actiam
PERSPECTIVE

An eye on energy transition

In parallel with the increasing awareness of climate change risks in investment portfolios, 'energy transition' as a societal means to address climate change, is becoming a strategic theme in the main stream investment community.

Management of climate change risks in investment portfolio's is mostly focused on adjusting exposures to companies or countries that might be impacted by climate change. This is mostly done in listed instruments and as such integral part of a fully integrated ESG Investment Management style.

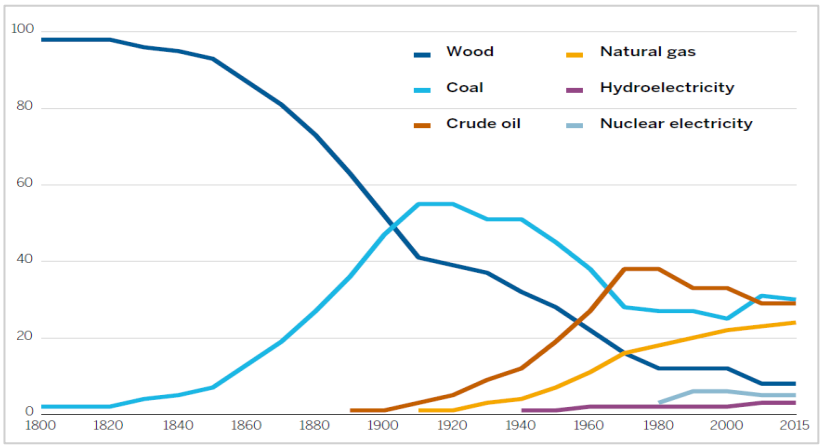
When 'energy transition' is approached as an investment theme, in first instance, this usually is associated with investments in renewable energy sources and in particular wind and solar assets. This is however just a tip of the proverbial iceberg.

WHAT IS ENERGY TRANSITION ALL ABOUT?

Generally, energy transition is defined as a long-term structural change in energy systems. More specifically changing energy sources, changing energy infrastructure and changing energy usage.

Historically we have experienced several such energy transitions before, changing from wood as primary energy source to coal, from coal to oil and increasingly gas. We can say that we are in the third energy transition, moving away from fossil carbon based energy resources and fossil carbon usage techniques.

Major energy transitions, 1800 – present
Share of global primary energy consumption (%)



Source: Vaclav Smil, Energy Transitions: History, Requirements, Prospects, 2017.
Chart data: 1800 – 2015

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This is achieved through actively and passively managed investment funds, via impact investing, mandates and ESG advice (Environmental, Social & Governance).

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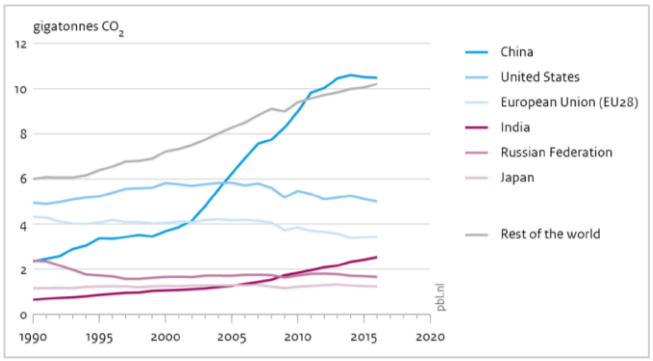
The previous transitions were key enablers of the Industrial Revolution and had far reaching - at that time unimaginable - global implications. The combustion of oil, gas and coal have enabled an increasingly higher standard of living over the past 150 years for an accelerating global population, influenced major shifts in international relations as a result of the globalization trade, more complex interdependency's, and unfortunately, conflicting with boundaries of natural resources and ecosystems.

Fact is that greenhouse gas emissions have become structurally larger than the uptake capacity of our planet which is about 50% at the current emission levels. So one of the key drivers for this energy transition is the need to reduce greenhouse gas emissions.

The need for change is evident and has resulted in globally supported goals to reduce to ultimately zero the use of fossil carbon and reducing Green House Gas emission levels to 40% of 1990 levels by 2030 (EU target)

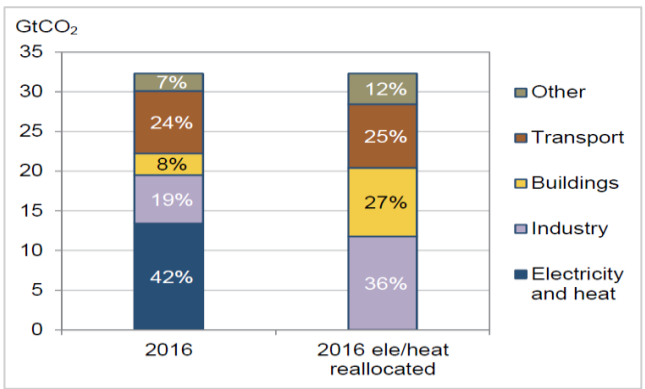
The graphs below depict the development of the absolute levels of CO2 eq emission per region as well as per economic sectors to which most of the emission can be attributed to. These are: energy and heat producers (utilities), buildings/built areas, transportation and agriculture which is part of the category other in the mentioned graphs.

CO_2 emissions from fossil-fuel use and cement production, per country and region



Bron: EDGAR v4.3.2 CO2 FT2016 (EC-JRC/PBL 2017)

Global CO_2 emissions by sector, 2016



Source: Internationaal Energieagentschap, CO_2-uitstoot 2018

ENERGY TRANSITION INVESTMENT AREAS

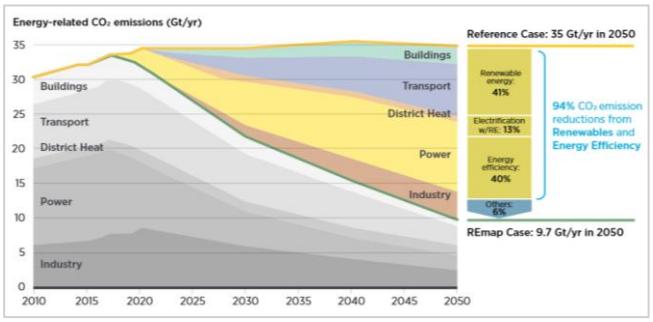
A number of key activities and investment areas are pivotal in making the energy transition successful.

- **Efficient use of energy**: This is the primary way to have a direct positive impact on greenhouse gase emission reduction.
- **Replacement of carbon-based fuel sources** by renewable energy sources. Main driving sources are water, wind, solar, biomass and geothermal heat. Technological innovations and ever-increasing scale production will continue to bring down going forward.
- **Building the energy infrastructure** needed to support use of renewable energy: maintain stability, enable upload and use of locally produced renewable energy for primary purposes
- **Re-using the energetic content** of waste products.

Energy efficiency and renewable energy sources will be the most important contributors if implemented properly according to IRENA (2018).

Renewable energy and energy efficiency can provide over 90% of the reduction in energy-related CO_2 emissions

Annual energy-related CO_2 emissions and reductions, 2015-2050 (Gt/yr)



Source: IRENA Global Energy Transformation, 2018

In order to make the potential investment areas in energy transition concrete we combine the four main energy using sectors with the key activities in a matrix and for each sector provide some examples of potential investment areas. Investment are predominantly in private instruments, be in equity or debt. To a certain extent, investments have similar characteristics to infrastructure investments.

Investment areas to support the energy transition

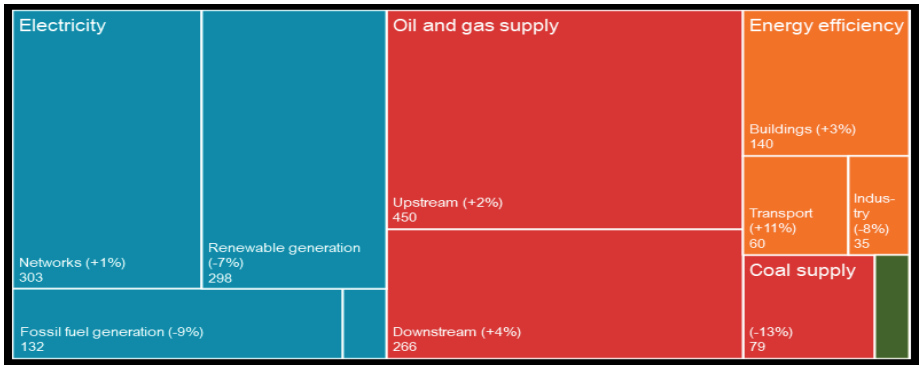
		Sector				
		Utilities	Industry	Transportation	Built Environment	Agriculture, Forestry & Land use
Energy transition theme	**Energy efficiency** *Reducing Energy Needs*	• More efficient power production	• Warmteterug-winning • Energiezuinige verlichting (LED) • Efficiëntere productie	• Improving efficiency of traditional energy systems	• Isolation • LED • Electrical Heating/Cooling • Smart lighting systems	• Efficient heating • LED (lighting and growth) • Local for local producing • Production efficiencies
	Renewable energy sources *Energy from naturally replenishing sources*	• Hydropower • Geothermal heat • Wind • Solar • Biomass • Tidal	• Decrease use of fossil fuels • Cogeneration • Rooftop Solar	• Electric Vehicles, • Vessels, batteries and hydrogen based • Bio based fuels liquid and gas	• Geothermal • Solar	• Biomass • · Solarparks • · Windparks
	Energy infrastructure *Smarter, stronger, efficient and reliable energy transport systems*	• Reinforcing existing grid for more flexibility • Storage capacity (batteries, H2) • Local grid infrastructure	• Local interconnections for heat, power, hydrogen	• EV loading networks (Batteries+H2) • Energy Storage(batteries, H2 gaseous and other)	• Heat networks • Heat/Cold Storage systems • Geothermal heating • Biomass based heat • Heatpumps	• Local grids/ networks and energy storage • Water Management systems
	Enhancing the circular economy *Restorative and regenerative economy*	• Recycling of depleted power generation capacity	• Long-lasting product design • Waste Recycling • Upcycling	• Recycling of materials	• Recycling of Materials • Upcycling of materials	• Agri Waste to biobased basic chemicals

According to IAE World Energy Investments 2018, the total annual investments in Energy Efficiency (USD 236 bln) , Renewables (USD 298 bln) and Infrastructure(USD 303 bln) amounted to 834 billion USD globally. This gives a fair gauge for the total annual investment market in Energy Transition.

For the Netherlands, Mckinsey estimates an annual investment in the Energy transition of €10 billion in order to realize a 60% greenhouse gas emission reduction by 2040.

It should be noted that these investments contribute positively to real economic and job growth. For the Netherlands estimates on new jobs in installation, maintenance and operations of upto more than 65 k jobs in sectors wind, solar and insulation and heat replacement investments in builded areas only.

Global energy investments in 2017; gauging annual investment levels



Source: IAE World Energy Investments 2018

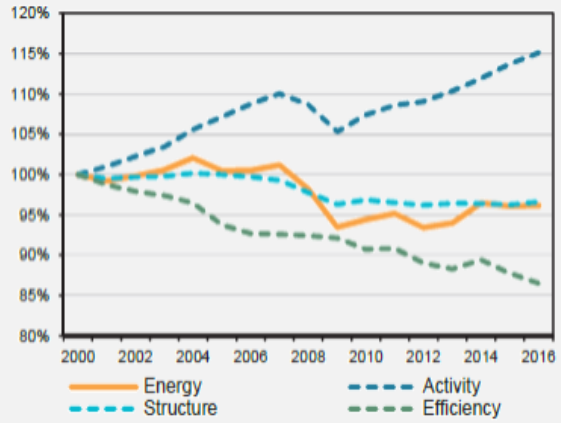
Developments in Energy Efficiency

Increasing Energy Efficiency is all about using less energy for the same activity. As long as fossil carbon is being used as energy source, every efficiency measure helps in bringing down GHG emissions directly.

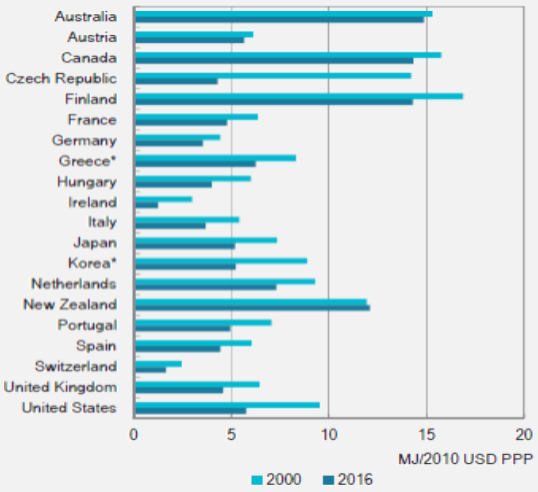
While energy efficiency is on the agenda within corporates in their long term replacement capex cycles reducing energy cost structural improvement has been realised The graph below some indications are given for the size and this development is shown since the year 2000. The energy use per unit added value GDP has been decreasing steadily. This has compensated for a good part the energy use increase as a result of higher activity levels.

In the graph below on the left hand side, the effects of efficiency measures are depicted. The energy intensity per unit has been declining somewhat per unit of value added (GDP). The shift in structure of the economy towards a higher weight on services being less energy intensive reduced the need by 4%. On a positive note, the increased economic output of the past years has been off-set by energy efficiency gains.

Drivers of final energy consumption****



Energy intensity of manufacturing by country, 2000-2016



Source: IAE Energy Efficiency Indicators 2018: Countries based on reporting most end user information

Looking at the performance of countries in their energy efficiency levels there is still a world to gain looking at the size of carbon emission and energy intensity of the industrial sector in most countries.

While energy savings projects outside the long term reinvestment cycles with a payback period of up to 2 years have been executed to a large extend, the next phase is to implement those savings projects with payback times of 3 to 10 years. As an indication, the investment need in the Netherlands is estimated to be around €2 billion annually in the industrial area only.

From the corporate perspective, such investments could be made ‘on balance’ as capex, and funded at the corporate level. Alternatively, it could be done off balance sheet, using the energy savings as a source of funding to repay the off balance funding. The use of Energy Service Companies and ‘as a service’ business models for light, heat and even roads are being implemented, however only to a limited extend.

The Industrial sector needs a clear regulatory framework with clear binding targets and fair incentives to implement the additional investments. This is currently not the case: While formal reporting on energy efficiency investment by the industry is now required by law, actual investments to make are still voluntary under the current European policy framework and allowed to executed at reinvestment cycles. Shareholder engagement towards corporates in energy intensive industries is another instrument that climate change aware investors can use to contribute to change.

EMBRACE CHANGE AND INNOVATION TO SPEED UP THE ENERGY TRANSITION IMPLEMENTATION

There is certainly room for improvement in terms of speed of implementing the energy transition. Adopting change is inherent to the concept of transition. Effective change often is driven by technological innovations and applications thereof, starting small and depending on its applicability being adopted exponentially. Likewise, those economic agents representing the interested of the 'installed base' have a natural tendency and bias not to change at all or temporize change in order to maximize return of the installed base itself. Speeding up the process of the transition can add value both in terms of climate change mitigation and economic growth. More robust economic growth even means better equity market performance as recently published in climate integrated ALM models developed by Ortec.

So, perhaps the most important driver for the speed of implementing of the energy transition is the willingness to embrace change and innovation by all relevant stakeholders and decision makers in the energy transition arena. In combination with smart governmental incentive schemes and effective corporation between 'development funding' and commercially driven investment capital, the desired transition goals could be financed effectively.

CONCLUSIONS

'Energy transition' as an investment theme is rapidly gaining momentum with investors as a fundamental instrument to address climate risks. For that matter it rightfully has its place in the strategic allocation decision of pension funds.

The investment opportunities in energy transitions are potentially large and divers in nature. Ranging from investments in renewable energy production, new energy infrastructure an storage facilities, electrification of transport to waste recycling, to name a few.

While certain parts of the total market have grown already to efficient markets like for example wind and solar investments, others are more industrial and larger scale and akin to infrastructure investments. Still other areas are starting to get momentum with smaller size investment opportunities and likely to evolve to new markets and business models.

The ever growing activity level is currently driven by entrepreneurs implementing these new models and techniques. At the same time, change adoption in the installed base is growing as well albeit still slowly. Undoubtedly investor 'pressure' helps in speeding up the willingness to change in the traditional energy industry.

Those proactive investors willing to embrace these opportunities in energy transition, valuing the opportunity properly, will directly contribute positively to carbon emission reduction, job creation and robust economic growth.

In order to allow institutional investors access to the full breadth of the energy transition market we expect specialized funds in private debt or private equity to be raised allowing institutional investors entrance to this exiting market with large growth potential and high societal value.