

System Operation Challenges & Opportunities with High Solar

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Subsidy Free Solar
Developer Forum
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Solar Record - powering over 25% of GB's power (15/5/2019)



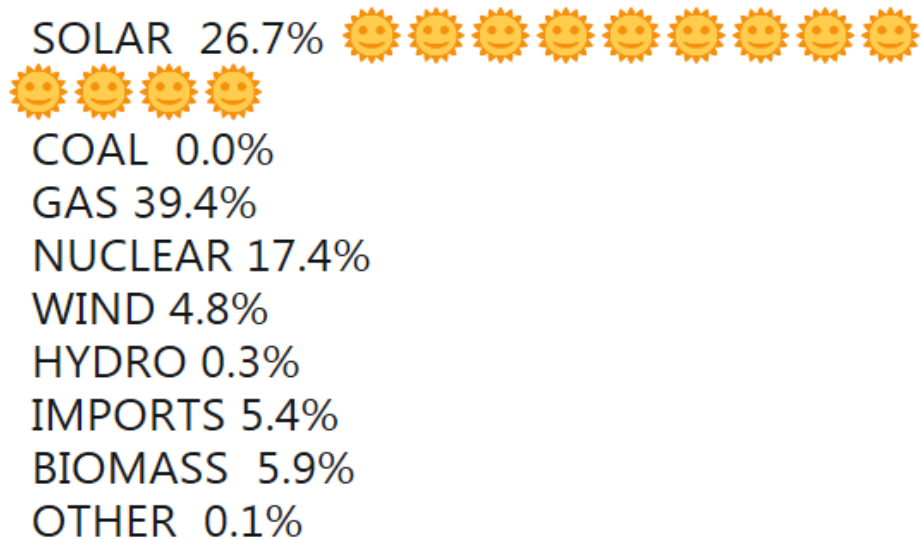
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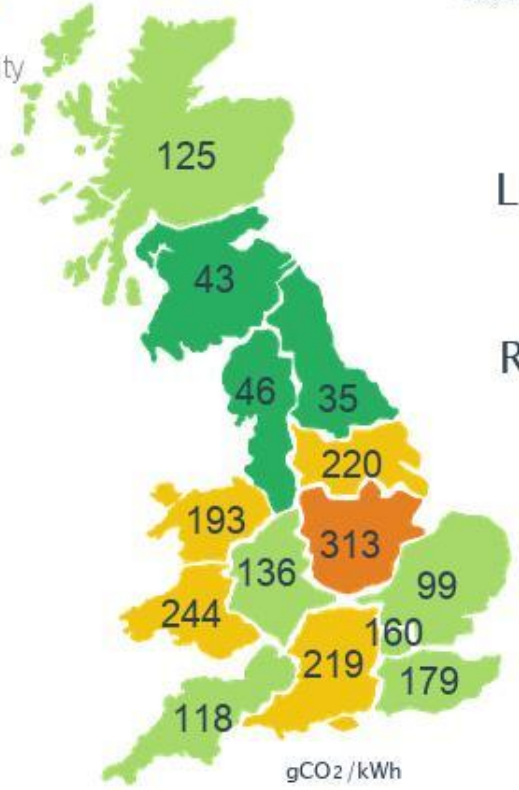
@ng_eso generation mix for yesterday's solar record breaking run:



Carbon Intensity Great Britain

Average - GB electricity system

Map shows the daily average carbon intensity of electricity consumed in each region.

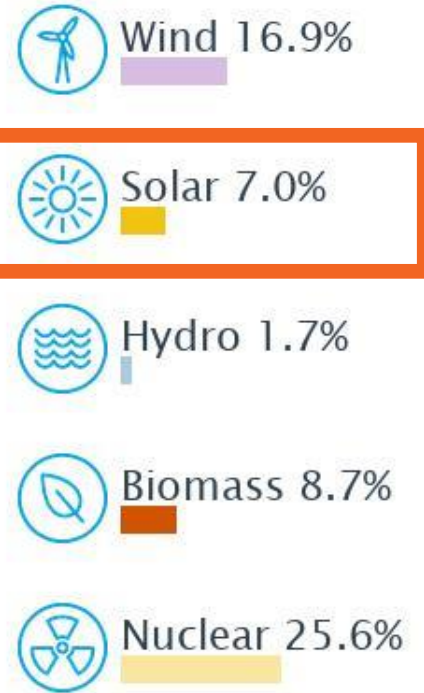
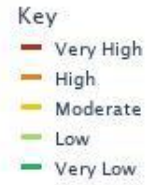


Carbon Intensity

162
gCO₂/kWh

Low Carbon
60%

Renewables
34%



Zero carbon system operation by 2025

1. How the System is Operated now
2. Key challenges that need to be addressed:
 - Frequency Management
 - System Stability
 - Voltage Management
 - Situational Awareness
 - Marketplaces

Opportunities for revenue from system services

- Active and reactive power services are equally important for the system
- In Power Potential project we are trailing reactive power market
- Inverter based technologies (e.g solar) can provide voltage control
- Reactive power services can be provided with other services at the same time (stacking services)
- Opportunities for revenue from system services, particularly reactive power, are huge

De-rating factor for Solar in Capacity Market (CM)

- Solar cannot currently participate in the CM
- BEIS are planning to put a change of regulation through parliament
- Needs to be completed before the July Summer recess, to allow Solar to participate in the T-1, T-3 and T-4 auctions planned for early next year.
- NG ESO have consulted on the derating factors for Solar
- The final re rating factors for solar are likely to be published around 12th July and the decision will be made by BEIS

