



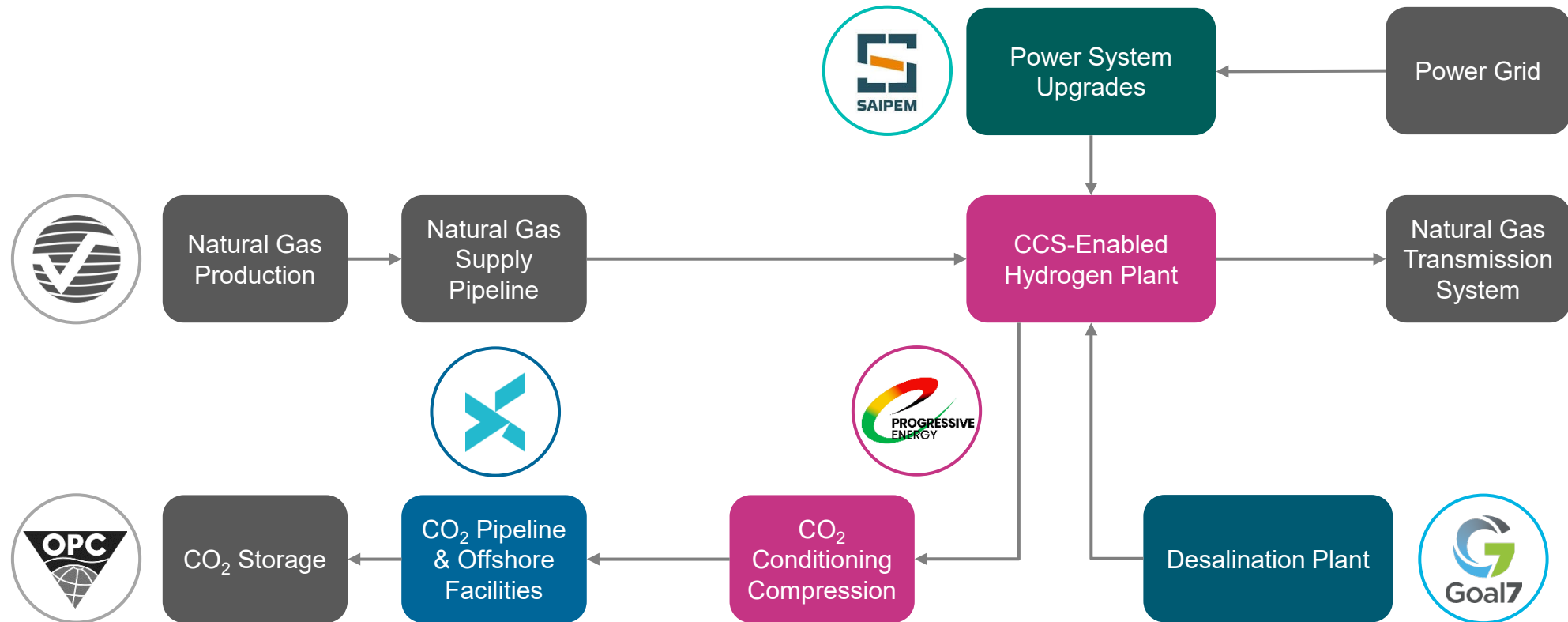
Bacton Energy Hub Advisory

Cost & LCOH Results

December 2022

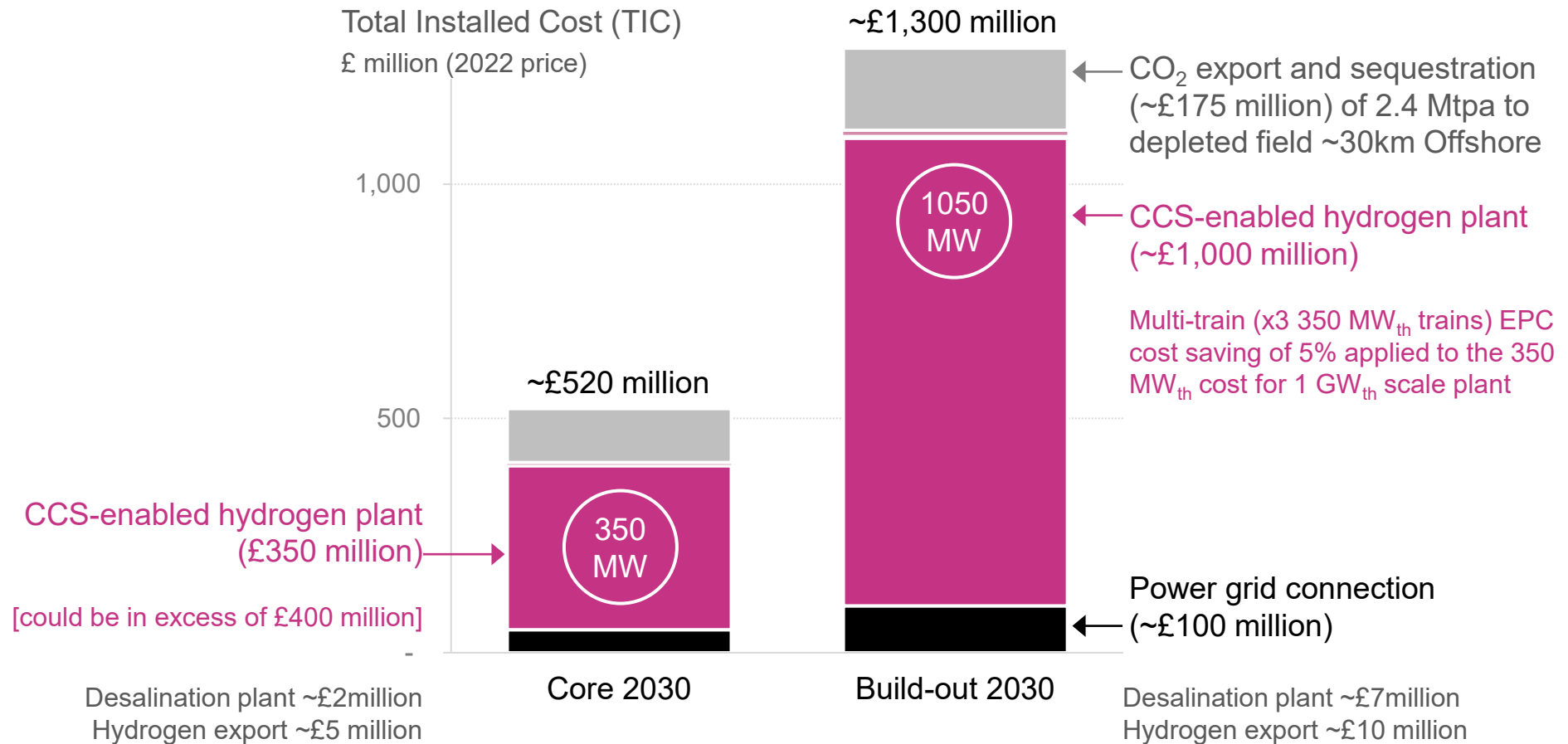
CCUS-enabled hydrogen cost blocks

overall cost based on estimates provided by SIG representatives with varying degrees of technical definition



capital cost rough order of magnitude estimates

Core CCS-enabled hydrogen plant cost based on the HyNet project, with limited level of technical definition

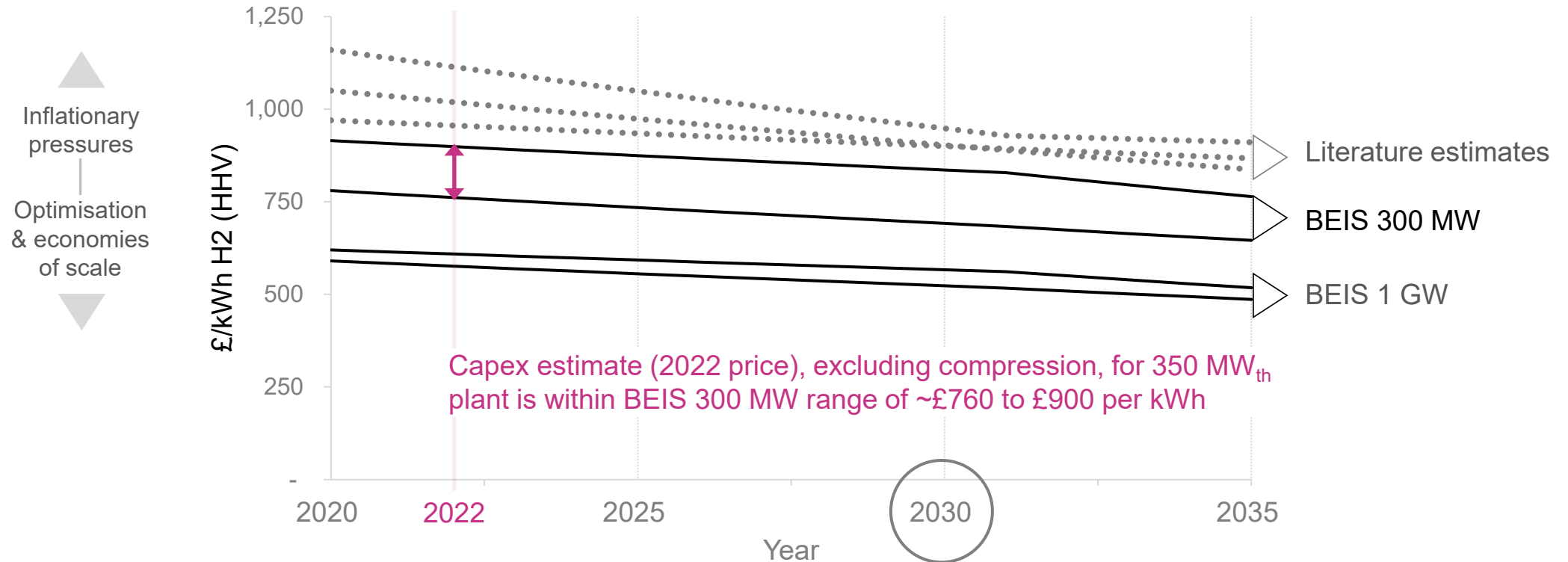


CCS enabled hydrogen capital cost reference

developing understanding of First-of-a-Kind projects and economies of scale linked to moving to larger sites

Capital cost comparison for CCUS-enabled reformation, excluding the cost of compression (2020 prices)

Source: BEIS, Hydrogen Production Costs 2021 (Note-1)



Note-1: CCUS-enabled technologies includes SMR, ATR and ATR+GHR technologies and exclude newer technologies such as partial oxidation

LCOH adopting BEIS 2021 basis

analysis approach largely corresponds to the 'BEIS Hydrogen Production Costs August 2021'

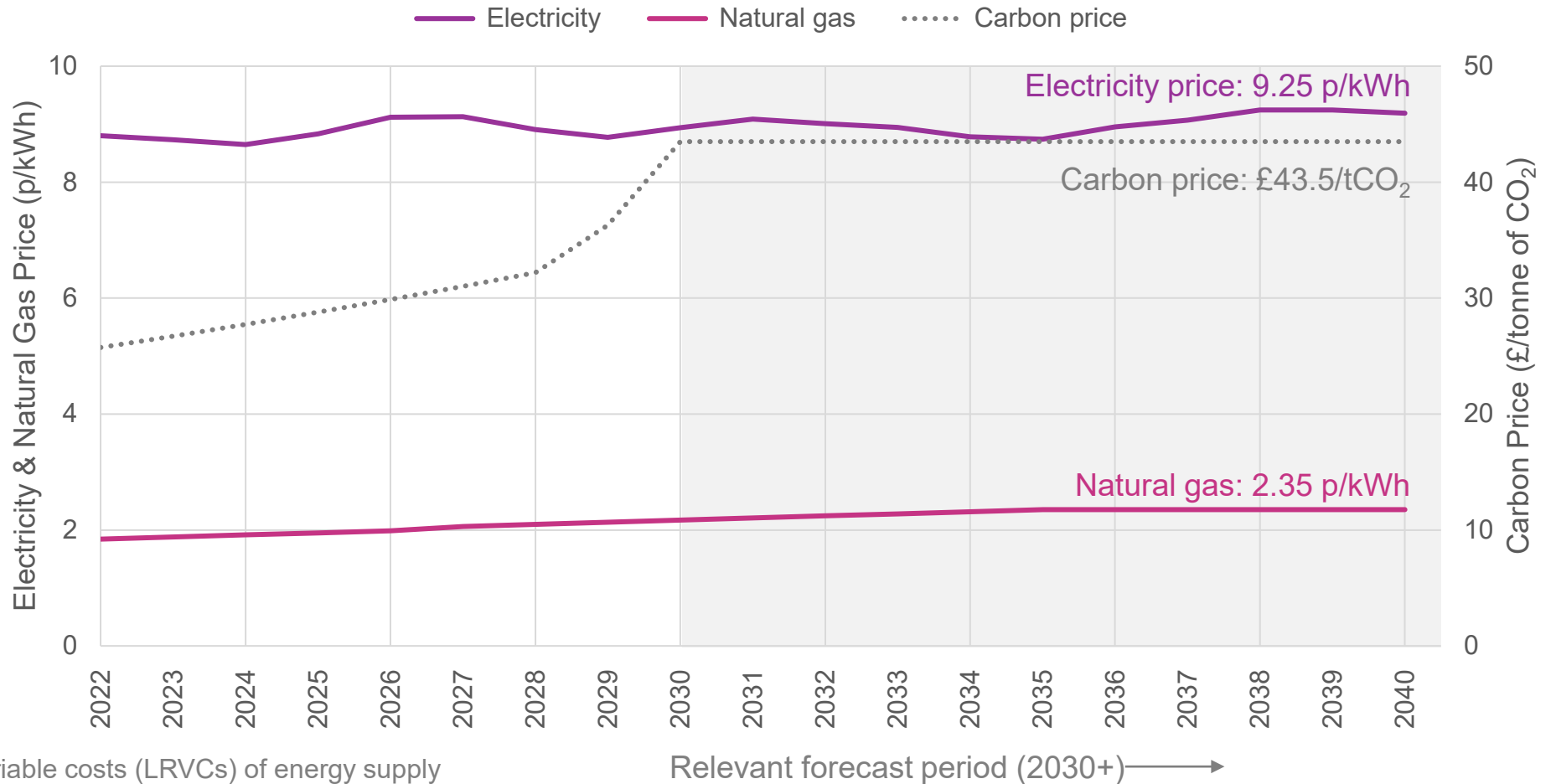
- 1 Levelized costs is a measure of the average cost of hydrogen produced over the full lifetime of a plant, expressed as a cost per energy unit of hydrogen produced (**£/MWh**);
- 2 BEIS analysis assumes a uniform build time of **three years** and excludes pre-development timings, and assumes a technical life of 40 years for reformer projects;
- 3 Electricity and fuel prices are based on published BEIS data, derived **before** the Covid-19 pandemic and Russia-Ukraine war and so do not represent the gas price surge this year;
- 4 BEIS report Long-run variable costs of energy supply of **9.25 p/kWh** electricity price and the underlying natural gas wholesale price of **2.35 p/kWh** (with notional **20% premium** for interconnector sourced gas);
- 5 Hurdle rates are the minimum financial return that a project developer would require over a project's lifetime, and BEIS report assumes a uniform **10% hurdle rate** to discount costs and output across time.

BEIS energy price basis long term forecast uncertainty

current industrial electricity & natural gas prices remain well above the level seen at the same time last year

Between Q1 2021 and Q1 2022 the average electricity price in cash terms excluding CCL in the non-domestic sector rose by 29% to: 18.14 p/kWh

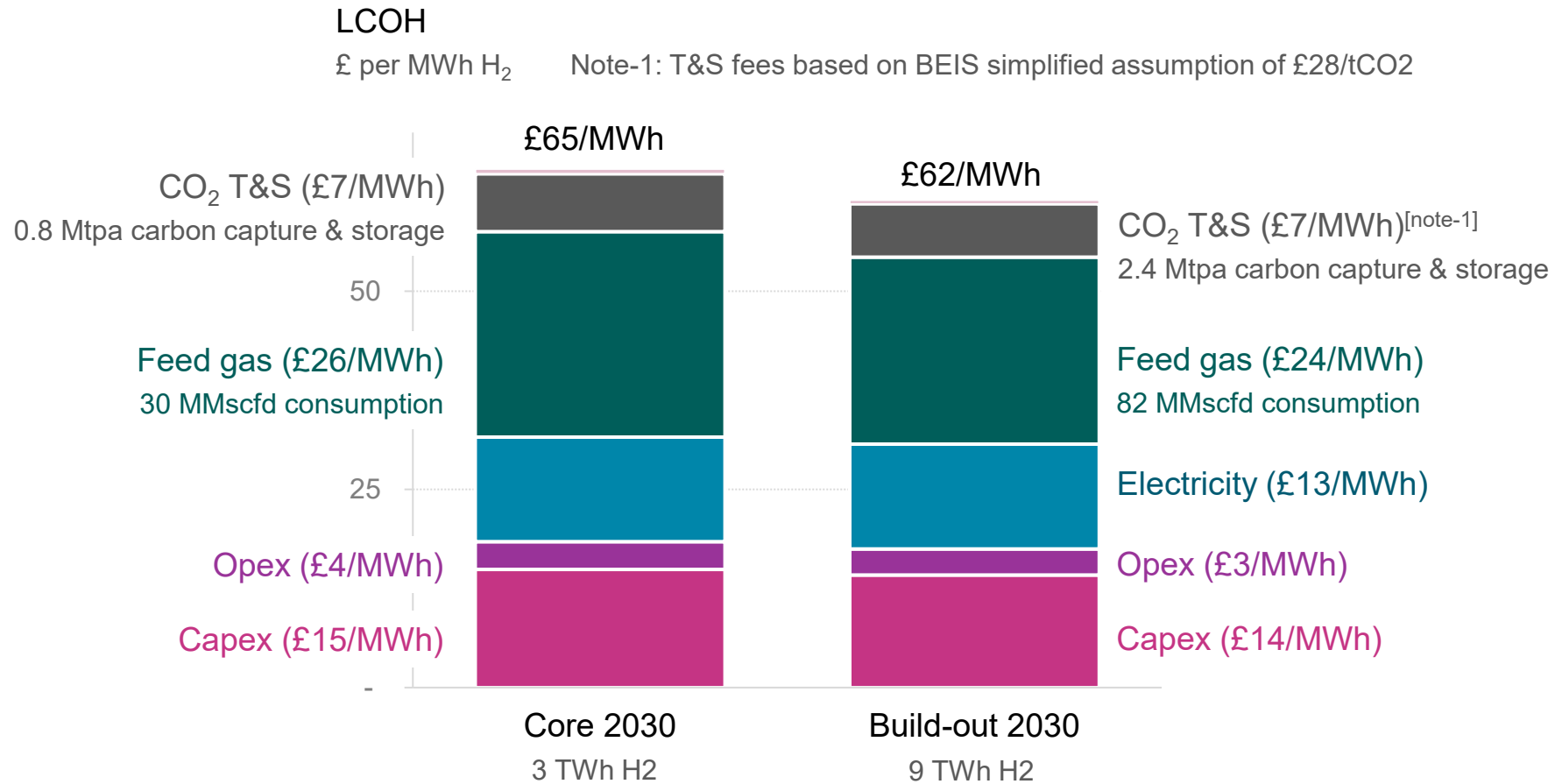
The average natural gas price over the same period in cash terms excluding CCL in the non-domestic sector rose by 71% to 3.95 p/kWh.



Source: BEIS Long-run variable costs (LRVCs) of energy supply

levelised cost of hydrogen scale cost efficiencies

£3/MWh LCOH reduction illustrates the economies of scale from three 350MW CCS enabled hydrogen plants



Core 2030 LCOH key assumption sensitivities

Feed gas price is the primary CCS-enabled hydrogen levelised cost of hydrogen value driver

