

Assessing the geographical potential of biogas methanation in Denmark based on the existing biogas sources

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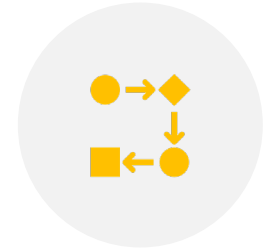
Introduction and aim



POWER-TO-X
TECHNOLOGIES ARE
ONE OF THE KEY
TECHNOLOGIES IN
REACHING 100%
RENEWABLE
ENERGY TARGETS IN
ALL ENERGY
SECTORS IN THE
LONG TERM.

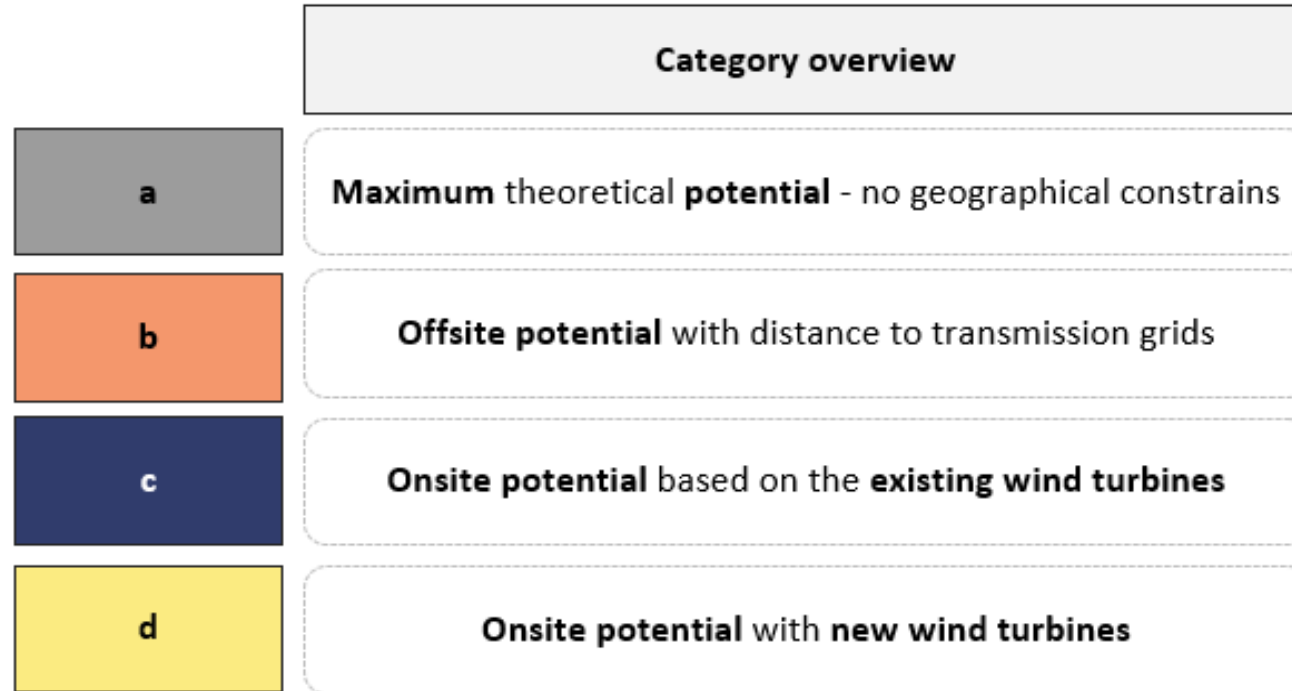


ASSESS THE
POTENTIAL FOR
BIOGAS
METHANATION
PLANTS IN A
LARGER
GEOGRAPHIC AREA



THE FOCUS IN THIS
PRESENTATION IS
THE AVAILABILITY
OF EXISTING
CARBON SOURCES
(CO₂) FROM BIOGAS
PRODUCERS

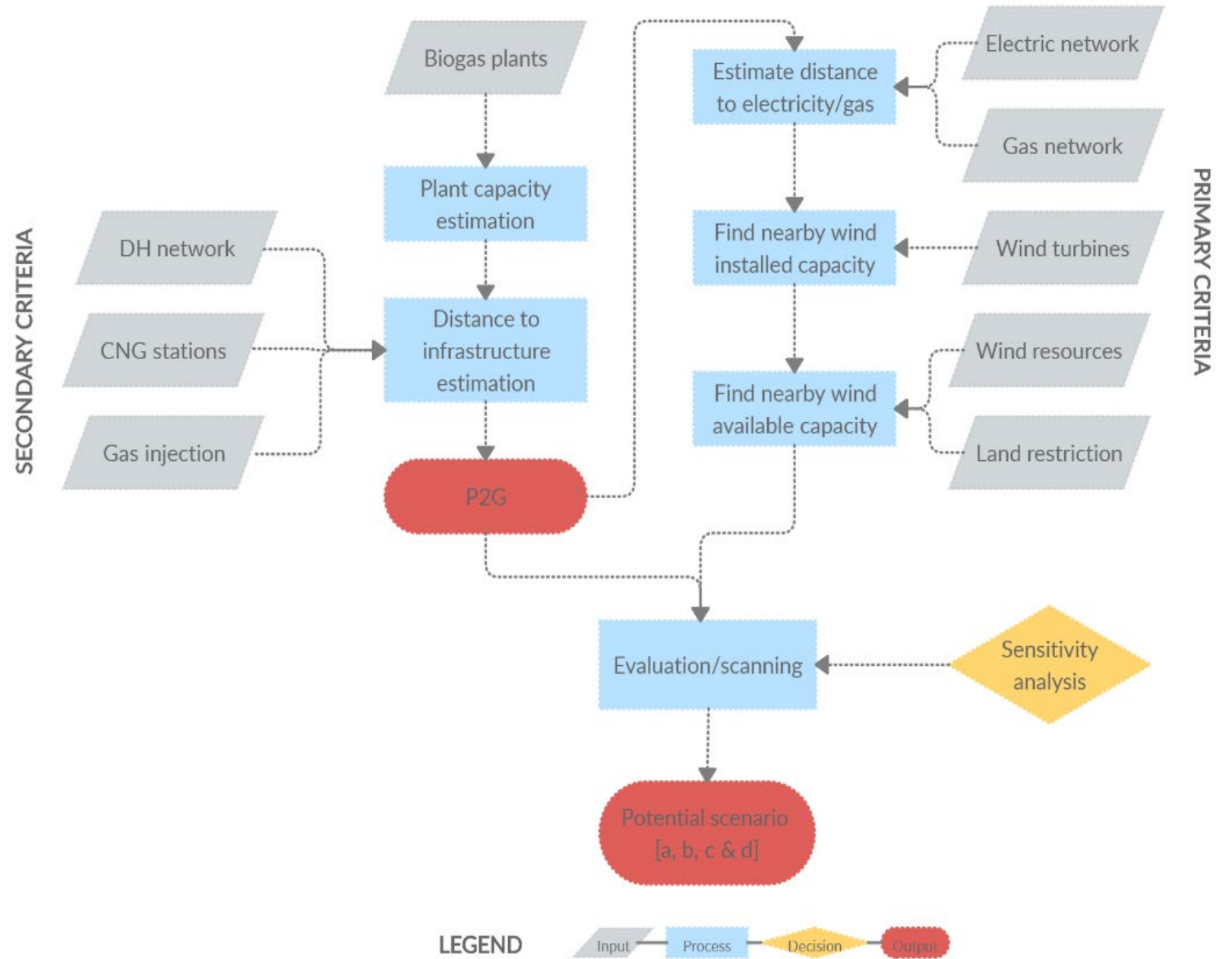
4 categories analysed



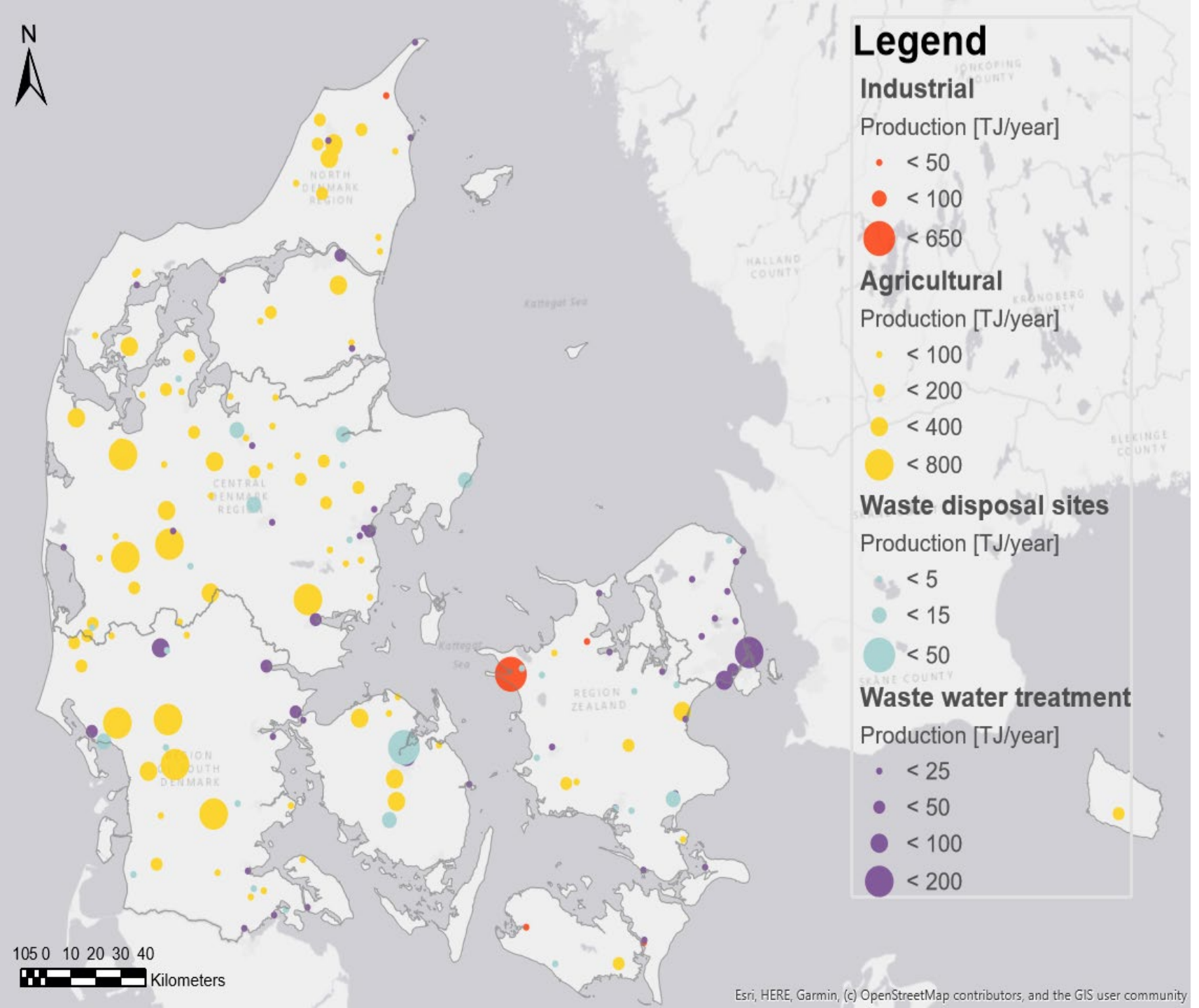
Delimitations:

- Only existing biogas plants
- Does not consider economic feasibility or operation of plants

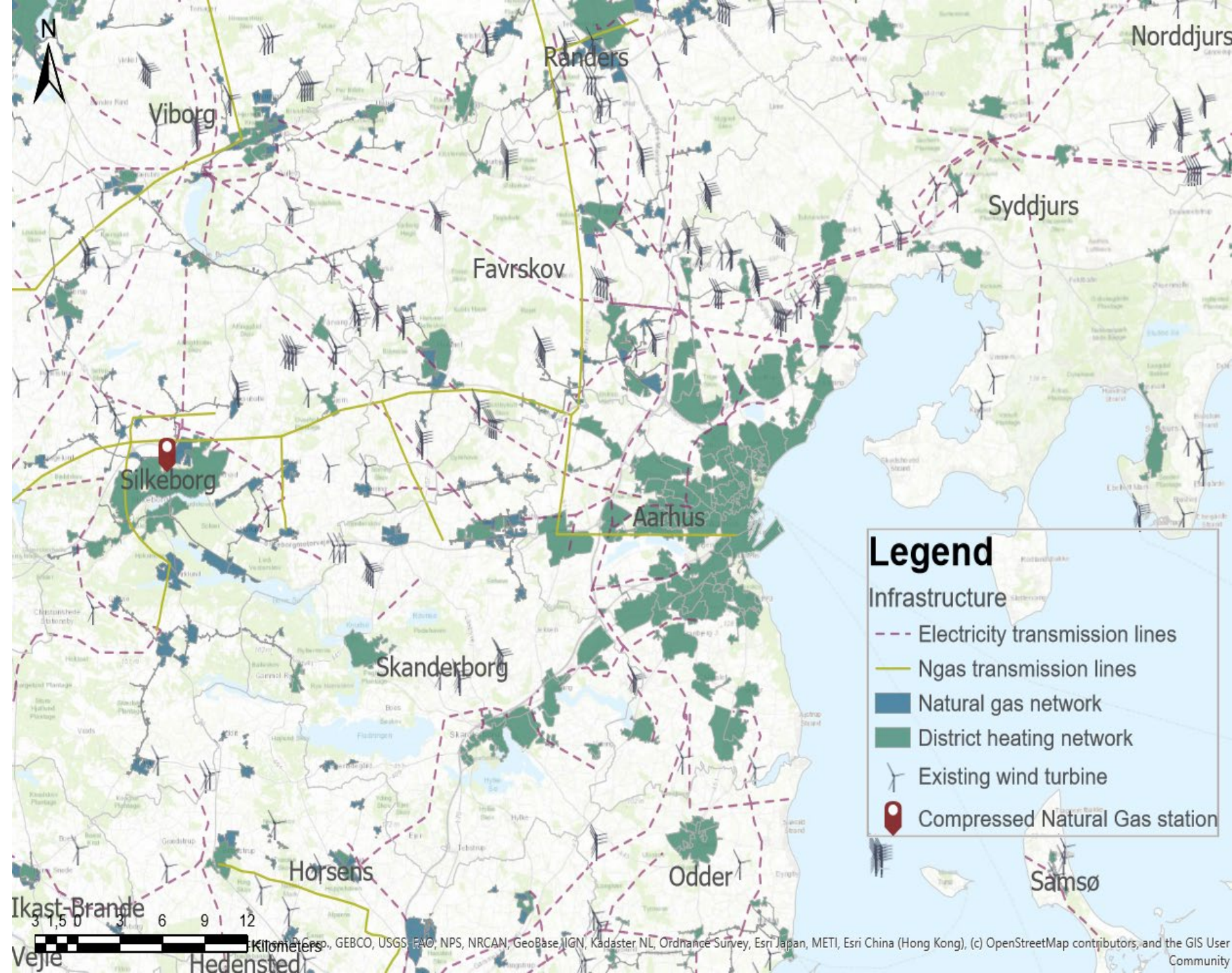
Methodology



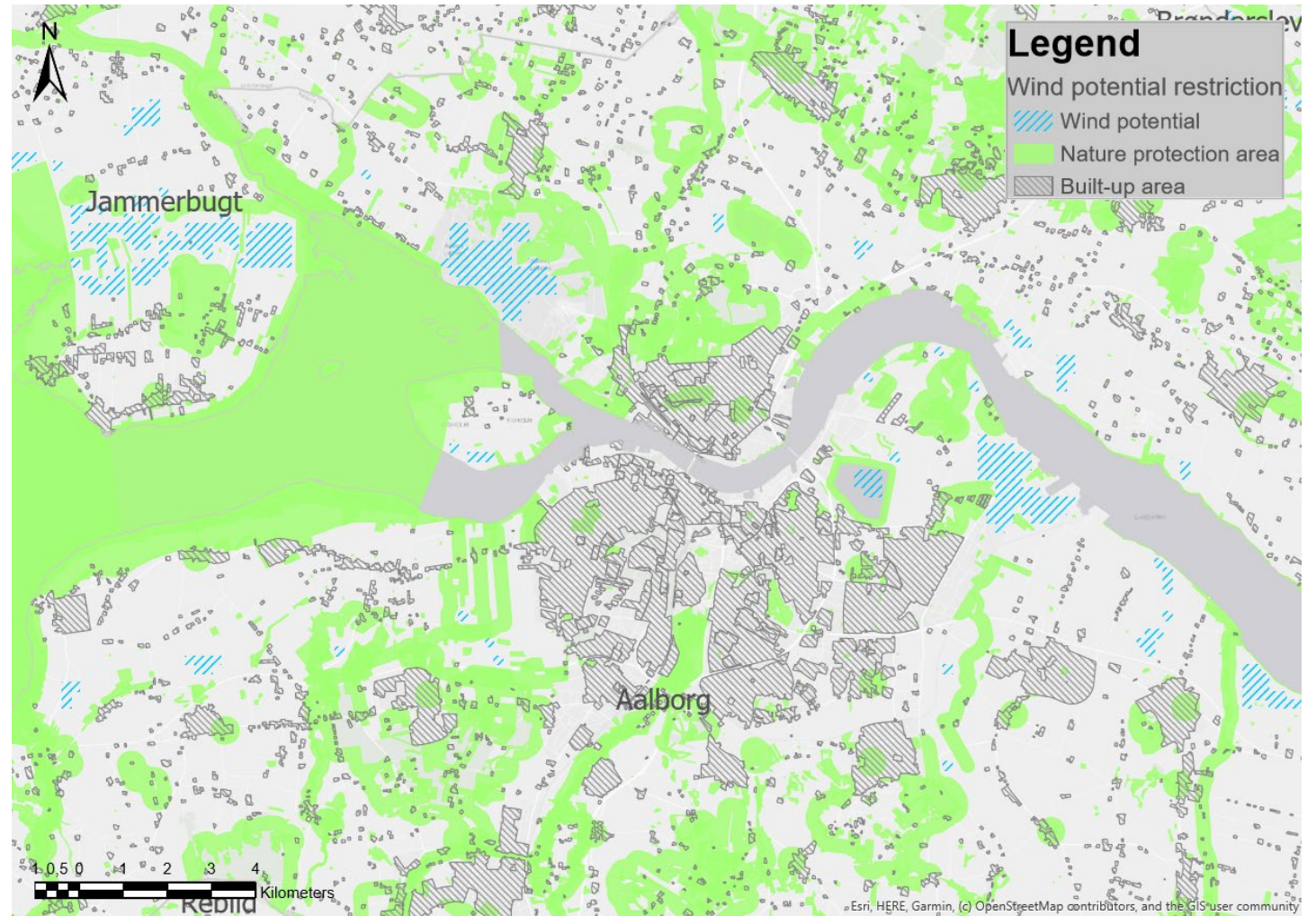
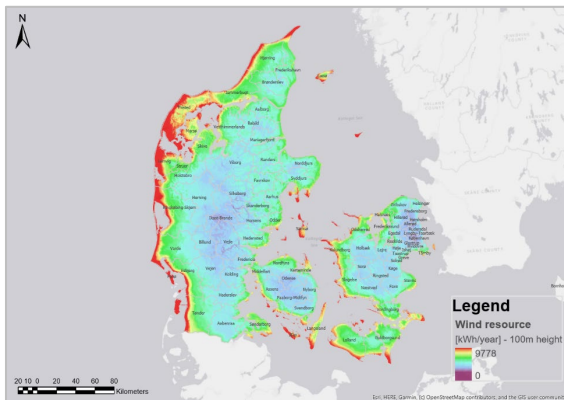
Biogas producers



Existing Infrastructure



Wind potentials



Selection criteria (base scenario)

Scenario b, c, d:

- 2 km distance to electricity and gas networks

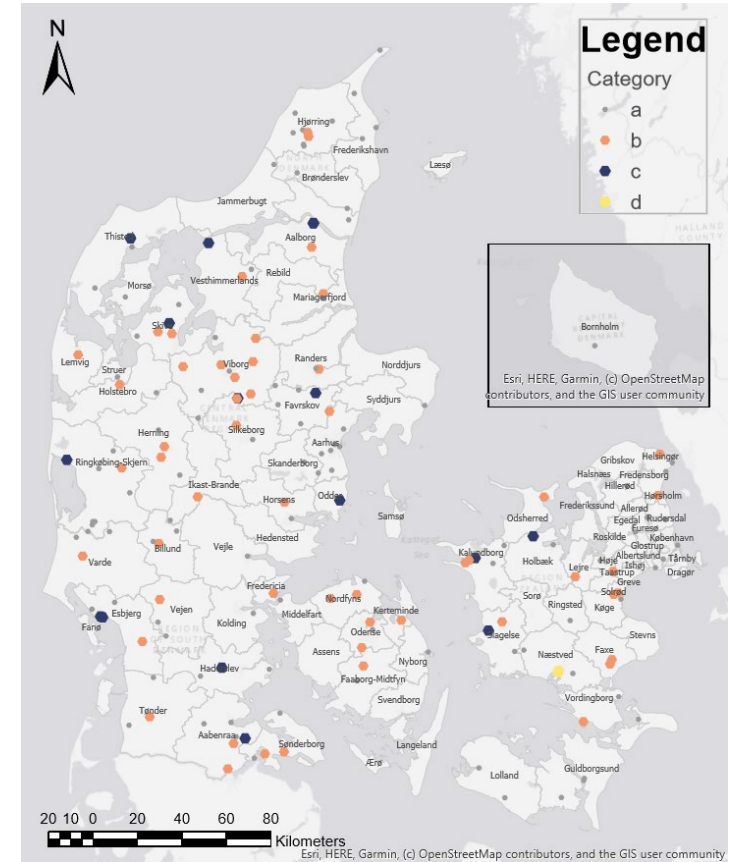
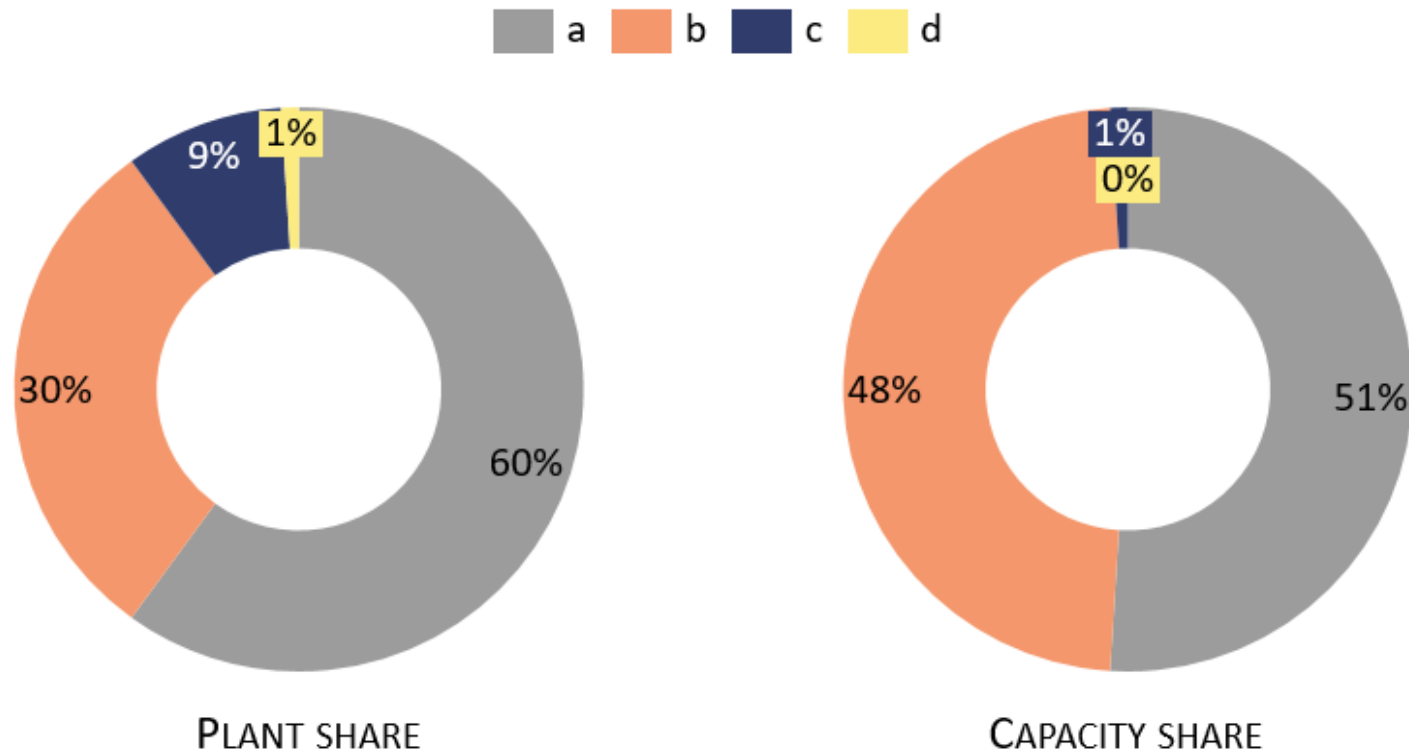
Scenario c:

- 3 km distance to existing wind turbines
- 3 ratio between biogas methanation capacity and required new wind capacity

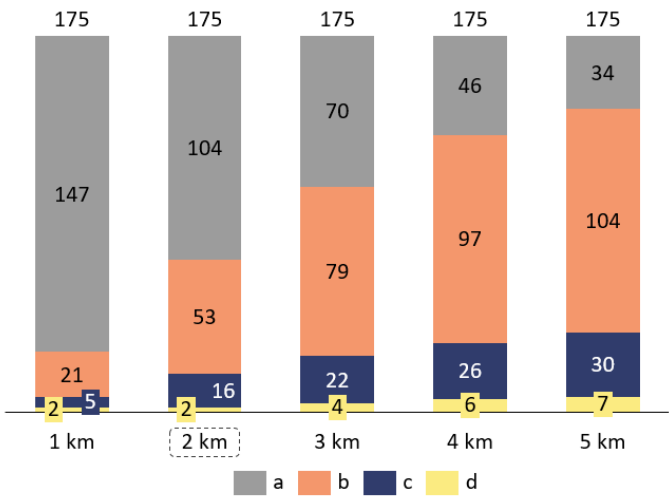
Scenario d:

- 3 km distance for new wind potential
- 4 MWh/m² for new wind potential

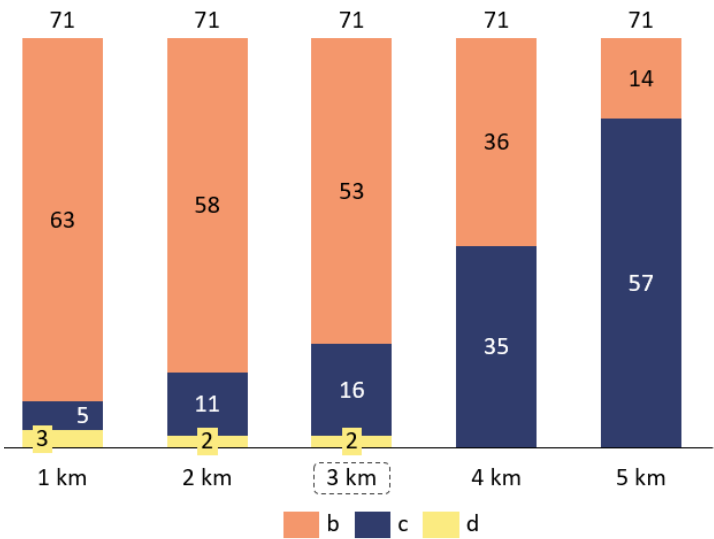
Base scenario results



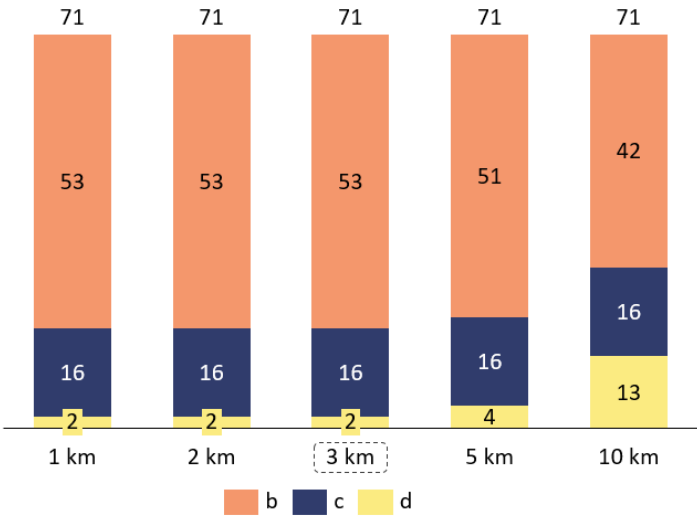
Distance to electricity and gas network



Distance to existing wind turbines



Distance for new wind potential



Sensitivities

The model

- Simplified distance (ordinary straight line)
- Neglecting capacities of existing infrastructure
- Only capacity of existing wind turbines are used (not production or ownership)
- New wind turbines is simplified and restricted

Further investigations

- Economic assessment of feasibility
- Potential from new biogas producers

Discussion

Total maximum theoretical production potential of 6,666 GWh/year

- 104 biogas sources in category [a] - too far from gas and electricity infrastructure
- 53 sources are in category [b] - only fulfilling the distance to gas and electricity infrastructure requirement
- 16 are in category [c] - existing wind turbines available
- 2 in category [d] - potential new wind locations available

Currently, around half of the biogas sources are relevant for biogas methanation

36 of the plants already has gas injection

114 plants are within 2 km of district heating

These numbers are very sensitive to the distance criteria used

Conclusion