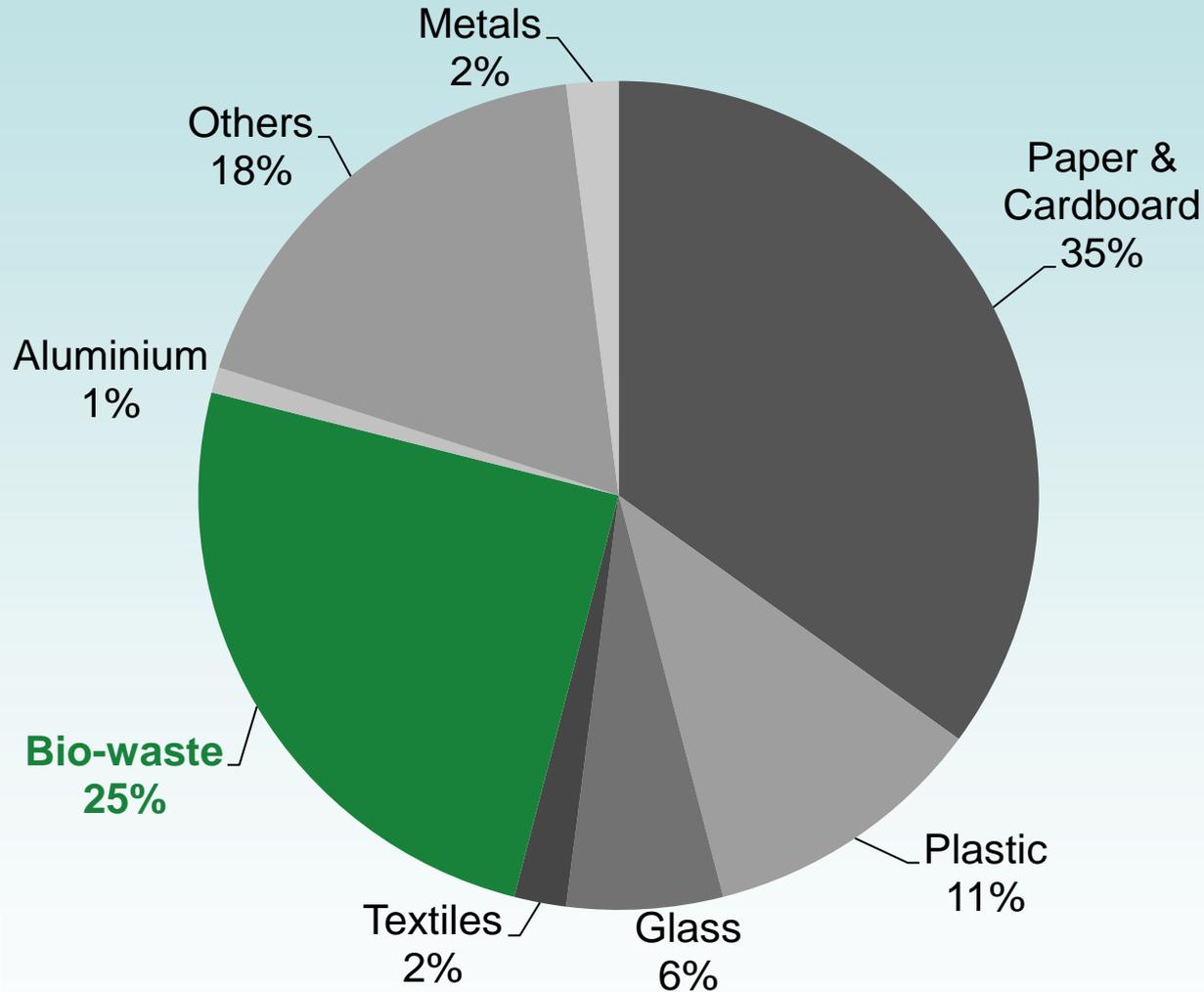
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- **The use of waste as feedstock for biogas production**
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Treatment of municipal waste in Europe in 2010



Typical composition of MSW



Treatment Methods for Bio-waste



Landfill

- Reduction necessary to comply with Directive 2006/12/EC
- Landfill gas could be energetically used, but energy output is low
- No use of nutrients is possible



Incineration Plant

- + Energetic use
- "waste heat" is often un-used
- No use of nutrients is possible
- High investment costs and other barriers for new plants
- Long transport ways due to centralised plants



Household Composting

- + Common practice in many cases
- + High-value end-product: closed nutrient cycle
- + No sophisticated logistics needed
- No energetic output
- Not all waste is suitable for private composts
- Not possible in urban areas



Industrial Composting

- + Common practice in many cases
- + High-value end-product: closed nutrient cycle
- No energetic output



Anaerobic Digestion

- + High energetic output**
- + High-value end-product: closed nutrient cycle**
- + Opportunity to produce transport fuels**
- Still needs non-technical support**

Advantages of Bio-waste Digestion

- Production of high-quality fertilizer
- Substitution of fossil fertilizer
- Closure of nutrient cycles
- Renewable energy production
- Technology with high GHG emission savings in comparison to other bio-waste treatment technologies
- Production of transport fuel (biomethane) with high energy content
- Biomethane from bio-waste as transport fuel fulfils the GHG reduction mandates of the RED
- Smaller decentralized treatment plants allow short transport distances of bio-waste



„WtB“ Supply Chain

- Waste companies
- Consumers
- Municipalities

Waste Management



- Biogas plant operator

Biogas Production



- Biogas plant operator
- Gas utility
- Technology supplier

Biogas Upgrading
Biomethane Production



- Biogas plant operator
- Gas utility

Grid Injection



- Consumers
- Public transport sector
- Filling stations

Natural Gas
Substitute

Transport



Why Biomethane?

Why are biomethane projects in some cases preferable than „only“ biogas projects?

- For plants that have no heat consumer in the vicinity
 - Biomethane can be used at any heat sink that is close to the natural gas grid
 - For transport applications
 - Natural gas grid acts as storage system
- Biomethane projects are very investment intensive
- The upgrading step is profitable only at larger-scale
- Typical sizes: e.g. Germany 125 - 5,000 m³/h; average about 600 m³/h

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- The UrbanBiogas Project
- The use of waste as feedstock for biogas production
- **Business models of biogas/biomethane projects**

Business Models – Business Concepts

- Key factor to the success of the biogas plant is the Business Model
- Business Concepts are influenced by:
 - main service
 - main customer
 - main product
 - main feedstock
 - involved partners
 - funding source
 - other factors
- A combination of these factors characterize the Business Concept of a biogas plant
- “Typical” Business Models exist for biogas plants, however each Business Concept is individual

Influencing Factors of Business Concepts

- Main service:** energy supply, waste treatment, contribution to power grid stability
- Main customer:** energy utility, grid operator, municipality, private homes
- Main product:** biogas, electricity, heat, biomethane, transport fuel, digestate/compost
- Main feedstock:** energy crops, farm products, municipal solid waste, wastewater sludge, agro-industrial waste, catering waste
- Involved partners:** plant operator, feedstock supplier, energy utility, municipality, project developer, consultant, authorities, equipment providers, consumers, banks, investors, traders
- Funding source:** equity, debt capital, closed, closed investment fund, etc.
- Other factors:** size of the plant, location, local/national framework conditions

Business Models

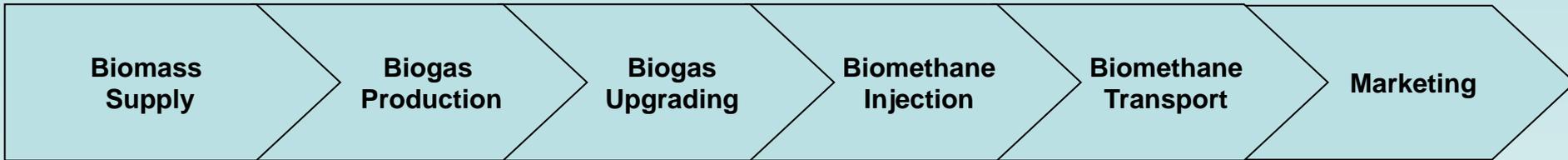
Biogas

- Agricultural plants: one or several farmers are feedstock suppliers and biogas plant operators
- Waste plants:
 - the biogas plant is often owned by the waste company...
 - ... and/or waste material is collected by the operator from several sources (getting tipping fees)

Biomethane

- Business models and involved partner structure is more complex
- Usually dedicated operating companies are set-up

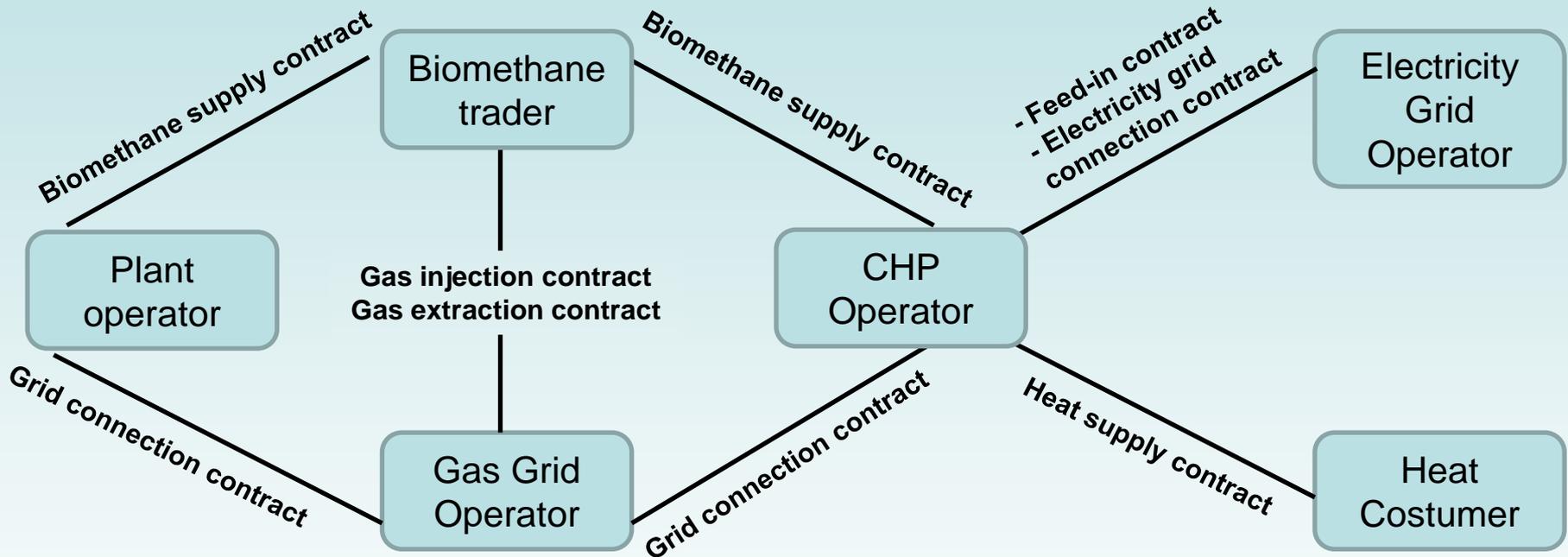
„Typical“ Business Concepts for Biomethane Projects



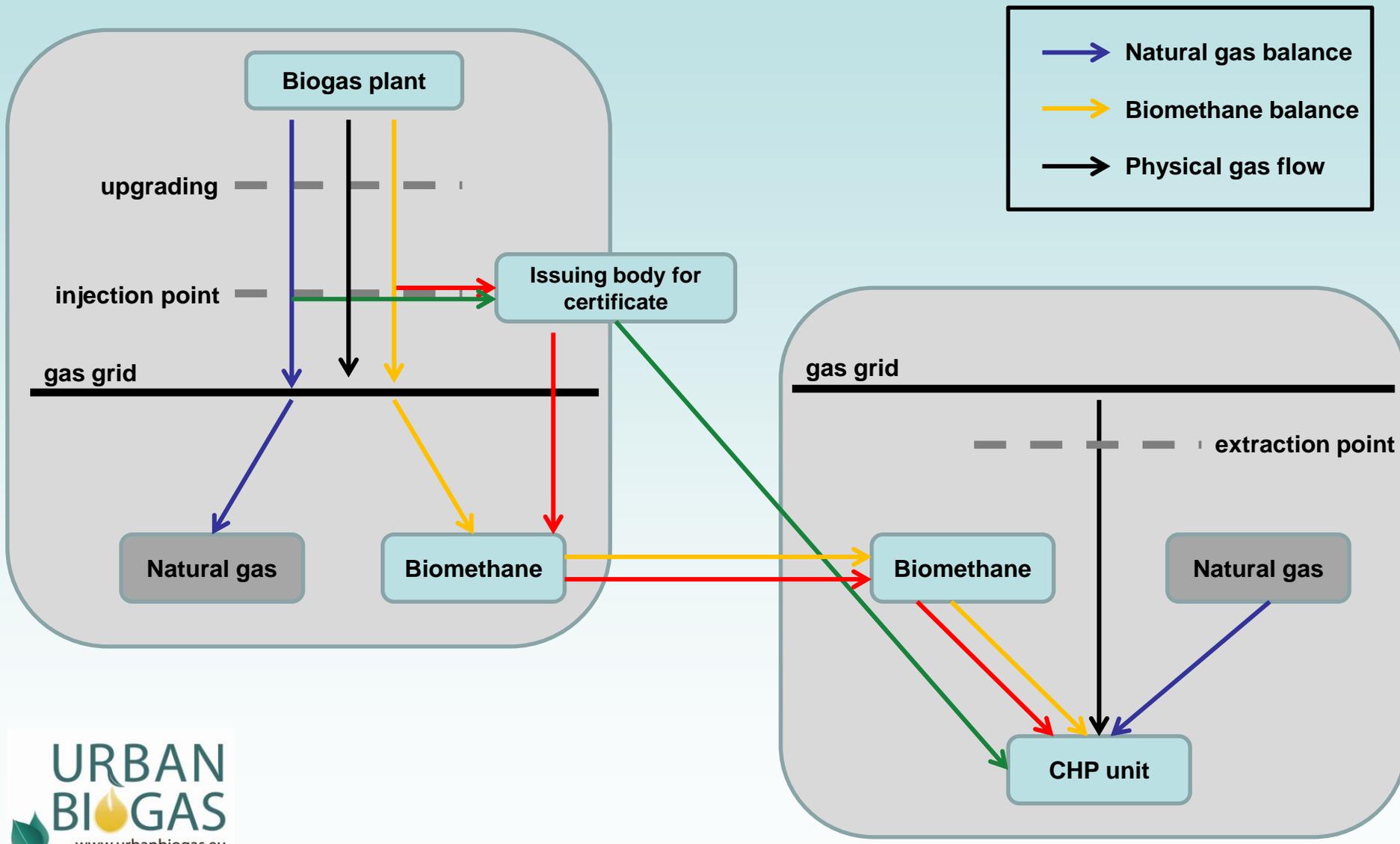
Potential involvement opportunities – „Business models“



Contractual structures of biomethane projects



Biomethane Certificate Systems



Thank You!

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