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GHG Emissions from Shipping - International Maritime Organisation
100 years of the World Energy Council
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ENERGY FOCUS

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The All-Party Parliamentary Group for Energy Studies
Established in 1980, the Parliamentary Group for Energy Studies remains the only All-Party Parliamentary Group representing the entire energy industry. PGES aims to advise the Government of the day of the energy issues of the day. The Group's membership is comprised of over 100 parliamentarians, 100 associate bodies from the private, public and charity sectors and a range of individual members.

Published three times a year, Energy Focus records the Group's activities, tracks key energy and environmental developments through parliament, presents articles from leading industry contributors and provides insight into the views and interests of both parliamentarians and officials.

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Executive Council

Energy Focus

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CHAIRMAN'S FOREWORD

This edition of *Energy Focus* is going to print as we find ourselves in a spectacularly interesting time. We have a new Prime Minister, a new Secretary of State for Business, Energy & Industrial Strategy and Minister of State for Energy and Clean Growth. We have a new leader of the LibDems and a new European Commission coming into view. However, we still have the same big issue facing us and a new deadline. Soon, something has to give.

Throughout the whole process, the All-Party Parliamentary Group for Energy Studies (PGES) has tried to look ahead, predict the issues and cover them in topics for the Speaker Meetings, also guided by our Policy Priority list, on which it was noticeable that they were all forward looking.

You will see inside this edition of *Energy Focus*, reports from the European Climate Foundation and the International Maritime Organisation, the last on decarbonising energy in the frequently overlooked areas of freight, shipping and off-road transport.

We are also carrying our usual picture report from the PGES Summer Reception, but following an excellent speech from Professor Doctor Christoph Frei, Secretary General and CEO of the World Energy Council, we are also including a report on his words.

When (or should I say, if) the dust settles on Brexit, PGES will lead with expertise on issues as they arise. Our Associate and Academic Membership is still growing in strength and diversity. Our Parliamentary Members, despite the pressures of political life, still attend meetings, although we would always welcome more!

Please make contact with me or the PGES Secretariat – we are continually looking for topics and articles of interest.

One thing of which we are confident is that energy will become more and more important, as we are all becoming increasingly dependent on it, increasingly engaged in the issues and far more likely to be generators as well as consumers.

Ian Liddell-Grainger MP

Chairman, PGES

An All-Party Parliamentary Group

TOWARDS FOSSIL - FREE ENERGY IN 2050

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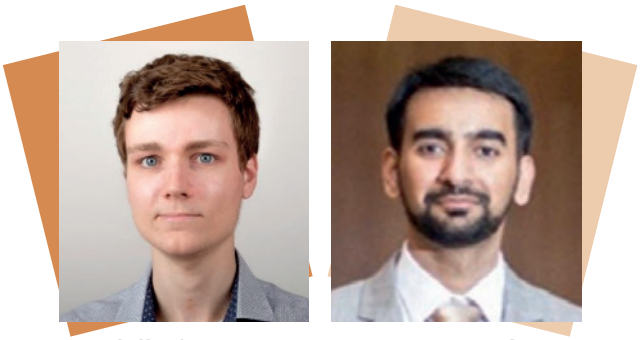

Stijn Carton Foaad Tahir

APRIL SPEAKER MEETING

For a new report titled *"Towards Fossil-Free Energy in 2050"* the European Climate Foundation (ECF) commissioned consultants Cambridge Econometrics and Element Energy to conduct an analysis of how zero-carbon energy systems in Europe can function.
The starting point for this analysis was the European Commission's recently published long-term strategy towards a Net Zero Economy by 2050. The report is part of the ECF's Net-Zero 2050 series, an initiative that aims to build a vision and evidence base for the transition to net-zero emission societies in Europe and beyond, by mid-century at the latest and in line with the EU's Paris commitment.

The report offers a unique in-depth analysis of the integration of power, road transport and residential heating sectors across Europe and does so on the basis of six scenarios, which cover a wide range of zero-carbon technologies and energy carriers divided in two groups. Three of these scenarios (the "High Electrification" or "HighE" scenarios) feature high electrification of end-use demand, and three (the "High Molecules" or "HighM" scenarios) feature a future with more moderate electrification of demand, complemented with a higher amount of green molecules in end-uses. The main differentiator between these two groups of scenarios are the assumptions on technologies used for the heating sector (direct electric vs green molecules) and the share of fuel cell vehicles in road transport. For all six scenarios, the analysis explored the macroeconomic impacts and energy system implications for a range of different archetype countries, representing both the different climatic zones (Northern European vs Mediterranean) and the extent of the existing gas networks (low – high) across European countries.

The report finds that all six of the examined configurations for zero-carbon energy systems in 2050 are feasible and come with important socio-economic benefits when compared to a current-policies baseline. In the "High Electrification" scenario with breakthrough levels of smart direct electrification and deep buildings efficiency these benefits are the most pronounced, with up to 1.8 million additional jobs created across the European economy and up to 23 billion EUR in annual savings on energy spending for households. With regards to the employment figures, the report does foresee structural shifts between sectors, away from fossil-fuel reliant industries towards electrical engineering and manufacturing, and so underlines the need for efforts to be made to ensure workers are re-trained for quality jobs in the growth sectors of the future.

In addition to the above, the report identifies three pillars of a future fossil-free energy system, common to all the configurations studied:

- **Buildings efficiency:** Measures to improve the thermal efficiency of buildings require upfront investment but lead to significant savings down the line – up to 22% when applied with smart technologies – due to avoided investments in energy infrastructure and generation assets. This is mainly thanks to the mitigating effect that efficiency measures have on peak demand for heating in buildings. Means should be found to remunerate customers for these avoided system costs.

- **Clean Electricity and smart electrification:** The report shows that, as electricity can decarbonise cost-effectively, it becomes attractive to maximise the value of carbon-free electricity in all sectors of the economy such as mobility, buildings and industry. In turn, smart electrification in these sectors, through the application of demand side response measures and battery storage, offers flexibility to a power sector that will be dominated by variable renewable sources. The study shows that electrification, if smartly integrated in the energy system, can reduce overall energy system cost through a reduction of the need for thermal back-up by up to 54% and renewables curtailment by up to 70%.

- **Seasonal storage:** Securing long-term storage is a key challenge for any zero-carbon energy system. Especially in colder Northern European countries with a strong seasonal heat demand pattern there will be extended periods of insufficient renewable energy available. In this report, heat networks and green hydrogen (generated from variable renewable sources via electrolysis) are shown to be technically viable options for the required longer duration storage of energy. In the "High Electrification" scenarios, we see that renewable electricity is used to produce green hydrogen at times of surplus generation throughout the year, stored and then used for power generation using hydrogen gas turbines (H2GTs) to meet peak electricity demand for heating in winter months. In the "High Molecules" scenarios meanwhile, the green hydrogen stored is directly supplied to end-users in buildings via the gas distribution grid, with H2GTs for electricity generation playing only a minor role.

A comparison of annual energy system costs in 2050 between the different scenarios further shows that, while scenarios with higher shares of green hydrogen, applied in the heating and transport sectors, offer some savings on required electricity infrastructure investments, these savings are outweighed by costs for electricity generation (to produce larger amounts of green hydrogen) and gas infrastructure. The infrastructure investments needed to decarbonise the EU's energy system through the use of large amounts of green gas are projected to be up to 36% more expensive than through smart direct electrification and deep buildings efficiency.

These findings on the economics and energy system implications of green hydrogen underline the need for careful application of green hydrogen in the energy system, directing it to those sectors and applications, where it can add the highest value and where it is not in direct competition with smart electrification and buildings efficiency.

For queries on the report, please contact Stijn Carton at the European Climate Foundation, Stijn.Carton@Europeanclimate.org