

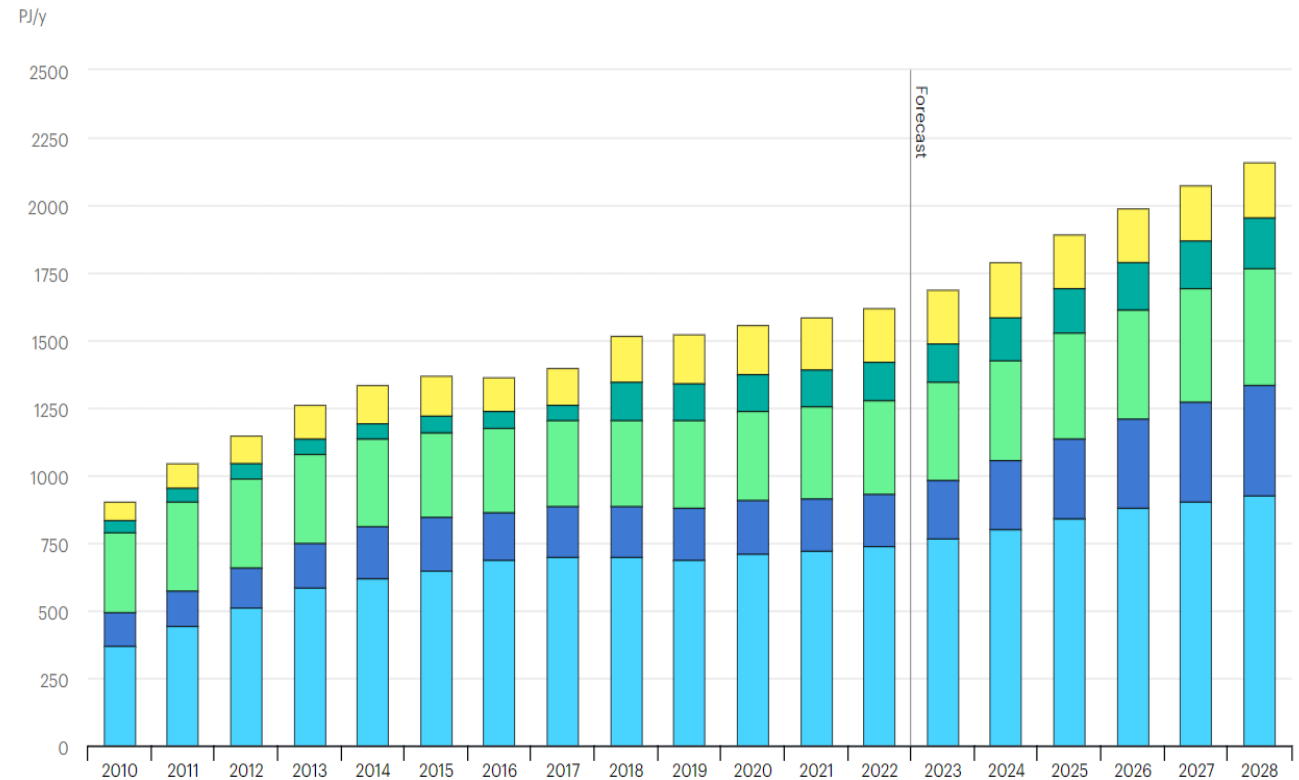
# Biomethane in Distribution System

**Case Study by Austria**  
Stefan Katzmann  
E-Control



# Global perspective

- Global historical production and forecast of biogases (2010-2028)
- For IEA Net Zero Emissions by 2050 Scenario, production of biogases should quadruple by 2030.
- IEA expects growth to accelerate from 19% in 2017-2022 to 32% in 2023-2028, an even higher pace is required to meet the Net Zero objective for 2030.



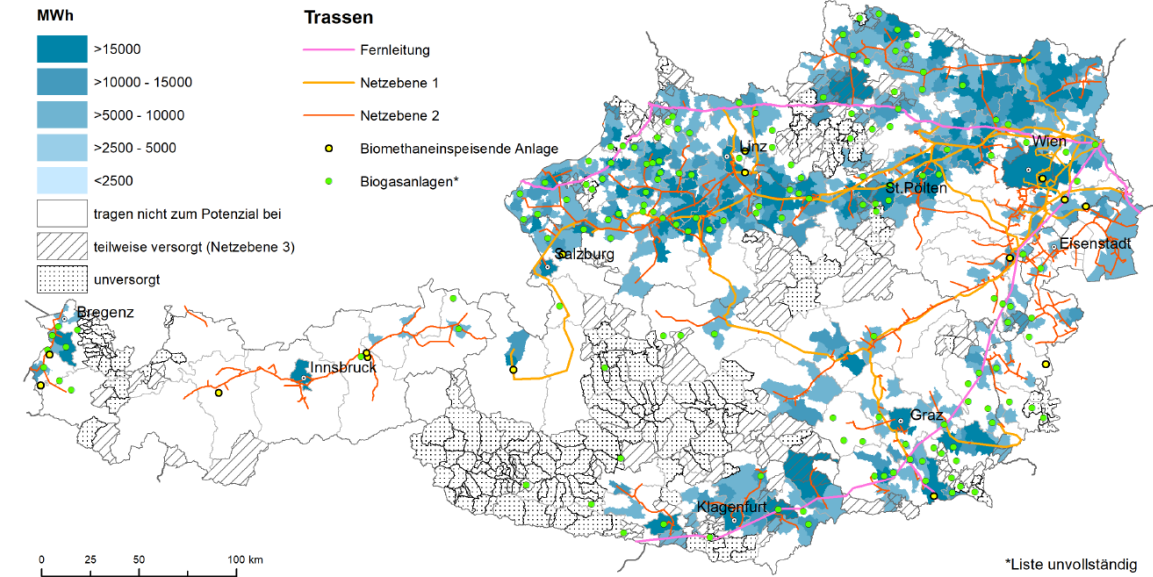
Source: IEA, Global historical production and forecast of biogases, 2010-2028, IEA, Paris <https://www.iea.org/data-and-statistics/charts/global-historical-production-and-forecast-of-biogases-2010-2028>, IEA. Licence: CC BY 4.0

# Biomethane in Austria – Potentials

## *Different expectations*

- Technical potential: 18,8 TWh/a\*
  - Realisable potential 2030: 6,8 TWh/a\*
  - Realisable potential 2040: 10 TWh/a\*
- 
- Technical potential: 17 TWh/a\*\*
  - Realisable potential 2040: 10,7 TWh/a\*\*
- 
- Political target 2030: 5 TWh into the grid
  - New proposed target 2030: 7,5 TWh

6,8 TWh Biomethane in 2030



Source: Environmental Agency Austria (2023)

\* Environmental Agency Austria (2023) (<https://www.umweltbundesamt.at/fileadmin/site/publikationen/rep0874.pdf>)

\*\* Austrian Energy Agency, Energy Institute JKU Linz, EVT der MU Leoben (2021)

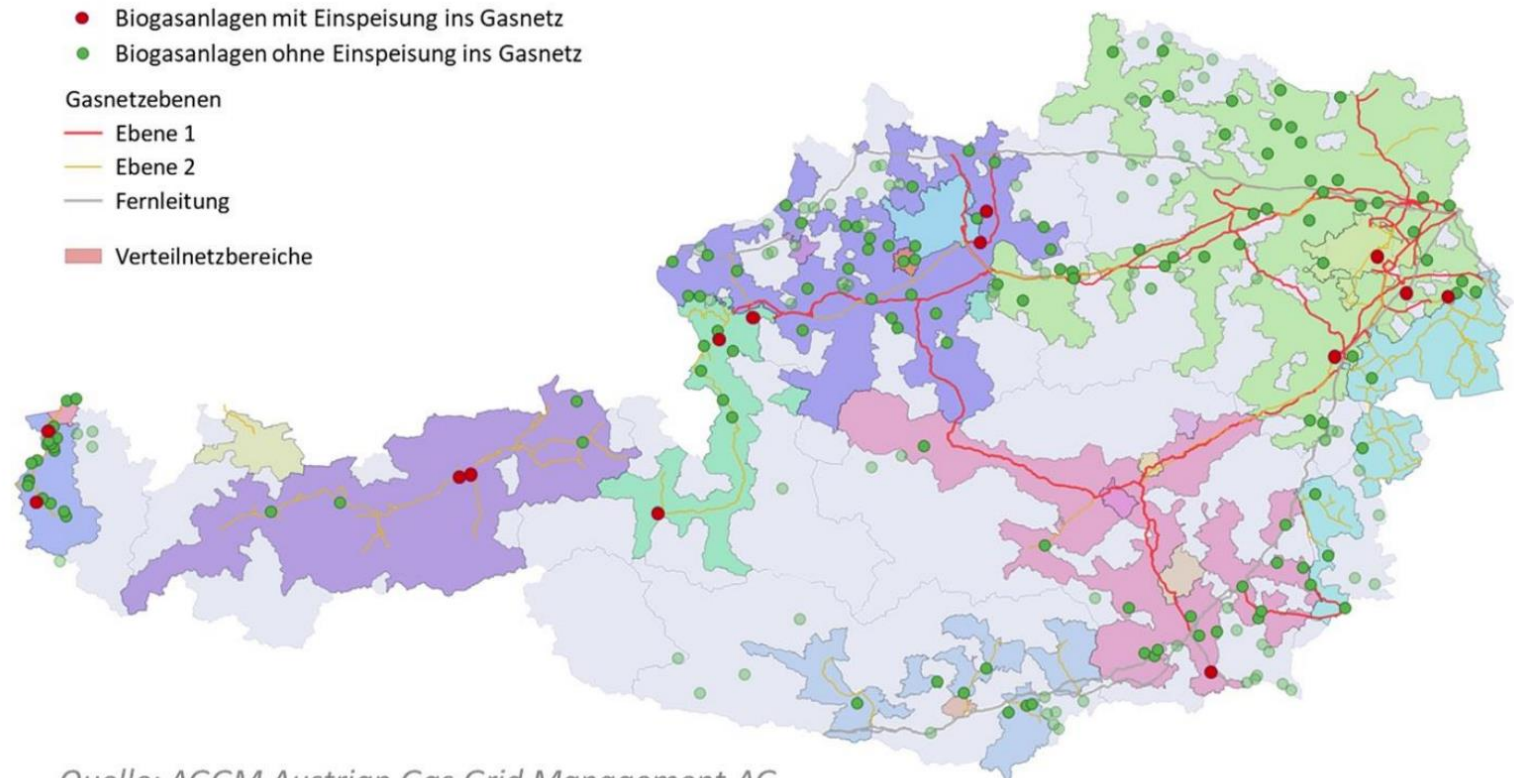
[https://www.energyagency.at/fileadmin/1\\_energyagency/presseaussendungen/allg.\\_pa/2021/06\\_erneuerbares\\_gas\\_2040\\_final\\_barrierefrei\\_juni21.pdf](https://www.energyagency.at/fileadmin/1_energyagency/presseaussendungen/allg._pa/2021/06_erneuerbares_gas_2040_final_barrierefrei_juni21.pdf)

# Biomethane in Austria – Actual situation

## Biomethane production in 2022

- 14 existing biomethane plants connected to the gas network (red)
- 270 existing biomethane plants not connected to the gas network (green)

	2022 TWh
Biomethane production for injection into the gas network	0.14
Biomethane production for power generation	0.54
Gas consumption	88.06

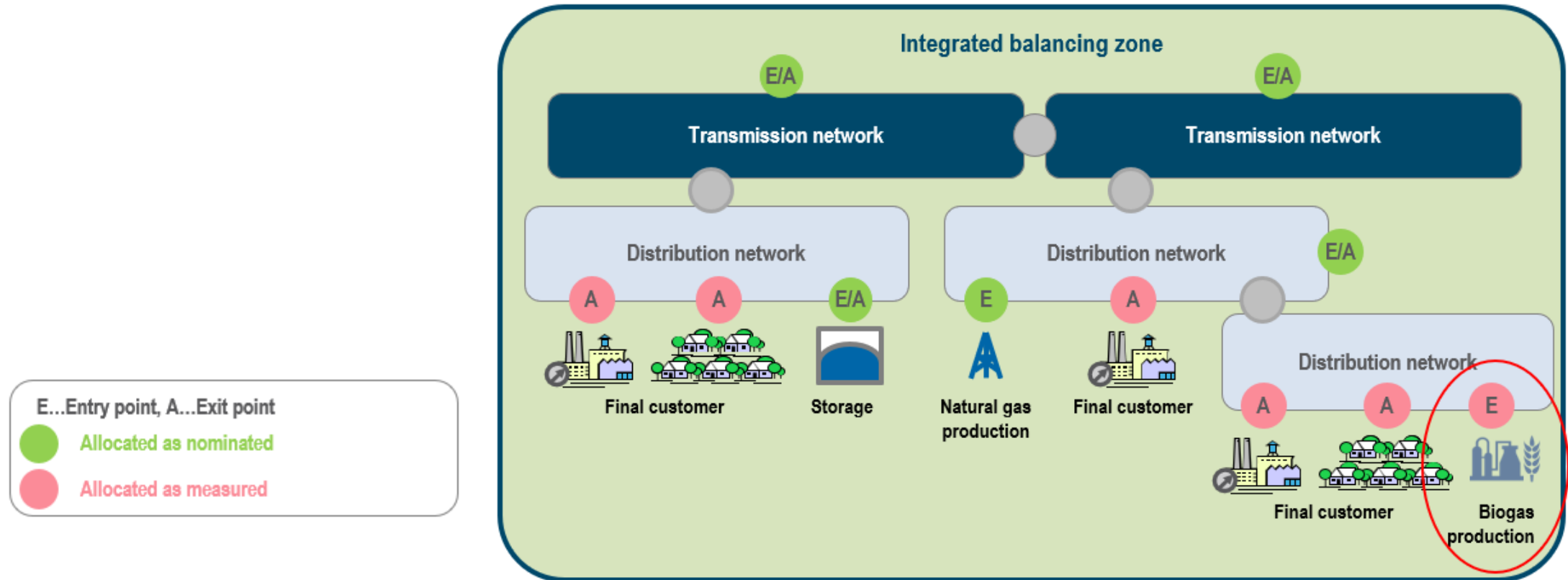


Quelle: AGGM Austrian Gas Grid Management AG

# Access to the wholesale market

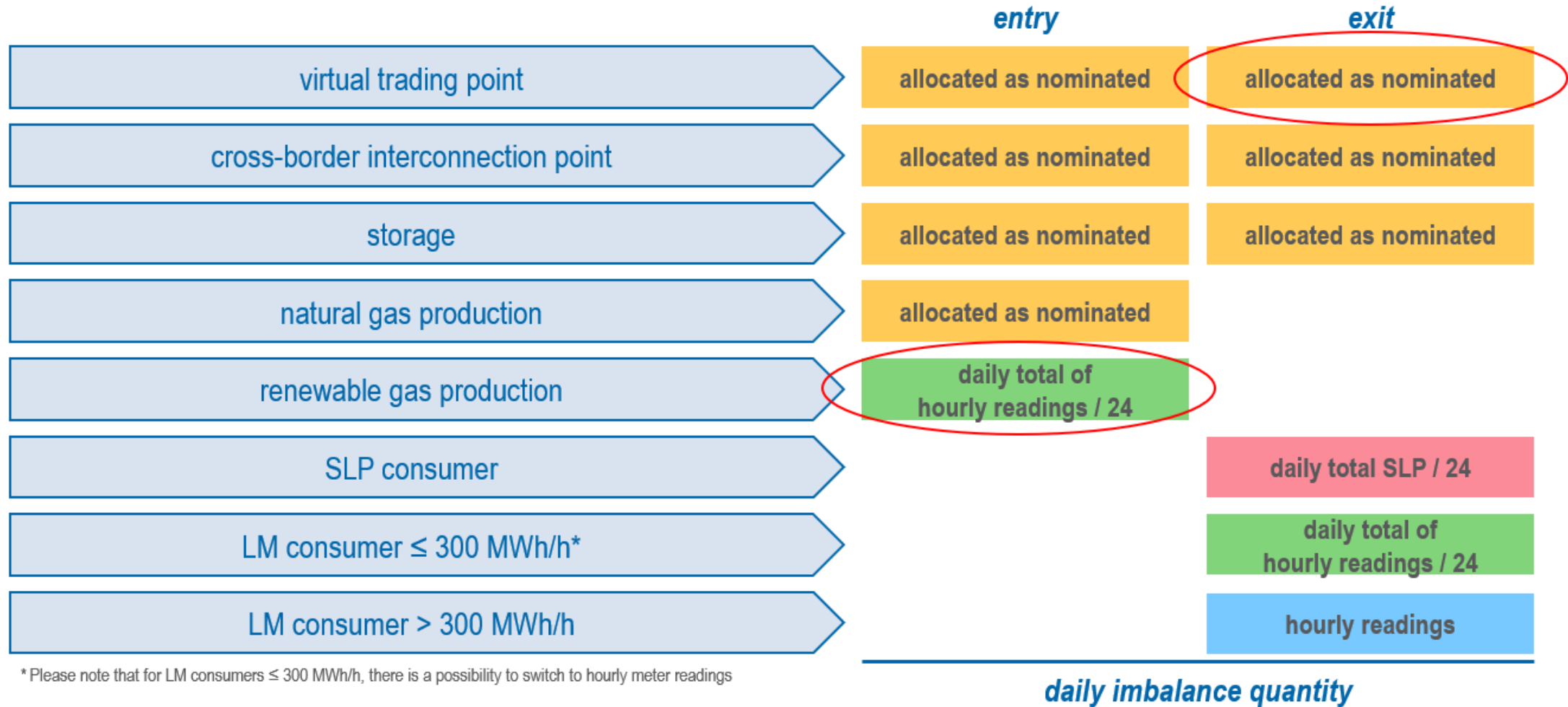
*Integrated market area balancing ensures that...*

... renewable gas injected at distribution level can be traded in the wholesale market



# Access to the wholesale market

Entry/exit components in the integrated balancing system



\* Please note that for LM consumers  $\leq 300$  MWh/h, there is a possibility to switch to hourly meter readings

# Access to the infrastructure

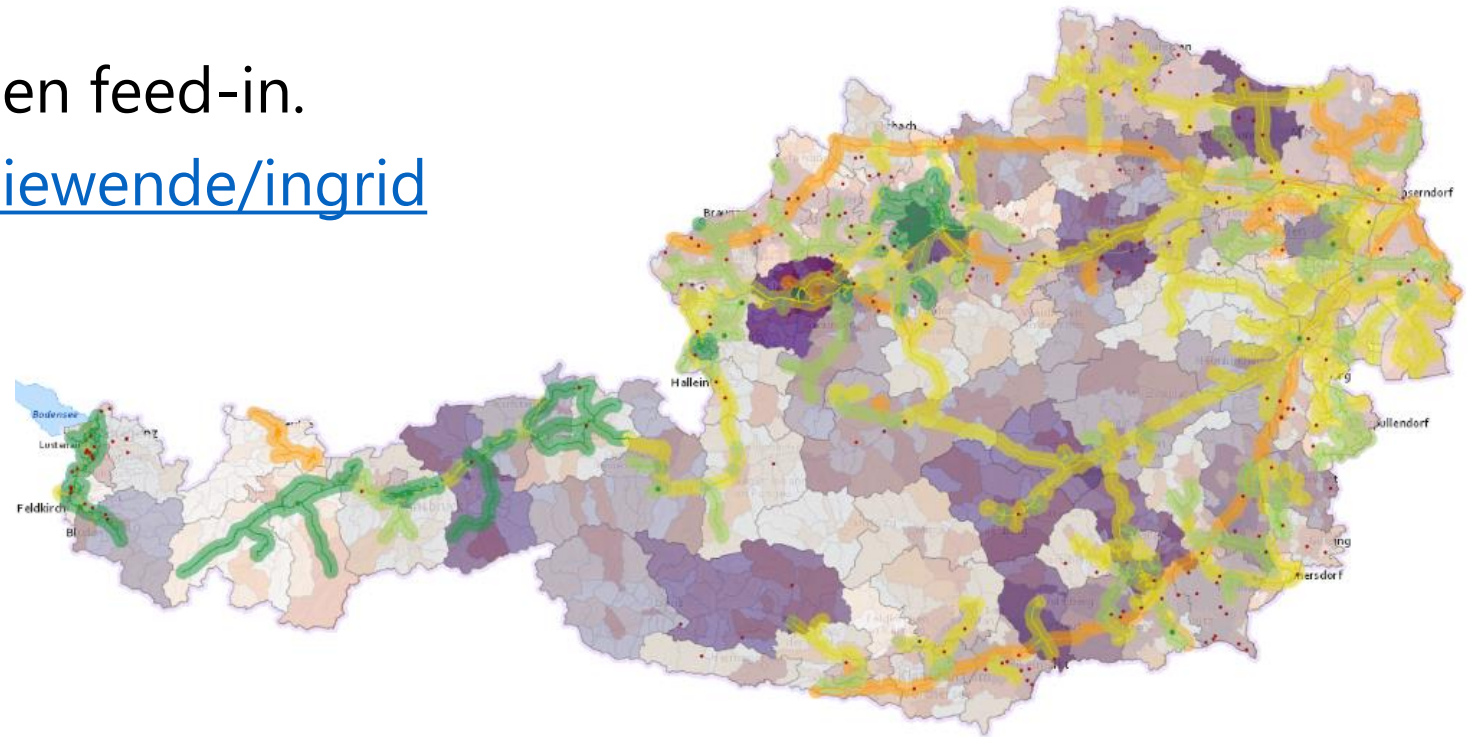
## *Firm capacity for the access of renewable gases*

- Biomethane producers get firm capacity
- Special provisions regarding the system admission charge for the first time connection
  - The following costs are socialized if a certain connection ratio is not exceeded
    - system admission for the injection of renewable gas
    - metering of quantities
    - quality assurance
    - any odourisation
    - any compressor stations or lines necessary for continuous injection
- Existing biomethane producers
  - Network connection ratio of up to 60 m<sup>3</sup>/m<sup>3</sup> CH<sub>4</sub> equivalent/h
  - Connection costs for new lines to be constructed up to 10 km
- New biomethane producers
  - Network connection ratio of up to 60 m<sup>3</sup>/m<sup>3</sup> CH<sub>4</sub> equivalent/h
  - Connection costs for new lines to be constructed up to 3 km

- Overview of efficient feed-in points for renewable gases in the gas grid.
- Digital twin of the Austrian gas grid - categorised into efficiency classes for the feed-in of renewable gases.
- Also layer for future hydrogen feed-in.
- <https://www.aggm.at/energiewende/ingrid>

### Legende

- Effizienzklassen der Eignungszonen
- A** (green) Einspeisung mit bester Effizienz möglich
  - B** (light green) Einspeisung mit guter Effizienz möglich
  - C** (yellow) Einspeisung möglich
  - D** (orange) Einspeisung nachrangig möglich
  - E** (grey) Einspeisung bedingt möglich
- Biomethanpotenzial aus  
feuchten Reststoffen [GWh/a]
- < 1
  - 1 - 2
  - 2 - 3
  - 3 - 5
  - 5 - 10
  - 10 - 20
  - > 20
- Biomethanpotenzial aus  
festen Reststoffen [GWh/a]
- < 100
  - 100 - 300
  - 300 - 600
  - 600 - 900
  - > 900
- Biogasanlagen
- (green) Biogasanlagen mit Gasnetzeinspeisung
  - (red) Biogasanlagen ohne Gasnetzeinspeisung



Source: AGGM



# Access to the infrastructure

## Example: Renewable gas injection map

- Injection capacity: 200 Nm<sup>3</sup>/h
- Categories show where biomethane can be injected into the network at different costs for the DSO

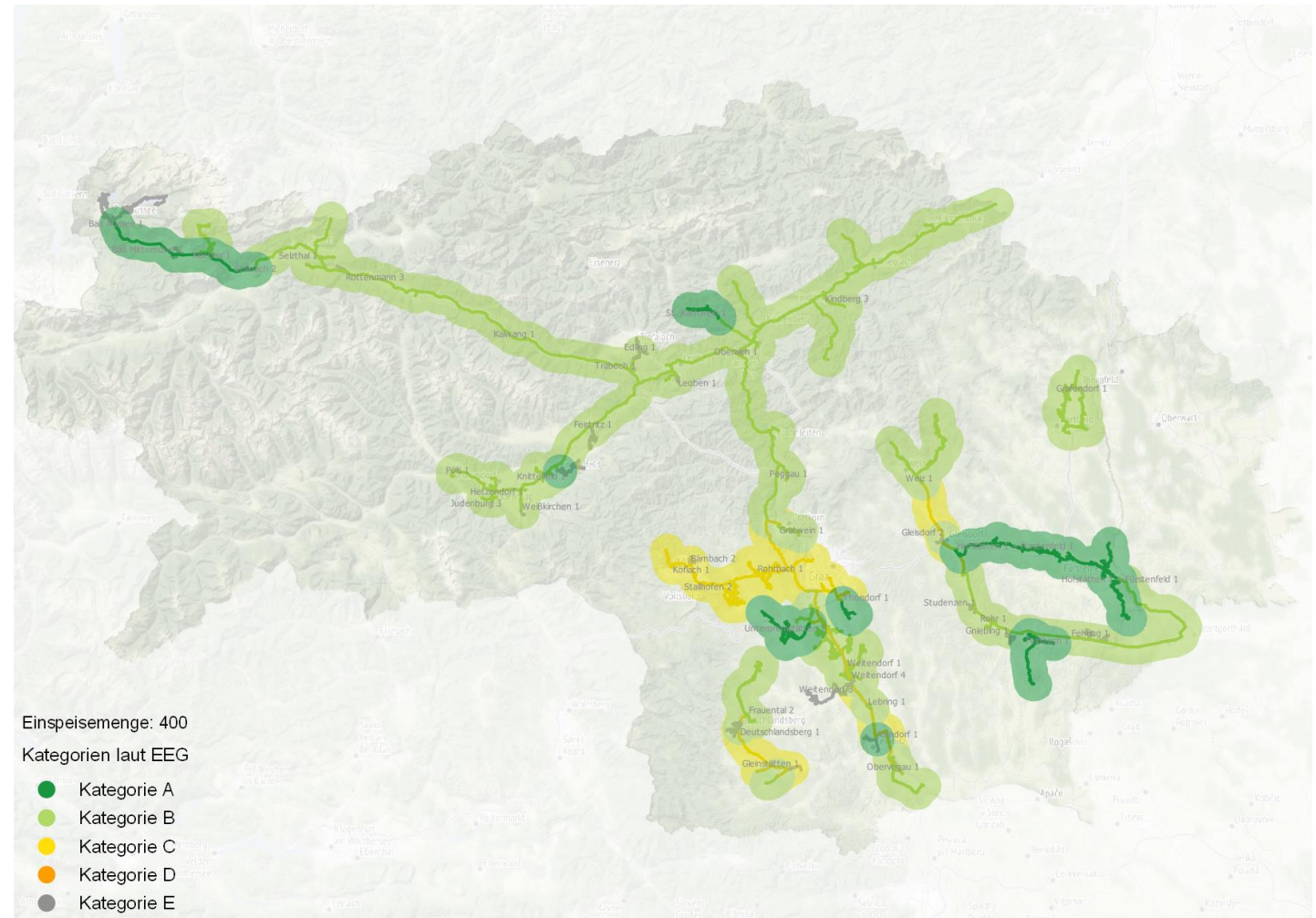


Source: AGGM

# Access to the infrastructure

## Example: Renewable gas injection map

- Injection capacity: 400 Nm<sup>3</sup>/h
- Categories show where biomethane can be injected into the network at different costs for the DSO



Source: AGGM

# Access to the infrastructure

## Example: Renewable gas injection map

- Injection capacity: 600 Nm<sup>3</sup>/h
- Categories show where biomethane can be injected into the network at different costs for the DSO



Source: AGGM

# Access to the infrastructure

## Example: Renewable gas injection map

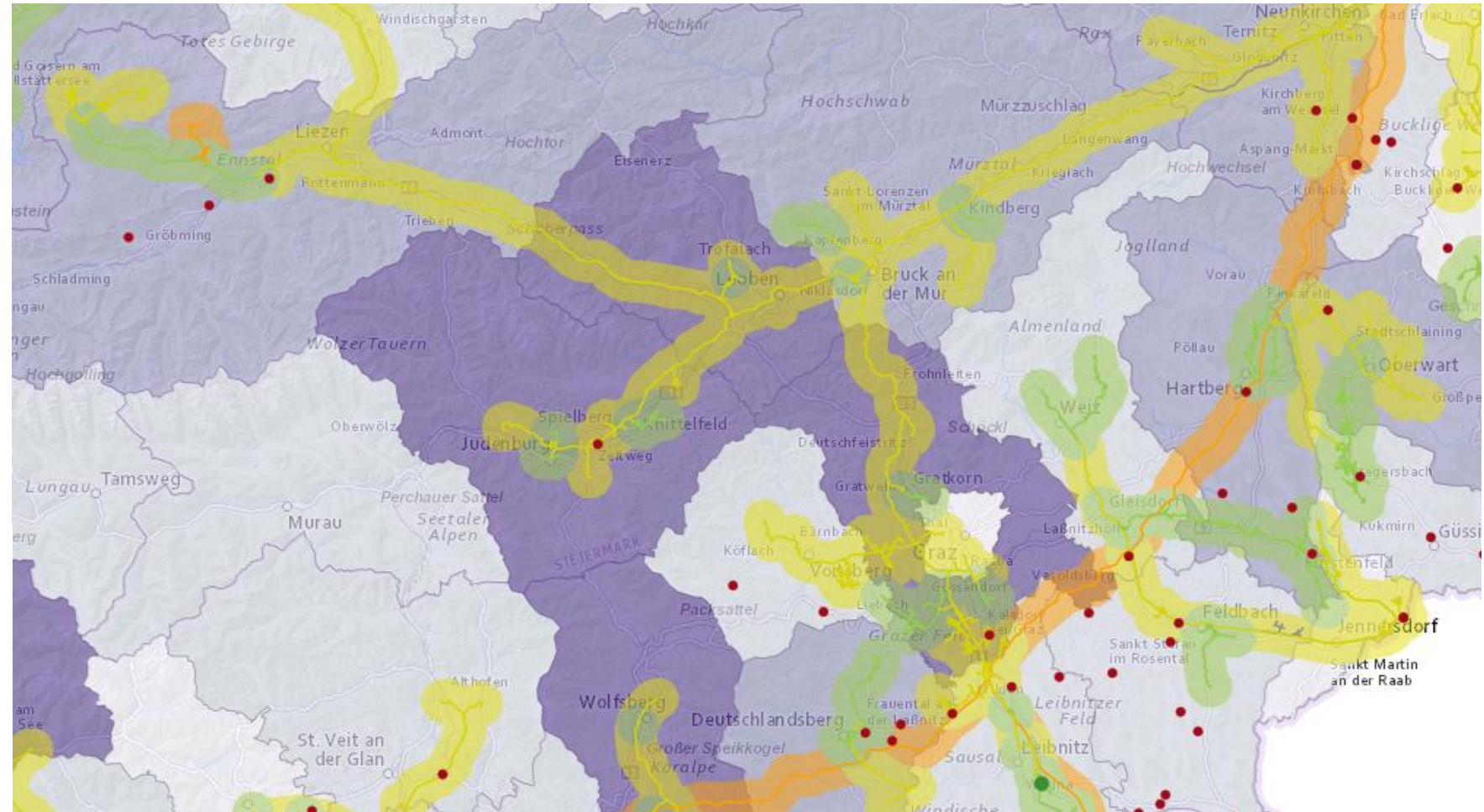
- Injection capacity: 200 Nm<sup>3</sup>/h
- Biomethane potentials from solid sources

Biomethanpotenzial aus festen Reststoffen [GWh/a]

- < 100
- 100 - 300
- 300 - 600
- 600 - 900
- > 900

Biogasanlagen

- Biogasanlagen mit Gasnetzeinspeisung
- Biogasanlagen ohne Gasnetzeinspeisung



Source: AGGM

# Access to the infrastructure

## Example: Renewable gas injection map

- Injection capacity: 200 Nm<sup>3</sup>/h
- Another layer for expected heat demand in 2030 in the transition scenario.

### Legende

Effizienzklassen der Eignungszonen

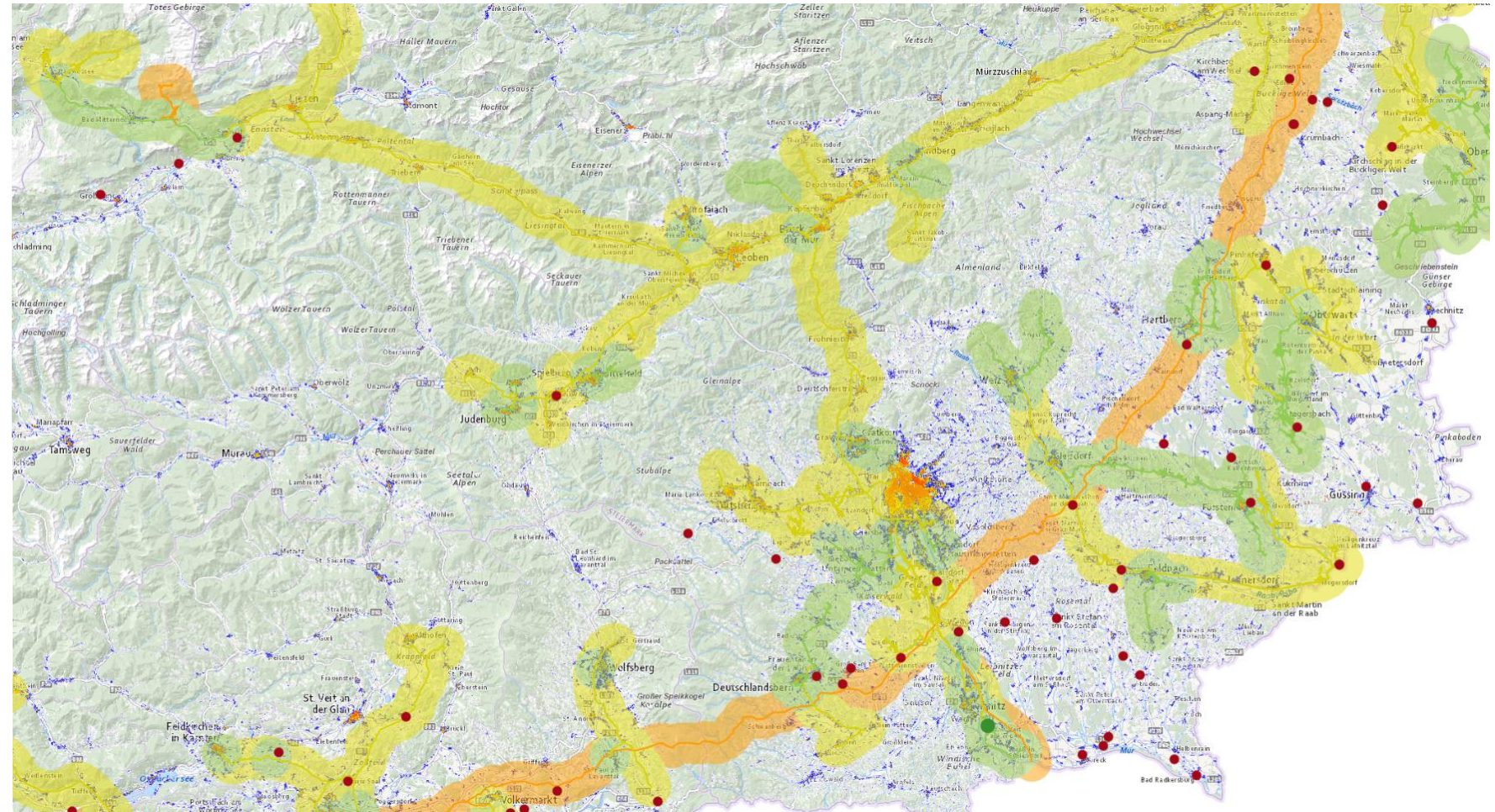
- A** (green arrow) Einspeisung mit bester Effizienz möglich
- B** (light green arrow) Einspeisung mit guter Effizienz möglich
- C** (yellow arrow) Einspeisung möglich
- D** (orange arrow) Einspeisung nachrangig möglich
- E** (grey arrow) Einspeisung bedingt möglich

Biogasanlagen

- Green circle** Biogasanlagen mit Gasnetzeinspeisung
- Red circle** Biogasanlagen ohne Gasnetzeinspeisung

Wärmebedarfsdichte

(2030, Transition) [GWh/km<sup>2</sup>a]



Source: AGGM

# GO-System for Renewable Gas

- GOs as a tool to increase transparency, communication tool targeting the consumers & tool to increase the value of renewable gas.
- Austria first country that is connected to AIB hub.
- In the past: Gas Disclosure System on a voluntary base.
- Present and Future: With new Renewables Law Gas Disclosure becomes obligatory for all suppliers.
- GOs are basis for renewable gas – biomethane and hydrogen
- 100 % Natural/fossil gas if no GOs are used
- Whole system runs in E-Control database
- 2022: First time GOs for gas and only 0,1% of GOs coming from biomethane.

# Cross-border trade of renewable gas

Example: mass balance system via the gas balancing system

## Country A

### 1. Physical injection

- Injection of renewable gas (50 units) into the gas network
- Measured by the TSO/DSO
- Allocated as entry in the balancing portfolio of shipper X
- Certificates for renewable gas issued by national registry of country A

#### Balancing portfolio of shipper X

##### Country A

	entry	exit
cross-border IP (natural gas)	x	x
renewable gas production	50	
cross-border IP (renewable gas)		50
final customer		x
daily balance		

### 2. Cross-border trade

- Shipper X: nomination of cross-border exit of renewable gas (50 units) vis-à-vis TSO/DSO
- Shipper Y: nomination of cross-border entry of renewable gas (50 units) vis-à-vis TSO/DSO
- Cross-border matching by TSOs/DSOs
- Certificates for renewable gas transferred between national registries

## Country B

### 3. Supply to final customer

- Shipper Y supplies its customer with renewable gas (50 units)
- Cancellation of certificates for renewable gas by national registry of country B

#### Balancing portfolio of shipper Y

##### Country B

	entry	exit
cross-border IP (natural gas)	x	x
renewable gas production		
cross-border IP (renewable gas)	50	
final customer		50
daily balance		



**THANK YOU  
FOR YOUR ATTENTION!**

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