

Locating development in the “smart” bioeconomy

WP7



Svein Olav Krøgli et al., Trondheim, 01.06.2015



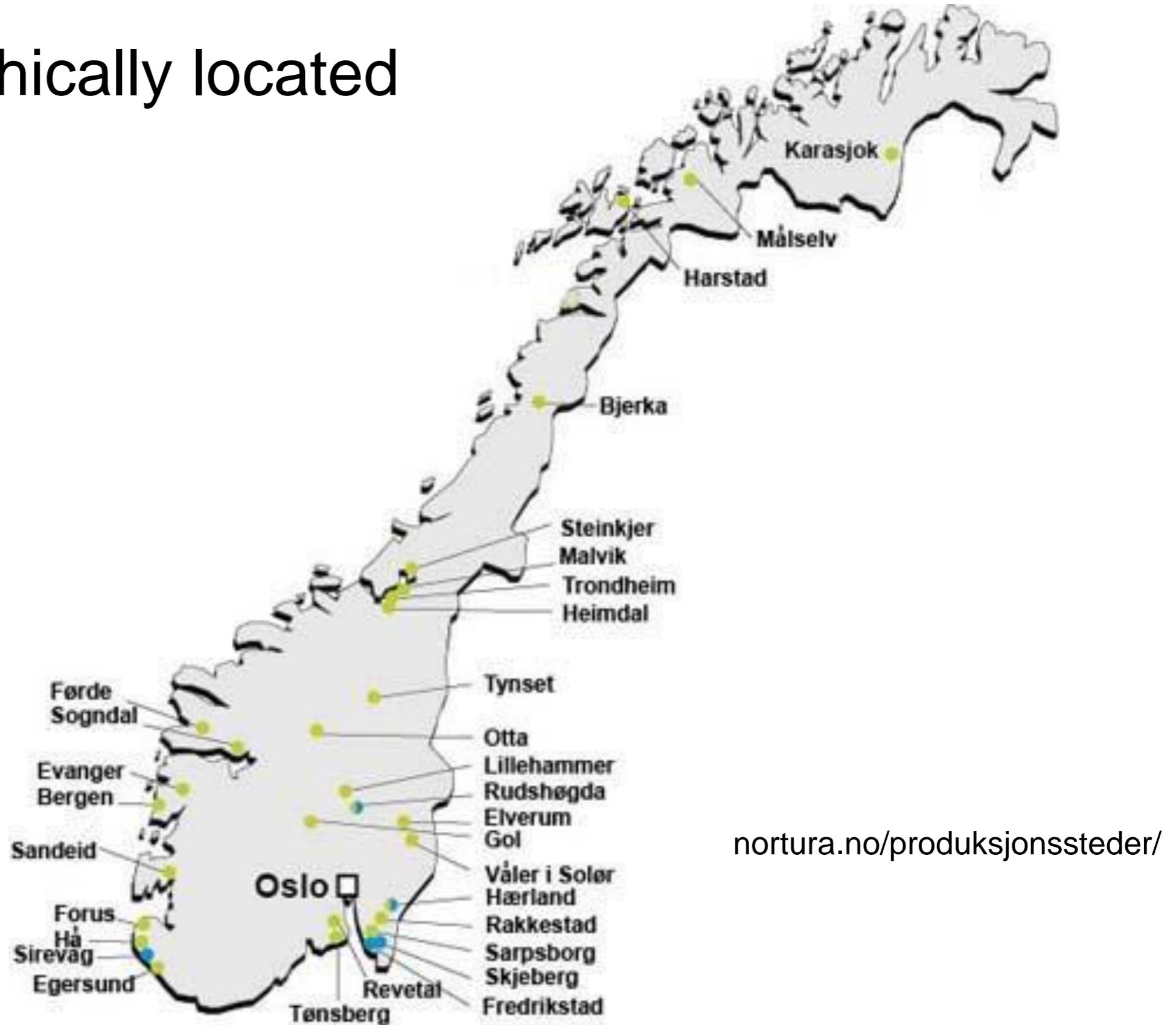
Geographically located

Resources



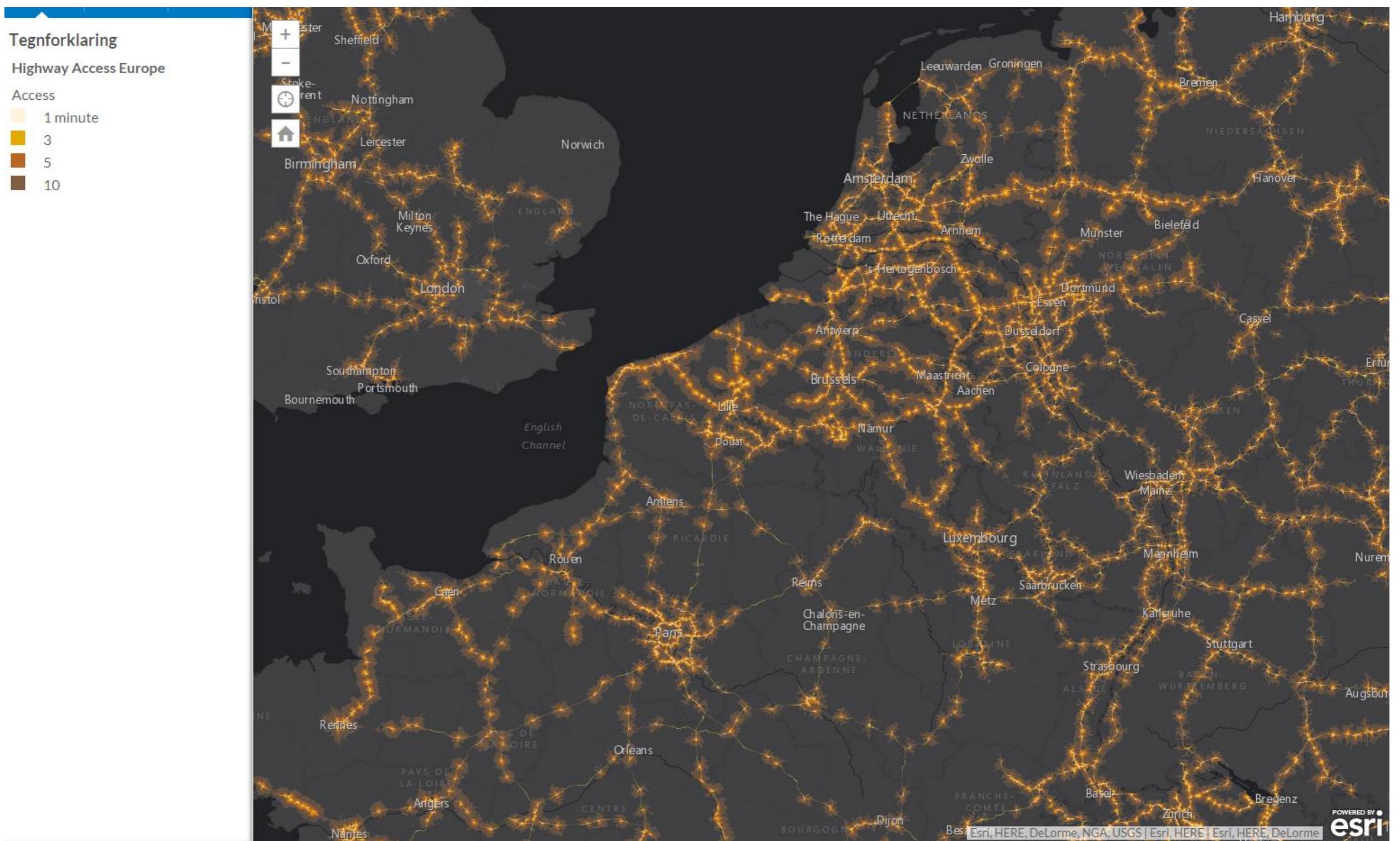
Geographically located

Factory/facility

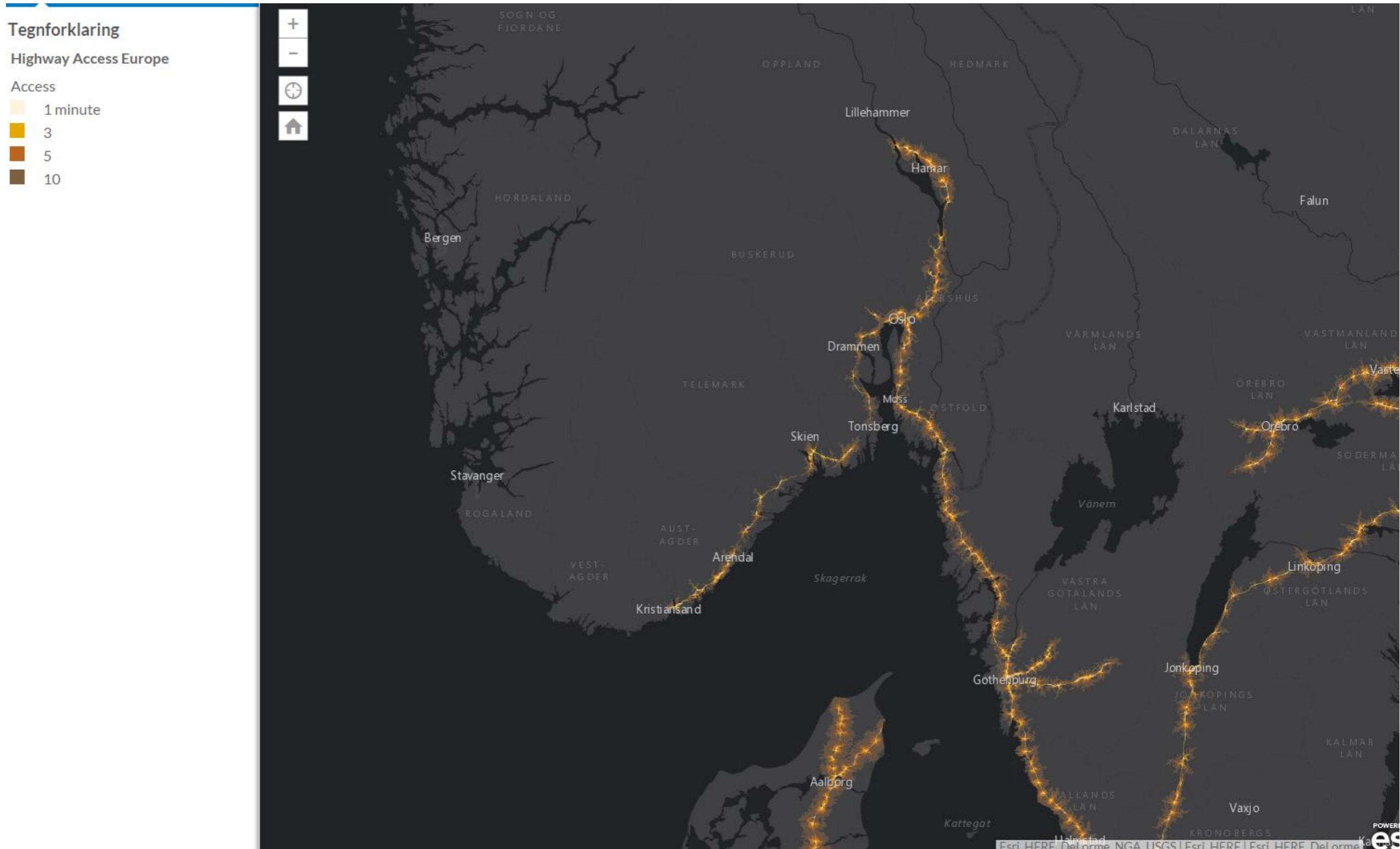


nortura.no/produksjonssteder/

Geographically located Transport



Geographically located Transport



Aim

- Identify possible and best/optimum location for development of bioeconomic clusters
- Exploring
 - Locational preferences
 - Requirements
 - Major obstacles and bottlenecks

Where

Location

- Best/optimal locations
- Best places to put ...
- Promising/potential/best overall suggestion of cluster locations

What

Variables (factors)

- Biomass/natural resources
 - Agriculture
 - Forestry
 - Aquaculture
- Human resources
 - Scientific sector/knowledge
- Infrastructure
 - Transport distances
- Demography
 - Demand
 - Consumers/market
- Industrial sector
 - Type
 - Capacity
 - Production costs
 - Waste
- Biotechnological developments
 - Increased production
 - Better utilization

How (assess)

Clusters

- Resource availability/access
- Resource requirements
- Minimise cost
- Maximise efficiency
- Independent bio-sectors
- Integration of bio-sectors
- Optimizing the use of resources
- Possible investment options for different types of industry
- Design of existing value chains
- Value chain optimization
- What are the tradeoffs, how can they be mapped described
- What are the conditions that would aid in developing a smart bioeconomy
- What are the spatial implications of different developments

Two-step approach

Cartographic GIS model

- Map algebra / overlay
- Maps of variables
 - Operationalize
 - Weights
- Suitability map
- Promising locations

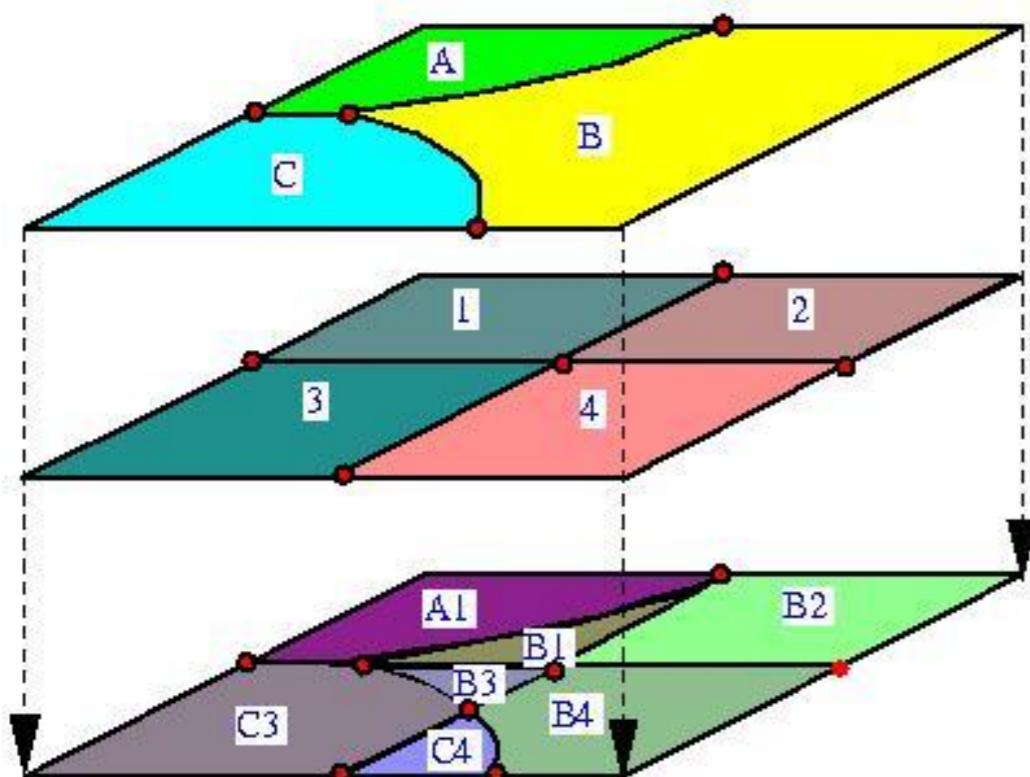


Optimization model

- Optimization methods
 - Assumptions
 - Conditions
- Best locations
 - Identifying the best overall suggestions for developing bioeconomic clusters
 - Including detailed information for each industry at each location

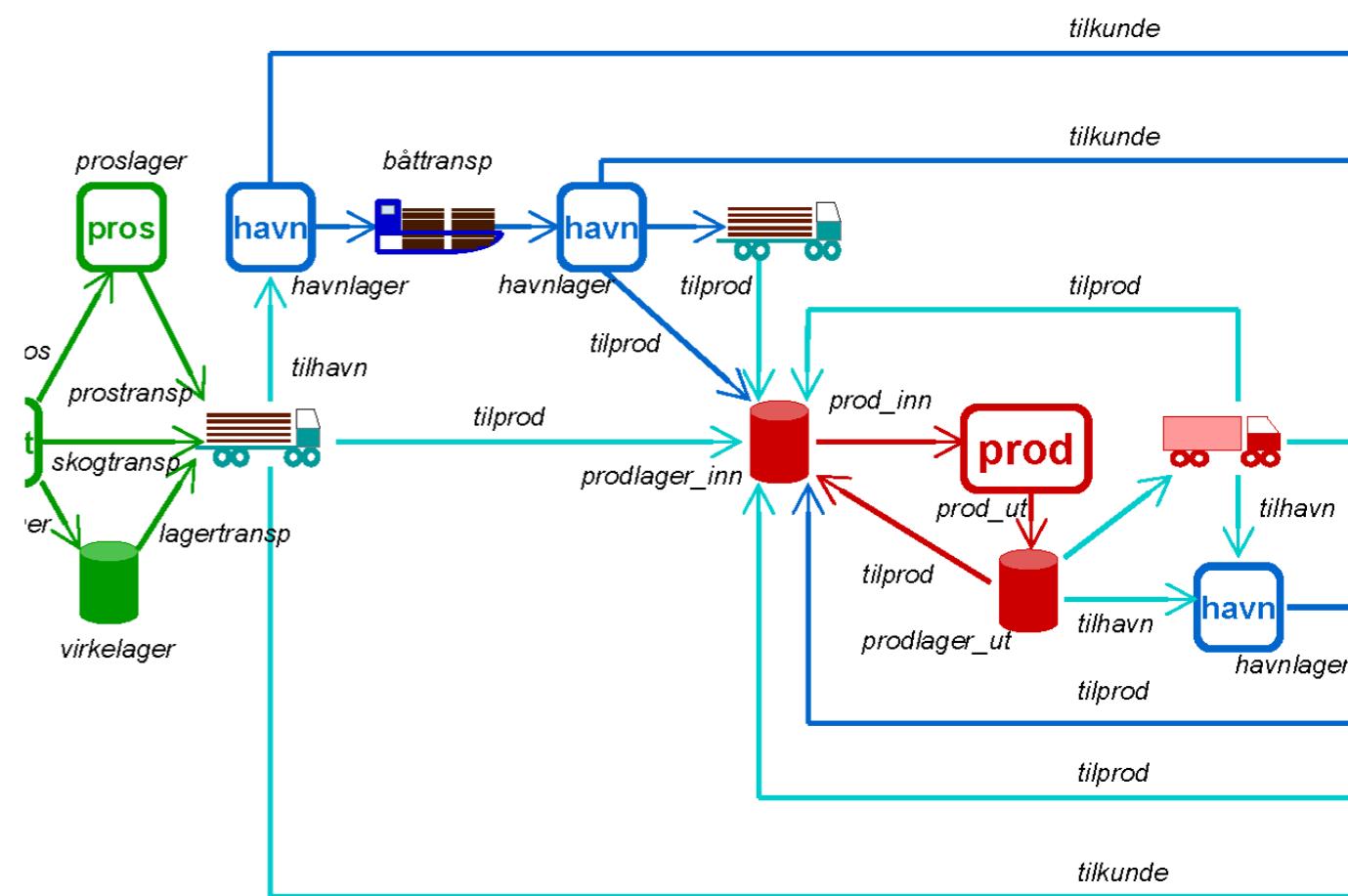
Two-step approach

Cartographic GIS model



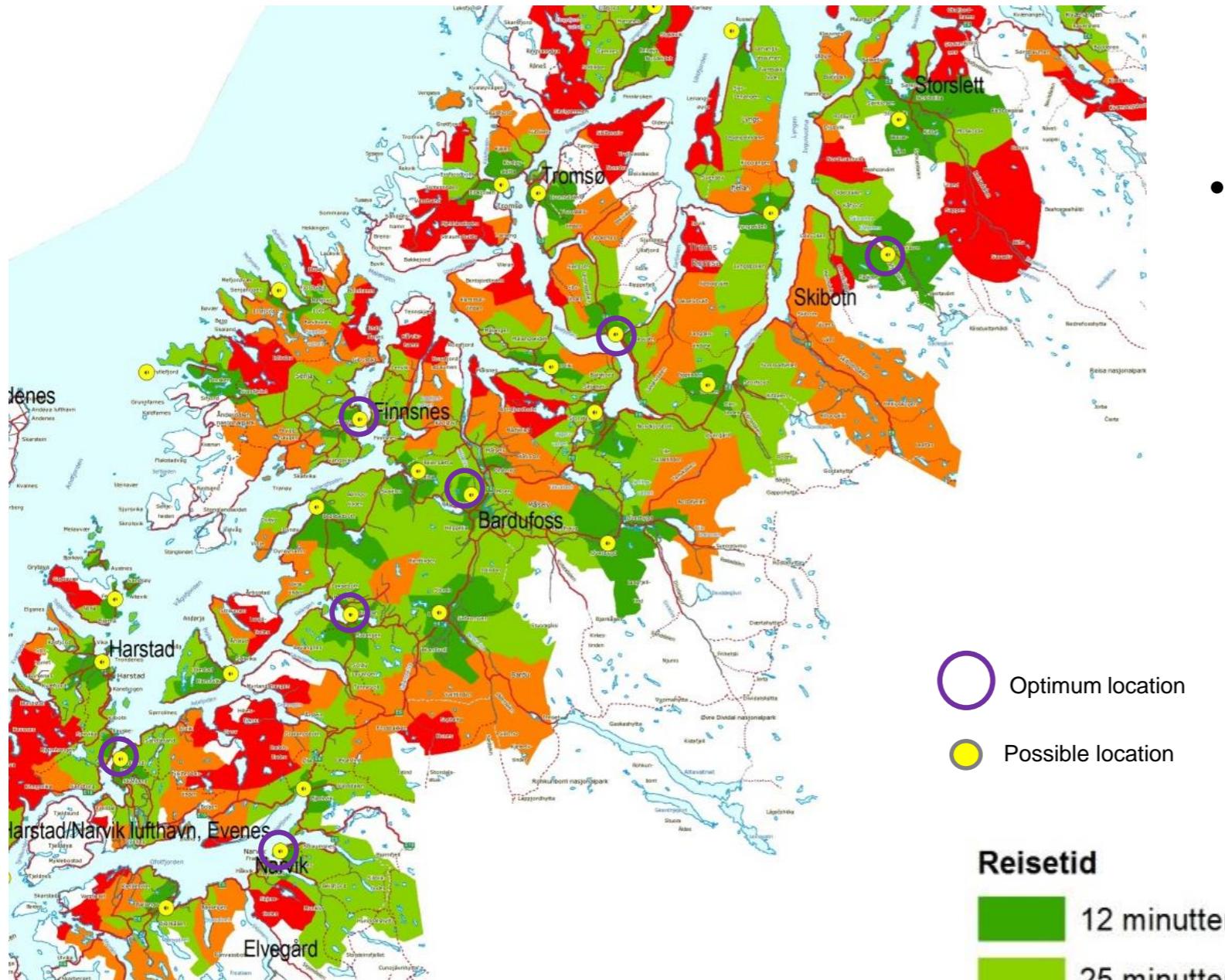
Spatial clusters of high values (hot spots) and low values (cold spots)

Optimization model



Picture of mathematical model that optimizes flow in a forest-value chain

Optimal location - example



- Optimum locations, based on
 - Possible locations
 - Resource availability
 - Transport distances

○ Optimum location

● Possible location

Reisetid

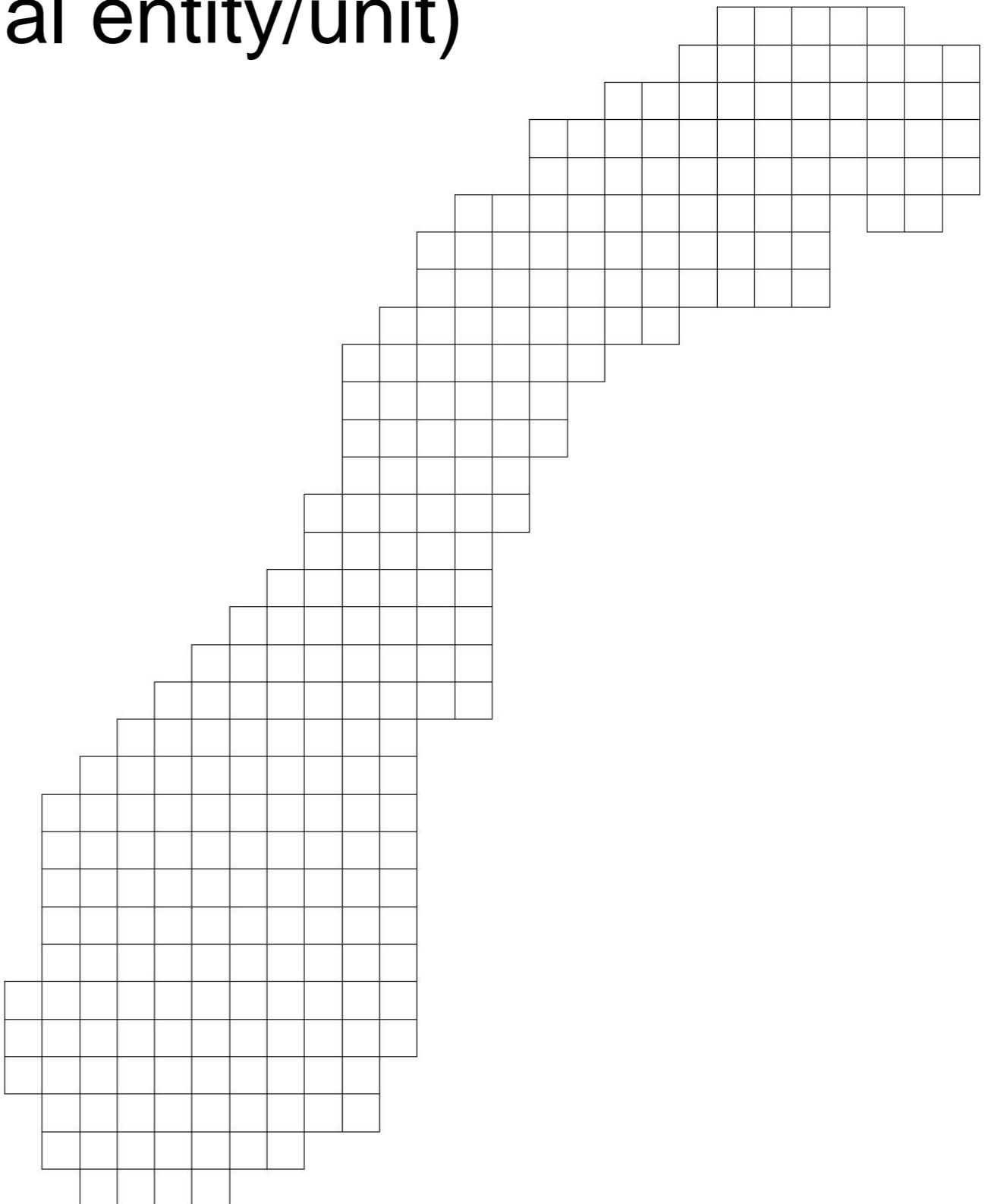
■	12 minutter
■	25 minutter
■	30 minutter
■	40 minutter

Analyse different perspectives on optimal location

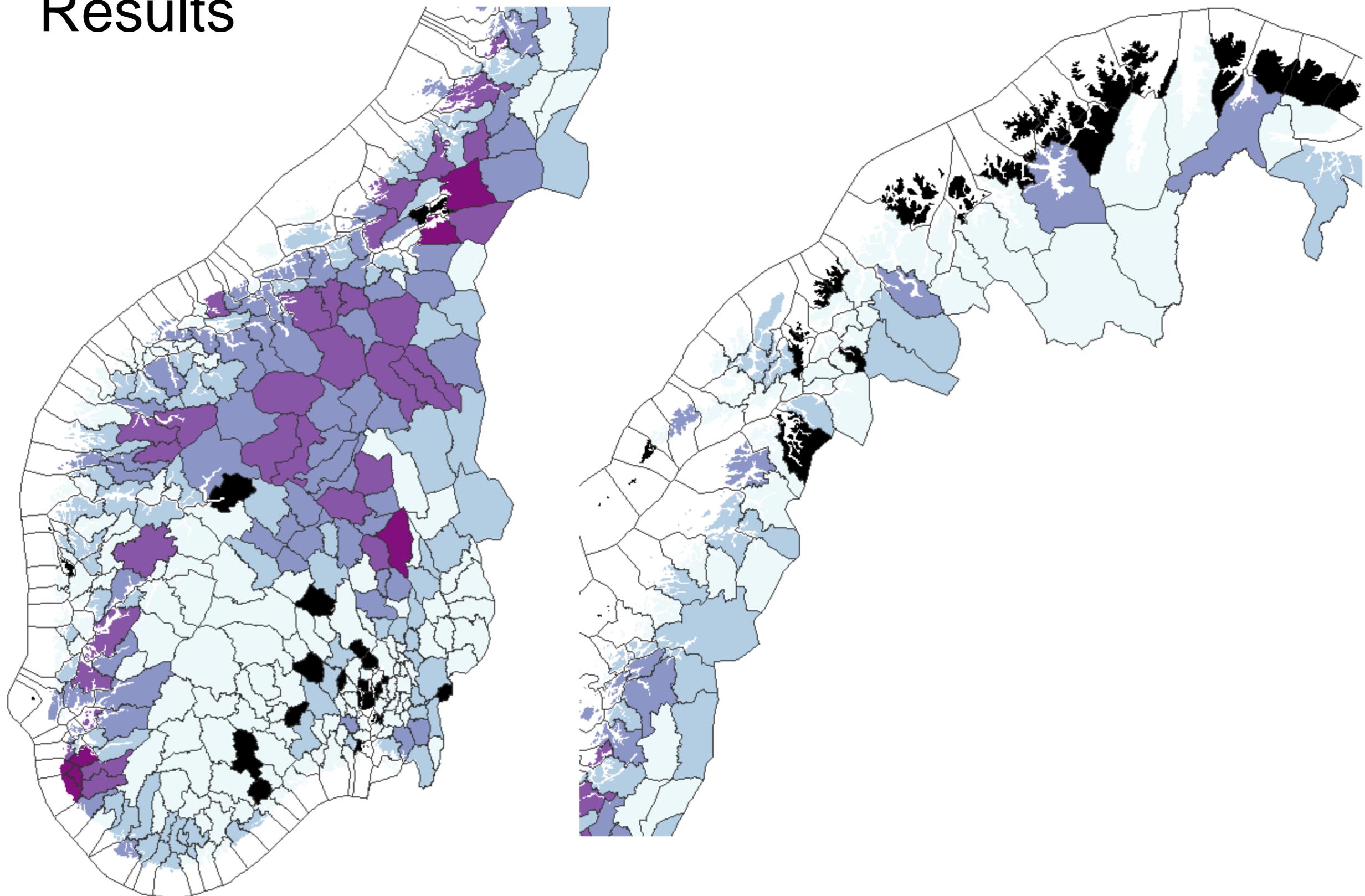
- Effects of variation in different parameters
- The opportunity to design new value chain networks with independent industry, transportation and clusters
- Sustainability
- Ethical issues
- Societal acceptability
- 2030 scenario

Geographic space (spatial entity/unit)

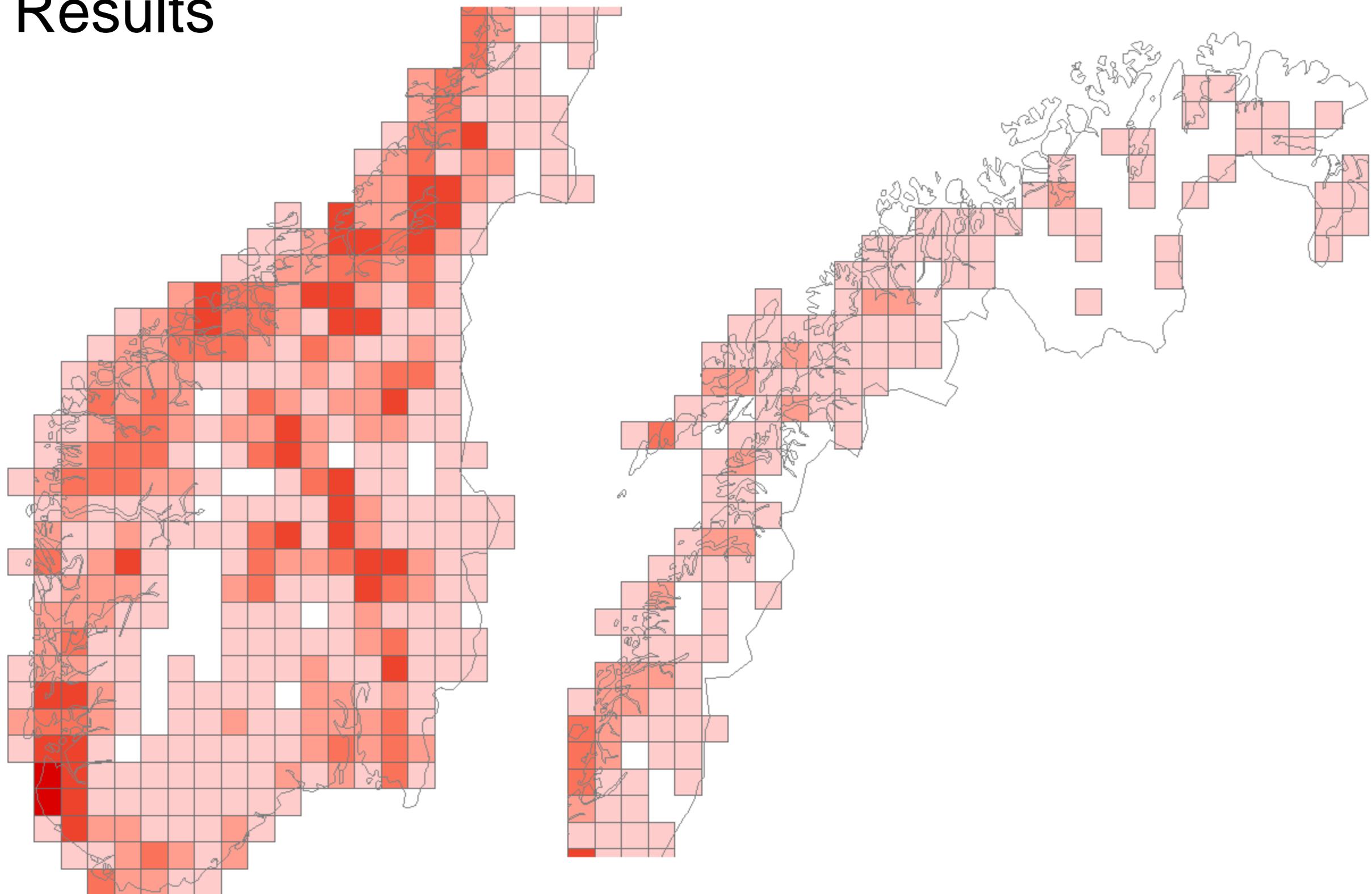
- County
- Municipality
- Other administrative boundaries
- Square grid cells
 - 5×5 km
 - 10×10 km
 - 25×25 km
 - 50×50 km



Results



Results



Expected outcomes

- Outputs
 - “Maps” for decision support
 - Early results will be used in WP2b to facilitate discussions among stakeholders on locating integrated bioeconomic development
 - Scenarios/models will be re-examined for the effects of variations in different parameters on optimal location
- Deliverables
 - 2 papers
 - 1 chapter in book
 - 4 conference papers
 - 1 popular science publication

Participating institutions/persons

- Norwegian forest and landscape institute (NFLI)
 - Wenche Dramstad
 - Svein Olav Krøgli
 - Misganu Debella-Gilo
- SINTEF
 - Vibeke Stærkebye Nørstebø
 - Kristin Tolstad Uggen

WP 6 Resource distribution
Data/info

WP 2a Foresight
Data/info



WP 7 NFLI
Data
Map algebra
Spatial «hotspots»

WP 7 SINTEF
«Hotspots»
Data
Optimization

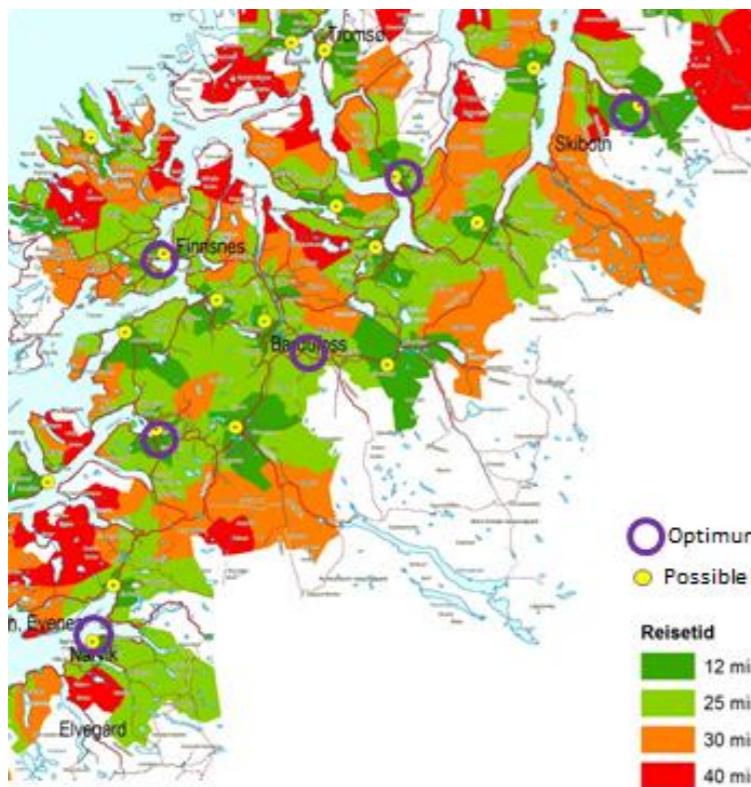


Paper

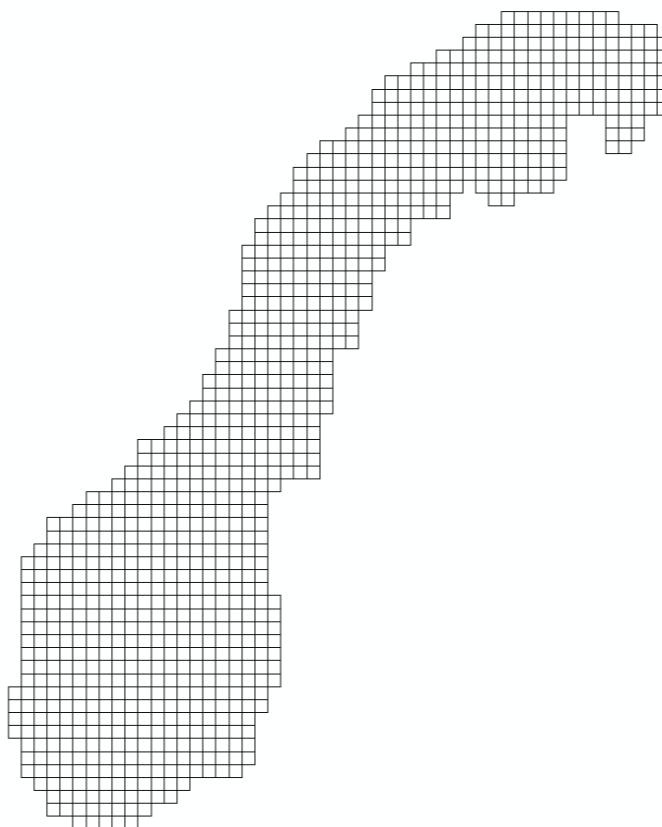
Paper

WP 2b
Integrated scenarios

Possible paper



Optimum
Possible
Reisetid
12 min
25 min
30 min
40 min



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Thank you!
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