

Clean energy solutions require systematic support

Our energy system is in the middle of a disruption. It will not be possible to use coal, oil or natural gas in the future. The production cost of wind and solar energy has decreased dramatically, while carbon capture and storage has proven to be very expensive. Distributed and intermittent production of electricity and heat will replace the present centralized and adjustable production. The disruption is already affecting energy producers, distributors and users. Novel low-carbon technologies tend to be less competitive in the beginning. Therefore, the low-carbon energy system can only be implemented with the help of policy incentives.

1. Electrification of the energy system needs to be enhanced

Fossil fuels in transport and heating can be largely replaced by low-carbon electricity. This means that the electricity consumption in Finland may increase from the present ca. 85 TWh to as much as 130 TWh in a couple of decades. From the point of view of emissions reductions, it is essential that the consumption and production of clean energy increase simultaneously.

The emissions trading cap has to be tightened in the entire European Union, or as a second choice a carbon price floor should be set, for example, in the Nordic countries.

Why: In order to mitigate climate change, it is important that emitters of carbon dioxide are required to pay fully for their climate impacts. This motivates the actors to invest in low-carbon solutions. We know now that the present price of EU emission allowances (ca. 20 €/t CO₂) is not sufficient to trigger effective measures to transform to a low-carbon energy system, but rather increases the use of natural gas and biomass.

The support of renewable electricity production needs to be continued.

Why: Low-carbon power production, such as wind power which is feasible in Finland, has to be increased so much that emission trading alone is not a sufficient

incentive. The production cost of wind and solar energy is dominated by the cost of capital, which as well as the risks increase with the uncertainties in the electricity market prices. The support measures for renewable energy need to ensure continuous growth of the production capacity and reduce the risks connected to the investments. The acceptability of wind energy could be increased by enhancing domestic and local ownership of wind power production.

The public sector needs new incentives to favour renewable energy in procurement.

Why: Public procurement could enhance energy efficiency as well as the construction of new low-carbon power production capacity. Municipalities, for example, could make long-term power purchase agreements (PPA). The state and the municipalities should ensure that the procurement criteria are designed in a way that directs public energy procurement to low-carbon energy products and services.

There is a need to speed up the electrification of transport and reduce the sales of new internal combustion engine vehicles using a broad set of incentives.

Why: In general, the recommendations of the Transport Climate Policy Working group (LVM 13/2018) need to be implemented. Increasing electric mobility helps to decrease greenhouse gas emissions, because electricity can be produced free of emissions. Electric vehicle batteries could be utilized in the electricity market to increase the necessary demand response.

2. The use of fossil fuels has to be discontinued in city heating

It is possible to meet the energy demand of cities without fossil fuels by using heat pumps, low-carbon electricity and utilization of excess heat. This will be a major change, which requires a seamless co-operation among buildings, district heating networks and heat production.

Residential investments in renewable energy and energy efficiency deserve the same support as the investments of other building owners.

Why: Residential buildings do not qualify for the Finnish Energy and Investment

Aid scheme. This delays investments in housing companies and residential properties. Access to the investment aid would increase, for example, installations of exhaust air heat pumps and implementation of energy saving renovations in housing companies.

The energy and power components in district heating tariffs have to be regulated in a way that incentivises the building owners in energy efficiency and demand response.

Why: The cost structure of district heat should enhance energy efficiency and demand response. In many cities, energy saving measures in buildings have not automatically had an impact on the power component of the price of district heat, which means that in reality that part of the cost is fixed. This reduces the incentives of building owners to invest in energy saving and demand response.

More open data is needed on the consumption and temperature of district heating networks

Why: The temperature and consumption data of the different parts of district heating networks should be openly available. This would increase the development of the system. This would allow various actors to participate in heat production and develop novel solutions for the management of the district heating networks.

3. The development of new technologies and business models requires support

Research and innovation funding should support the increase and management of intermittent energy production.

Why: The disruption of the energy system requires new technologies. New low-carbon technologies are first not competitive. As the production of intermittent energy production is increasing, new knowledge is needed for the management of intermittency. Research and development are needed for energy storage, energy conversion (conversion of electricity to hydrogen, fuels, protein etc.), demand response and energy efficiency technologies. In addition, it is important to develop new models for the energy market, business models for energy services, as well

as the usability and installability of the products.

4. Systemic change has to be managed

The energy disruption is a systemic transformation and therefore it causes major changes in society as a whole. All societal measures need to be designed to ensure a fair transition to a low-carbon society.

High-quality re-training is required for the changing energy sector.

Why: Thousands of new skilled workers are needed annually in wind energy, building automation, heating technologies, building maintenance, renovations, energy services and implementation and maintenance of electric mobility, for example. In a disruption the availability of low-cost and high-quality training is important, because people have to work with emerging technologies. Re-training can help to shift workers from declining areas to growth areas and ensure the sufficient availability of skilled work.

Fair transition: A compensation scheme is needed for those who suffer inordinately from the transition.

Why: In any transition, there is a limited number of citizens who suffer much more than others. Examples of those requiring compensation may be elderly people requiring complex energy renovations or rural residents facing changes in mobility options. These groups need to be identified when designing policies. Tailoring specific solution to these people may enhance the transition of the whole society.

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