

A comparative study of four biomethane retail markets in Europe

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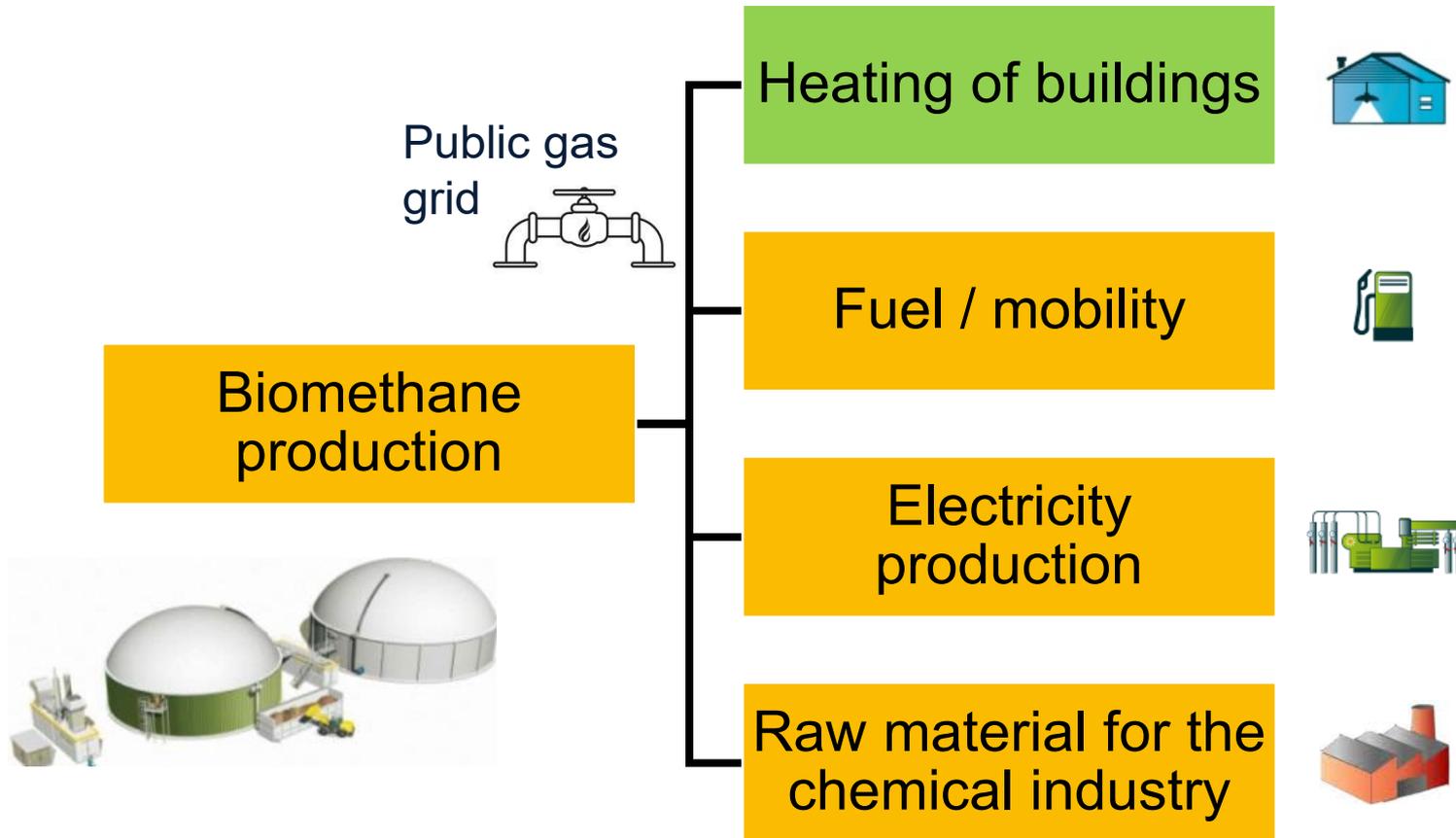
AIEE, Rome, December 12, 2019



Agenda

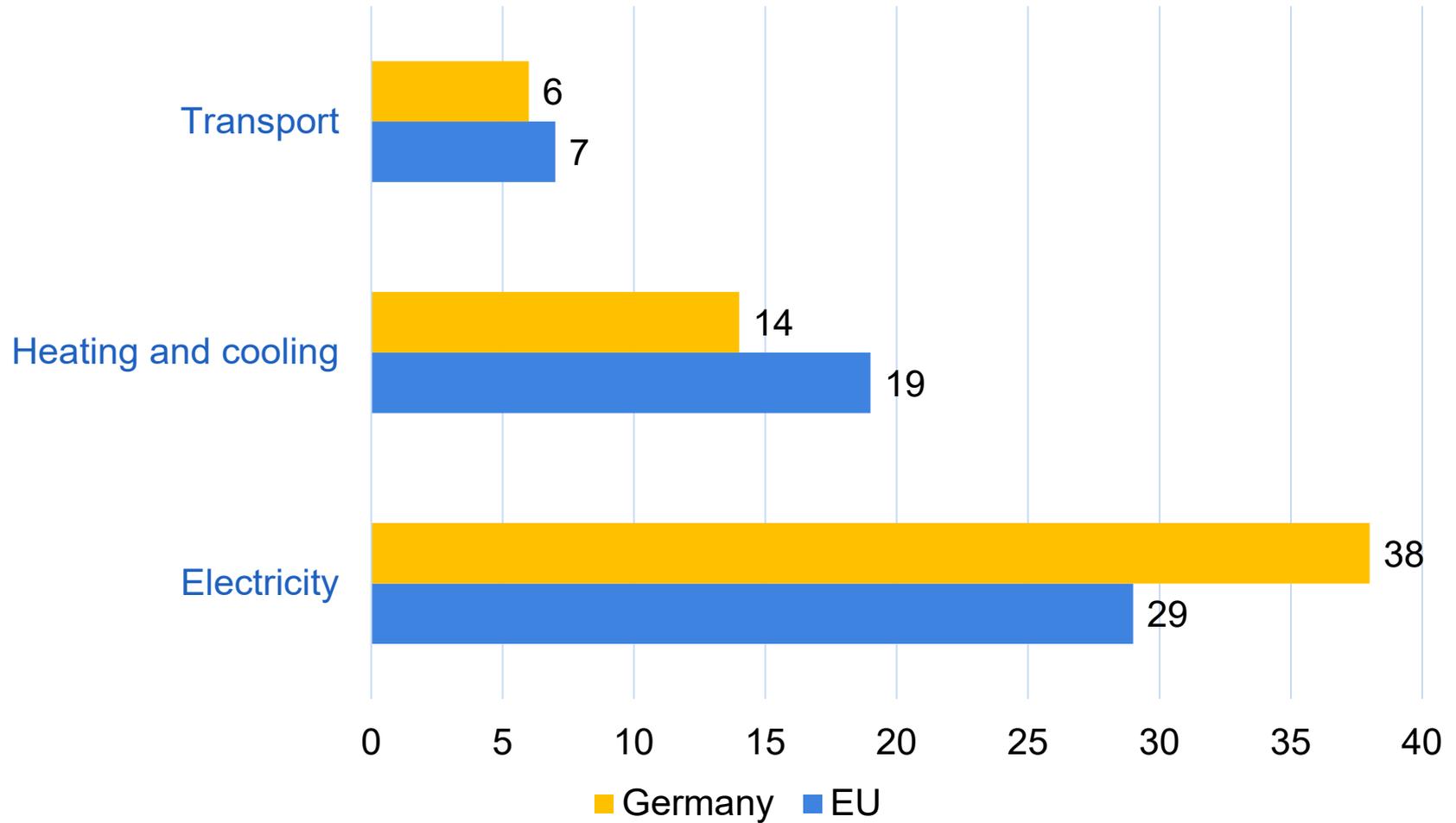
- Introduction: The role of biomethane in the energy sector
- Hypotheses and methods
- Results
- Discussion and conclusion

Use paths of biomethane



Pictures: Nawaro BioEnergie AG

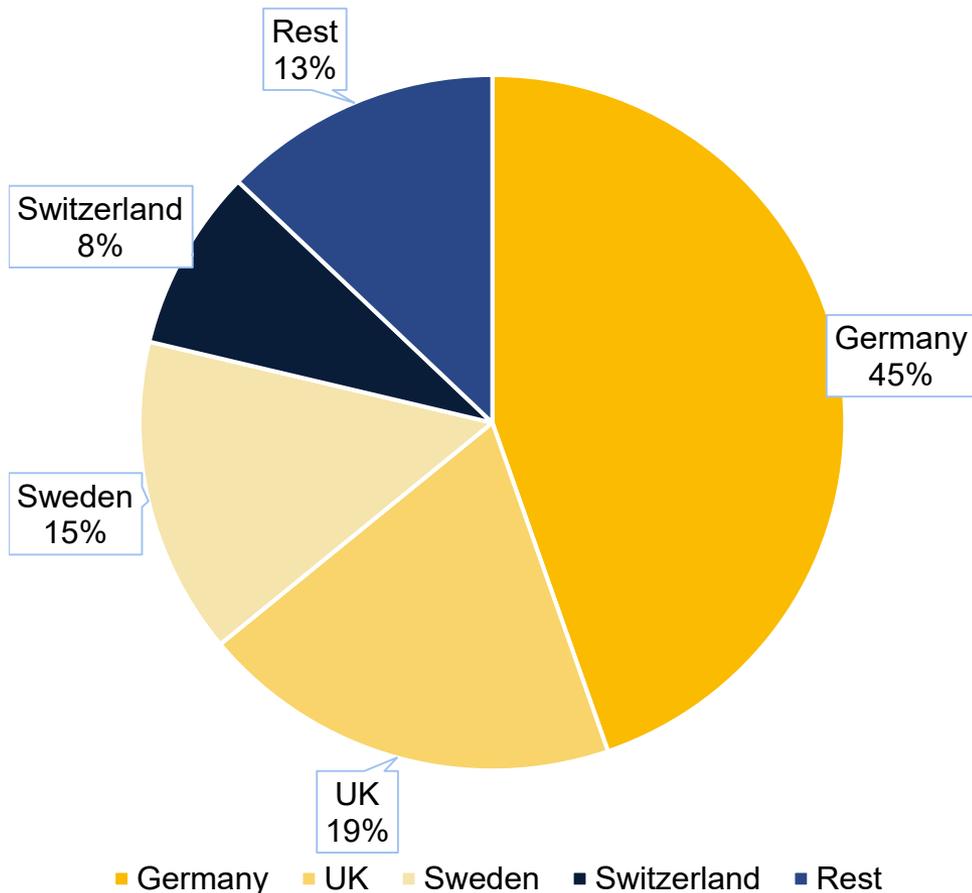
Renewable shares by sector



EU: 2015; Germany: 2018

Biomethane production in Europe

Number of biomethane plants in the EU



- Total production in the EU 2015: 1.2 bn cubic meters = 12 TWh
- Various support schemes: feed-in-tariffs (e.g. France), quotas, indirect support schemes
- Different foci: e.g. in Germany CHP, in Sweden fuel
- Partly ambitious goals, e.g. France

Products for private households

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🌱 15% green gas
That's sustainable biomethane. To offset the remaining 85%, we invest in lots of green projects. Protecting 500,000 hectares of threatened CO₂-absorbing forests around the world is just the beginning.

Past research on consumer preferences

Preferences for renewable energy

Preferences for renewable electricity

High renewable content: Grosche and Schroder, 2011; Mozumder et al., 2011

Local: Ebers and Wüstenhagen, 2016; Kaenzig et al., 2013; Kalkbrenner et al., 2017; Ma and Burton, 2016; Tabi et al., 2014; Vecchiato and Tempesta, 2015

Eco-label: Kaenzig et al., 2013; Mattes, 2012; Tabi et al., 2014; Wüstenhagen and Bilharz, 2006

Preferences for biomethane

High biomethane content: Forsa, 2013

Biomethane from waste: Forsa, 2013

Eco-label: Forsa, 2013

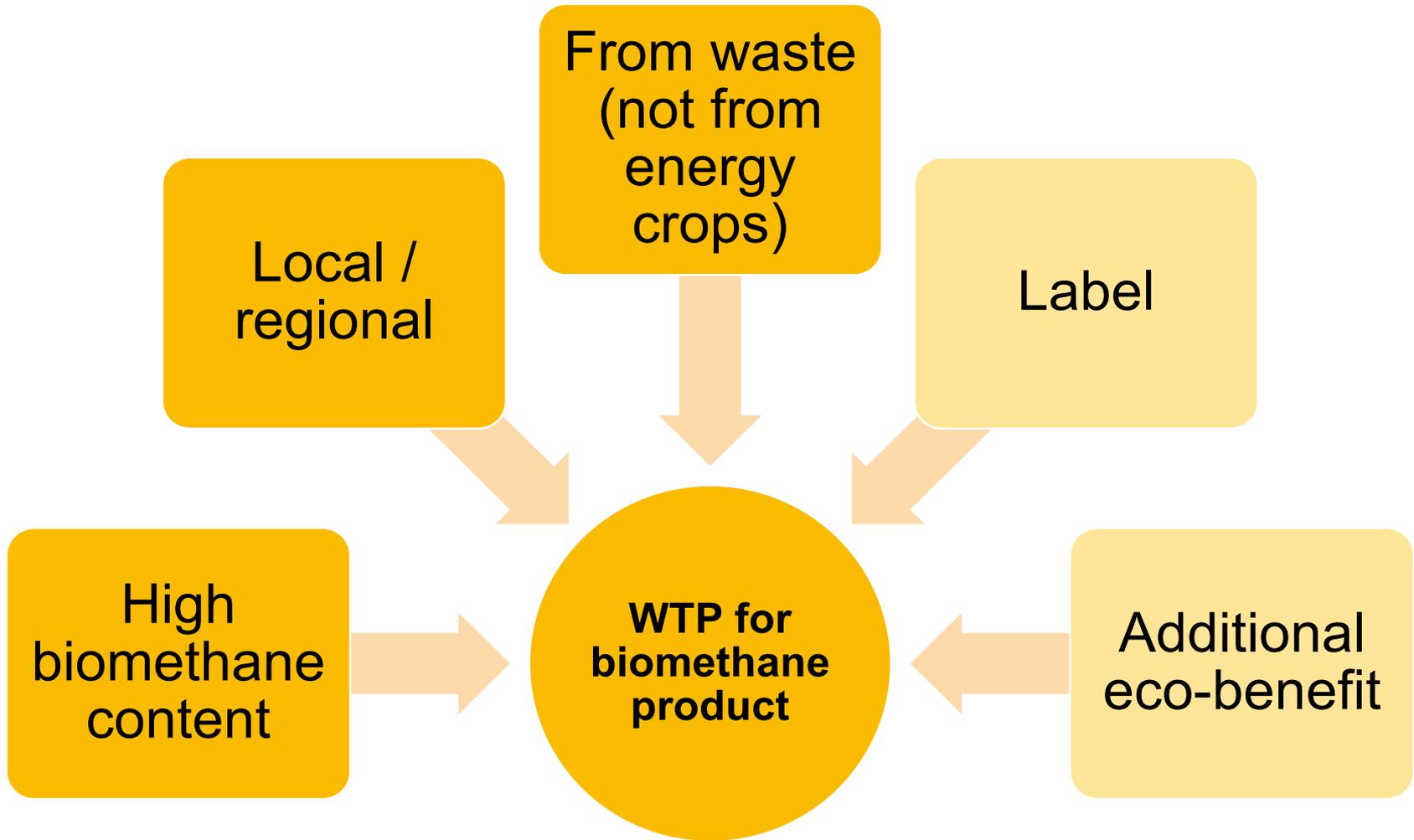
Discourse on bio-gas (in Germany)

Negative view on energy crops:
Herbes et al. 2014a;
2014b

Providers' pricing strategies (Germany only)

Only biomethane content has an influence: Herbes et al. 2016

Factors possibly influencing WTP for biomethane



Hypotheses based on past research

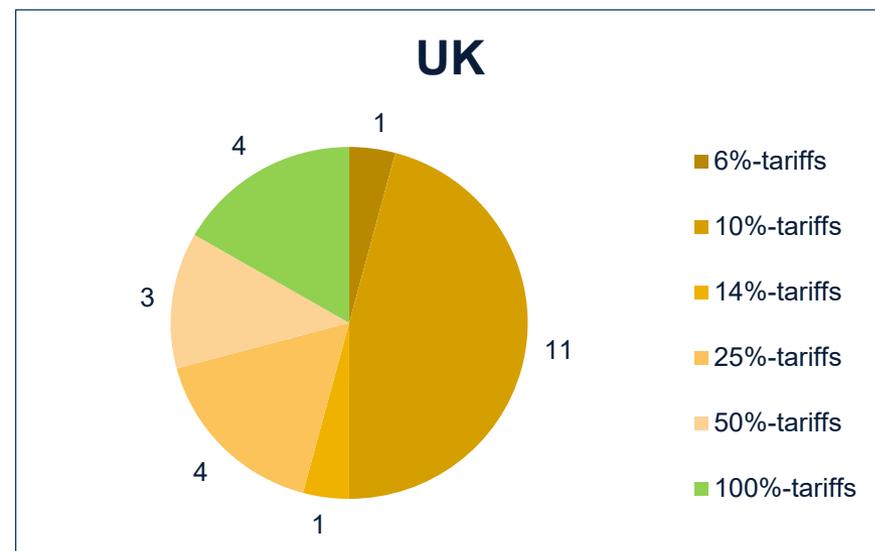
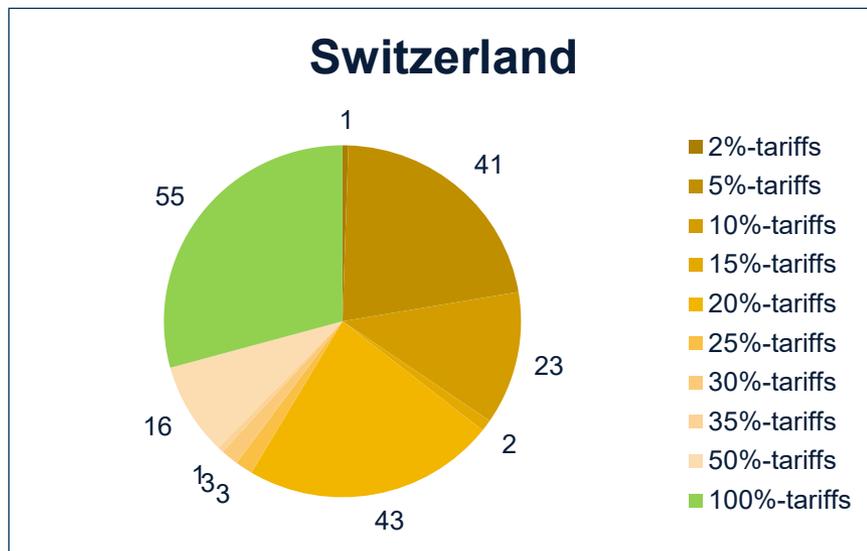
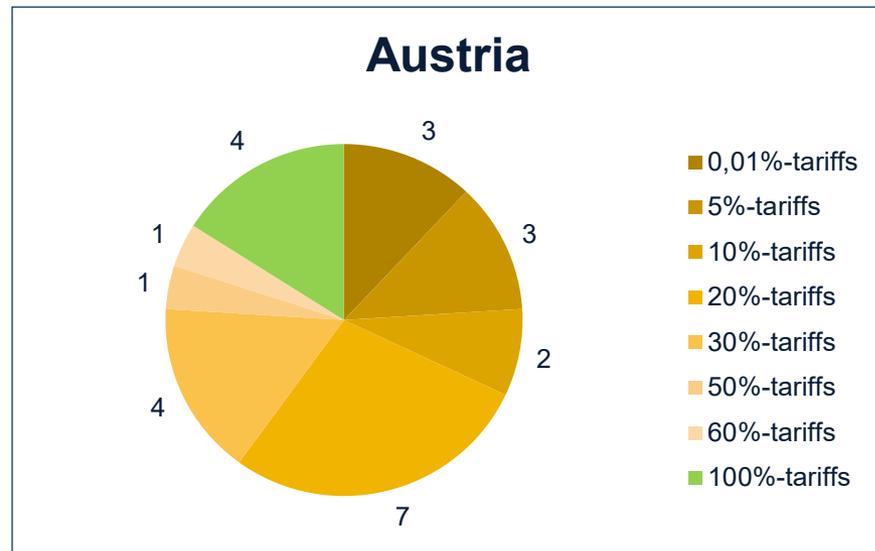
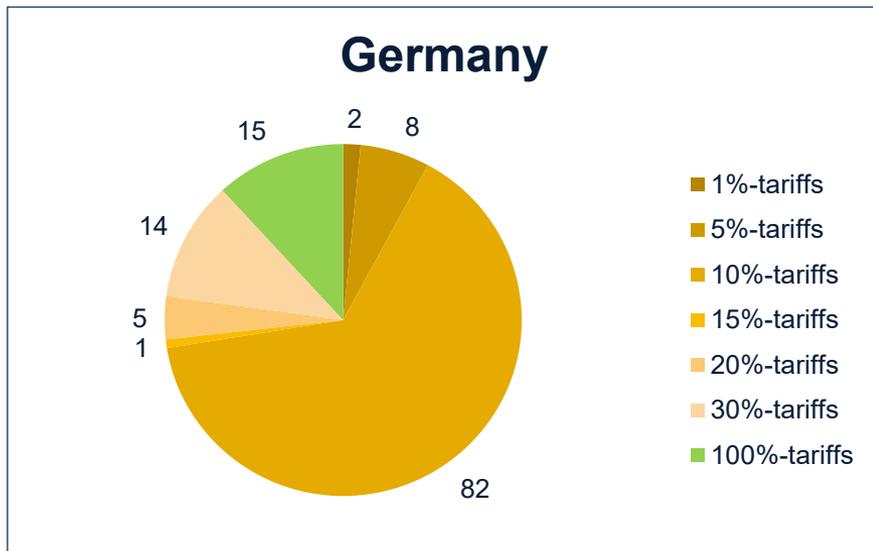
Underlying idea: providers' pricing strategies take consumers' preferences into account and try to skim additional WTP for pro-environmental attribute levels

1. The attribute „biomethane content“ is positively related to the price (higher percentage => higher price)
2. The attribute level „regional“ is positively linked to the price
3. The attribute level „from waste“ is positively linked to the price

Sampling and data collection

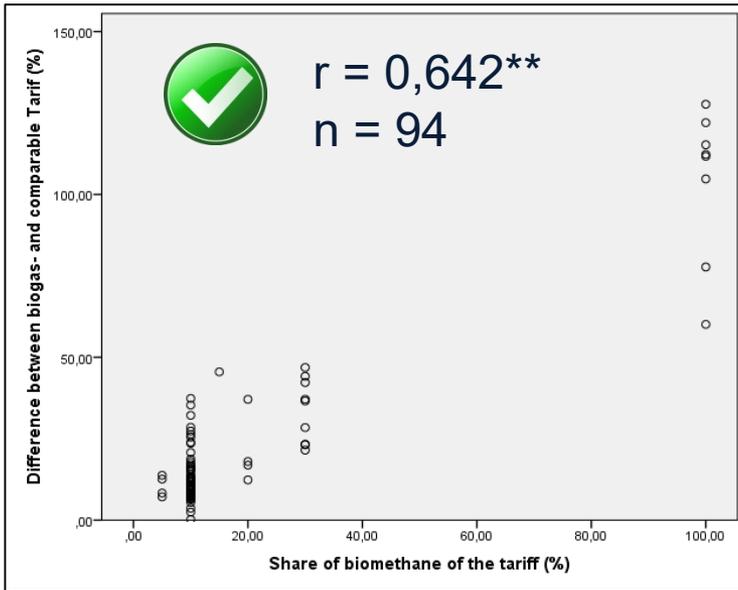
- Number of bio methane tariffs and sampling per country:
 - Germany: 127 tariffs, sampling via previous research (Herbes et al 2016) and two comparison portals
 - Austria: 25 tariffs, sampling via regulatory authority and comparison portal
 - Switzerland: 188 tariffs, sampling via umbrella association of the Swiss gas industry
 - United Kingdom: 24 tariffs, sampling via regulatory authority and comparison portal
- Data collection between July 2018 and June 2019
- Regional differences in grid charges in Germany accounted for by comparison with comparable natural gas tariff in the same area

Product design: biomethane content by tariffs and country (number of tariffs)

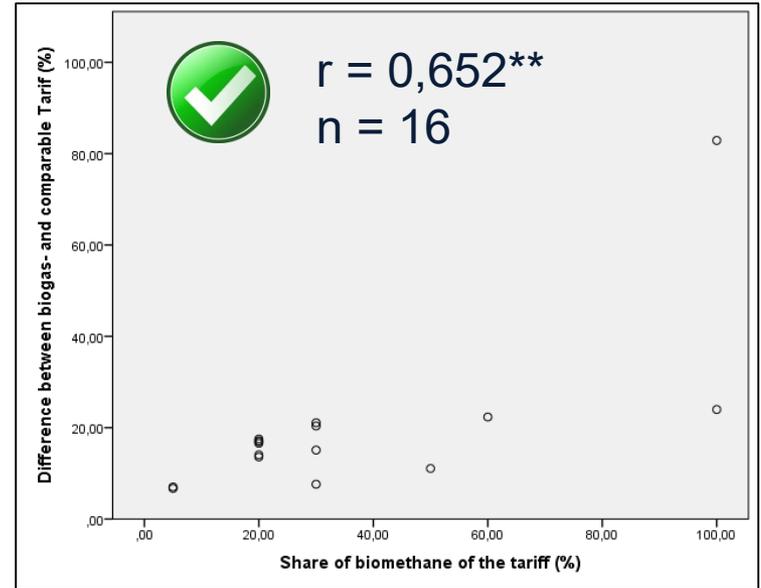


Biomethane content and price (H1)

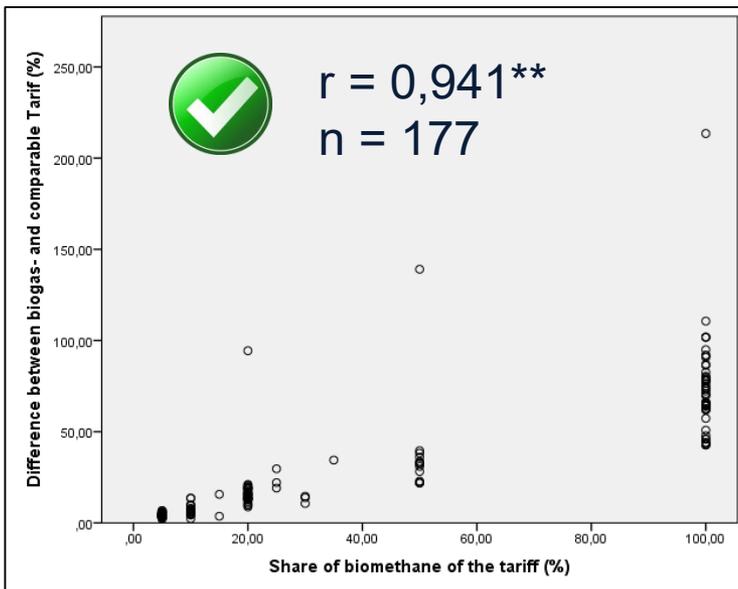
Germany



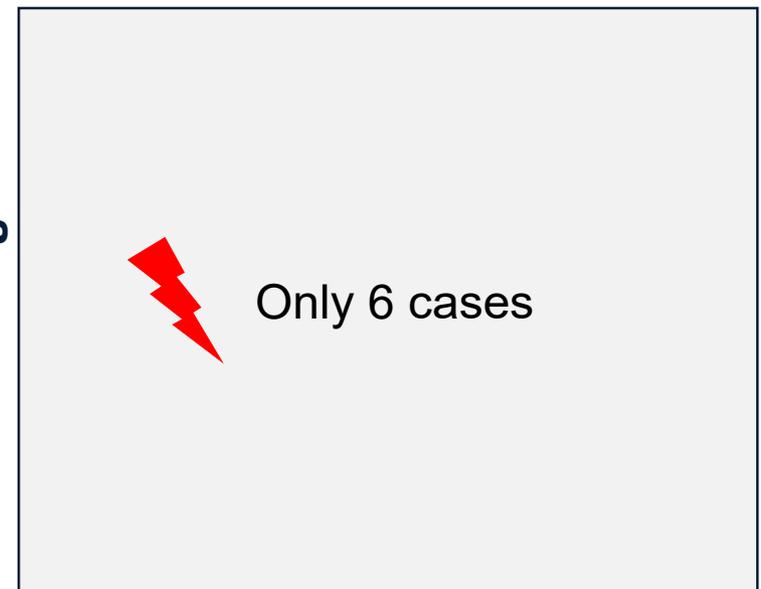
Austria



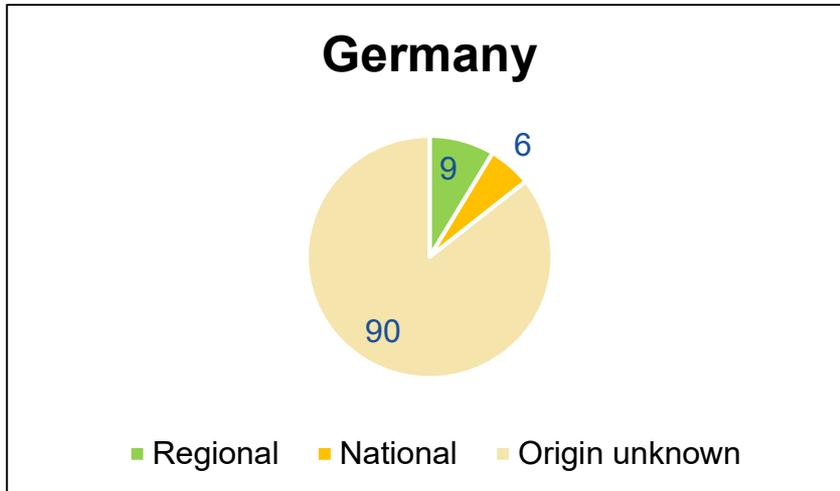
Switzerland



United Kingdom

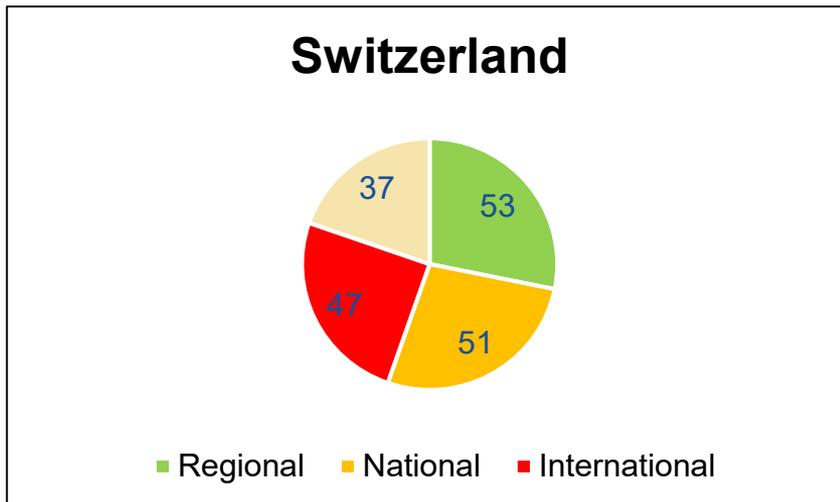


Product design: origin by tariffs and country (number of tariffs)



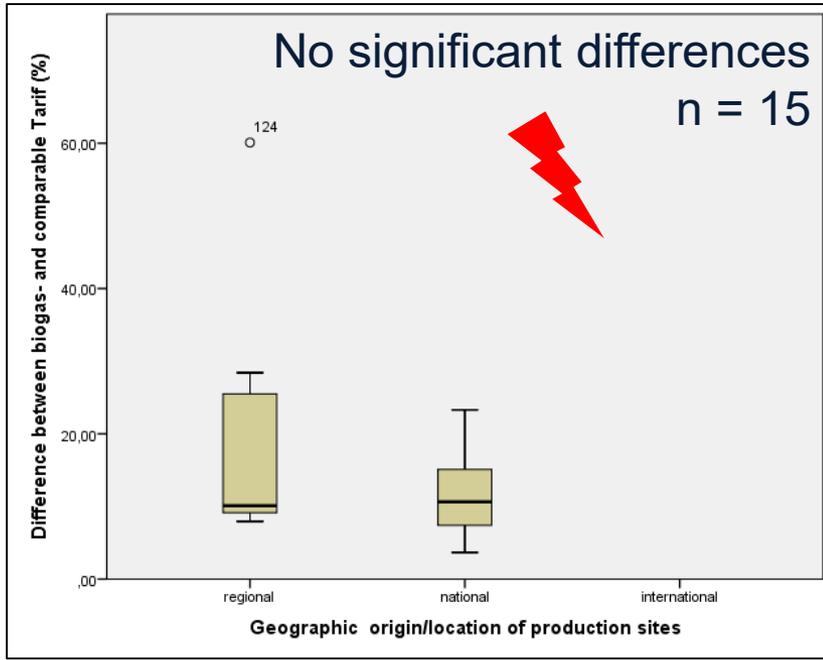
Austria: Only tariffs sourcing regionally available.

United Kingdom: Origin is unknown/not disclosed for all cases.

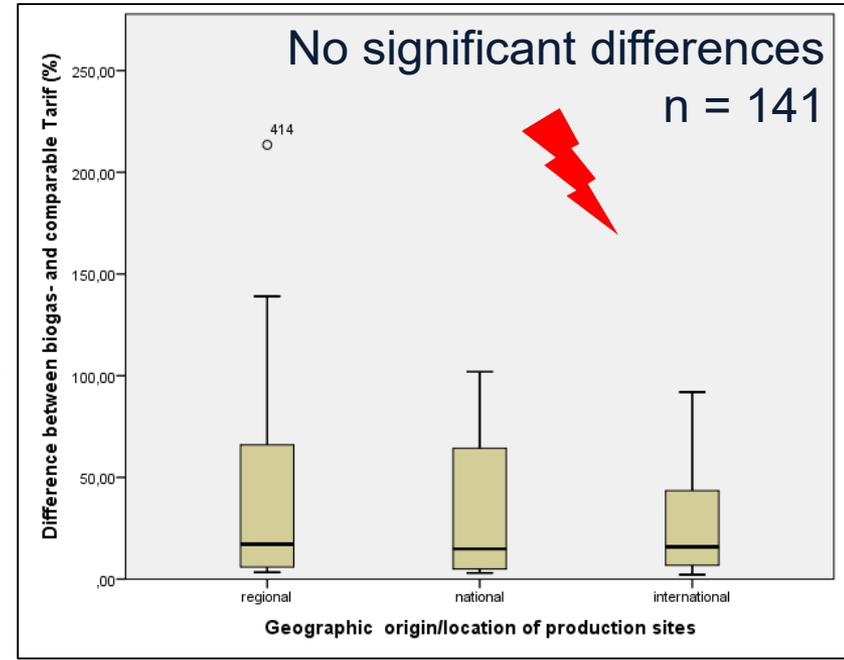


Origin and price (H2)

Germany

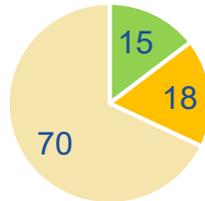


Switzerland



Product design: feedstocks by tariffs and country (number of tariffs)

Germany



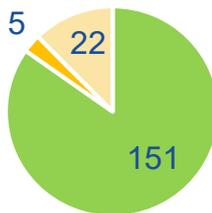
- Waste
- Mix and energy crops
- Feedstock unknown

Austria



- Waste
- Mix and energy crops
- Feedstock unknown

Switzerland

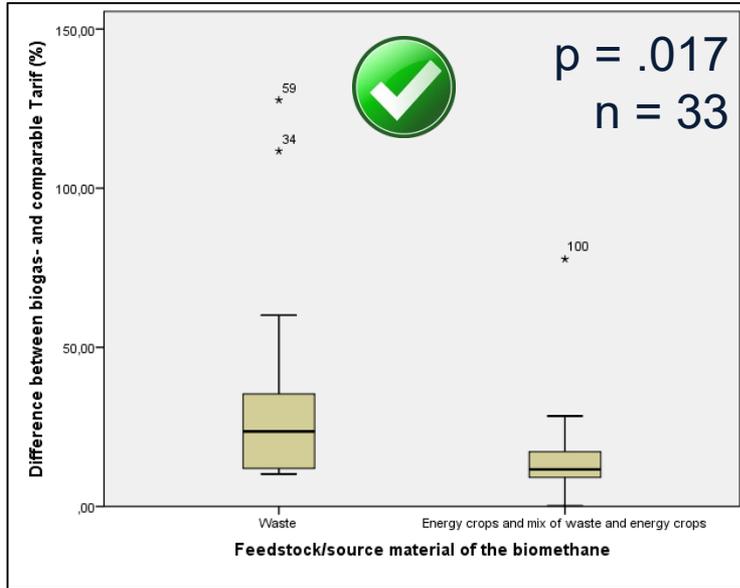


- Waste
- Mix and energy crops
- Feedstock unknown

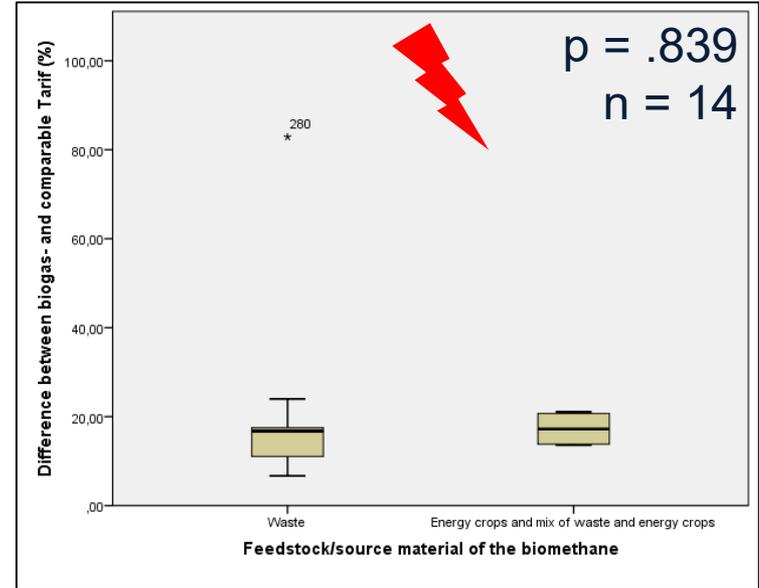
United Kingdom: Only one case

Feedstock and price (H3)

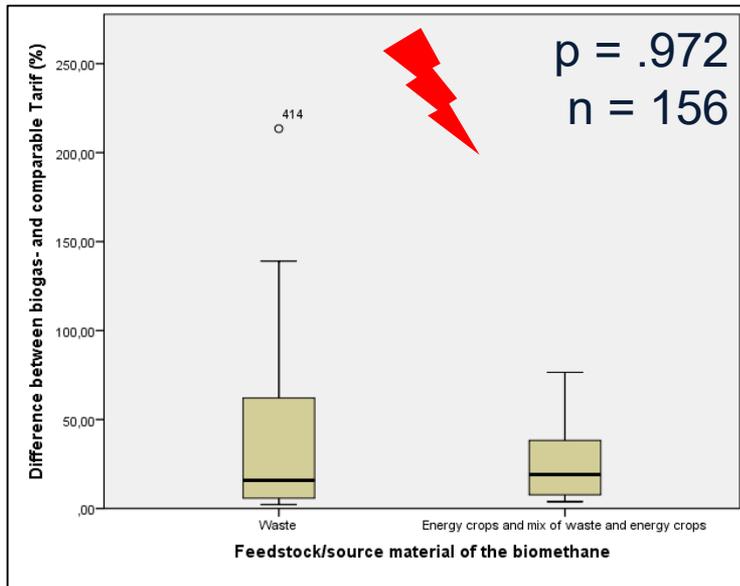
Germany



Austria



Switzerland



United Kingdom

Only 1 case

Discussion (1/2)

- Clear differences in product design between countries
 - Biomethane content: Germany and UK markets dominated by 10%-tariffs; Switzerland and Austria more evenly distributed
 - In Germany driven by legal provisions which mandate a 10% biomethane content for fulfilling the renewable heat law of the state of Baden-Württemberg
 - Reason for UK still unclear
 - Geographical origin: German providers mostly do not disclose the geographical origin, Austria only has regional tariffs and the Swiss market shows even distribution
 - In Germany, many providers source biomethane from the market, partly short-term, therefore do not know origin beforehand
 - Feedstock: The Austrian and Swiss markets are dominated by waste-based tariffs, German providers often do not disclose the feedstock

Discussion (2/2)

- H1 (biomethane content): supported for Germany, Austria and Switzerland, too few data for UK
 - In line with consumer preferences (and likely WTP)
 - Also cost-driven (consistent with markup-pricing approach)
- H2 (geographical origin): not supported for Germany and Switzerland, too few data for Austria and UK
 - Not in line with consumer preferences
 - Maybe due to lack of cost differentiation
- H3 (feedstock): supported for Germany, not supported for Austria and Switzerland
 - In line with consumer preferences in Germany
 - Change of pricing strategy as compared to five years ago
 - Although waste-based gas can be sourced at lower cost since CHP units using waste-based gas receive lower feed-in-tariffs for electricity

Conclusion

- Disclosure of biomethane product attributes is still insufficient in Germany, providers could increase trust and possibly skim higher WTP if disclosing pro-environmental attributes
- German and Swiss providers could try to exploit the possibly higher WTP for local/regional gas products
- Austrian providers could try to exploit the possibly higher WTP for waste-based gas products

**=> Ongoing research, we welcome international cooperation on marketing of renewable energy
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