



ENERGY

Local grids: why DSOs should not leave it to the TSO alone to engage in active system operations.

An economic perspective on the relationship TSO-DSO

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04 April 2019

40 %

30 %



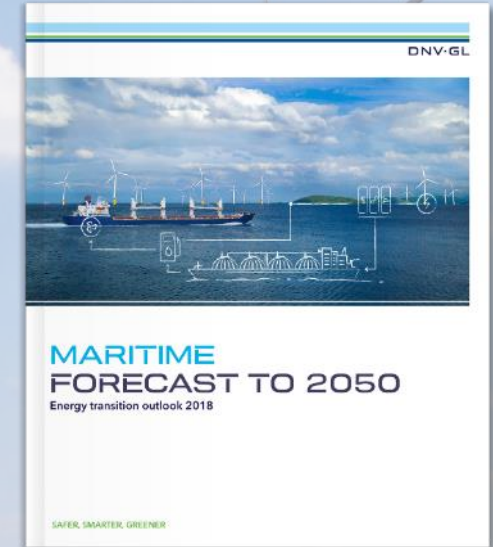
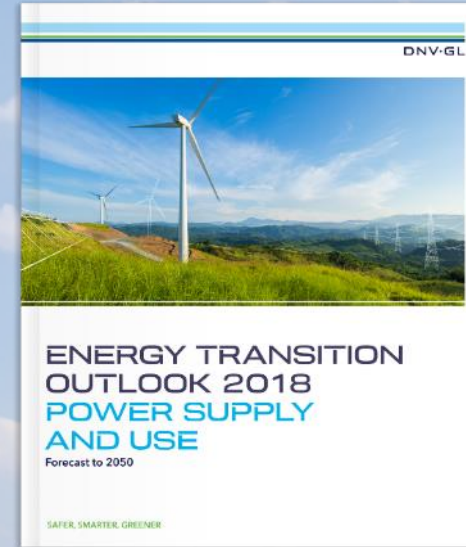
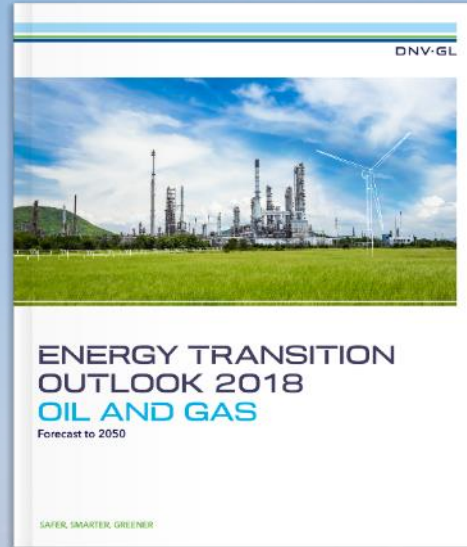
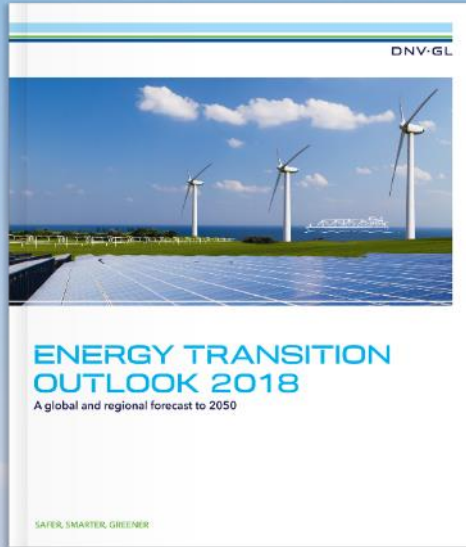


01 The energy transition

02 Transition in practice

03 Efficient organisation

Energy Transition Outlook: Helping to accelerate the energy transition

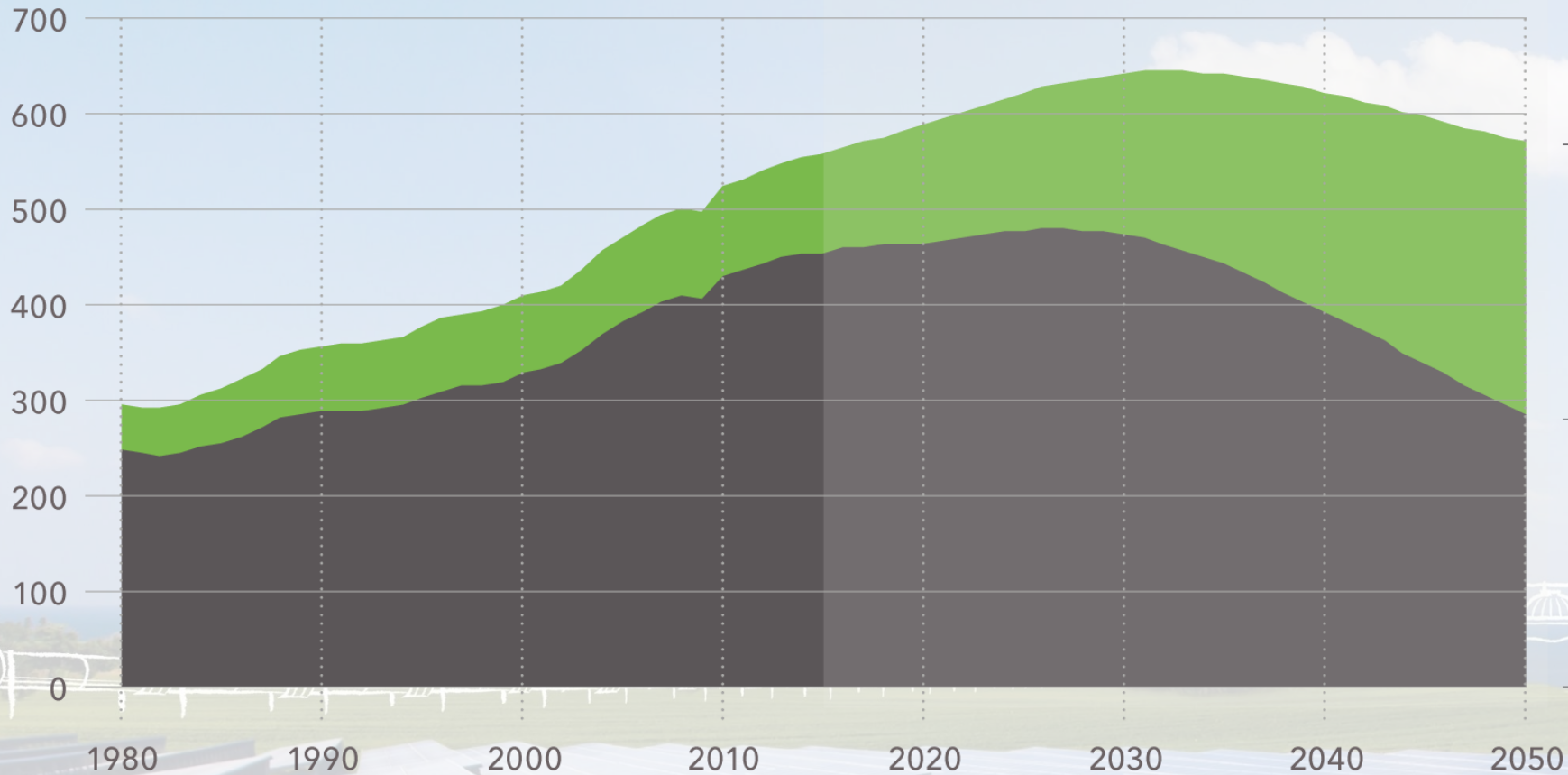


eto.dnvgl.com/2018



RAPID RAMP-UP OF RENEWABLES

Units: EJ/ Yr



Non-fossil **50%**

Fossil **50%**

DRAMATIC CHANGES FOR UTILITIES



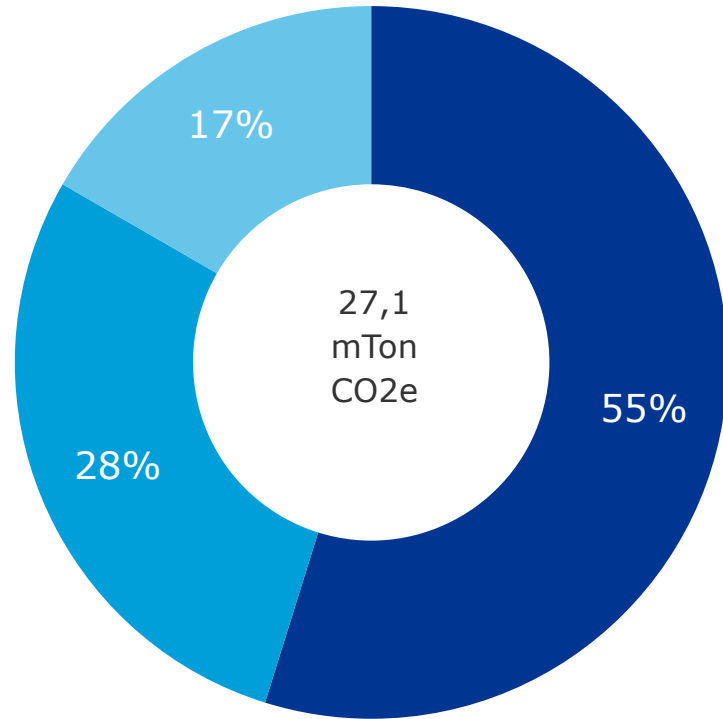
Increasing demand for electric energy
(but not only from grid)

Rapid technology development within power consumption and-production

A new era for the network industry

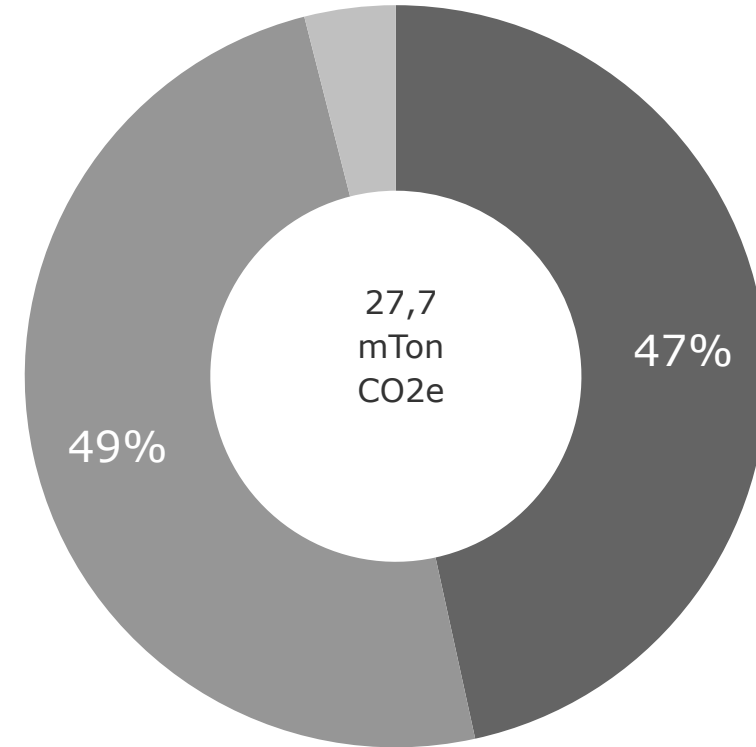
Norwegian emissions; ETS and non-ETS

Non-ETS sectors



Transport Agri Other

ETS sectors



Oil & gas Manufacturing Other



Large emissions (in Norway)

Relatively cheap emission cuts



Fast





Electricity networks – at the core of the challenges

Capacity

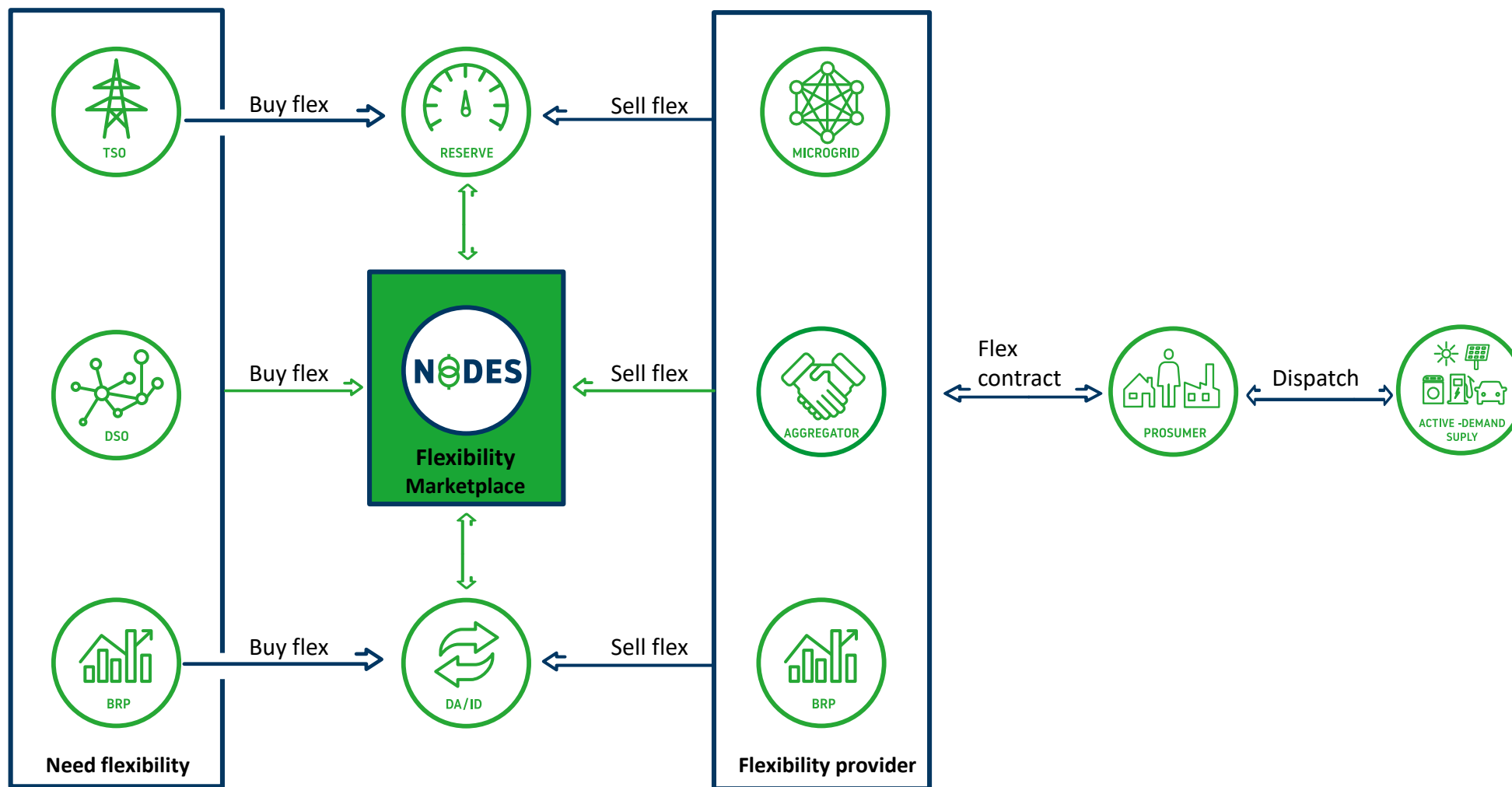
Costs

Time

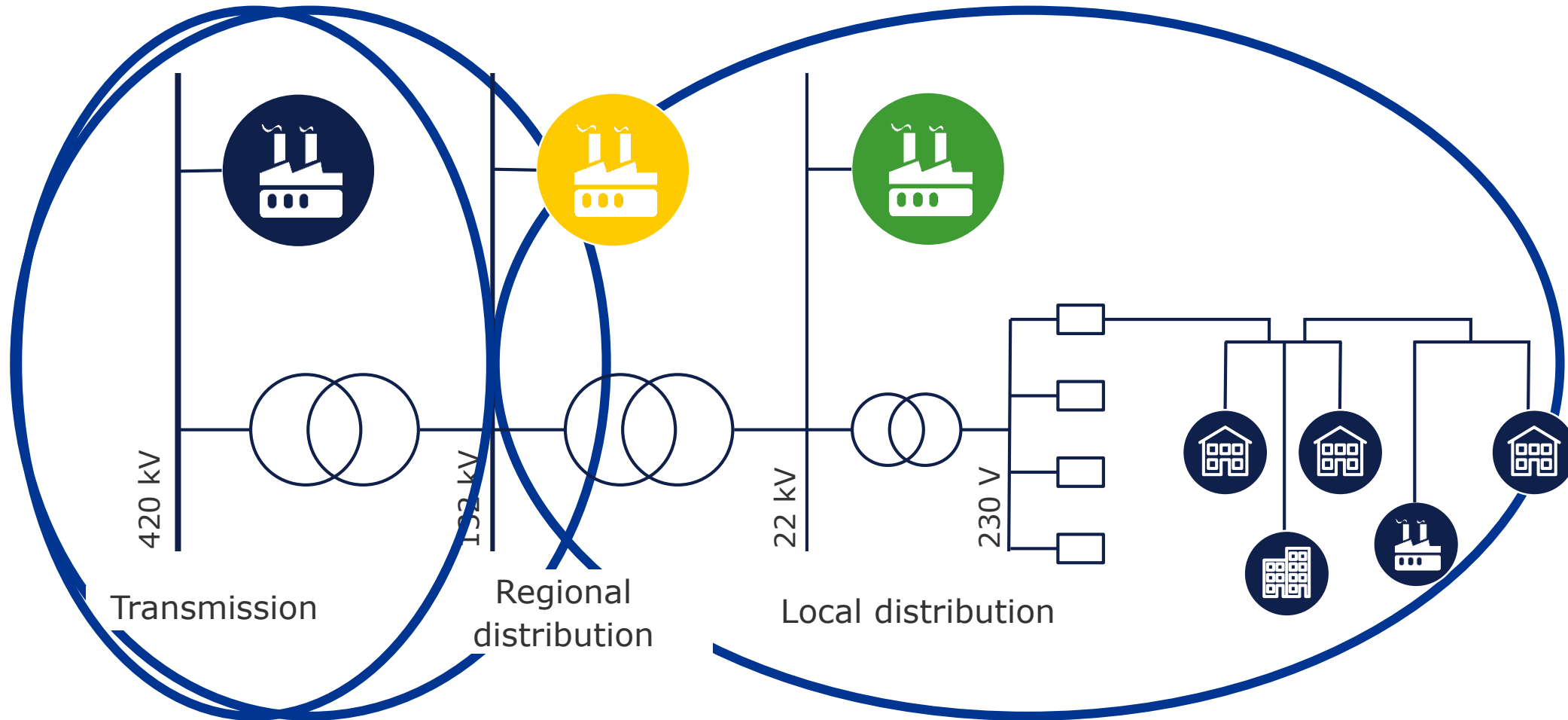
Quality



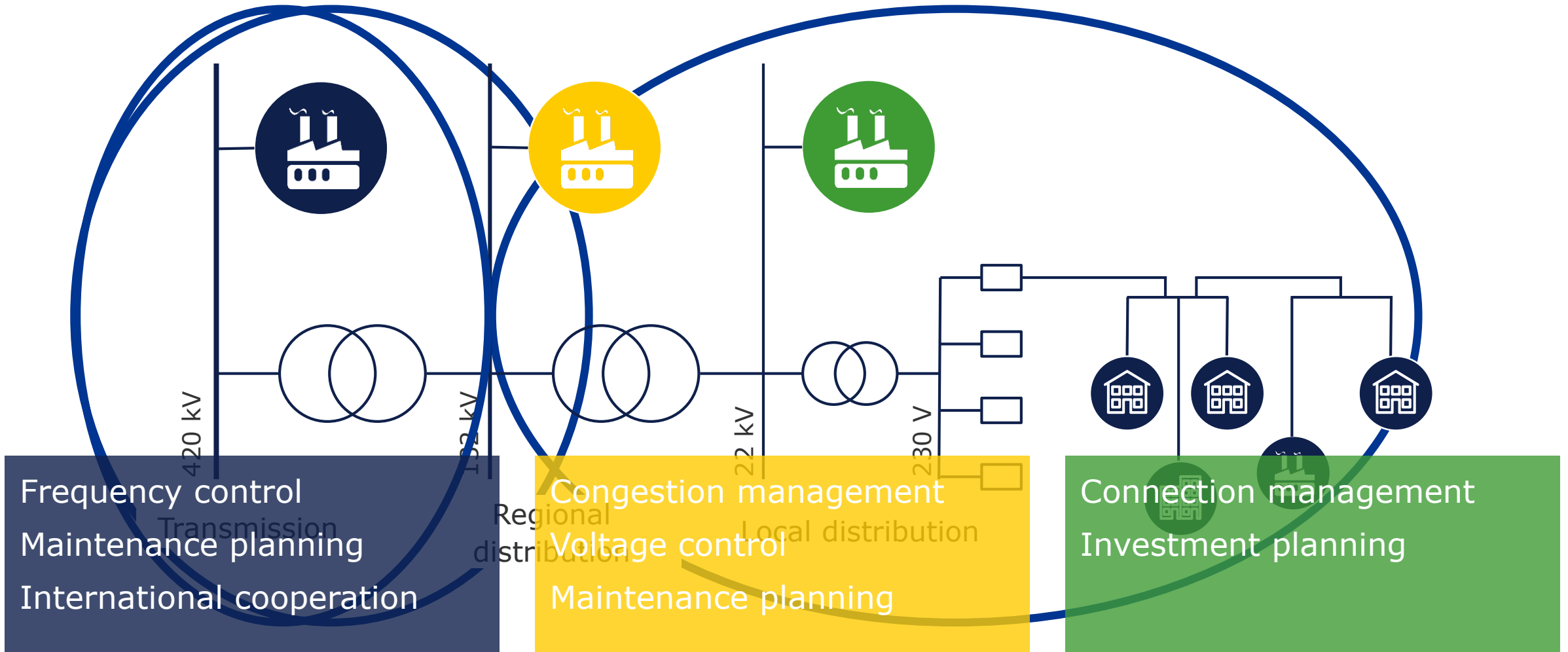
Alternatives to grid investments are real



System operation – towards all voltage levels



System operation – towards all voltage levels





Complexity triggers decentralisation

Capacity

Costs

Time

Quality

Relevant system operator



Thank you!

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SAFER, SMARTER, GREENER

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