



GROWTH PERSPECTIVES FOR BIOGAS IN FINLAND – POTENTIAL OF DEVELOPING BUSINESS ECOSYSTEMS

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THE STUDY MADE FOR SITRA: COULD ECOSYSTEM DEVELOPMENT ADVANCE BIOGAS BUSINESS ?

- A business ecosystem is a broader concept than a value chain.
 - **The primary value chain:** Subcontractors, suppliers, production and internal customers
 - **The extended value chain:** External clients and the clients of clients. Supply chains in a broader sense.
 - **The ecosystem:** All the above, as well as players who can influence business activity, like authorities, associations, solution and business developers
- The study made for Sitra (the Finnish innovation fund) analyzed the potential of ecosystem development to advance biogas business in Finland.
- In addition, **a wide range of other enabling actions was identified**, ranging from boosting the demand of end products to national policies supporting biogas

BIOGAS IS SPEEDING UP IN FINLAND AND EXAMPLES OF ECOSYSTEMS CAN BE FOUND

Biogas in Finland 2015

Overall production of biogas ~180 million m³/a (850 GWh/a)

- Cf. Sweden: more than 1800 GWh/a

Vehicle biogas: 24 refueling stations

- Cf. Sweden: 161 public refueling stations, vehicle consumption appr. 1600 GWh

Energy from biogas: 600-700 GWh, less than 1% of renewable energy

- Cf. Germany: 41 000 GWh, energy from biogas ~5% of overall consumption

Biogas production on ~15 farms.

- Cf. Sweden ~50, Germany over 8000

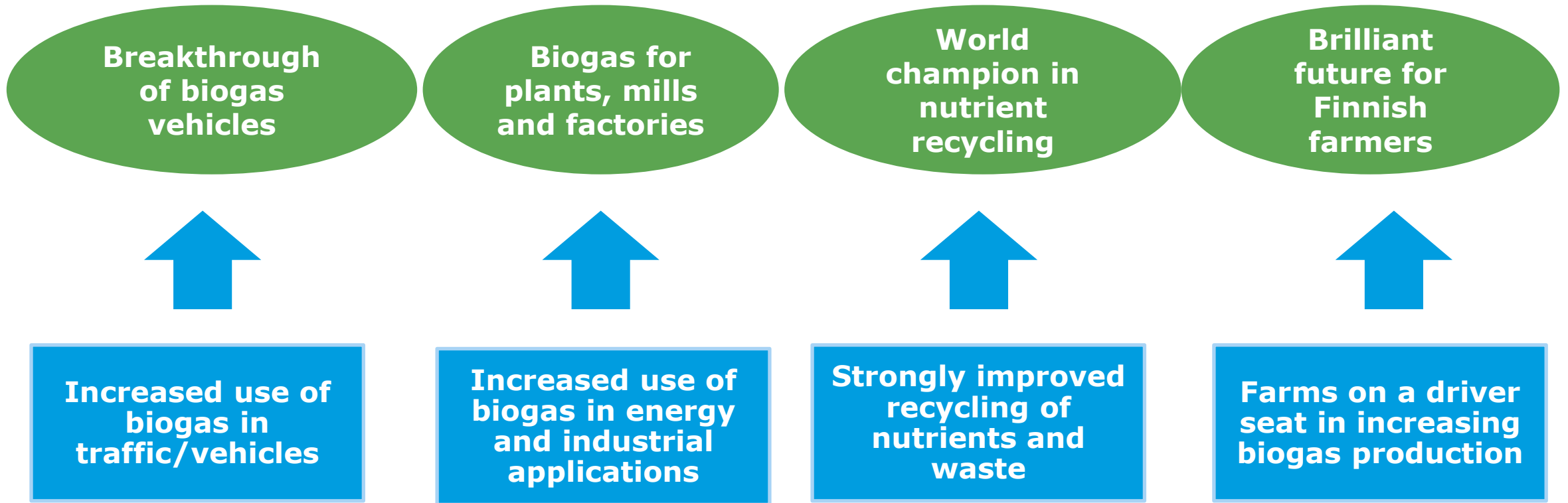
Examples of up-and-running ecosystems in Finland

- Envi Grow park, Forssa
- Jepua's Biokaasu Oy
- Ab Stormossen Oy around Vaasa
- Ekokem Circular Economy Village at Riihimäki
- Kalmari's farm at Laukaa.



THE FRAMEWORK FOR THE STUDY: FOUR PATHS (SCENARIOS) FOR BIOGAS GROWTH

VISION FOR GROWTH



THE MOST IMPORTANT GROWTH DRIVER

BUSINESS POTENTIAL IN END-USE TERMS: HUNDREDS OF MILLIONS EUROS A YEAR

- Finnish biogas association: In Finnish farms and agriculture, potentially 2-10 TWh of energy could be produced (includes manure and crops)
- A study by Tähti and Rintala: The theoretical biogas production in Finland adds up to 24,4 TWh, technically and economically viable production up to 9,2 TWh
- Gasum: Bio-based gases have a combined potential of 15-18 TWh (1/3 of natural gas usage in Finland).
- Long term national climate and energy strategy sets the goal as 4-5 TWh

+ 5 TWh/a of heat with an end user price 30-50 eur/MWh

150 – 250 million euros

OR

+ 5 TWh/a of electricity with an end user price 70-90 eur/MWh

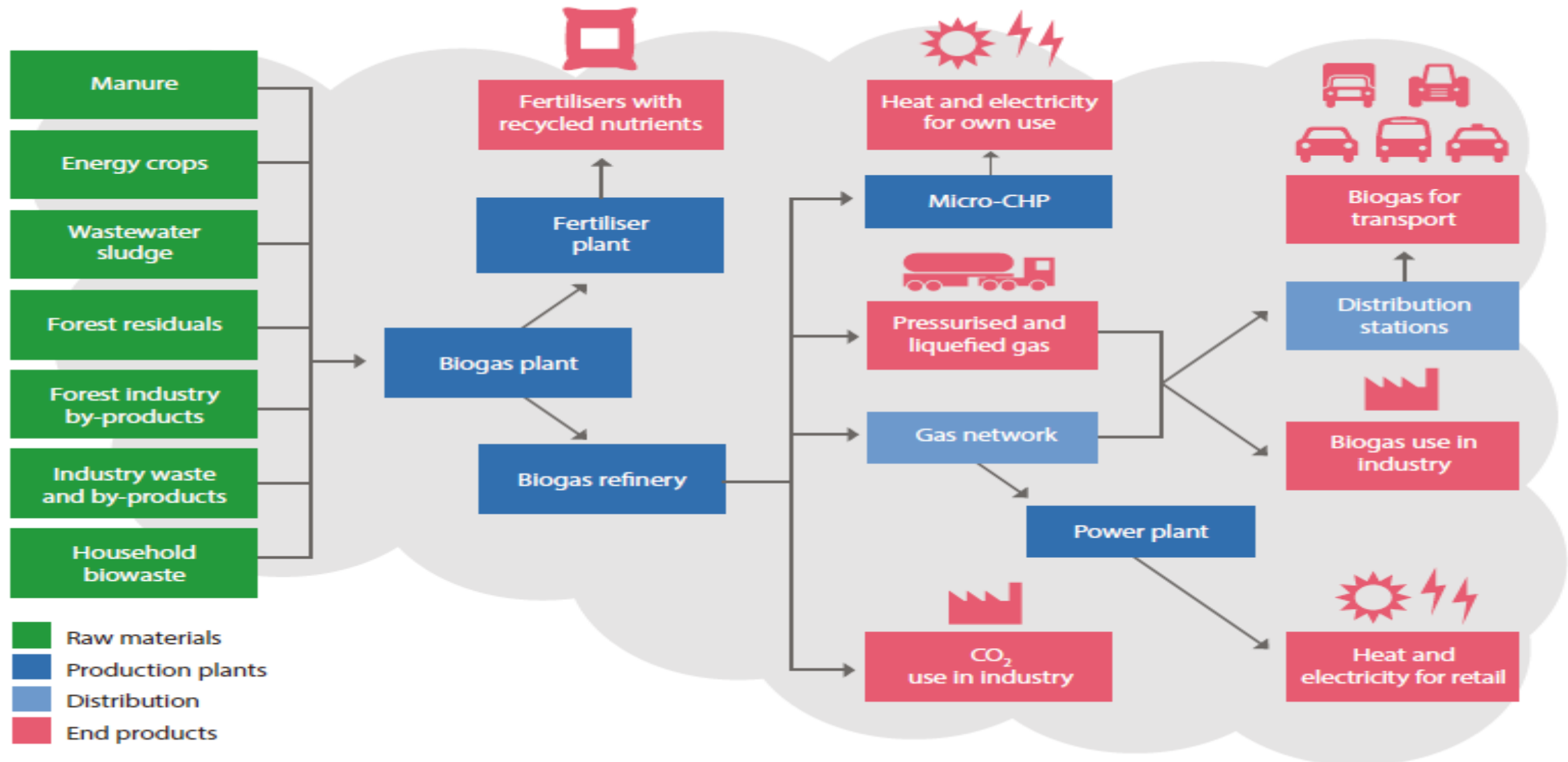
350-450 million euros

OR

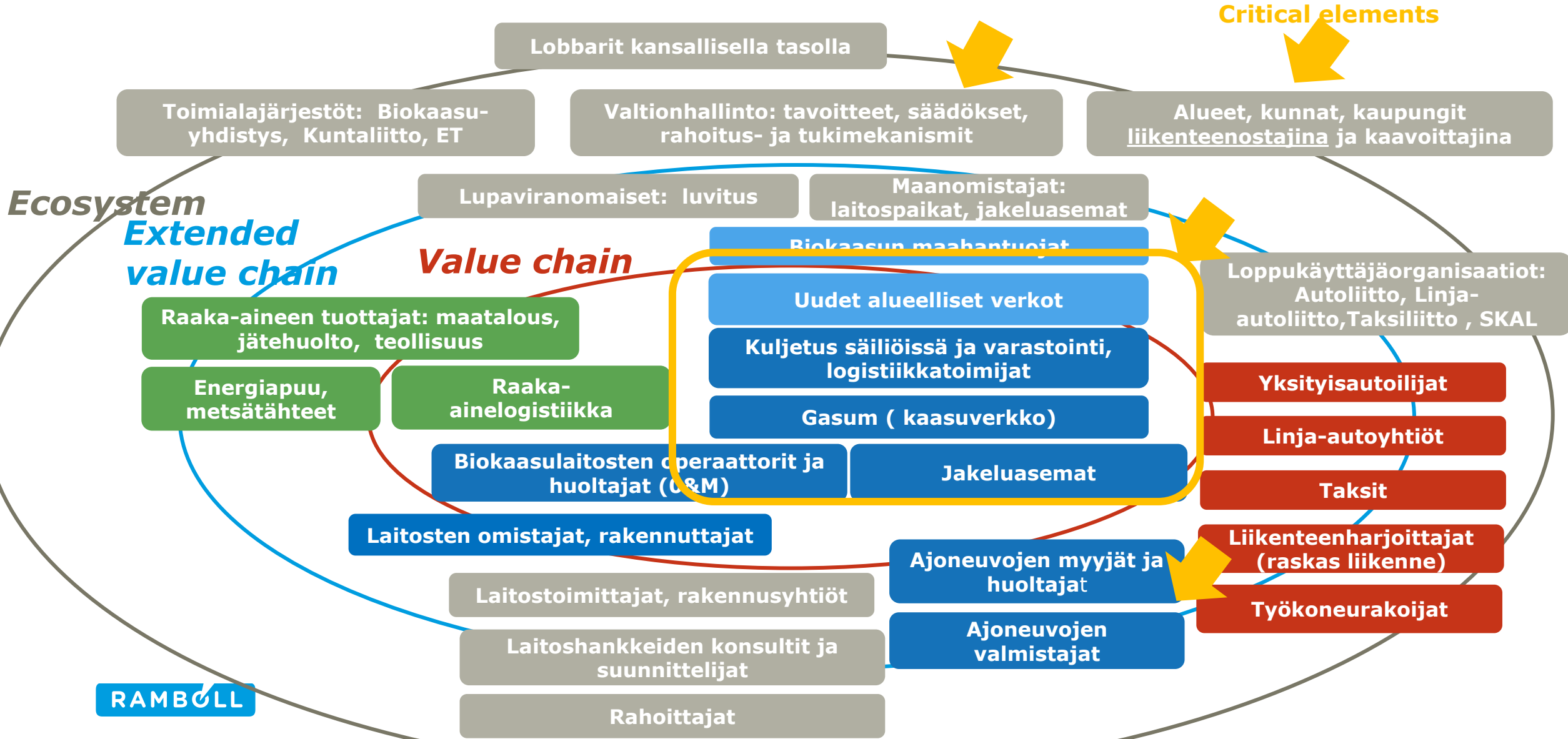
+ 5 TWh/a of vehicle gas with an end user price 90 eur/MWh

450 million euros

A SIMPLIFIED OVERVIEW TO THE BIOGAS ECOSYSTEM



AN EXAMPLE OF THE MORE DETAILED ANALYSIS: "BREAKTHROUGH OF BIOGAS VEHICLES"



EXAMPLE OF A FUTURE ECOSYSTEM: PALOPURO AGROECOLOGICAL SYMBIOSIS



Integration of different, but connected operations

Minimizing the need to purchase energy, feeds, and fertilizers.

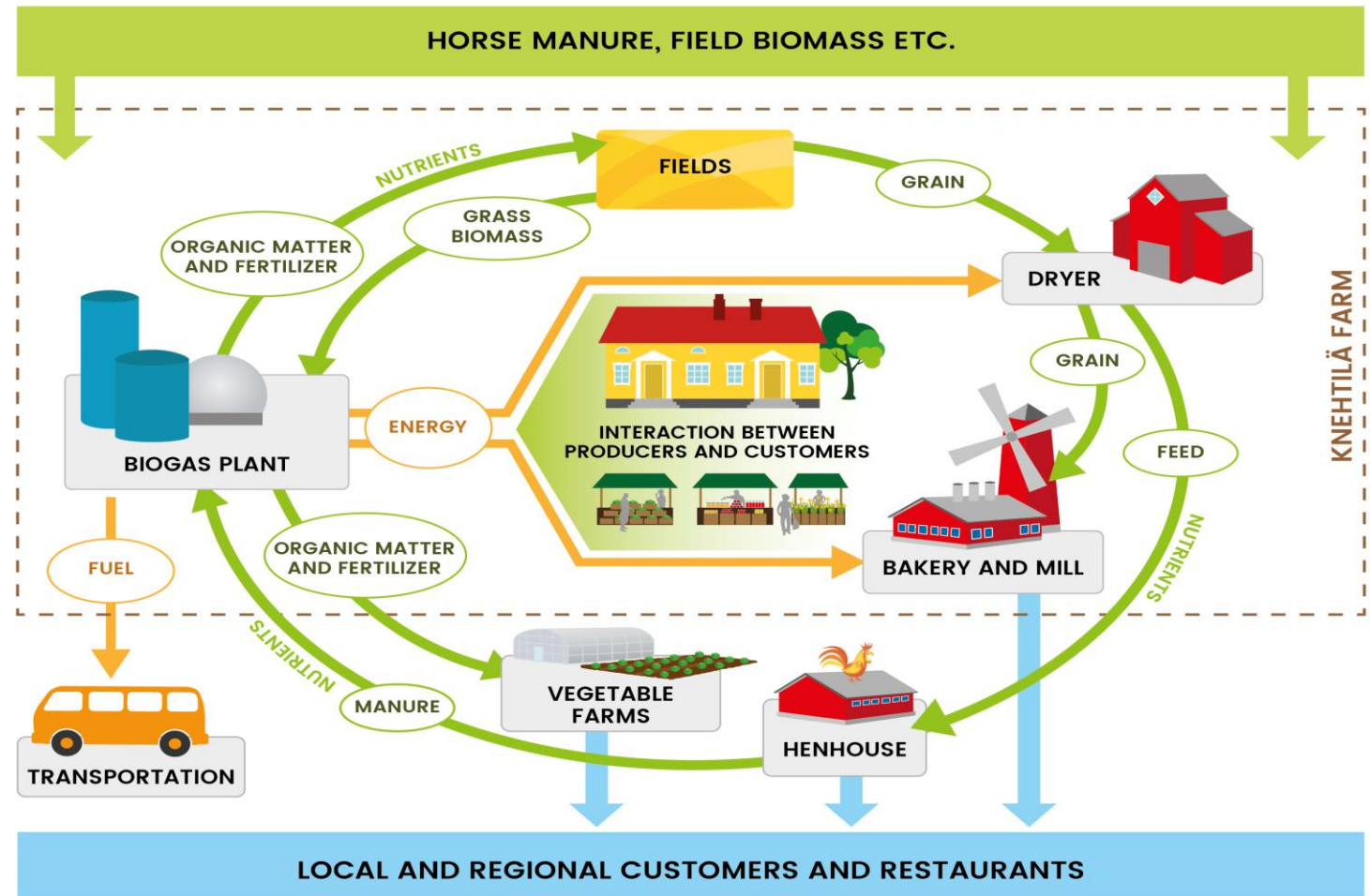
Making additional income by selling excess bioenergy

Reducing the greenhouse gas emissions per unit of product.

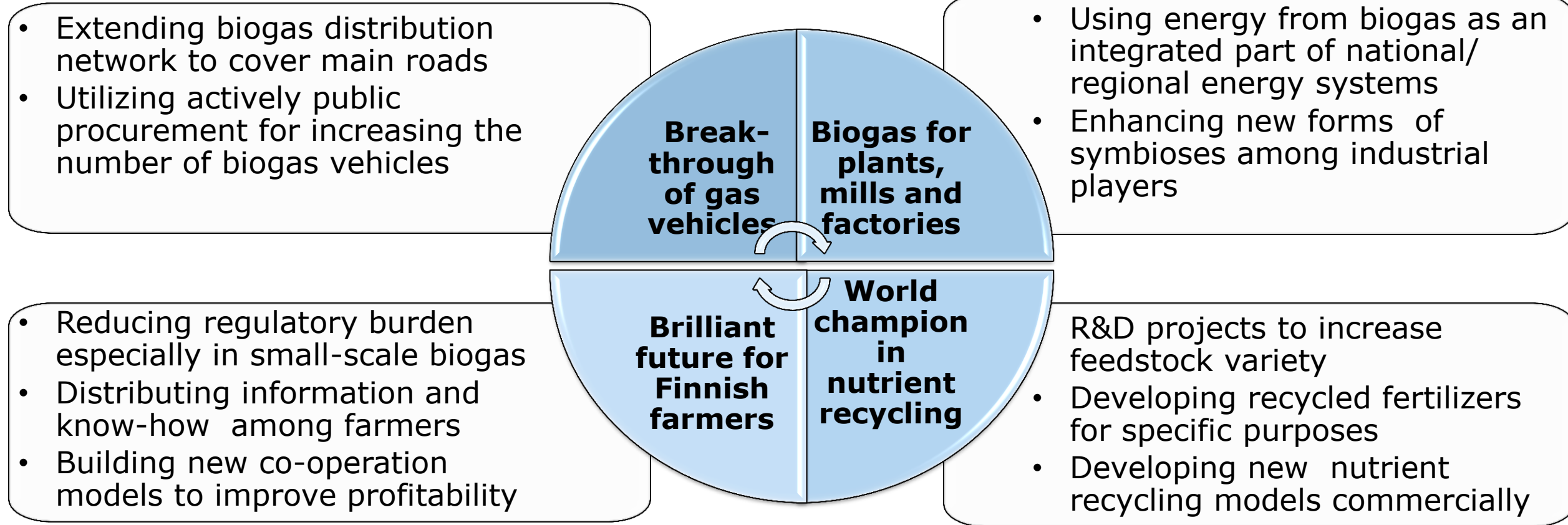
Increasing the nutrient cycling, reducing nutrient loss

Reconnecting local consumers with the source of their food.

Palopuro Agroecological Symbiosis



MORE THAN 80 FACILITATING OR ENABLING ACTIONS WERE IDENTIFIED, EXAMPLES



Updating regulations and subsidy mechanisms

RAM Providing guidance and support in national strategies and policies

Activating and unifying communication and lobbying for biogas

MESSAGES TO BE DELIVERED TO VARIOUS PLAYERS

MESSAGES TO BIOGAS PRODUCERS

- ✓ **Search actively possibilities to broaden co-operation with companies and farms in your neighbourhood**

MESSAGES TO BIOGAS BUSINESS DEVELOPERS

- ✓ **Develop new operating and financing models to reduce risks related to investments**

MESSAGES TO FARMERS

- ✓ **Search actively co-operation possibilities outside your own farm, either in upstream (raw materials) or downstream (biogas usage) in order to share the investment risk**

MESSAGES TO NUTRIENT MANUFACTURERS

- ✓ **Put active efforts to develop recycled nutrients for specific purposes together with biogas producers and farmers**

MESSAGES TO FACTORIES , MILLS AND INDUSTRIAL PARKS

- ✓ **Study and develop actively biogas symbiosis outside your primary value chain. Be active to pilot new co-operation models to share risks and improve profitability**

MESSAGES TO TECHNOLOGY SUPPLIERS AND SOLUTION PROVIDERS

- ✓ **Develop service-based solutions to lower the investment threshold. Implement actively pilots in domestic markets, aim at international markets**

EXAMPLES OF RECENT ECOSYSTEM DEVELOPMENT

Finland's leading biogas producer Gasum aims to expand its circular economy model with Soilfood, a Finnish startup producing organic fertilizers. In their cooperation model, nutrient residues generated in biogas production are processed into nutrient-rich targeted fertilizers mainly to be used by farmers. This makes the recycling of valuable nutrients more efficient. (Source: Gasum)

EcoEnergy SF is investing in first-of-its-kind biogas plant to process the pulp slurries. EcoEnergy SF Oy – a sister company to Envor Protech - is currently building a biogas plant in the area of MetsäFibre Bioproduct Mill in Äänekoski. Biogas plant shall process the wastewater slurries of the Bioproduct Mill, and turn those into biogas for transportation, fertilizers and solid biofuel. (Source: Envor Protech)

Jyväskylä, together with the entire Central Finland, wishes to be a trendsetter in biogas-powered driving. The City of Jyväskylä wants to lead by example by converting garbage trucks and the city's leasing cars into biogas-powered versions. The popularity of biogas-powered driving is expected to grow with the help of the biogas production plant to be commissioned at Mustankorkea, together with new biogas filling stations. (Source: City of Jyväskylä).

THANK YOU! QUESTIONS? COMMENTS?

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