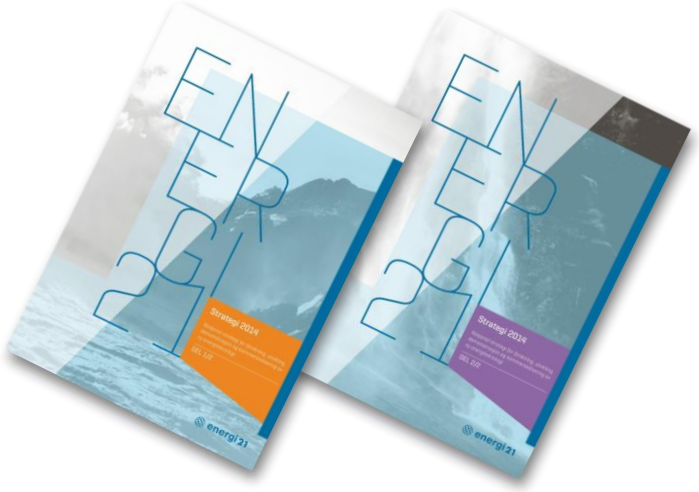
Norway's national RD&D strategy for renewable and climate-friendly new stationary energy technology

IEA Committee on Energy Research and Technology
EXPERTS' GROUP ON R&D PRIORITY-SETTING AND EVALUATION
Wednesday 3 june 2015
Lene Mostue, Energi21, director

Outline

- **Energy21**
  - Strategic Advisory Body
  - National RD-D strategy
- **Energy 21 strategy 2014**
  - Main guiding principles for choice of strategic direction
  - Strategic Technology Targes Areas
  - Recommended measures for implementation



Energi21

- **Permanent strategic advisory body**
- Established in 2009 by the **Norwegian Ministry of Petroleum and Energy**.
- **Industry led board** appointed by the Minister of Petroleum and Energy
- Prepares **national RD&D strategy**
- Strategic work bases on **multidisciplinary cooperation**.

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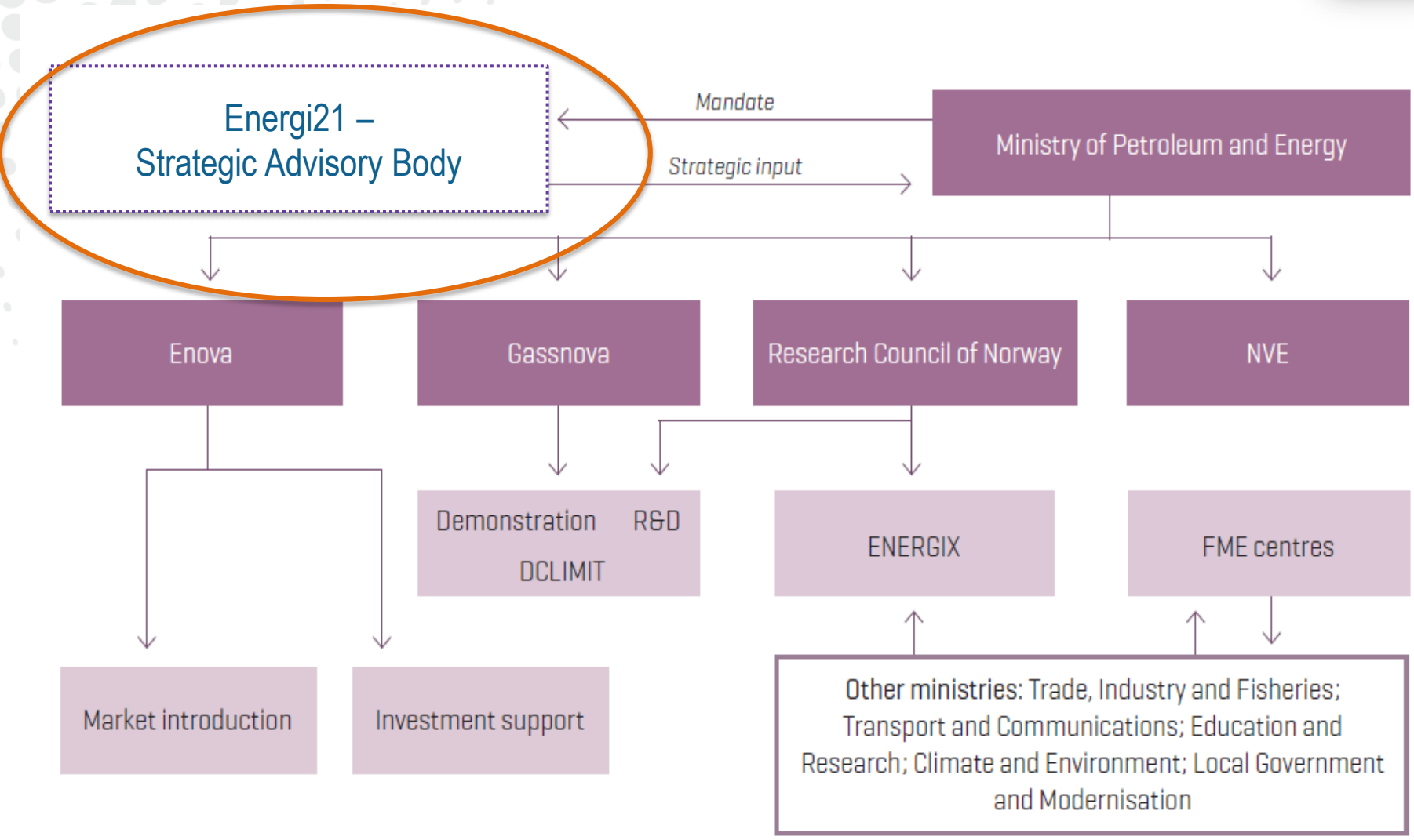
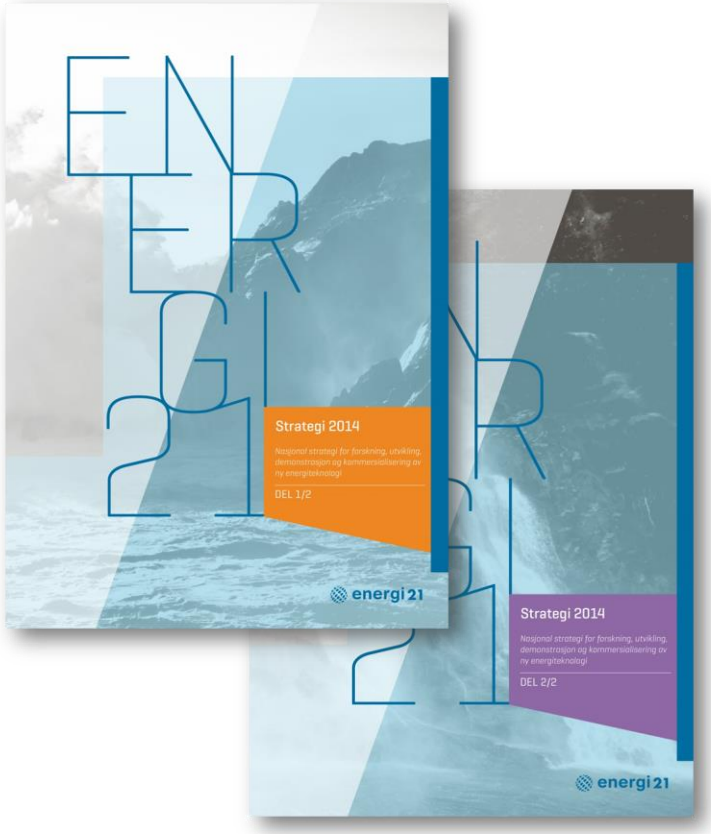
Energy Research under Ministry of Petroleum and Energy



Energi21 – Strategy 2014



Minister of Petroleum and Energy Tord Lien receives the new Energi21 strategy from chairman of Energi21 Sverre Aam September 12

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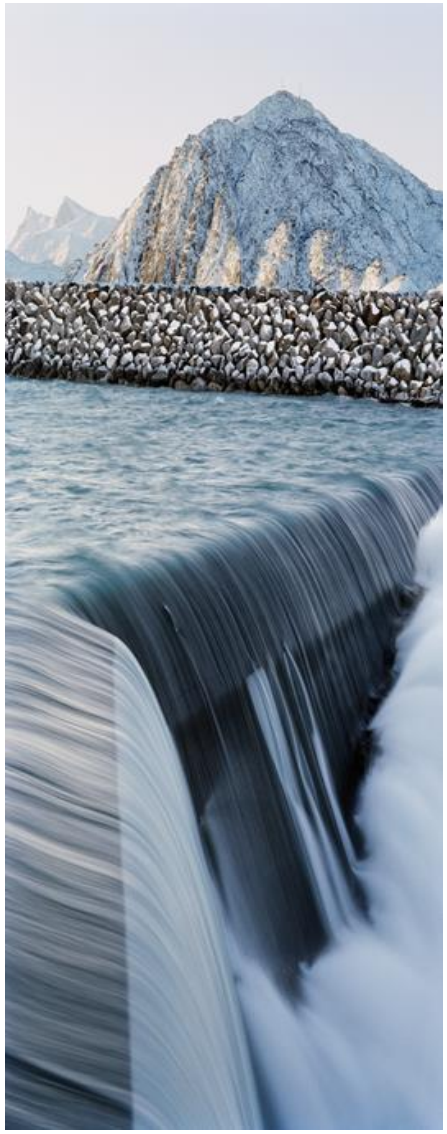
Strategic process

Collaborative strategic work between utilities, business, research institutes, universities and government

Strong involvement and will to participate in the work from the utilities, supply industry and other business

200 persons participated in the strategic process – broad **public hearing - more than 50 contributions**

STRATEGY :
THE ADVICE FROM THE NORWEGIAN ENERGY INDUSTRY



Strategic vision

NORWAY

a climatefriendly energy nation

an international supplier of

energy, **power**, **technology** **and** **knowledge**.

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Strategic goals

- Increased **value creation** on the basis of **national energy resources** and utilization of energy

- **Energy system transition** through efficient use of energy and **increased flexibility** in energy systems

- Development of internationally **competitive industry** and **expertise** in the energy sector




Strategic drivers (1)

- **Climate challenge** – contribution with knowledge and new technologies
- National **security of energy supply**
- **Ambitions** in industry
- Current research platform and **need for reinforcements**
- Gain positions in **international** energy markets
- **Competetive advantages**

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Exploit competetive advantages

- **Hydro** power technology
- **Electric power system** expertise
- **Offshore activities**, systems and technologies
- **Marine operations** and specialised vessels
- **C**arbon **C**apture, **T**ransport and **S**torage
- **Materials** technology
- **Market design** (power market)

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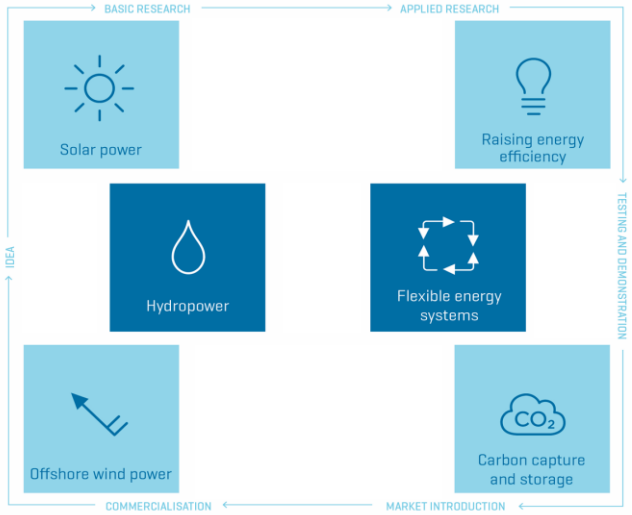
Strategic analysis towards recommendations

GOALS IN MANDATE

COMPETETIVE ADVANTAGES

STRATEGIC DRIVERS

RECOMMENDATIONS & STRATEGY



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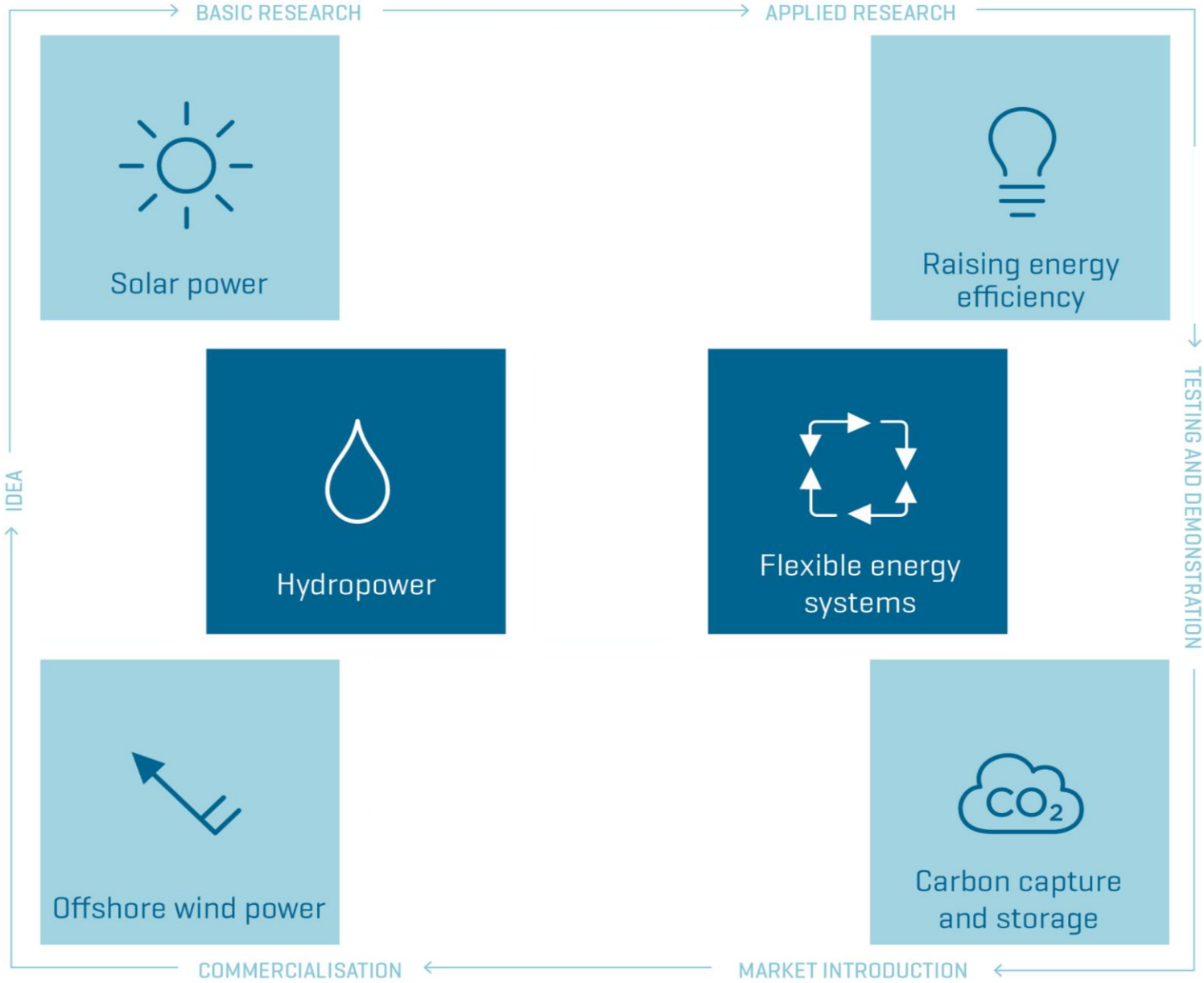
Six priority focus areas



- **6 priority focus areas**

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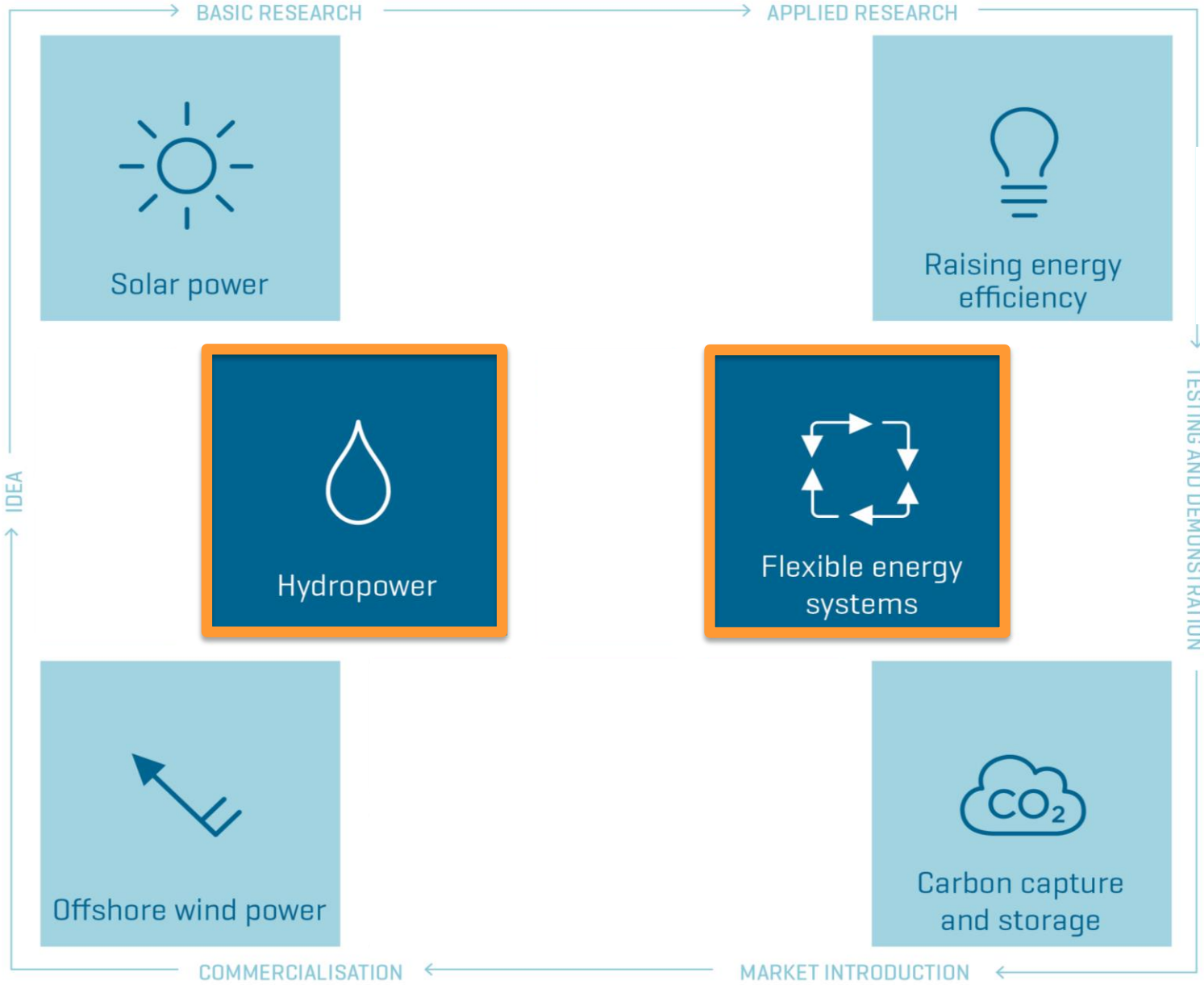
Six priority focus areas



- 6 priority focus areas
- 2 areas of particular strengthening

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Hydropower

WHY?

- Backbone in Norway ‘s energy system
- 50 % of European storage capacity is in Norway – potential for storage and balancing services
- Hydropower plants are old - need for upgrade – potential for technical innovations and enhanced flexibility
- International growth in hydropower – market potential for norwegian industry

Contribution **Goal 1: Energy resources – value creation**

Goal 2: Energy transition

Contribution **Goal 3: Industrial development**

Solar Power

WHY?

- Already strong basis in Norwegian industry and research
  - Materials – silicon
  - Efficient industrial processes
  - Solar – cluster with deliverances along the whole value chain
- Solar will be (the most) significant source worldwide
- Market potential – fastest growing RSE-technology – Norway is able to deliver.

Contribution

Goal 1: Energy resources – value creation

Goal 2: Energy transition

Goal 3: Industrial development

Offshore Wind

WHY?

- National competitive advantages – from maritime and oil and gas industries
- Growing international offshore market – potential for Norwegian industrial growth
- Cost must be reduced - Norwegian competence and experience within cost reducing activities.
- Huge Norwegian wind resources

Contribution

Goal 1: Energy resources – value creation

Goal 2: Energy transition

Contribution

Goal 3: Industrial development

Energy Efficiency

WHY?

- Large potential in
  - Norwegian industry
  - Buildings – 31 % internationally
- Energy efficiency – important part of the solutions (IEA) – reduce green house gas emission
- Sources of surplus heat – potential for better usage of low grade heat to electricity production and heating

Goal 1: Energy resources – value creation

Contribution → **Goal 2: Energy transition**

Contribution → **Goal 3: Industrial development**

Carbon Capture and Storage

WHY?

- Norway has strong position – research basis and competence “early mover”
- CCS necessary solutions to win climate battle – fossil energy 40 % (in 2050 (IEA)
- Large resources of oil and gas
- Storage opportunities in North Sea Basin – we have experience (Snøhvit and Sleipner)
- EOR – CO_2 – enhanced oil recovery (EOR)

contribution **Goal 1: Energy resources – value creation**

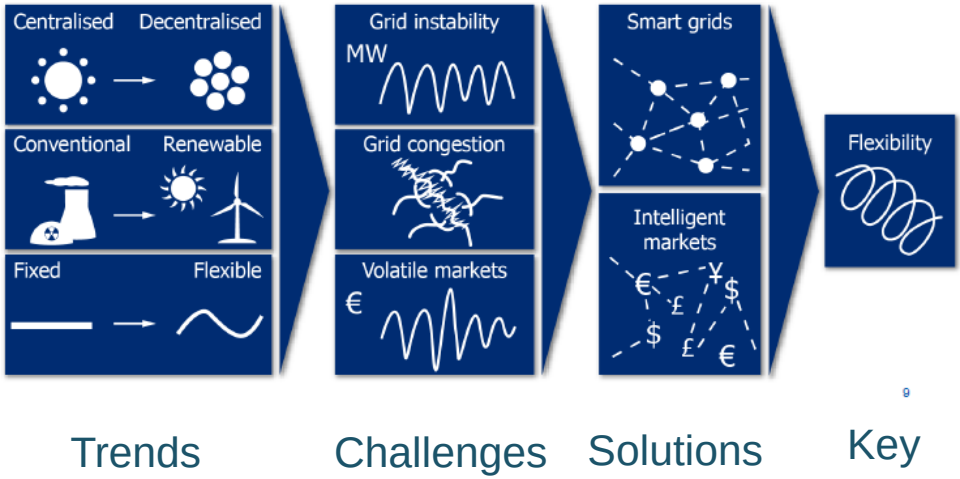
Goal 2: Energy transition

contribution **Goal 3: Industrial development**

Flexible Energy Systems

WHY?

- Flexibility in energy production, energy supply, and storage opportunities will be fundamental for a climate friendly energy system.
- Rapid developments and new challenges – need for integration of smart grid technology, market solutions and knowledge about consumption patterns
- Large future investments in Norwegian electricity grid is an opportunity for integration of new technology and innovations



Contribution

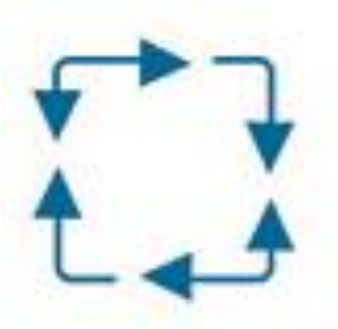
Goal 1: Energy resources – value creation

Contribution

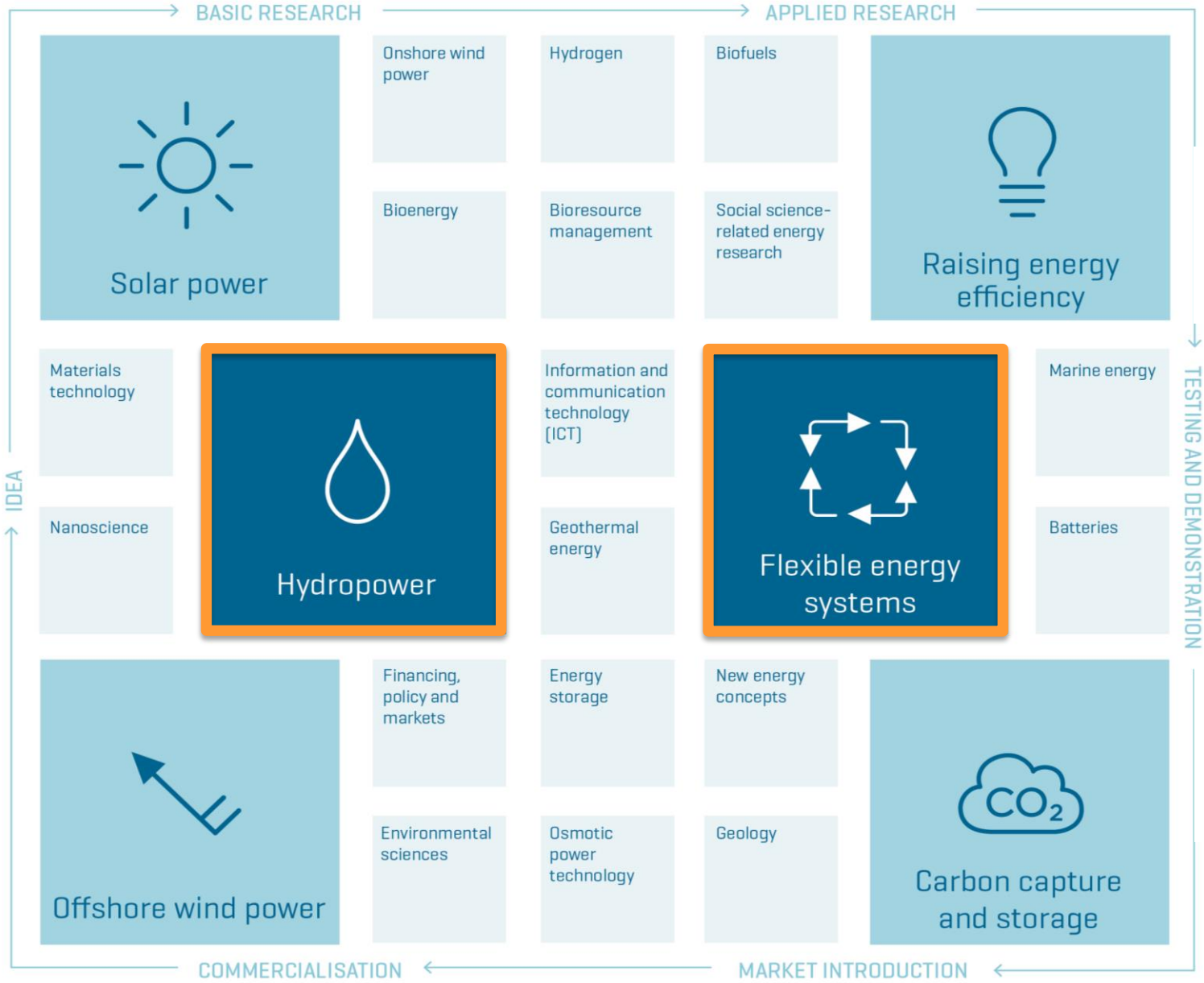
Goal 2: Energy transition

Contribution

Goal 3: Industrial development



Six key areas



- 6 priority focus areas
- 2 areas of particular strenght-ening
- Strong basis

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Measures for implementation

- **Integrated incentive structure** along the entire innovation chain.
- Establish national **testing and demonstration projects.**
- Facilitating Norwegian **participation in international testing and demonstration** projects.
- Enhancing research and innovation **cooperation** in the **EU arena.**
- Increasing **recruitment** to strengthen Norway's position as an energy nation.
- Promoting greater **sectoral cooperation** at the government administrative level

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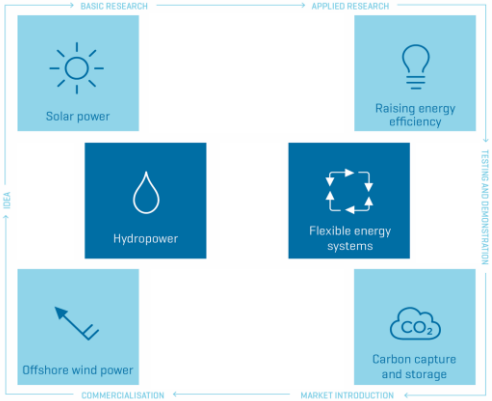
Summing up

- Energi21 is national strategy for research, development, demonstration and commercialization of new climate- friendly energy technology



- The strategy has 6 priority areas:
  1. **Offshore wind power**
  2. **Solar Power**
  3. **Flexible Energy systems**
  4. **Hydropower**
  5. **Energy efficiency**
  6. **Carbon Capture and Storage**

- International and multidisciplinary cooperation is an important recipe for successful implementation

Thank you!

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