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Laszlo Varro Chief Economist

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... but there's a tough climb still ahead



We made it to the base camp...

Energy efficiency and low fossil fuel prices

The th orth America ENERG XYZ ENDIGIA - EHEPTIVE - ENEPTIVA kWh/annum ENERGIA - ENERGY - ENERGIE 40 YZd8 -10 Y,Z VWXYZ ABCDEFG YZ_{d8} Janeur 2010/10/2 Appliance standards lock in efficiency improvements despite

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declining electricity prices

No peak yet in sight, but a slowdown in growth for oil demand

mb/d 6 3 0 -3 Aviation Petrochemicals Power Buildings Maritime Freight Passenger generation cars

Change in oil demand by sector, 2015-2040

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The global car fleet doubles, but efficiency gains, biofuels & electric cars reduce oil demand for passenger cars; growth elsewhere pushes total demand higher

Electricity is leading the transformation



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Current wind and solar investment is equivalent to over 1% of global Electric cars generate consumer excitement, but displaced only 0.01% of oil gas production not burned in CCG is production last year

The growth of renewables is not necessarily decentralised

Global wind and solar production

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Energy storage solutions in a high carbon system



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The ability to integrate renewables is improving but there are unanswered questions at very high shares



Is the low hanging fruit scalable?

Is the Supergrid politically feasible?





Can smart pricing overcome consumer convenience?

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Flexible gas turbines remain essential to keep the lights on



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Coal and gas-fired power investment in Asian markets (2015)



Asian markets comprised 85% of global coal power investment, while N. America and Middle East, with robust infrastructure, favoured gas for new fossil fuel power

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Young and old coal

Young and old coal capacity, 2015



A third of global coal capacity is less than 10 years old representing 90 billion tons of potential CO2 emissions during their lifetime

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CCS good news depend on oil market developments





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EOR oil pays for clean coal

Large oil and gas projects with an integrated CCS component

For every single CCS project that has succeeded in real life hydrocarbon revenues played an important role

Nuclear: a large low carbon source with uncertain prospects





- China: a new reactor every quarter
 - Russia: strong nuclear program with global ambitions
 - Korea: pro nuclear policy, strong industrial capability
- Persistent project management issues
- Exposure to wholesale market design

Losing the EU and US nuclear fleet would absorb 20 years of wind and solar deployment at the current investment rate