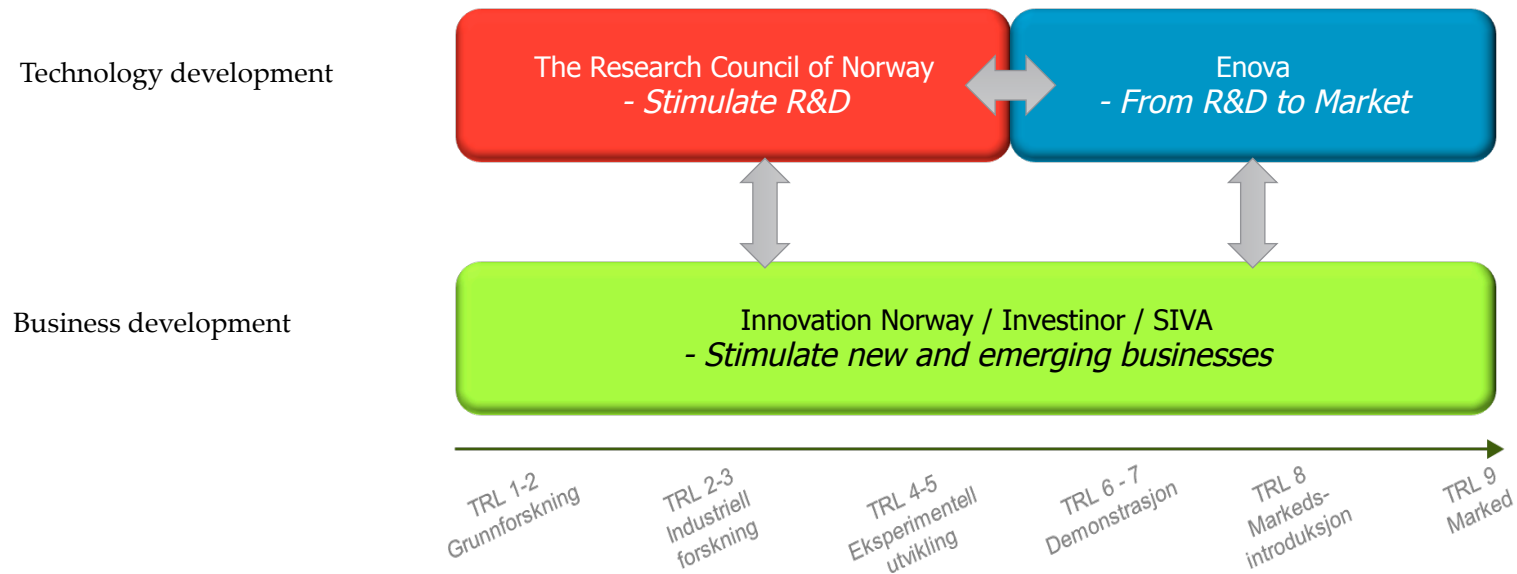


National strategies and incentive programs for increased energy system flexibility

Thomas Berg, Senior Advisor Enova SF

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The Norwegian Innovation Support System (simplified)





Vibrant change

- Towards the low emission society

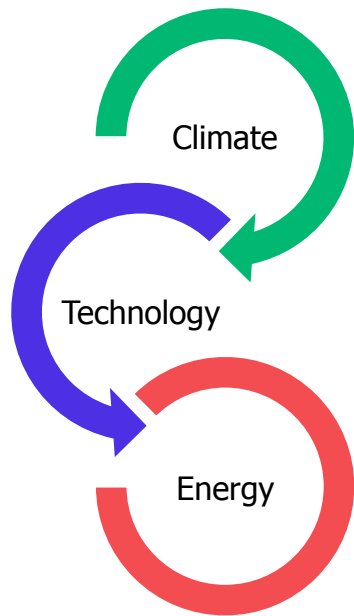
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Enova – the basics

- Public enterprise owned by the Ministry of Petroleum and Energy (MPE)
- National agency, promoting climate gas reductions, security of supply and energy- and climate technology
- Established in 2001
- Four year contracts with the MPE
- A budget around 300 - 400 m€
- Around 80 employees
- Located in Trondheim

The purpose of Enova



- Reduced greenhouse gas emissions
- Increased innovation of energy and climate technology
- Strengthened security of supply

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Enova – between politics and market



Politics



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Market

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TRANSPORT



INDUSTRI



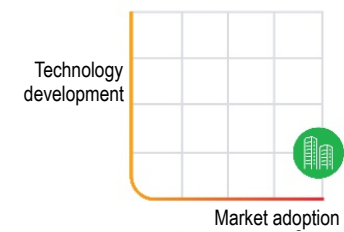
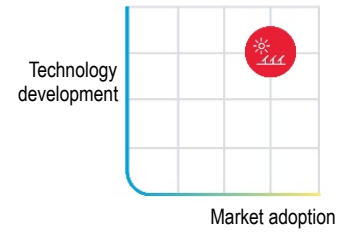
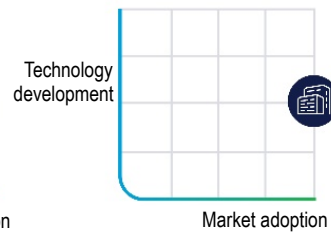
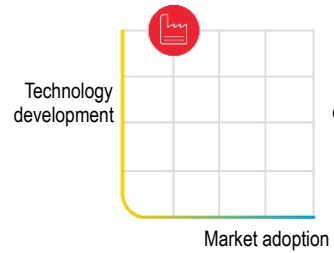
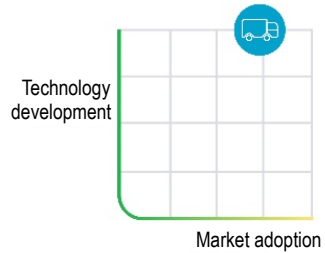
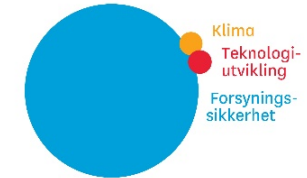
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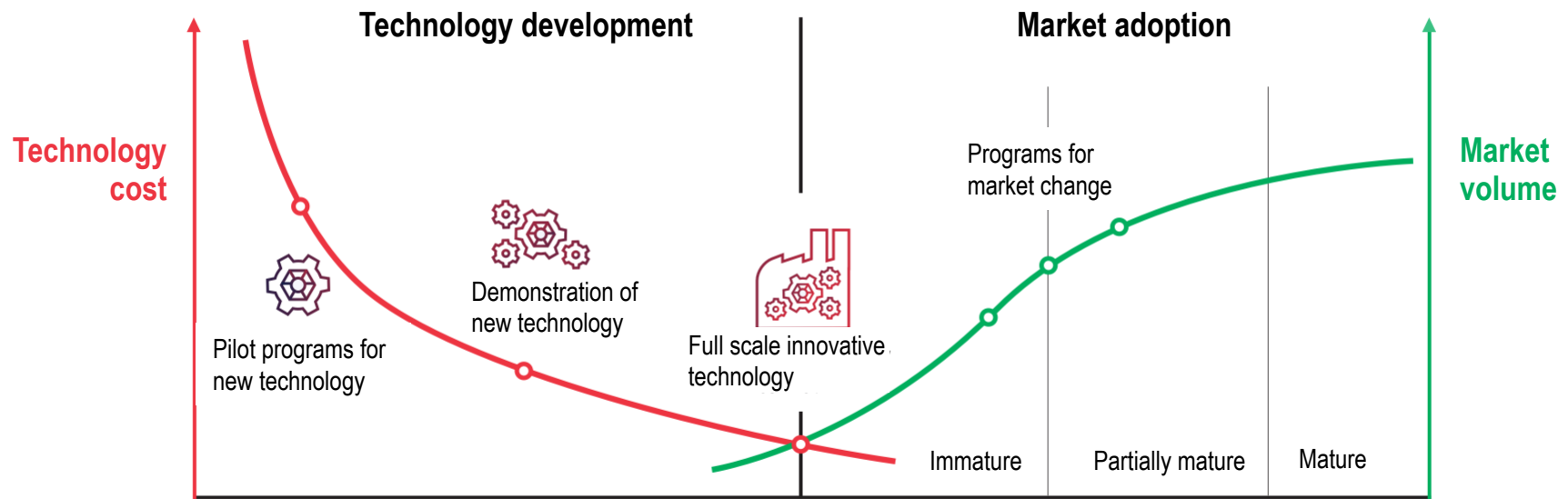
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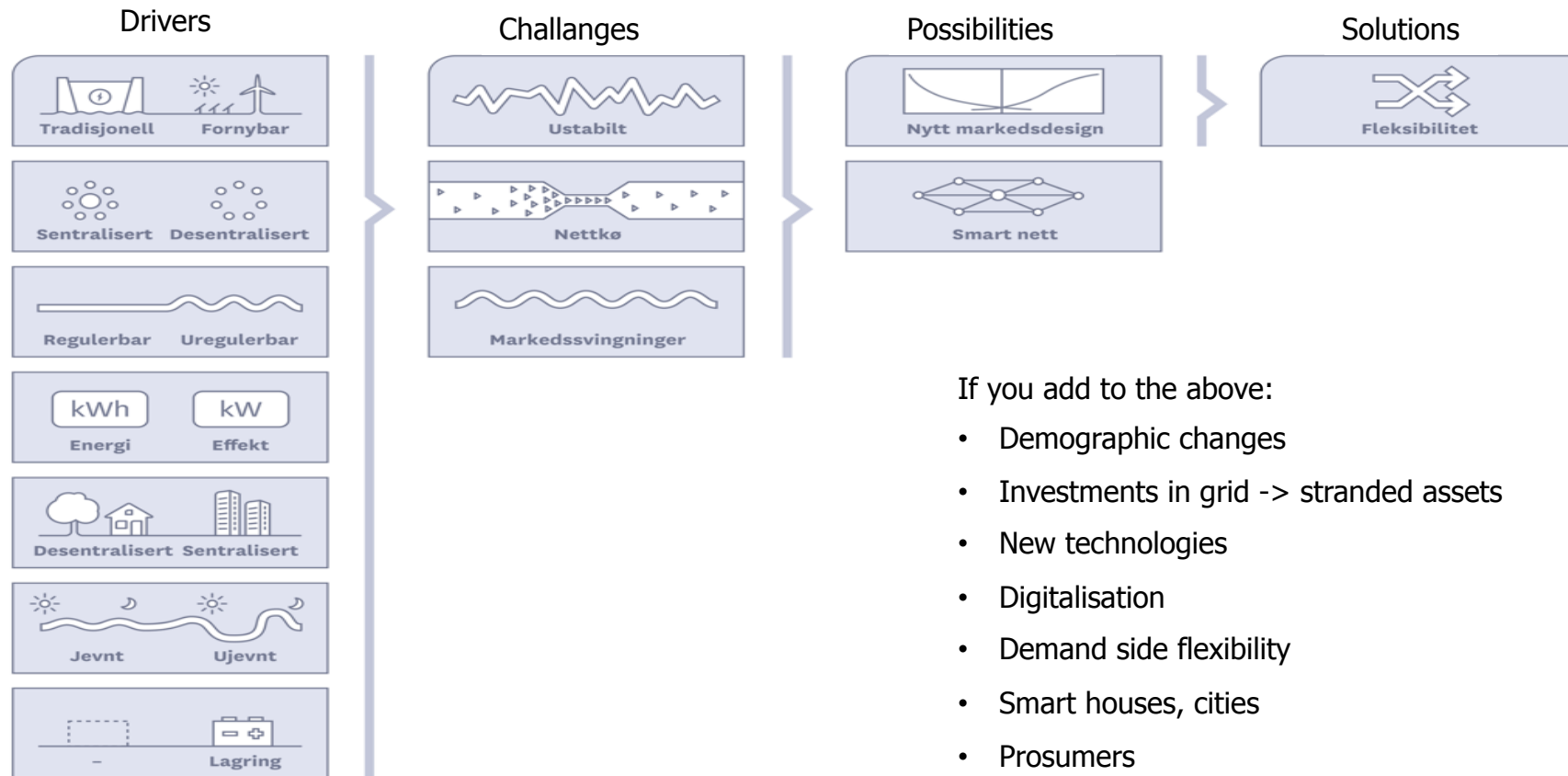


Enova has support programmes for both development of new technology and for market adoption



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The energy system is changing



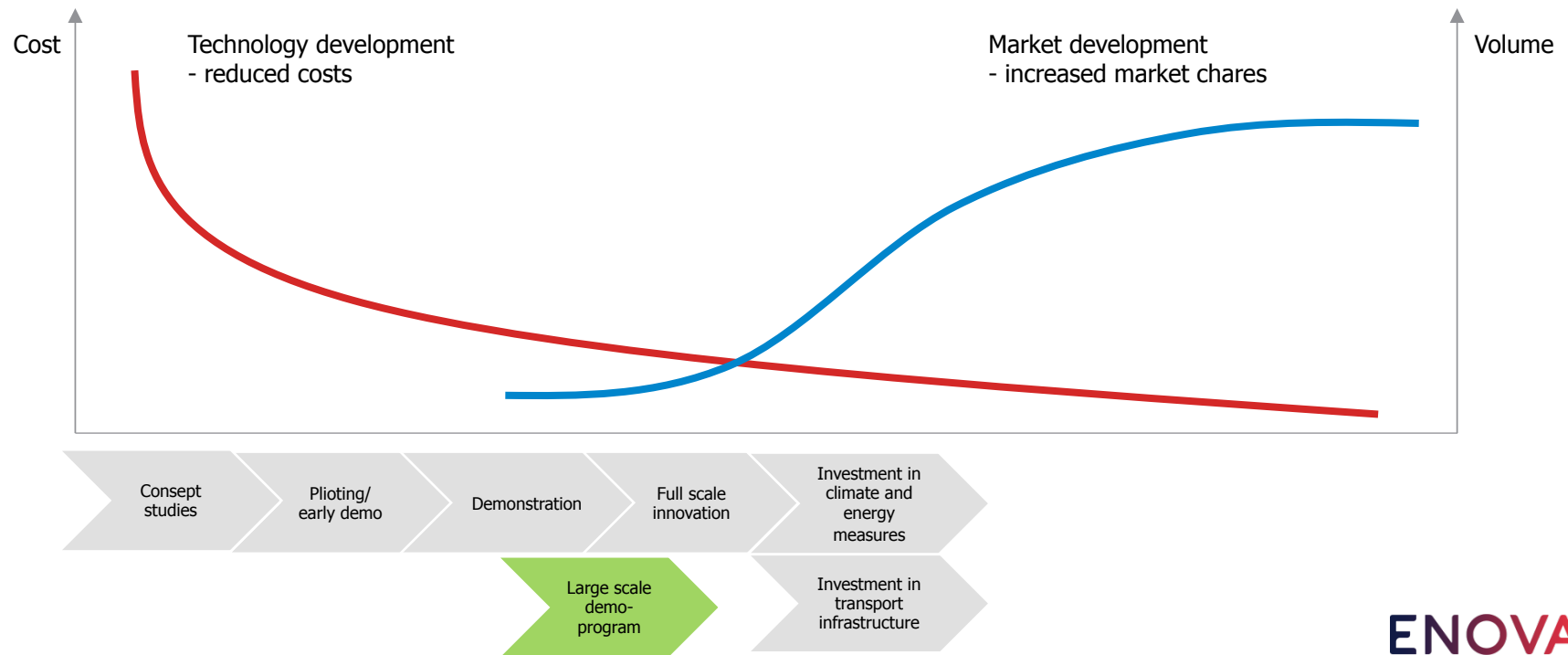
If you add to the above:

- Demographic changes
- Investments in grid -> stranded assets
- New technologies
- Digitalisation
- Demand side flexibility
- Smart houses, cities
- Prosumers
- etc

Large scale demonstration program

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Two basic strategies and 4 + 1 generic financial support mechanisms





What are the main barriers?

- Significant development costs and risk for the “first mover”
- Grid companies are natural monopolies and strictly regulated -> lack of innovation and a “traditional” attitude
- Lack of knowledge and experience
- The scale of the pilots so far are not big enough to verify the technology or the business models

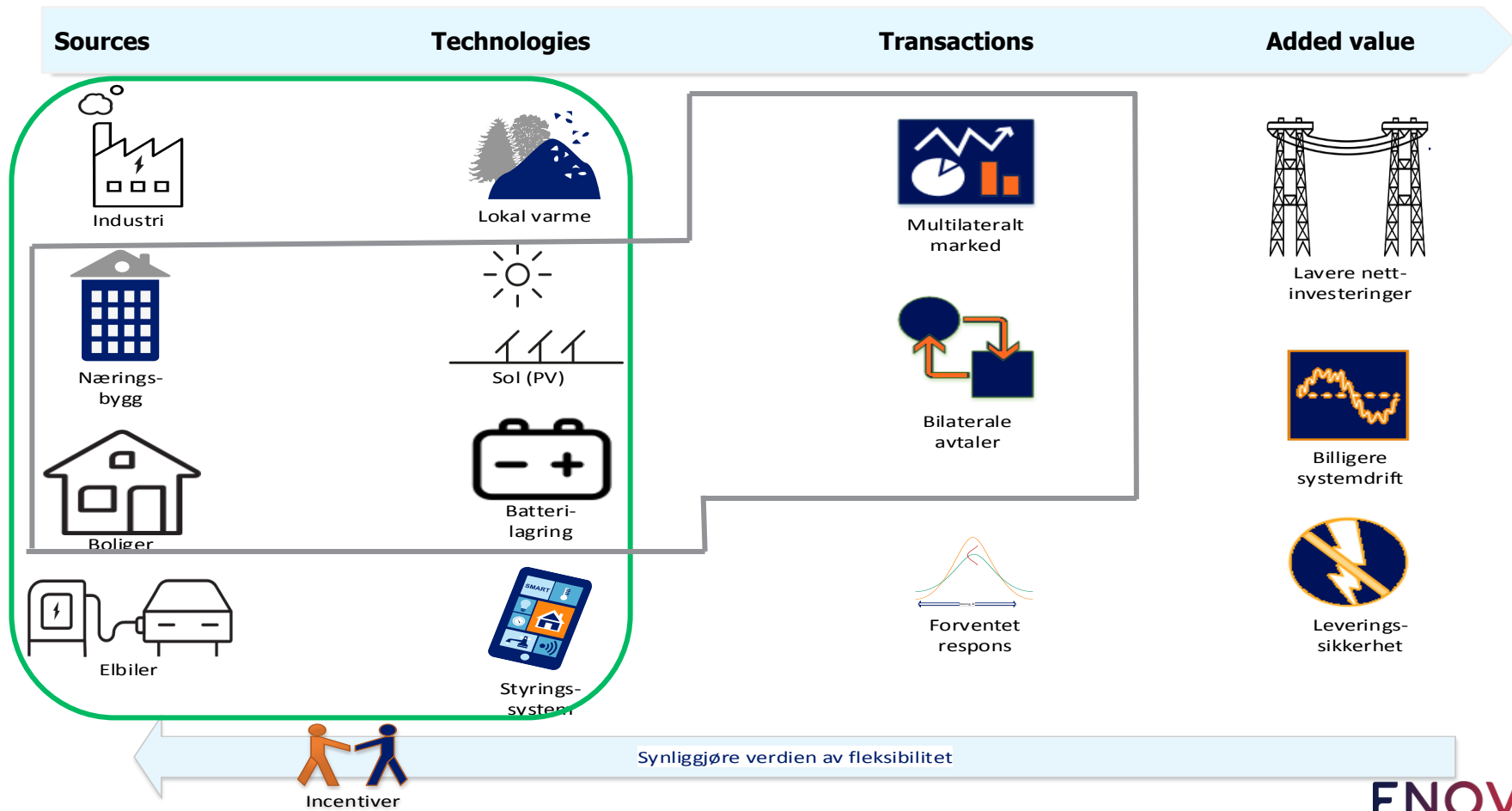
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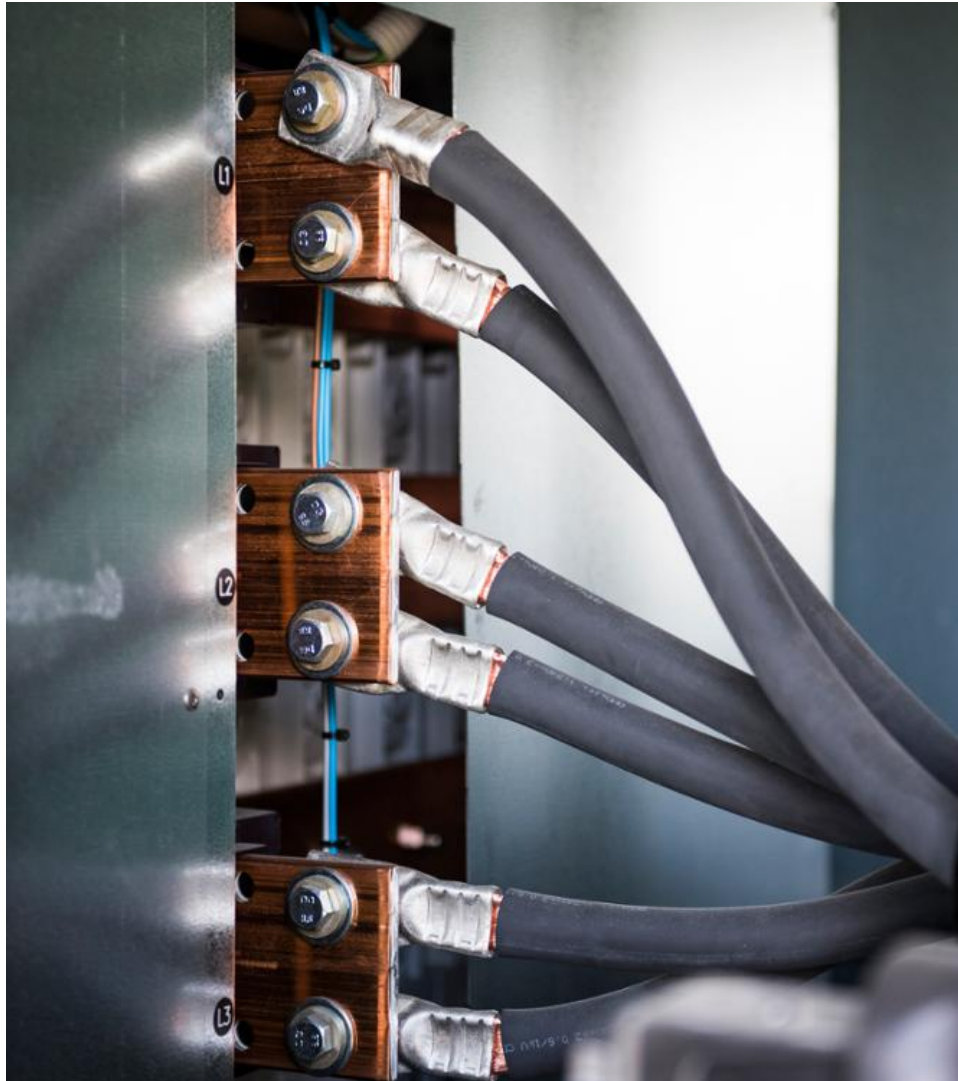


Purpose

«Demonstrate new technology, digital solutions and business models that increases the flexibility of the energy system»

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Three different areas of innovation

1. Demonstration of innovative models for efficient resource utilization and the use of other energy carriers than electricity
 - local production
 - storage (thermal and batteries)
2. Demonstration of new "smart" solutions that reduces the stress and increases the flexibility of the energy system
 - «Smart grid» technology
 - Load shifting/«peak shaving»
 - Control systems
3. Demonstration of new market models that stimulate increased utilization of flexibility in the energy system
 - flexibility markets
 - aggregator

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Thank you for the attention!

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