

# Delivering the energy transition on the demand side

Westminster Energy Forum

Jan Bruland, 8<sup>th</sup> May 2024

**CRA** Charles River  
Associates



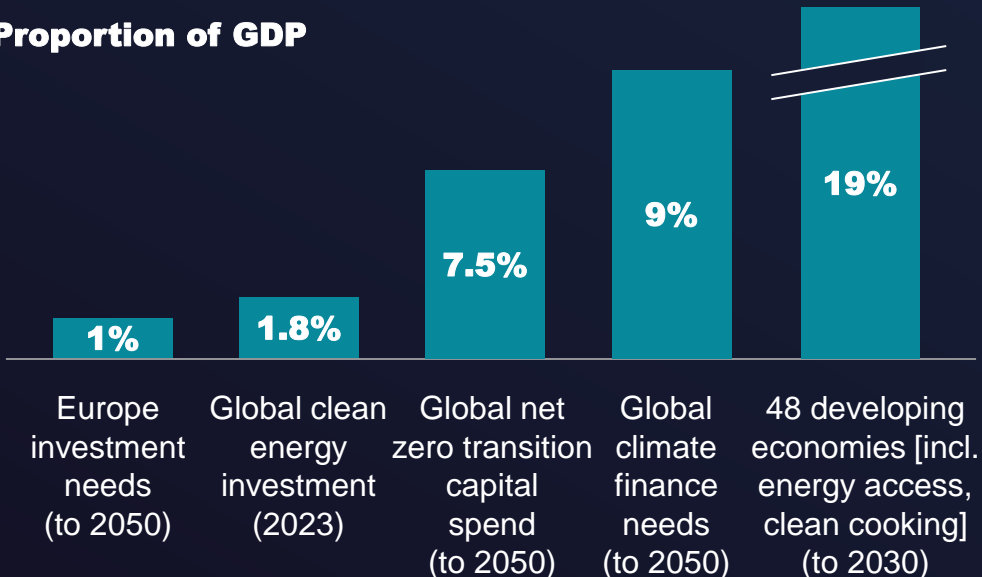


# The **energy transition** is going to be **costly** – but so is the alternative



## Range of estimates for **energy transition cost**

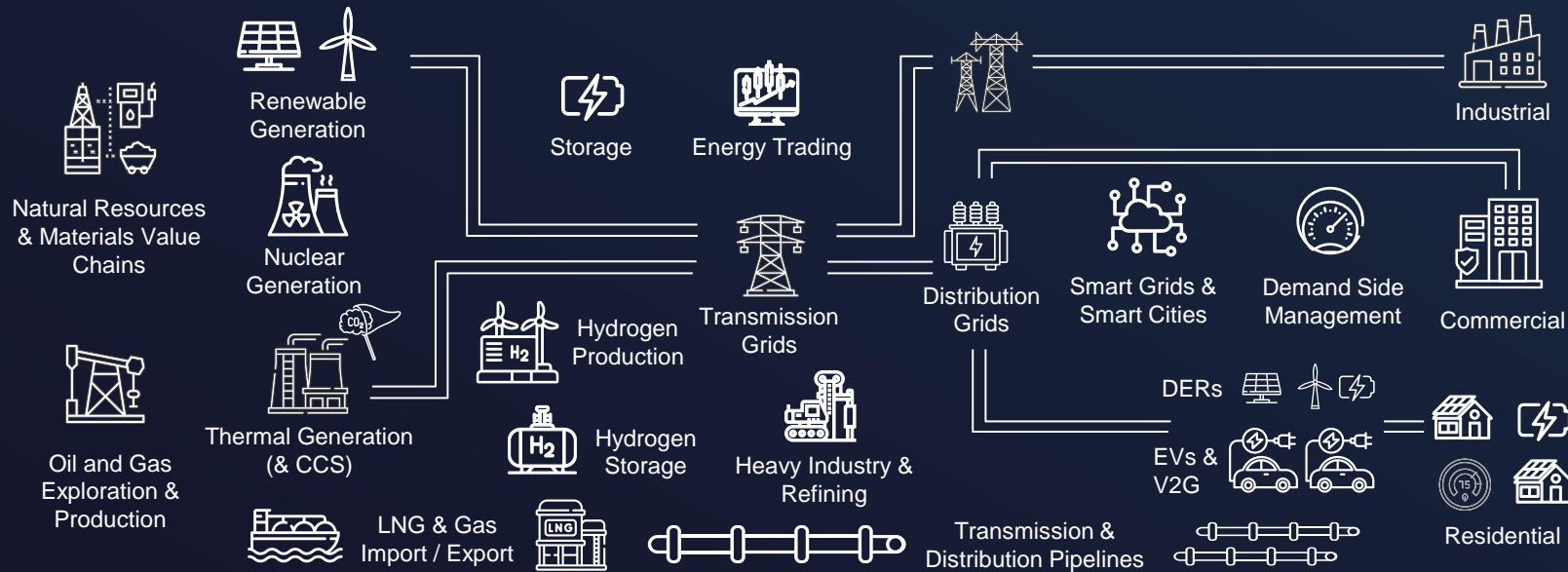
### Proportion of GDP



## Cost estimates for energy and climate related spend






- **\$7trn (appx. 7% of global GDP)** – fossil fuel subsidies (2022)
- **\$25trn** – cost of climate related repairs, retrofits and adaptations for real estate owners to 2050
- **7.8%** – proportion of value in MSCI global real estate performance index at risk due to transition or physical risks
- **US\$ 12k/a** – average cost to insure a single-family home in Florida (if deemed insurable)

# The **energy value** chain has evolved into a more decentralised **system**

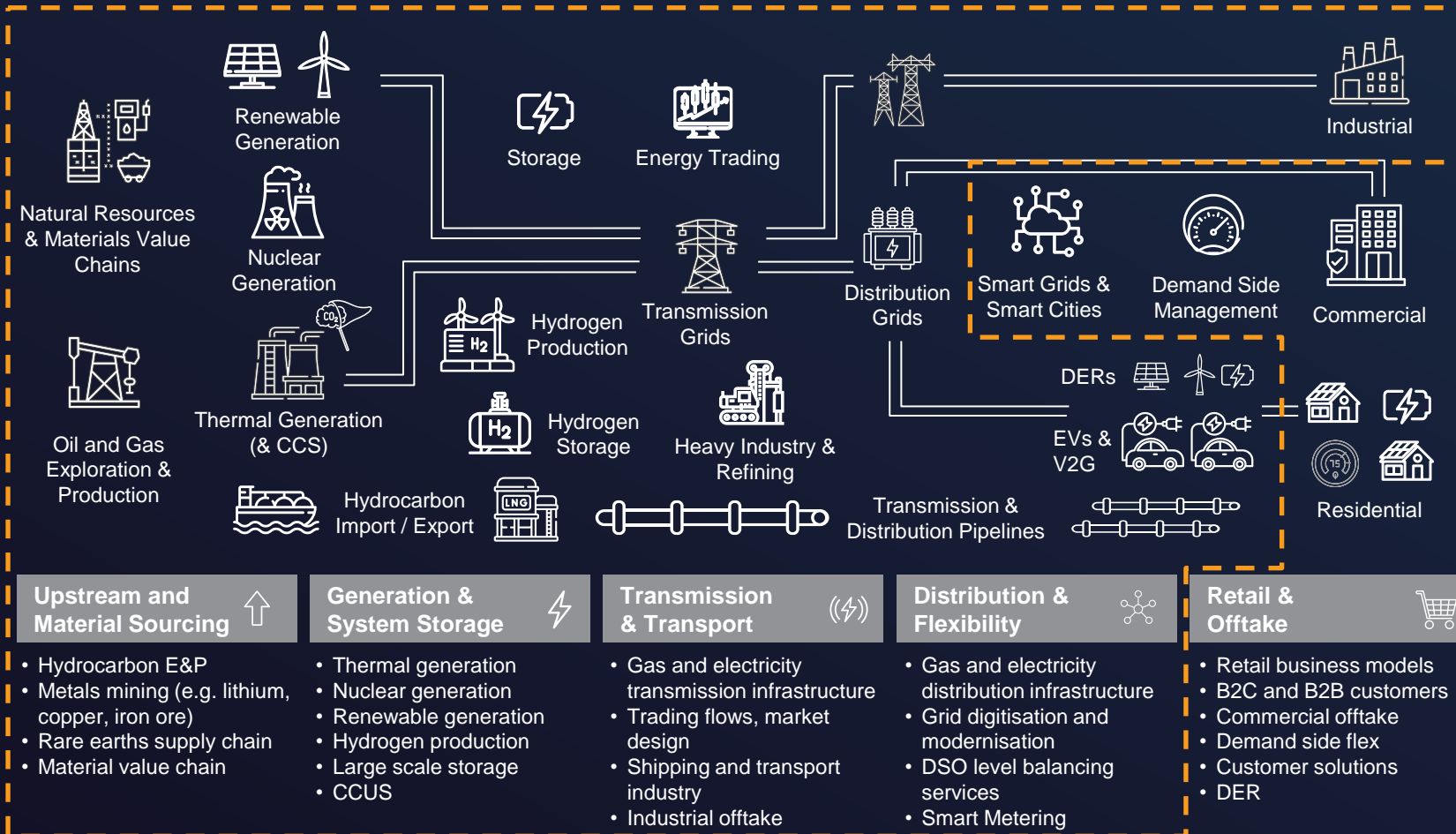


## Development of the energy value chain

- The traditional value chain transports energy from left to right
- The decentralised energy system includes more flexibility and **participation opportunities**
- Mostly driven by electrification and enabled by digitalisation

Upstream and Material Sourcing 	Generation & System Storage 	Transmission & Transport 	Distribution & Flexibility 	Retail & Offtake 
<ul style="list-style-type: none"> <li>• Hydrocarbon E&amp;P</li> <li>• Metals mining (e.g. lithium, copper, iron ore)</li> <li>• Rare earths supply chain</li> <li>• Material value chain</li> </ul>	<ul style="list-style-type: none"> <li>• Thermal generation</li> <li>• Nuclear generation</li> <li>• Renewable generation</li> <li>• Hydrogen production</li> <li>• Large scale storage</li> <li>• CCUS</li> </ul>	<ul style="list-style-type: none"> <li>• Gas and electricity transmission infrastructure</li> <li>• Trading flows, market design</li> <li>• Shipping and transport industry</li> <li>• Industrial offtake</li> </ul>	<ul style="list-style-type: none"> <li>• Gas and electricity distribution infrastructure</li> <li>• Grid digitisation and modernisation</li> <li>• DSO level balancing services</li> <li>• Smart Metering</li> </ul>	<ul style="list-style-type: none"> <li>• Retail business models</li> <li>• B2C and B2B customers</li> <li>• Commercial offtake</li> <li>• Demand side flex</li> <li>• Customer solutions</li> <li>• DER</li> </ul>

# Investment is focused on infrastructure (generation and networks)



## Energy customers invest in decarbonisation – examples:

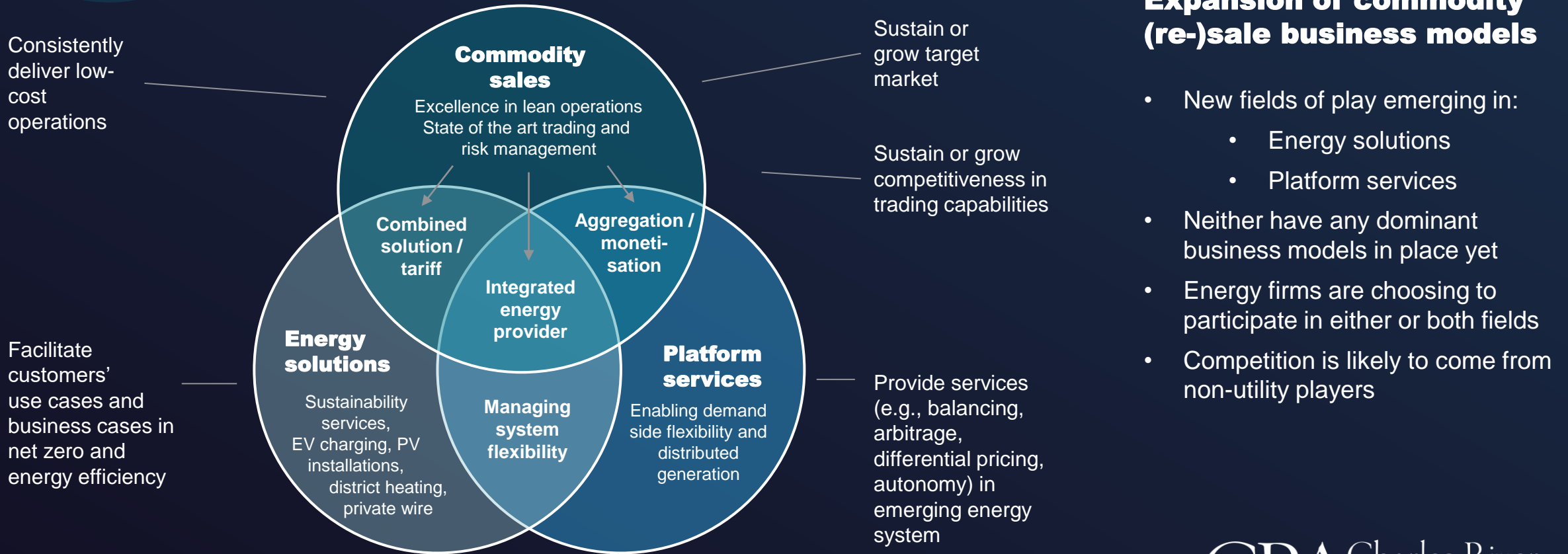
- E-mobility
- Decarbonisation of heating
- Smart home products

## Relatively low institutional interest in demand side assets:

- Price signals
- Large consumer flexibility (I&C)
- Consumer side flexibility (e.g., ESO pilot)



# Energy companies find new ways of engaging with the demand side



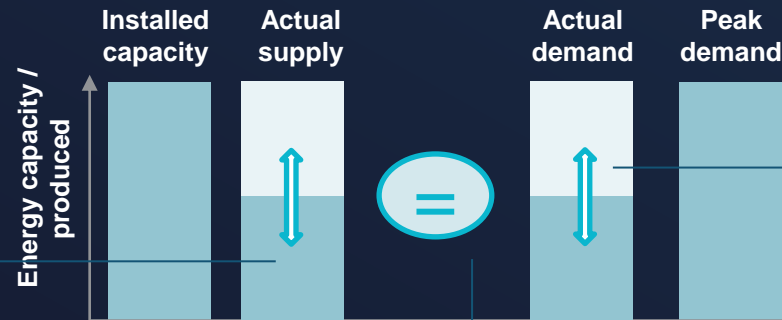
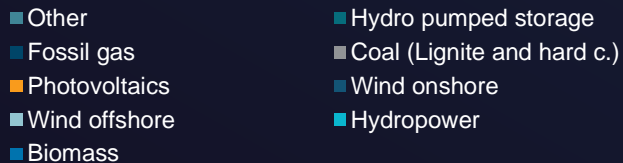
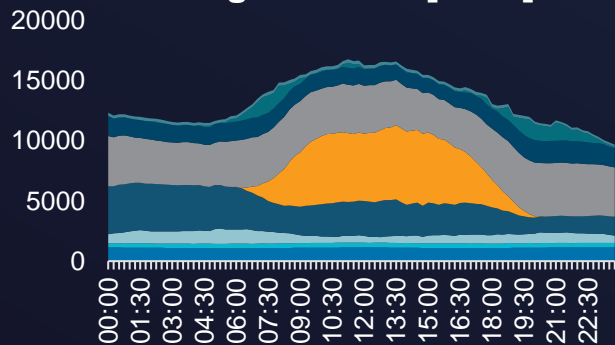
# A key price is in demand side flexibility



## Generation

Shares of actual generation (over 1 day): ~11% natural gas, ~29% coal, ~3% pumped hydro storage (cumulatively **33% of installed capacity** in 2022)

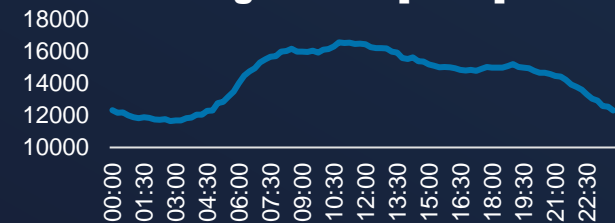
### Actual generation [MWh]



## Demand

Households and Business / Commerce / Services make up **~56% of electricity demand**

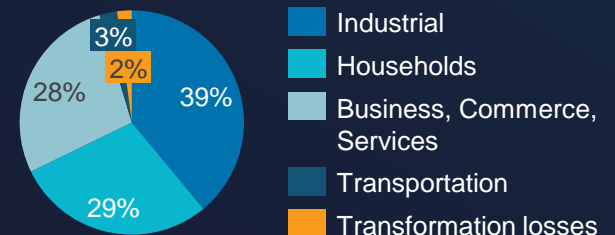
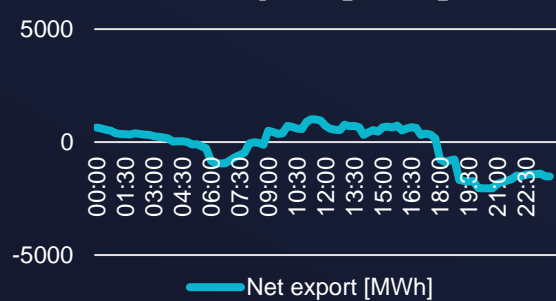
### Total grid load [MWh]



## Interconnection

Maximum of **~14% net import** as share of total grid load

### Net export [MWh]



# Challenges and outlook



## Customer demographics and behaviour

- Energy consumption preferences centred on **low and transparent cost** and **convenience**
- UK median household **disposable income** in 2022: GBP 32,300
- Median gross household **savings**: GBP 12,500

## Energy company role

- Ongoing **perception shift** from utility to solution provider
- Limited ability to leverage granular **customer data** due to availability and other issues

## Market readiness

- **Value propositions** to be developed
- **Routes to market** to be developed
- No **localised options**

## Challenges



## Outlook

- Would-be energy solutions and platform services providers need to **create** their own market
- Individual offerings are more (e.g., EV charging) or less **mature** (e.g., demand side flexibility)
- Even mature offerings may only be commercially viable on a **case-by-case basis** (e.g., new district heating)
- Attempts to “**lock in**” certain markets may prove successful (e.g., city energy partnerships)



**For any follow-up questions  
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**Thank you**