

Case study: Energy transition strategy of De Markerwaard
 Client: none
 Location: an imaginary region in The Netherlands
 Time: 2019



Problem

Our society will have to make many decisions in the coming years for meeting climate and energy transition objectives. At the regional level, they involve investments and coordination with network operators. With a variety of strategic energy transition options, the right choices will not be trivial.

SecuoS approach

We set up a study of an imaginary region "De Markerwaard" to illustrate how we can assist a region in making optimal choices from the perspectives of (1) reduction of the CO₂ emissions, (2) security of supply, and (3) limitation of the transition costs. With an ARTIS model, we have studied the region's concrete plans over the period 2020-2030, which include developing additional solar and wind energy, geothermal energy, reinforcement of the 50 kV distribution net, increased hydrogen use, and heat pump applications.

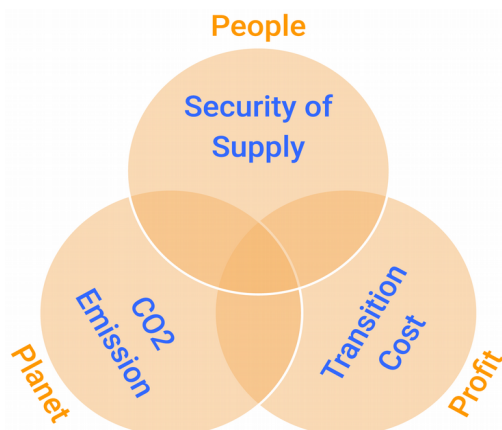


Figure 1: maintaining the security of supply is a strict boundary condition when reducing emissions and reducing costs

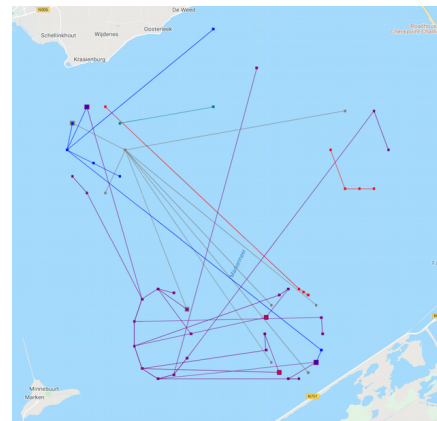


Figure 2: network diagram of the imaginary region "De Markerwaard"

Outcome

The study exposes the bottlenecks of the original plans clearly such as shortfalls in the supply of electric power and heat from 2025 onwards, insufficient capacity of the 50 kV distribution grid in the period 2023-2025, and a 13 MW shortage of heat for the agriculture sector.

To tackle this, the study proposes specific improvements such as putting in place contracts to import additional electric power up to 150 MW, doubling the capacity of the 50 kV distribution network, and adding heat storage to the geothermal project in the agriculture sector.

The study has provided valuable insights:

- Security of supply is a strict boundary condition when evaluating CO₂ emissions and energy transition costs.
- Regional transition plans do not come cheap and the cost of energy could increase with 40% between 2020 and 2030.
- An ARTIS model offers a transparent platform for the long-term regional planning as well as the balancing of the surpluses and shortfalls between the regions.

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