

# **Biomethane from gasification:** market potential and national strategies

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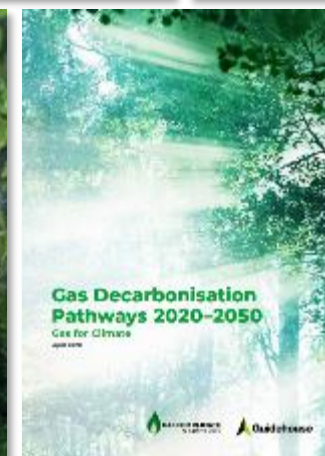
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**Gas for Climate** was initiated in 2017 to analyse and create awareness about **the role of renewable and low carbon gas in the future energy system**. Gas for Climate is committed to achieve net zero greenhouse gas emissions in the EU by 2050.

**Consortium members**





# Research scope

## Time horizon

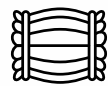
2030 and 2050

## Countries

EU-27 + Norway, Switzerland and UK

## Technology & Feedstocks

### Anaerobic Digestion



Agricultural residues



Animal manure



Biowaste



Industrial wastewater



Permanent grassland



Roadside verge grass



Sequential crops



Sewage sludge

### Thermal Gasification



Forestry residues



Landscape care wood



Municipal solid waste



Pruning



Wood waste

\*The study allocates each feedstock to one technology type to avoid potential double counting

# Methodology

Step 1

**Identify** feedstocks and conversion technology option per feedstock

Step 2

**Estimate** potentials per feedstock per country in 2030/2050

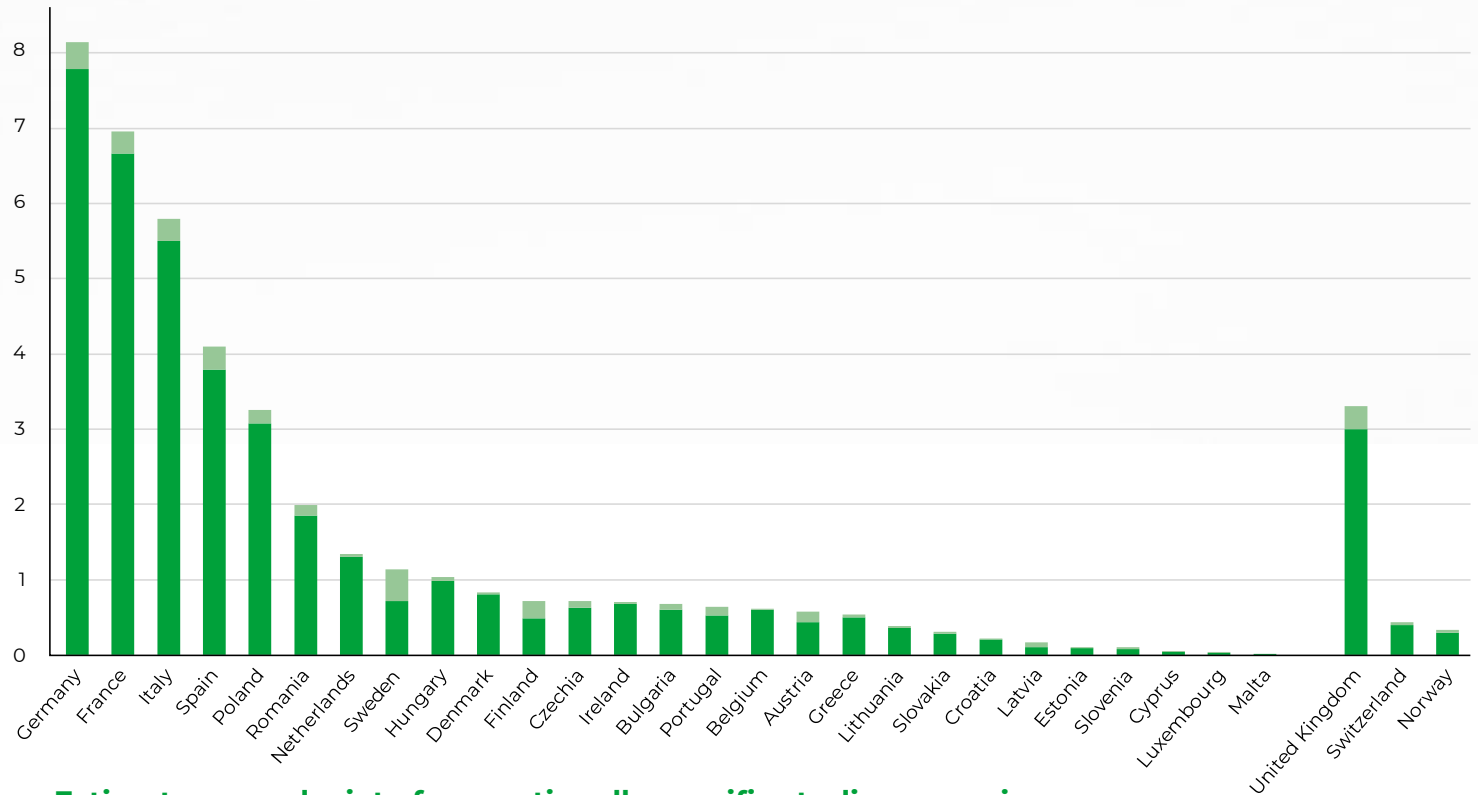
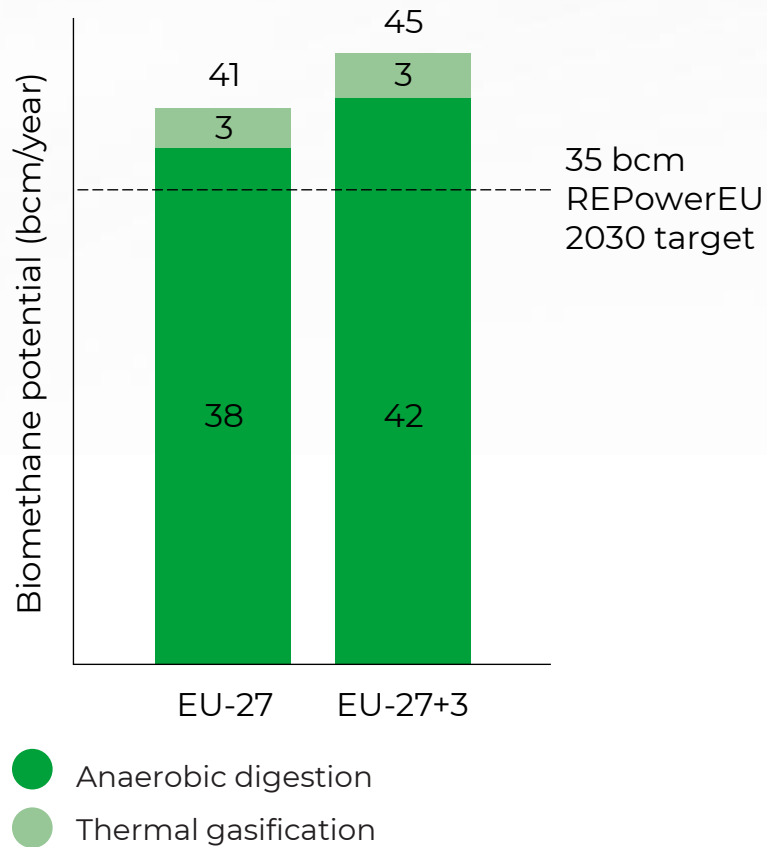
Step 3

**Convert** feedstock potentials to biomethane potentials in 2030/2050

Based on **published reports** covering 2030-2050 time horizon or **current statistical data** (including Eurostat, FAOstat)

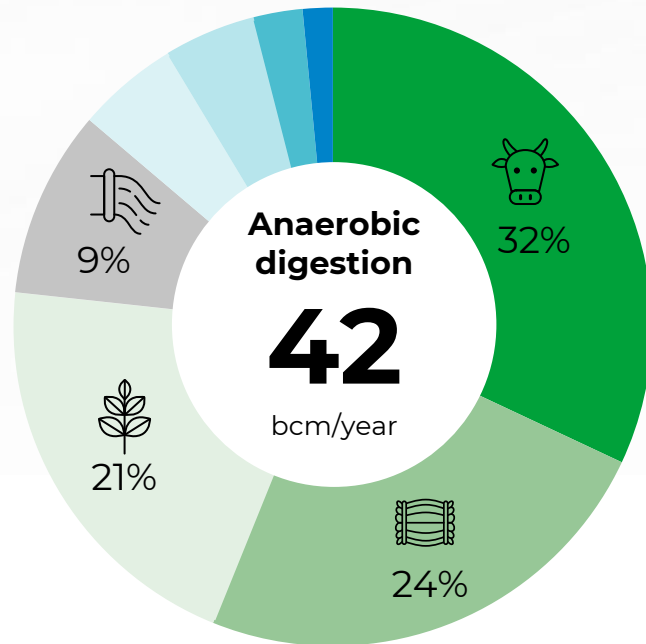


# Biomethane from thermal gasification can contribute to REPowerEU target of 35 bcm in 2030

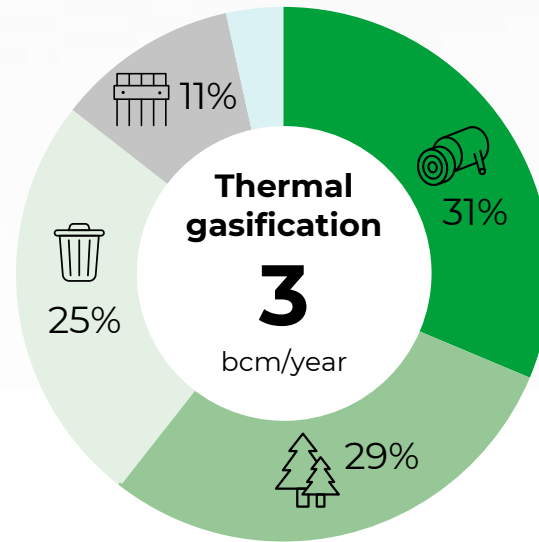


Estimates may deviate from nationally specific studies assessing feedstock availability for sustainable biomethane production

# 2030 feedstock mix: dominated by wastes and residues for both biomethane technologies



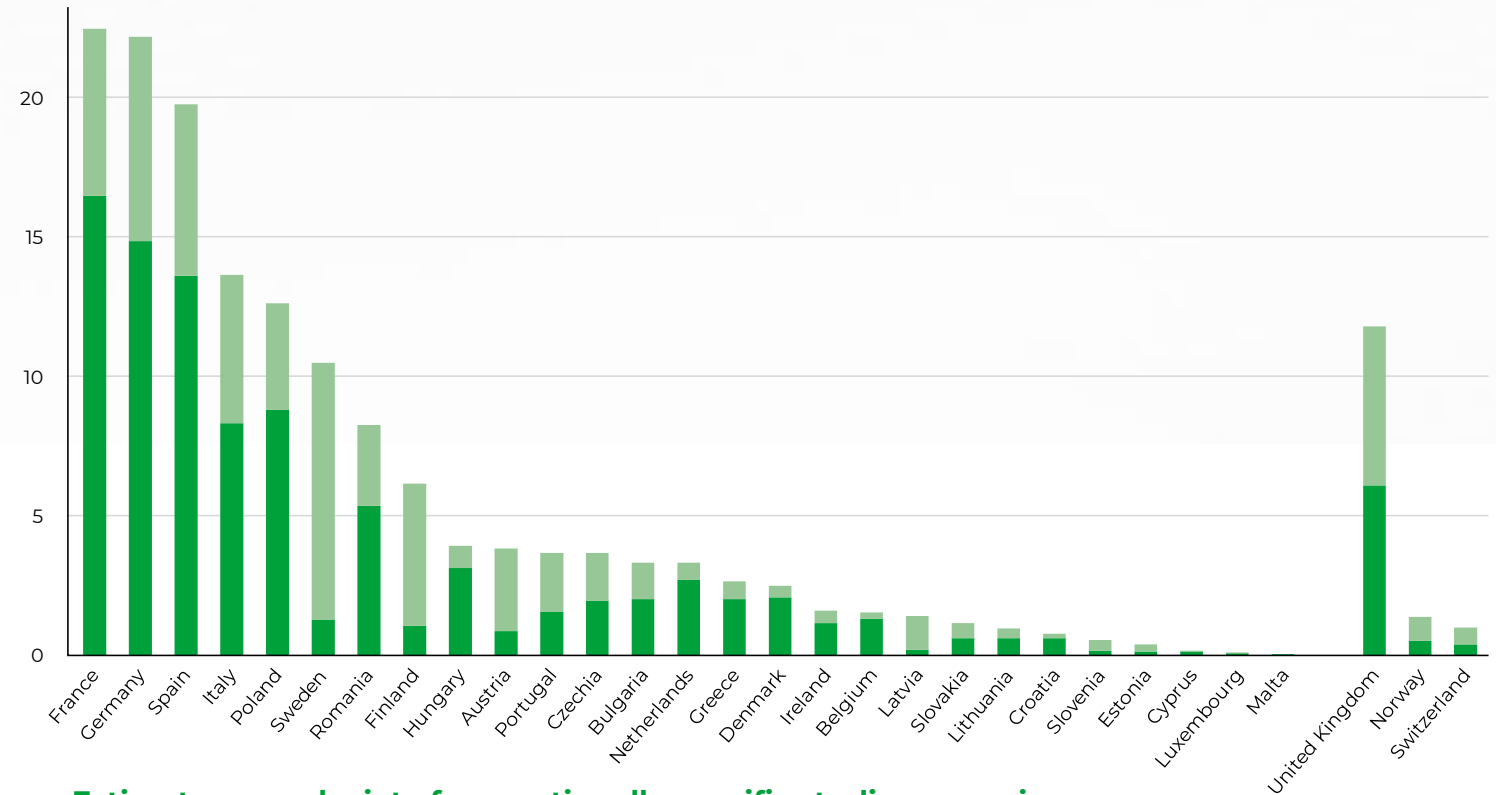
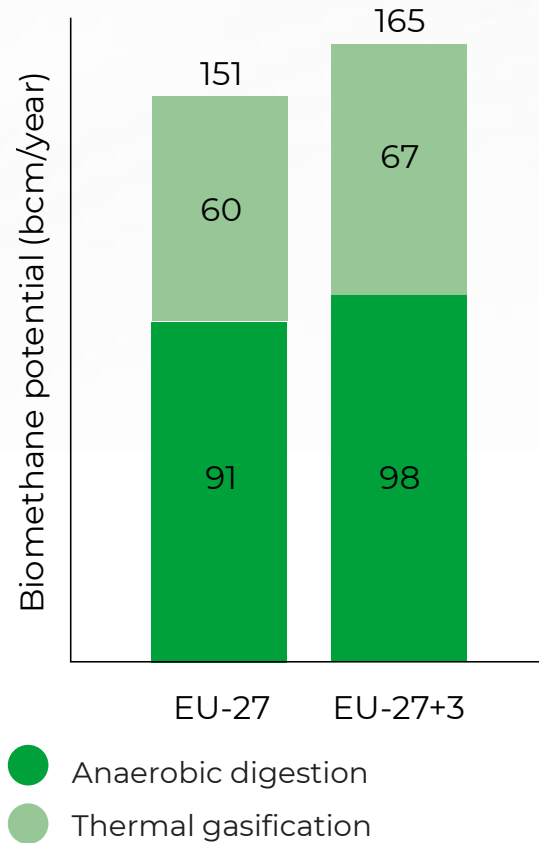
- Animal manure
- Agricultural residues
- Sequential crops
- Industrial wastewater
- Permanent grassland
- Biowaste
- Sewage sludge
- Roadside verge grass



- Wood waste
- Forestry residues
- Municipal solid waste
- Landscape care wood
- Pruning

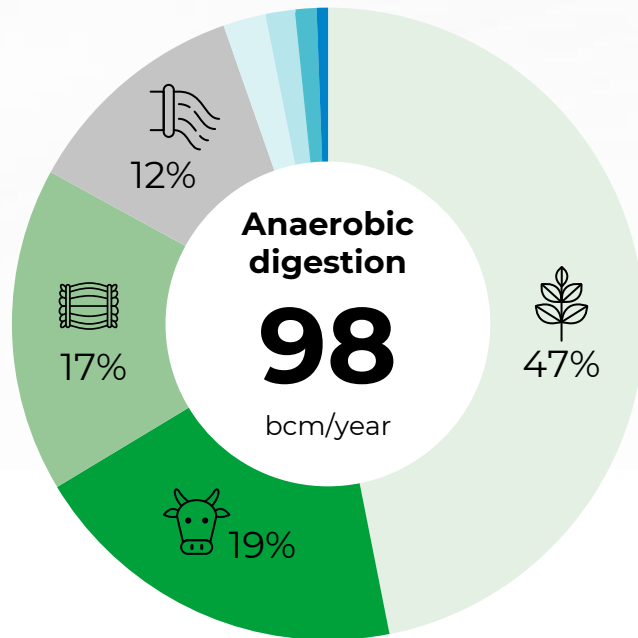
- 56% of AD potential based on agri. wastes and residues
- 75% of TG potential based on woody biomass, of which >60% relates to forestry residues and wood waste
- MSW provides meaningful contribution to TG potential with 25% of total

# Biomethane potential in 2050 sees an important contribution for gasification

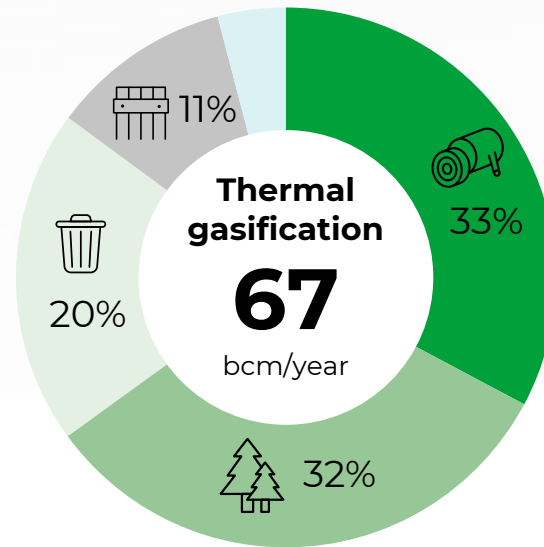


Estimates may deviate from nationally specific studies assessing feedstock availability for sustainable biomethane production

# 2050 feedstock mix: dominated by sequential crops for AD and woody biomass for TG



- Animal manure
- Agricultural residues
- Sequential crops
- Industrial wastewater
- Permanent grassland
- Biowaste
- Sewage sludge
- Roadside verge grass



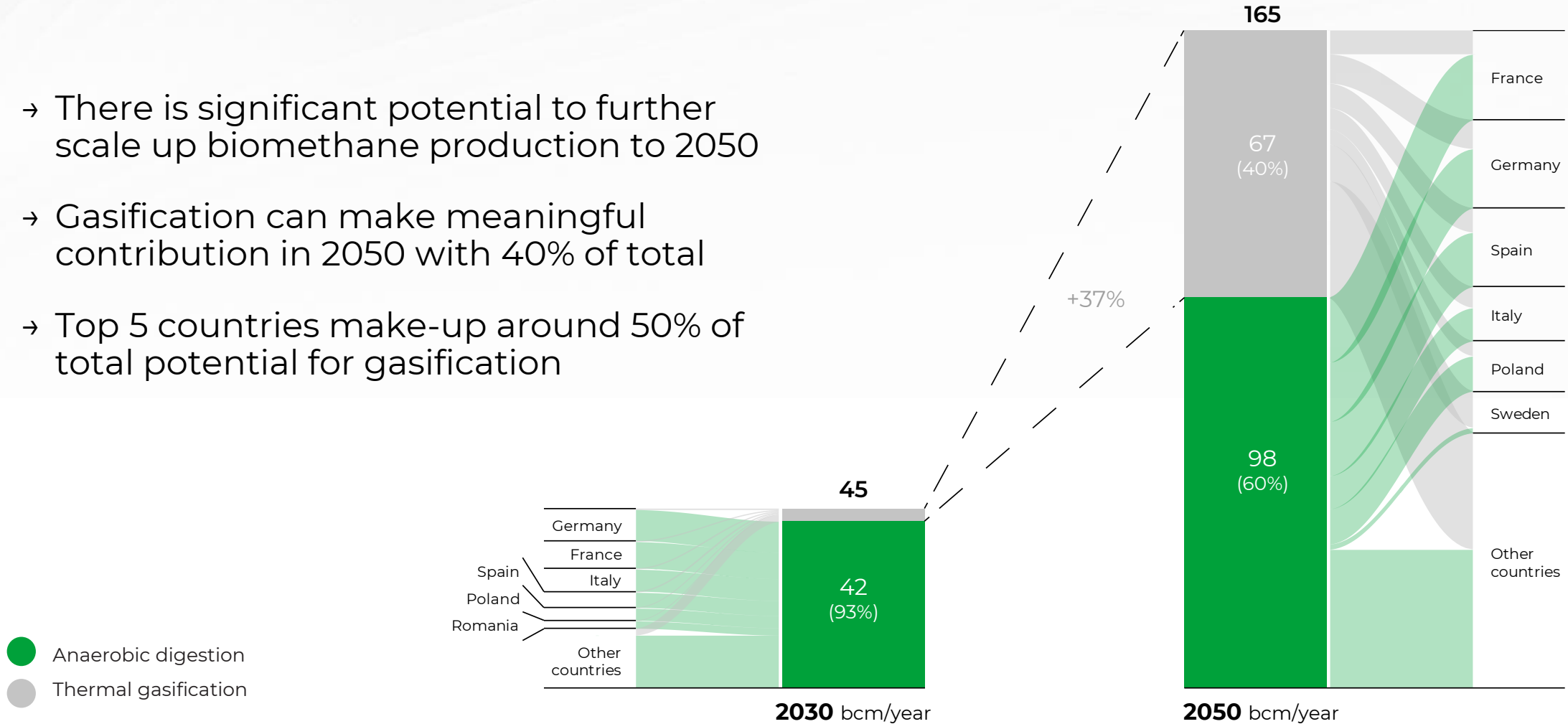
- Wood waste
- Forestry residues
- Municipal solid waste
- Landscape care wood
- Pruning

- Sequential crops (47%) now dominate AD potential, with agri. wastes and residues again contributing a significant share (36%)
- 80% of TG potential now based on woody biomass, with wastes and forestry residues again dominating
- MSW share of TG potential reduces to 20%



# Significant scale up of potential from 2030 to 2050

- There is significant potential to further scale up biomethane production to 2050
- Gasification can make meaningful contribution in 2050 with 40% of total
- Top 5 countries make-up around 50% of total potential for gasification



# Strategies to scale-up sustainable biomethane



## Mobilise waste and residue feedstocks

- Mobilise **collection of woody wastes and residues** – whilst ensuring strict sustainability criteria are applied
- Explore options to **unlock potential from MSW**, without compromising overall waste management policy aims



## Continued technology innovation

- Target research on **increasing gasifier efficiency and gas quality**
- Focus on feedstock flexibility to broaden range of feedstocks that can be utilised
- Pursue both **thermal gasification** and **hydro-thermal gasification** technologies to maximise long-term biomethane potential



## Investing in commercial scale gasification plants

- Policy makers to set out **long-term policy framework** that supports biomethane gasification, while also targeting continuous cost reductions to **minimise societal costs**
- Industry to invest in **commercial scale gasification plants** (200 MW+)

# Several countries are supporting biomethane production from gasification – but more is needed



**Finland**

- Target of 4 TWh biomethane production in 2030 – including 1 TWh from technologies such as gasification and renewable methane
- Projects: NordFuel Oy plans to build a biorefinery, which would produce 150 GWh biomethane annually



**Sweden**

- Long-term funding (min. 10 years) for biomethane production from July 2022 - including from gasification
- Subsidy of €0.01 to €0.02/kWh available
- Gas industry in discussion with Swedish government additional support for biomethane from gasification



**Netherlands**

- Biomethane gasification eligible for support under the SDE++ subsidy scheme
- 2023 SDE++ scheme will allocate specific funding for renewable gas (including biomethane from gasification) to provide more guarantee of receiving funding
- Projects: DBG Bio Energy B.V. aims to produce 15 kton of bioLNG per year from 2022



**UK**

- Biomethane from gasification supported under the UK Renewable Fuel Transport Obligation – counted as a ‘development fuel’
- UK Department for Transport has ran several ‘competitions’ for advanced fuels production – several companies deploying gasification
- Projects: ABSL targeting 22 GWh biomethane production from waste from 2022

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