Integrating renewables: some outcomes from INTEGRATE and LEO

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Oxford Energy Day, 23rd March 2022

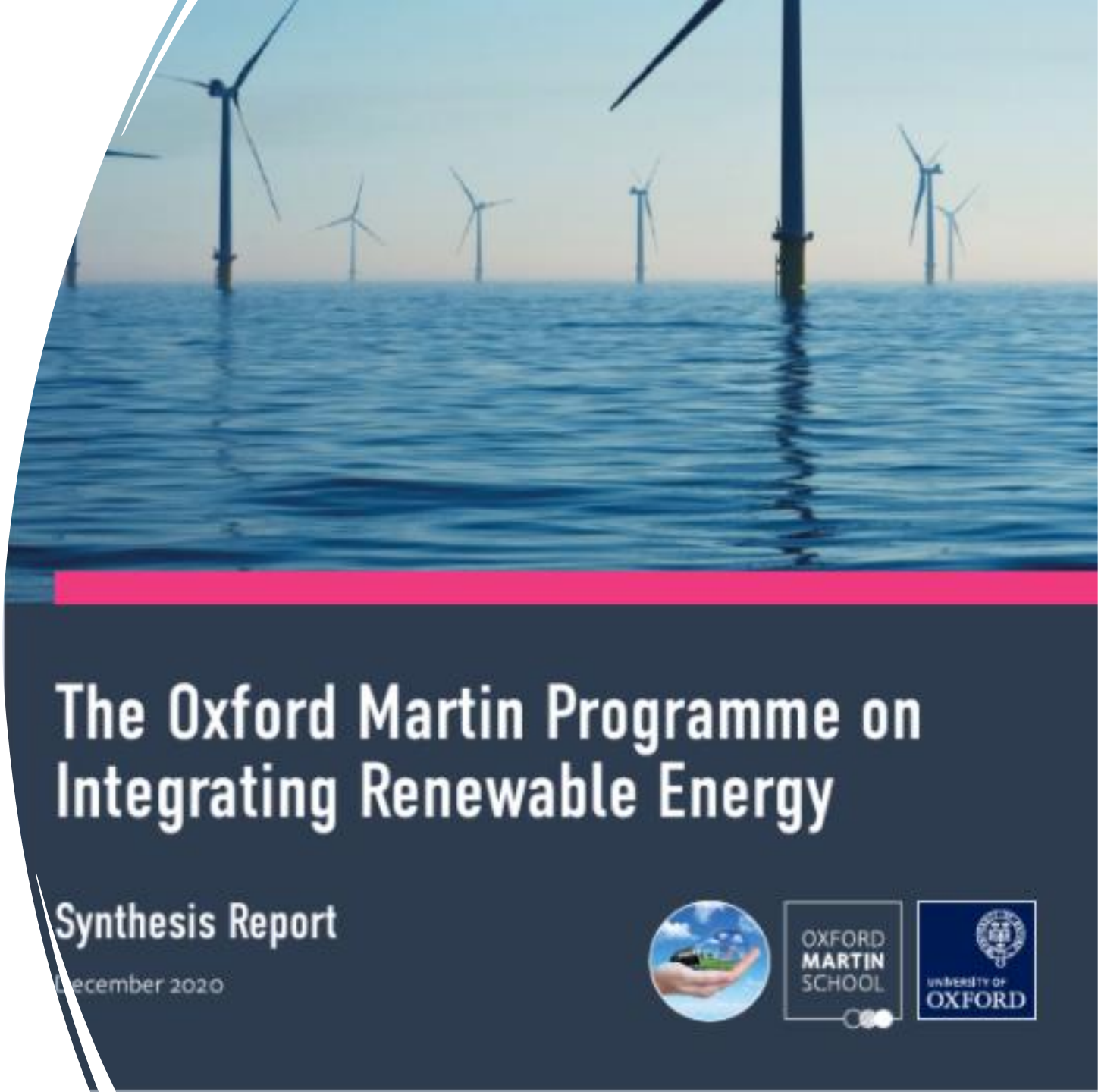
Headlines from the OMS INTEGRATE programme

Solar and wind are becoming the cheapest forms of electricity generation and will be key to a low carbon energy system, *together with storage and flexibility;*

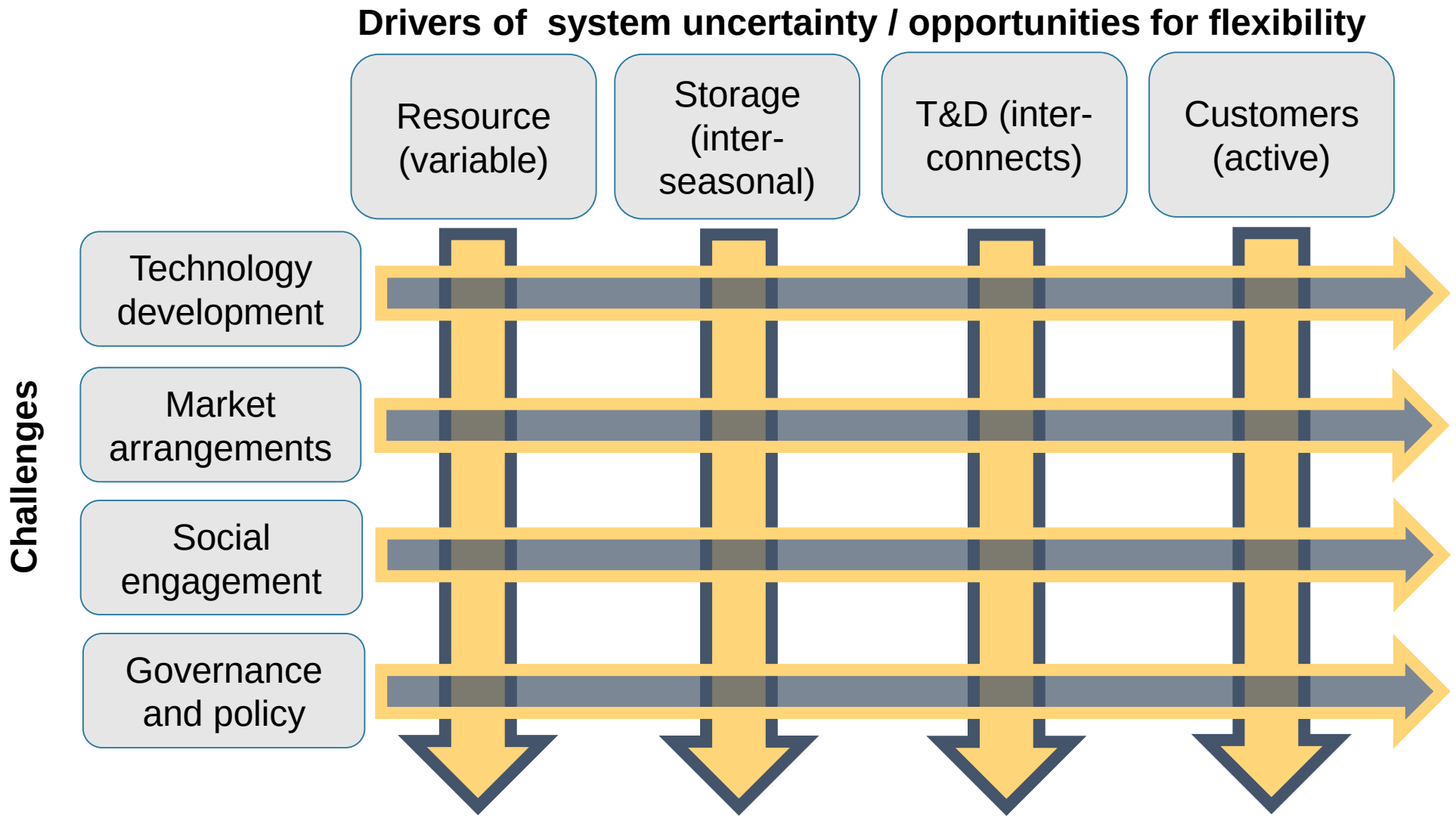
Use will depend on *integrating* variable generation into electricity networks;

Any solution will involve a *mix* of flexible demand, inter-connection and storage;

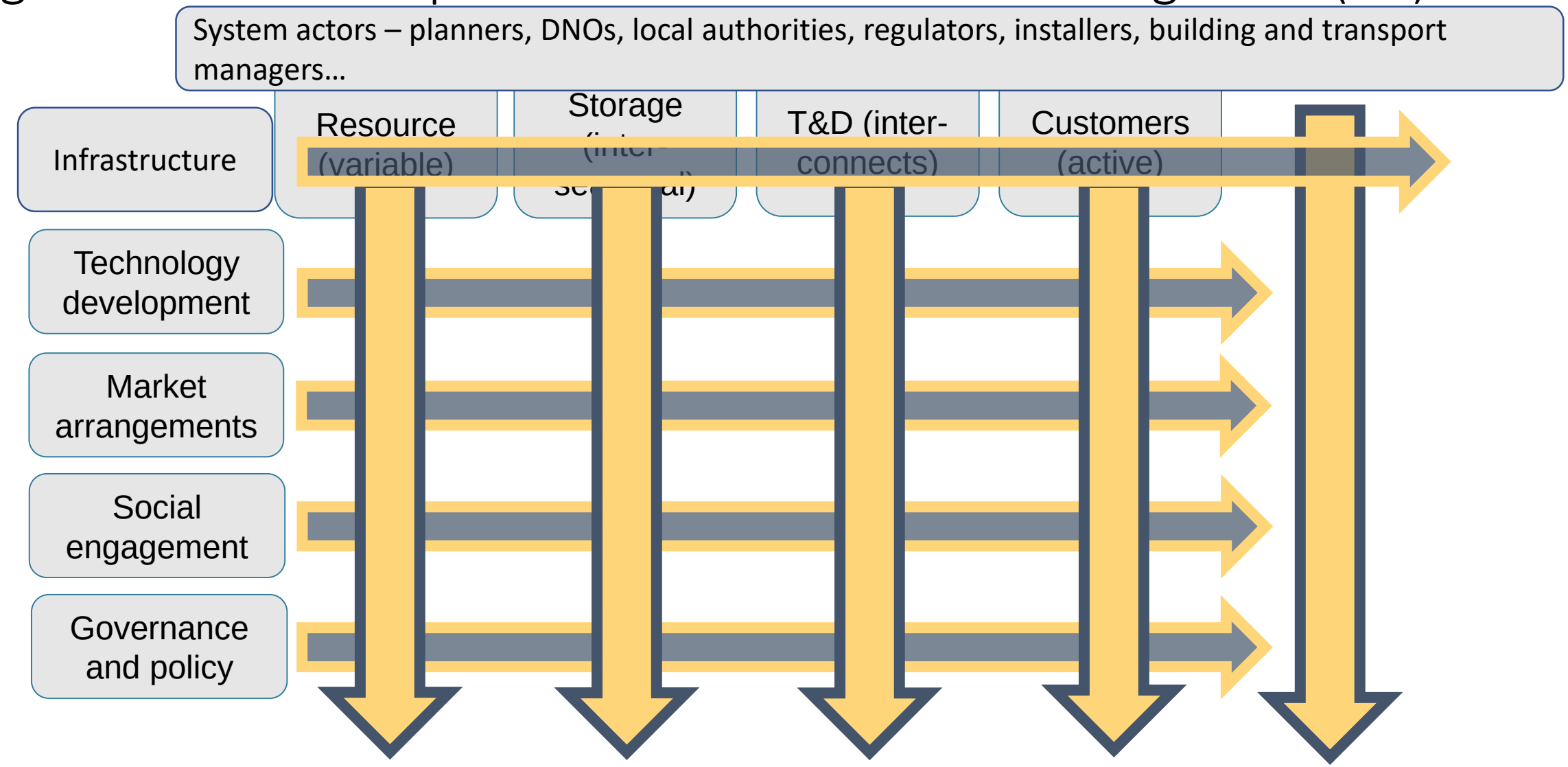
Changes urgently needed to *market design, regulation and governance*.



OMS Programme on Integrating Renewables: our problem statement



Suggested revision to problem statement for full integration (SD)



Integrating renewables with land use and infrastructures: the LEO Integrated Land Use Map

Layers for

- Boundaries
- Planning
- Environment
- Archaeology
- Electricity network
- Renewable generation potential

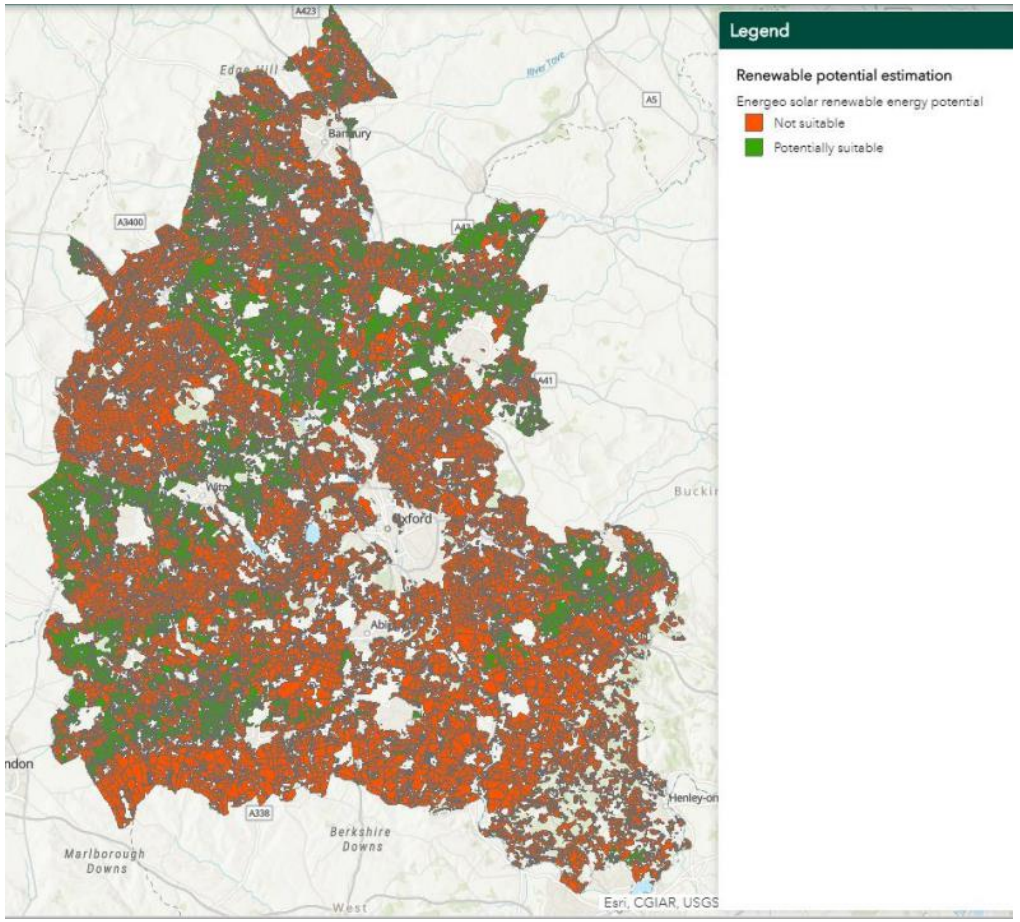
+ aerial photography

Step	Specification for solar suitability
1	Not on Grade 1 or 2 agricultural land
2	Not in the green belt
3	Not in flood zones 2 or 3
4	Not in a SSSI, AONB, or other conservation zone
5	No buildings within field parcel
6	No woodland within field parcel
7	No water within field parcel
8	Pitch 0-10 degrees within the 90-270 (through south) aspect arc
9	Pitch 0-3 degrees within the 270-90 (through north) aspect arc
10	Minimum size 0.5 hectares
11	For sites that meet all the above criteria, estimate potential install **capacity**: Capacity: 1MW installed per hectare

https://project-leo.co.uk/wp-content/uploads/2020/10/LEO-Report-LandUseMap_vs4_FINAL-new-cover.pdf

Mapping exercise for renewables → estimated potential

- 46,100 ha in 9520 parcels suited to solar
- ~2,120 ha in 517 parcels suited to wind



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Datasets proposed for inclusion in phase 2

- Current and predicted electricity demand (from SSEN)
- Domestic electricity (and gas) consumption by postcode and LSOA
- Off gas areas
- People's Power Station (Integration with Low Carbon Hub's map of installed community owned renewable energy projects)
- Socio-economic indicators, inc. fuel poverty and indices of deprivation
- Weather information i.e. Met. Office, historical information from European Centre for Medium-Range Weather Forecasts
- River heights - to understand capacity for hydro.
- CORINE Land Cover data
- Transport data (inc. EV charge points).

https://project-leo.co.uk/wp-content/uploads/2020/10/LEO-Report-LandUseMap_vs4_FINAL-new-cover.pdf

Enabling local area energy planning – the LEMAP initiative

- Understand situation affecting the energy system, using data from official sources
- Check and supplement this with local info using participatory, community mapping – include a survey for those in the community who want to take part in this part of the trial
- Try different scenarios to understand local options for reaching net zero by 2050 – e.g., how flexibility, demand reduction, storage etc. could reduce local emission and enable more renewable generation without costly upgrades to electricity network.

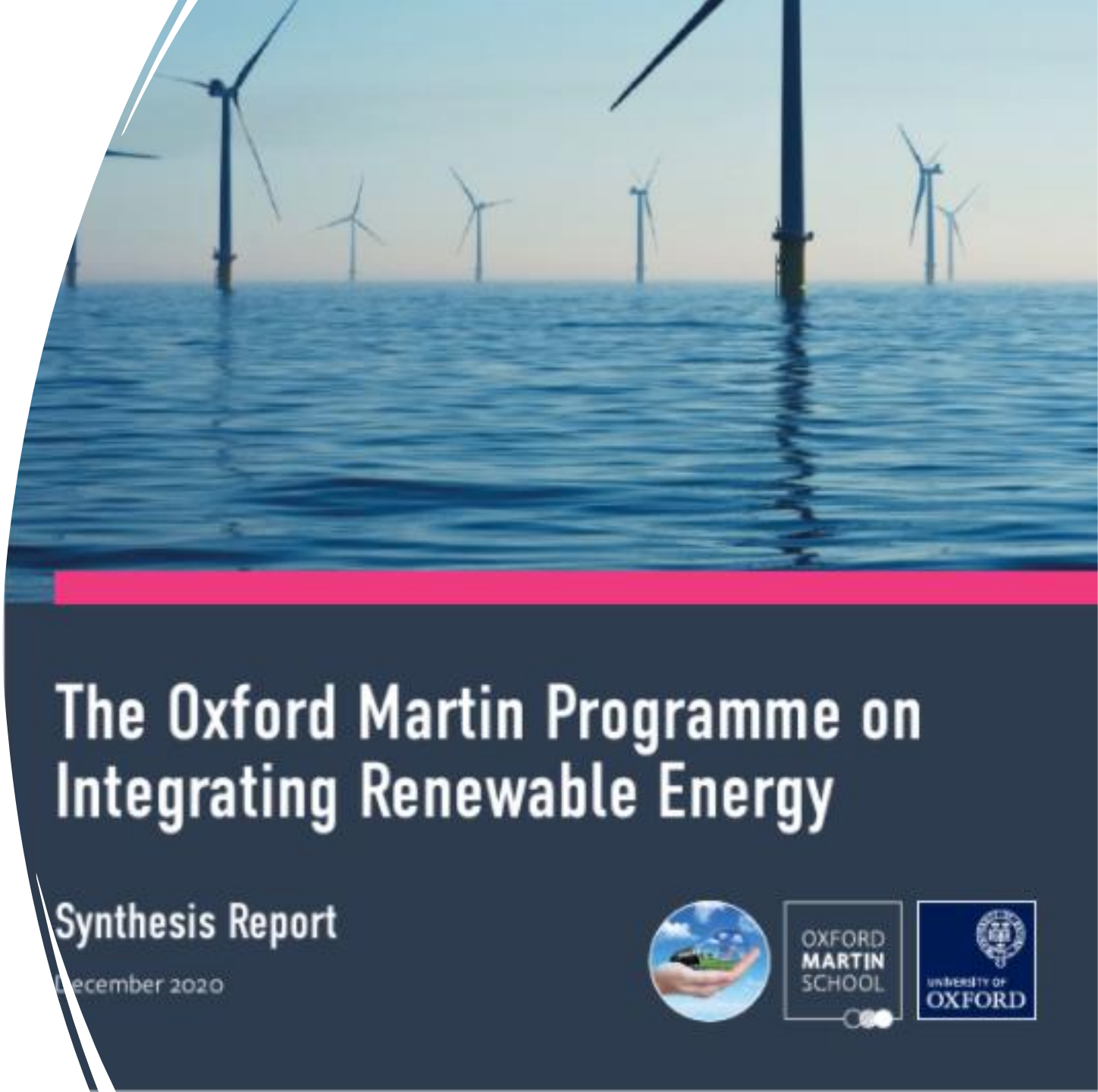
Battery at Rose Hill Primary School


Rose Hill Primary School Solar PV array

https://project-leo.co.uk/case-studies/rose-hill-smart-and-fair-neighbourhood-trial/

Programmes to look out for

- EnergyRev (UK)
- LEO and ESO (Oxon)
- ReFLEX (Orkney)
- NEWCOMERS (emergence, operation, business models, Europe)



Gavin, H. 2020. The Oxford Martin Programme on Integrating Renewable Energy: Synthesis Report. Oxford: Oxford Martin School, University of Oxford. ISBN 978-1-874370-84-0