



**Reforms to network charges:**  
*The Targeted Charging Review and its implications*

Public report, May 2019

# Targeted Charging Review is part of Ofgem's wider initiative to reform network charges which began in 2016

July 2016 Open letter: Charging arrangements for Embedded Generation (EG)

## Objective

Ofgem launched a review of network charging arrangements over concerns that these were preventing a level playing field between embedded and transmission connected generators<sup>1</sup>

## Key concerns highlighted

**TNUoS demand residual:** Encourages potentially inefficient investment in small behind-the-meter generation<sup>2</sup>

**TNUoS generation residual:** Transmission-connected generation receives a negative residual charge, creating distortion between embedded and transmission generation<sup>3</sup>

**BSUoS demand and generation charges:** Distorts dispatch decisions by bringing out of merit generators into merit when they should otherwise not have been profitable to do so

## Targeted Charging Review

The objectives of this SCR are to:

- Consider reforms of residual charging arrangements for both generation and demand, to ensure it meets the interests of current and future consumers
- Keep the other 'embedded benefits' that may distort investment or dispatch decisions under review.

Consultation

03/2017

SCR launch

08/2017

Minded to decision

11/2018

Final decision

Summer 2019

## Network Access and Forward-Looking charges

The objectives of this SCR are to:

- Review the definition and choice of transmission and distribution access rights
- Review DUoS charges and distribution connection charging boundary
- Conduct a focused review of TNUoS charges

Working paper

11/2017

Consultation

07/2018

SCR launch

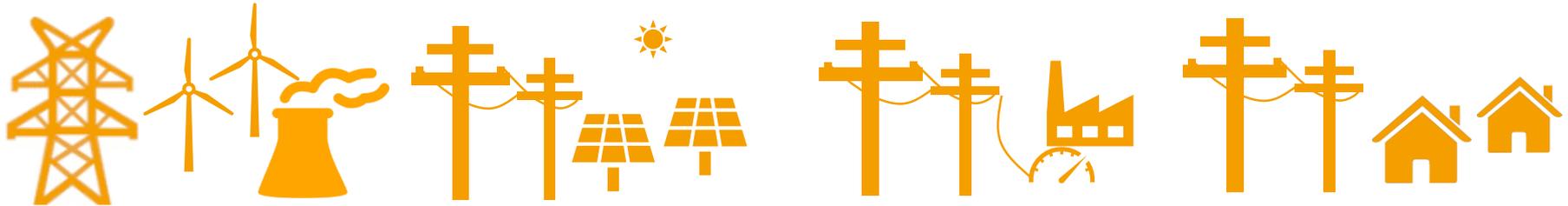
12/2018

Minded to decision

Spring 2020

1. Apart from these SCRs, there is additional work in progress as part of Ofgem's "Strategy for Regulating the Future Energy System". 2. CMP 264 and 265 were raised in order to tackle the increasing transmission residual payments to embedded generators which were creating market distortion. 3. CMP 224 and 261 also highlighted the need for reforming the transmission generation residual (TGR)

# Network charges vary by location and connection type; the TCR proposals affect all asset types



Transmission connected	Distribution connected	Behind the Meter	Demand
Larger assets such as CCGTs or Offshore wind farm. Connection voltages @ 275kV or 400kV	Small-medium sized assets such as gas recip. Connection voltages up to 132kV	Small assets connected to metered demand load from commercial/residential consumers	Consumers of electricity which can be connected at different voltage levels

Applicable charges/ benefit	Charge	Benefit	N/a	Focus of TCR
	TNUoS <sup>1</sup>	TGR <sup>2</sup>	TNUoS	TNUoS
DUoS <sup>3</sup>	DUoS	DUoS	DUoS	DUoS
BSUoS <sup>4</sup>	BSUoS	BSUoS	BSUoS	BSUoS

1. Transmission Network Use of System 2. Transmission Generation Residual 3. Distribution Use of System charge 4. Balancing Services Use of System

# Changes proposed by the TCR are expected to impact assets throughout the whole merit-order

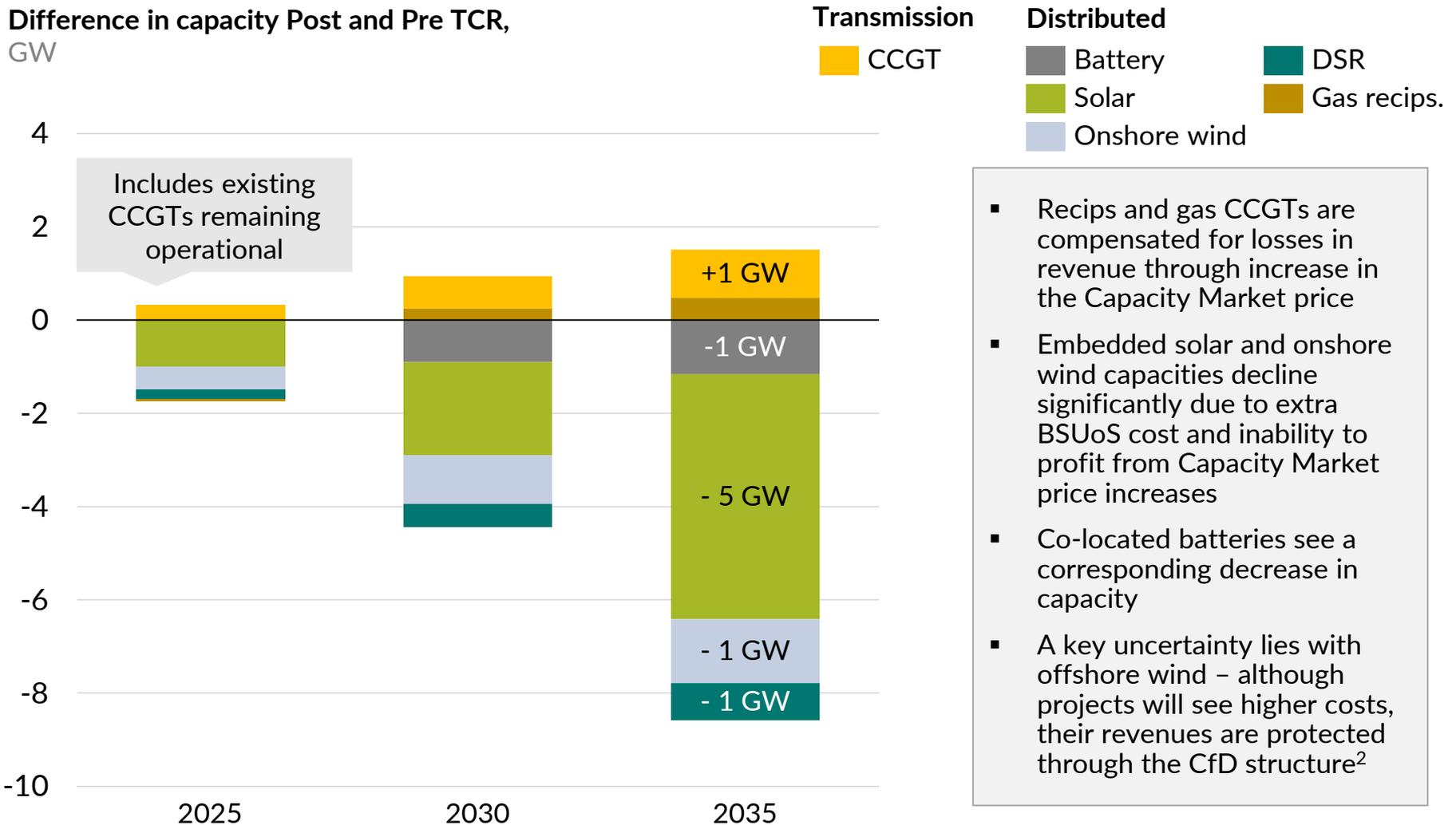
	Current status	Change proposal	Impact
<b>A</b> Demand residual charge reform	Transmission demand residual charges (Triads) are levied on triad volumes and can be avoided by BTM	Change of charge allocation to a fixed or agreed capacity, removing ability to avoid charges	Significant / complete reduction of BTM triad benefit will reduce BTM distortion
<b>B</b> Reduction of TGR payments to zero	Large transmission connected generators receive a credit through the Transmission Generation Residual	Setting of TGR payment to zero, removing credit payments to transmission-connected generators	Cancellation / reduced returns for some projects, particularly CfD or RO supported renewables
<b>C</b> Removal of embedded BSUoS payment	Embedded generators can access pass-through BSUoS cost savings due to allocation on net demand	Allocation of BSUoS charges on gross demand instead, removing cost savings and benefits to embedded generators	Reduction of embedded generator BSUoS payment from £2-5/MWh to zero
<b>D</b> Removal of BSUoS charge exemption	Smaller embedded generators are exempt from generation BSUoS charges	Removal of BSUoS charge exemption for smaller embedded assets, increasing cost for them and exporting BTM generation	Increase of BSUoS charge payment from zero to £2-5/MWh

Ofgem proposed options <sup>1</sup>	Implementation		
	2020	2021	Phased 2021-23
TGR + partial BSUoS reform (A + B + C)	Earliest date maximizes consumer savings but is very disruptive to industry	Reduced disruption to industry, extends distortions by a year	Further reduced disruptions to industry. Aligns TCR reforms with RIIO2 (Adds complexity to transition)
TGR + Full BSUoS reform (A + B + C + D) (Preferred option)	(Preferred option)	(Preferred option)	

1. The TCR also includes an extension of small generator discount which expires on 31 March 2019 and accounts for ~£12/kWh in 2019/20. Applies to sub 100 MW transmission in Scotland

# Targeted Charging Review will benefit gas generation at the expense of renewables and battery storage

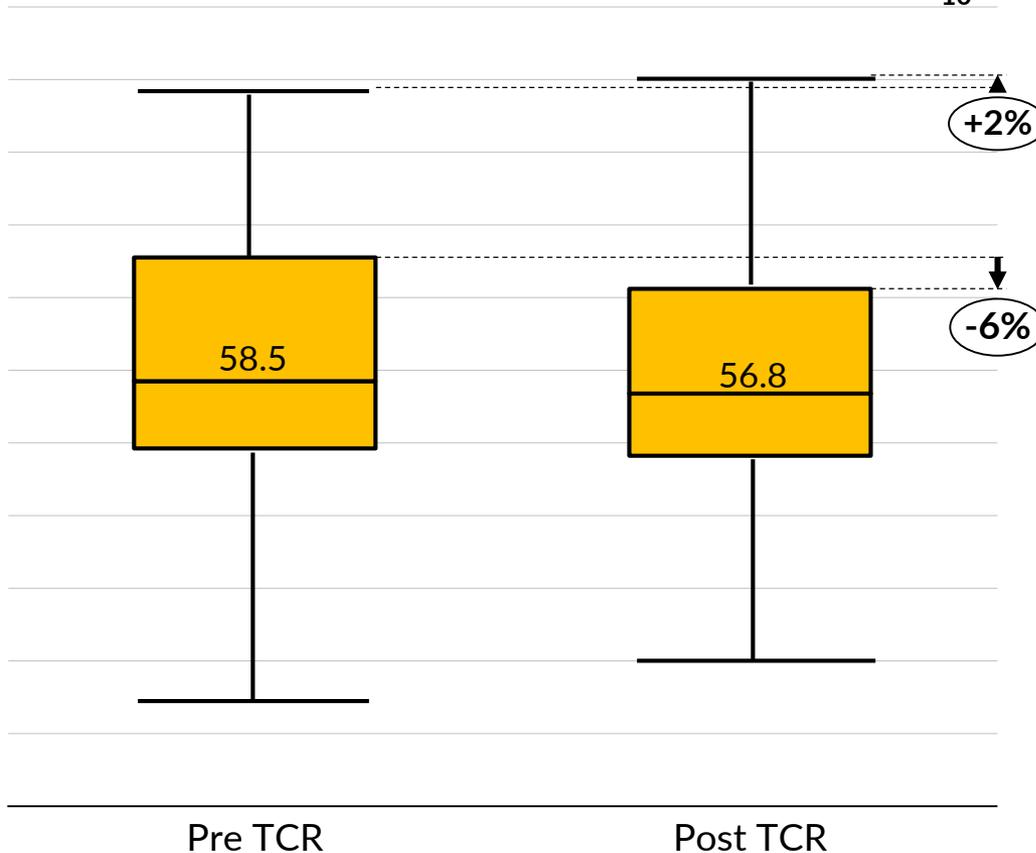
Difference in capacity Post and Pre TCR, GW



1. Positive value implies capacity is greater in post-TCR scenario than pre-TCR scenario. We model for the average asset in each category and specific assets (namely well situated assets) could enjoy more advantageous economics. 2. We assume that Government would provide additional subsidies if required to meet its Offshore Wind target and therefore do not change capacities.

# TCR reforms will lead to dip in baseload prices by 3% as low merit CCGTs displace recips; top prices rise by 2%

Wholesale price in 2020s,  
£/MWh, (real 2018)



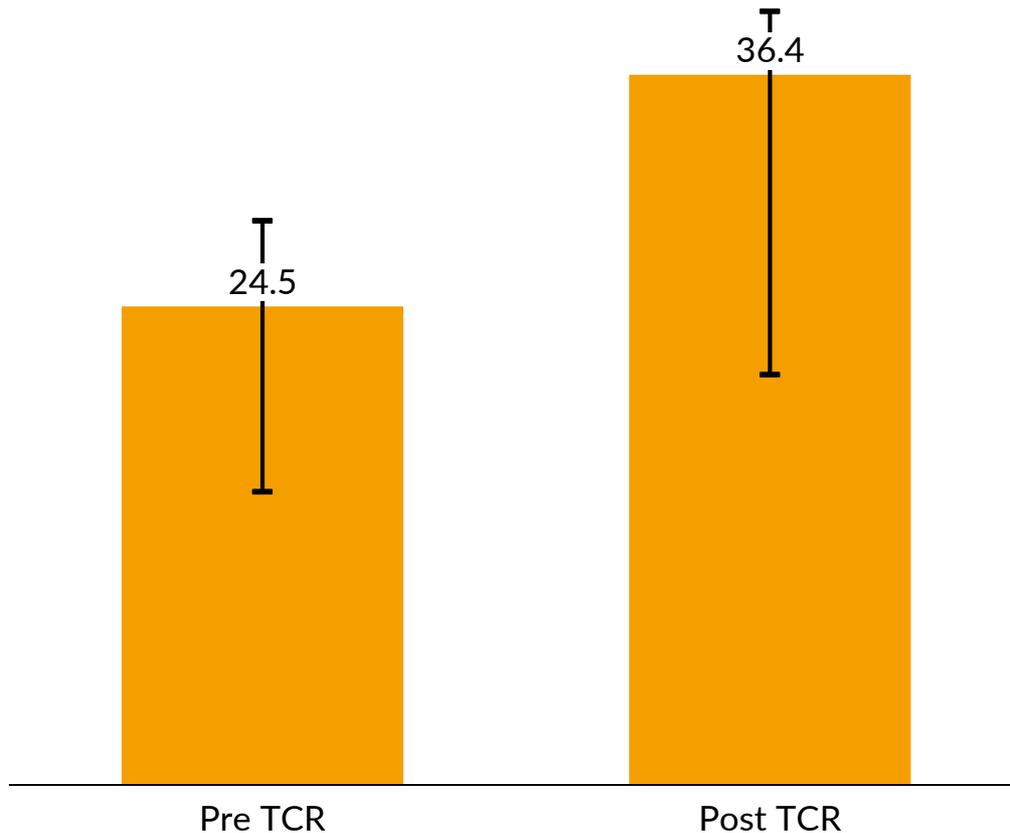
- BSUoS reforms will increase the variable cost of gas peakers while decreasing that for low-merit CCGTs<sup>1</sup>
- Consequently, the Targeted Charging Review will result in a dip in baseload prices as (i) transmission assets face lower BSUoS cost; and (ii) low-merit CCGTs displace higher marginal cost peakers at the margin
- Top prices will however rise to reflect the higher BSUoS charges faced by gas peakers

1. CCGTs are charged BSUoS charges which equate to roughly £3.1/MWh, while embedded gas recips are exempt and receive these charges as payments for reducing demand on the distribution network. The TCR will subject all assets to pay BSUoS charges. As more generation will pay the charges, the charge on a MWh bases fall.

# Capacity Market prices will rise by an annual average of £6/kW - £12/kW to compensate assets for losses through the TCR

Capacity Market clearing price between 2023/24 – 2030/31<sup>1</sup>,  
£/kW (real 2018)

┆ Max and min



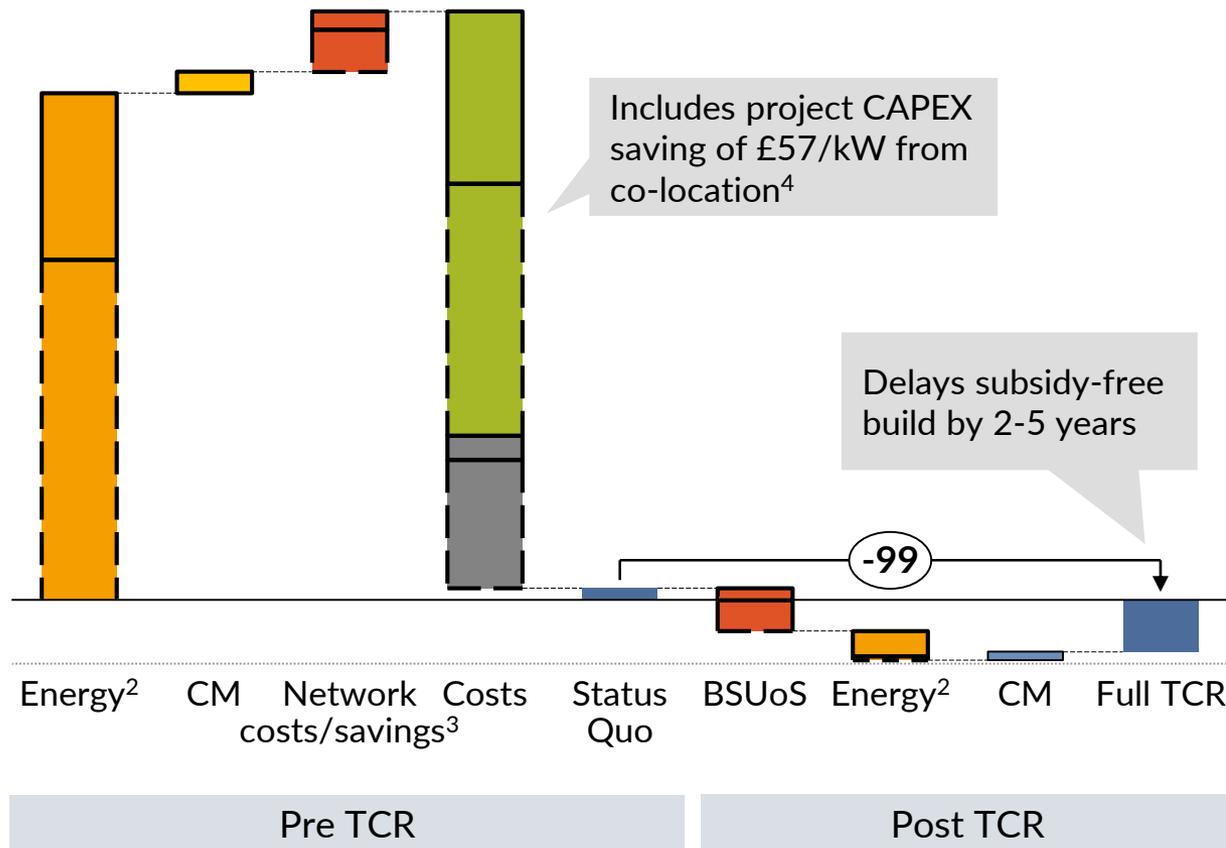
- TCR reforms will affect the economics of a majority of new and existing assets through lower energy market revenues and higher costs
- This translates into higher capacity market prices as assets require additional revenues to remain on the system

1. We model the average asset for each technology. Well-sited assets could require a much lower CM top-up due to other (such as locational) benefits.

# Solar + battery: TCR erodes revenue streams for both batteries and solar, delaying subsidy-free buildout

NPV of solar farm with paired battery<sup>1</sup>,  
£/kW (real 2018), entering in 2025

□ Battery  
▭ Solar



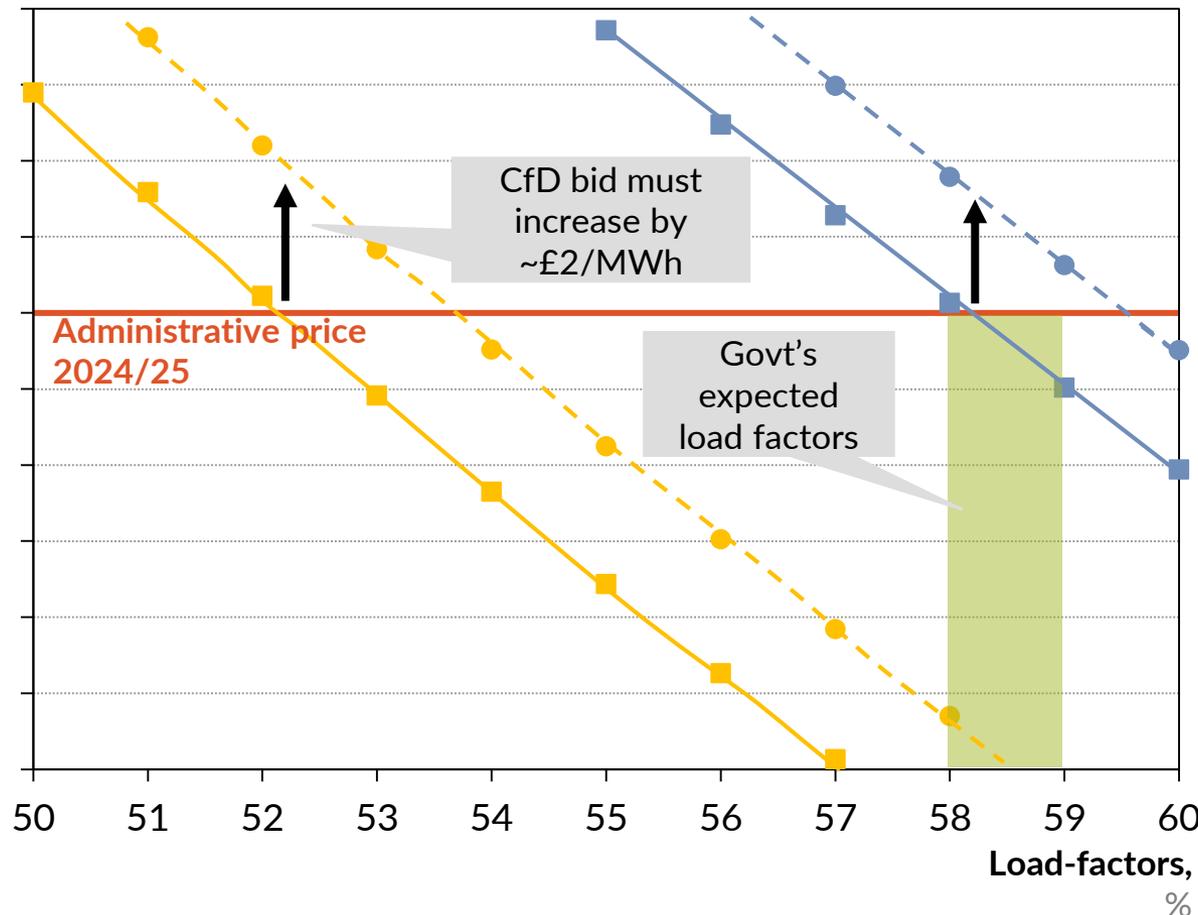
- The majority of solar assets deploying in the 2020s were expected to come through co-location business models as this gives various benefits including lower CAPEX
- TCR reforms will hurt the economics of both solar and battery reducing their NPVs by ~£100/kW
- This would delay the subsidy-free buildout of solar by 2-5 years

1. Plant characteristics: capacity ratio of 1MW of solar and 0.4 MW of 2-h battery. Located in the South of England. 2. Energy market revenues include wholesale and balancing. 3. Network costs and savings include embedded benefits from BSUoS and GDUoS. 4. Capex savings from co-location include grid connection and balance of system

# Offshore wind: Assets in upcoming CfD auction will have to increase bids by £2/MWh as a consequence of the TCR

Secured strike price<sup>1</sup>,  
£/MWh (real 2018)

— 7% IRR      — Pre TCR  
— 9% IRR      - - - Post TCR



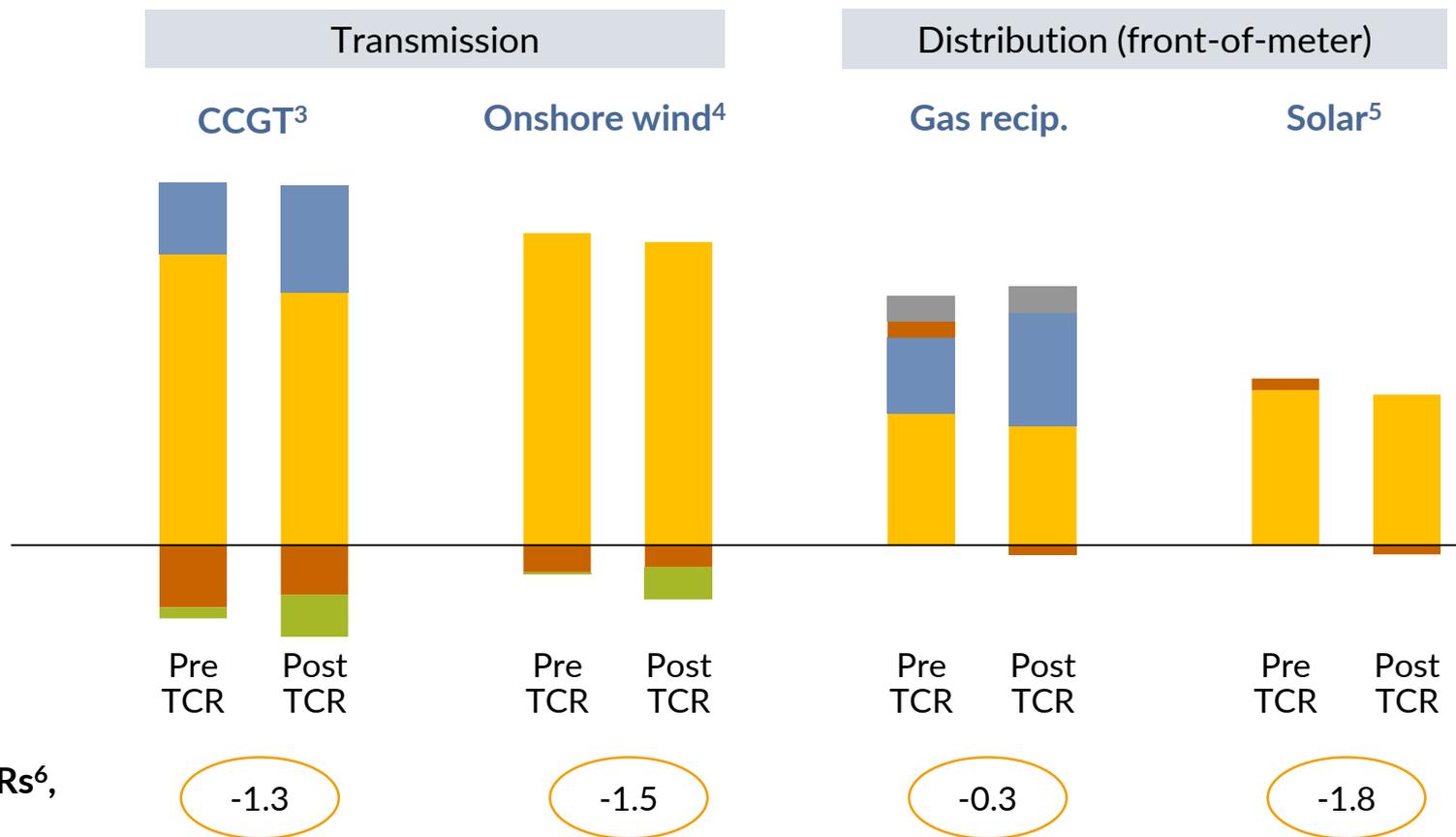
- Most developers bidding into Round 3 auctions are looking at 7-9% IRRs
- Post-TCR, a wind farm will have to increase its CfD bid by £2/MWh to ensure the same IRRs for any given load factor assumption
- Given the administrative strike price cap of £58/MWh (in 2018 money), projects will have to achieve load factors of at least 54% to achieve the minimum hurdle rate of a 7% IRR
- Achieving a 9% IRR would be unlikely, as load factors will have to exceed 60%

1. For a generic asset delivering from the year 2024/25 with CAPEX of £1,718/kW and located in the North Sea.

# Crucially, investor confidence could be dampened as TCR reforms affect returns across a range of asset types

Annual gross margins between 2023 - 2030, £/kW (real 2018)

Other EBs<sup>1</sup> TNUoS Energy<sup>2</sup>  
 BSUoS CM



Change in IRRs<sup>6</sup>, %

1. Other Embedded Benefits include EET, benefits from gross half-hourly Triad demand tariff and GDUoS. 2 Includes wholesale and balancing. 3. High-merit CCGT (56% HHV) assuming average TNUoS tariff for conventional generators. 4. Load factor of 30% assuming average TNUoS tariff for intermittent generators. 5. Load factor of 11%. 6. Assume built in 2023.

# Key takeaways

▶ The Targeted Charging Review was launched in August 2017 by Ofgem over concerns that the current framework for residual network charges could lead to an inefficient use of the network which would negatively impact consumers.

▶ The Targeted Charging Review will affect all asset classes. Specially, Ofgem's preferred option would see a removal of benefits for behind the meter, embedded and transmission assets, and embedded generators paying BSUoS.

▶ Such a scenario will benefit thermal generation at the expense of renewables and battery storage as these assets are unable to capitalise on higher capacity market payments due to their low contribution towards security of supply.

▶ Consequently, the TCR could hinder the growth of subsidy free renewables and undermine GB's decarbonisation targets. Crucially, the regulatory change could impact investors confidence as existing assets see fall in IRRs.

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