

FME INSIGHTS ENERGY

Transition energy system offers many opportunities for Dutch technological industry



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Our energy system is in transition. Social issues like climate change present challenges, while also offering tremendous opportunities for the Dutch technological industry. To confront these challenges collectively as a chain, FME's Energy Cluster convenes technology companies, knowledge institutions, clients and financiers. In order to help technology companies from various sub-sectors identify and seize opportunities, FME presents its first 'FME Insights Energy', including an action plan for the industry. This summary contains a number of highlights drawn from the full report.

1 Trends and developments

Energy consumption keeps growing but energy mix changes

Looking at the most important developments and trends for the next decades, two trends deserve particular attention:

1. An increase in global energy consumption, although slower than before.

- Energy use Western world stabilizes.
- Energy use emerging markets will continue to portray strong growth.

2. In addition, there will be a steady change in the energy mix.

- The use of fossil fuels (and nuclear energy) will continue to grow.
- As an energy carrier, electricity will gain in importance.
- The use of renewables will show a stronger increase than the use of fossil fuels. However, the cost price of sustainable energy should continue to decrease to facilitate this energy

source's effective competition with fossil fuels.

These trends result from several social and economic developments, which will be discussed in the report. The trends and developments present the playing field of the energy sector and its technology suppliers. The energy market will continue to offer a wide array of opportunities for technology suppliers.

2 The energy system

Dutch technology suppliers have a strong global position

The energy system is a complex body of energy production, transportation, storage, conversion and consumption (see overview at the right).

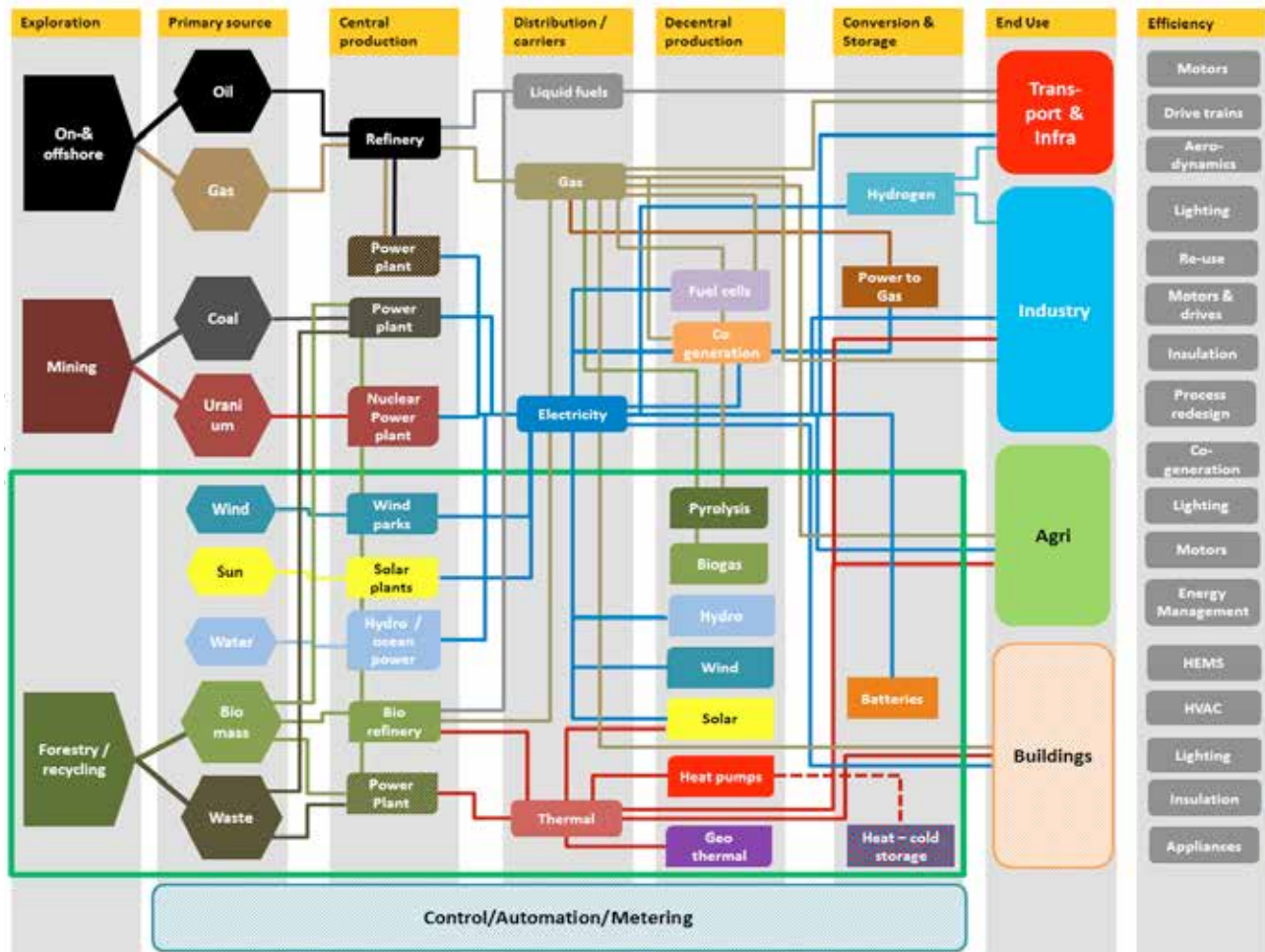
There is a wealth of developments occurring across the various sections of the energy system, offering opportunities for companies in the technological industry. For example, decentralized production of energy is gaining in popularity. Local energy hubs are emerging as locally generated energy is within reach with heat-cold storage,

solar, wind, and geothermal energy. Combined with Smart Grids these are becoming increasingly autonomous energy systems where supply and demand meet.

Energy is also becoming Smart Energy. Integration of ICT is making energy systems ever smarter. Appliances and networks independently decide when energy is supplied or demanded and under which market conditions.

The markets on which our companies operate cover the entire energy chain

and vary from exploration of new oil and gas fields to local energy networks through to energy-saving technologies for end-user sectors; in short, a very wide range of activities. Dutch technology companies are in a privileged position to seize the opportunities presented by the transition of the energy system. On a global level, Dutch technology companies are strongly positioned in a large number of subsectors such as energy-saving technologies, smart grids, offshore wind and the production of solar cells.



Source: FME Energy Cluster 2015

3 Opportunities for the technological industry

Focus on flexible energy systems, energy efficiency and market expansion

In the report, two highly relevant innovation topics for technology companies will be explained in more detail:

Flexibility: Crucial for optimal energy transition

In the FME Insights Energy the following points will be worked out so as to explain the opportunities revolving around an increasingly flexible energy system:

- The energy transition requires an energy system that is flexible across the board. Flexibility is required to facilitate fluctuations in energy supply. In this respect application of new technology is indispensable
- Upgrading so-called ‘must-run’ Combined Heat and Power Generation (CHP) to flexible CHPs provides a wide array of opportunities for the

technological industry

- To meet energy demand in due time, on average carrier capacity of the electricity network should have doubled by 2030
- The market for storage technologies is moving fast.
- Demand Response is an increasingly valuable resource option.
- Smart Grids will make it possible to optimize investments

Members are assisted in investment decision-making by the FME Industry Roadmap ‘Flexible energy systems’.

Industrial energy efficiency: A global growth market for technology

The opportunities provided by energy efficiency are dealt with on the basis of the following points:

- Energy efficiency could be considered an extra energy source given its energy saving potential.
- Within the global energy system, energy efficiency will be the fastest growing market during the years to come.
- Energy efficiency can be economically viable, on condition that we invest in technology. However, investment opportunities vary per sector and per region.
- When it comes to energy efficiency in The Netherlands, to date the agri & food sector obtained the best results; construction and industry are promising future sectors.

The FME Energy Cluster collaborates with companies and other stakeholders to realize accelerated energy saving.

In addition to the above-mentioned innovation topics, the report features an analysis of those regions that harbor most potential for sustainable and conventional energy technology, such as the Gulf region. Moreover, the programs for market expansion are explained in more detail.

- **Market and Export: Cleantech export program and Dutch Energy Solutions**
Within the FME Energy Cluster two

programs are focusing on market expansion for cluster participants:

1. Cleantech export program: In collaboration with Dutch Cleantech businesses, universities, governments, and non-profit organizations we promote Dutch innovative products and services in the following fields: renewable energy, energy infrastructure, energy efficiency and energy storage.

2. Dutch Energy Solutions platform:

Dutch Oil & Gas suppliers, R&D companies, associations and governmental bodies collaborate with a focus on the Gulf region. The objective of the platform is to establish ongoing exchange of information, knowledge and business contacts with partners in the Gulf region.

4

Action plan and activity calendar

FME Energy Cluster helps companies realize goals

In connection with the innovation and export opportunities, the FME Insights Energy includes a comprehensive activity calendar. The calendar describes the

specific activities for and with members that make for the 'stepping stones' with which action plan objectives will be achieved. The up-to-date activity

calendar can be consulted on www.fme.nl/energy (innovation topics) and www.fme.nl/ioagenda (export topics)

FME Insights Energy

The FME Insights Energy is the first in a series of insight reports published by FME's Clusters. Based on the conviction that joining forces will increase the earning capacity of technology companies, FME launched a number of 'clusters': Energy, Life Sciences & Health, Agri & Food and Built Environment. These clusters meaningfully connect companies, knowledge centers, clients and financiers. The clusters allow involved parties to complement one another in the development of knowledge and solutions for wide-ranging social issues.

The FME Insights Energy provides a comprehensive understanding of:

- developments in the international energy market
- opportunities this market offers to suppliers across the technological industry
- today's most important energy topics
- an FME action plan that helps members seize these opportunities.

These insights will inspire you, help you innovate and develop new market opportunities, and, as a consequence, drive your company's growth and earning capacity.



Requesting full report and additional information

The FME Insights Energy report is available for FME members only. For additional information on the report, the Energy Cluster and becoming a member, please reach out to Cluster manager Energy Hans van der Spek, **T** +31 79 353 12 20, **E** hans.van.der.spek@fme.nl. For members, the FME Insights Energy can be downloaded for free via www.fme.nl/energy.