



Towards a sustainable energy future: Local solutions

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Summary

Energy GRP: our research & local solutions

Opportunities & constraints, and what uni's can do: partly to fuel later discussion



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Electrical power

We focus on how we find and use electricity - from when it is created, to how it comes into our homes and how we use it. Research on the electric grid system is a key part of this.



Energy storage

Our energy supply is not constant. We are working on ways to store energy. This also applies to sustainable sources of energy including thermal and compressed air storage.



Energy management

As the world's population grows, we need more energy. We focus on ways we manage the energy we have, and how we can find alternative supplies in the future.



Low carbon transport

We are electrifying our transport network. We work on the design and parts of electric vehicles. We are also interested in ways we can prepare for them. This includes battery technology and charging points.



Heating and Cooling

Energy storage is vital to achieve decarbonisation of power network, heating supply and transportation. Our research includes electrochemical, thermal, and mechanical energy storage technologies.



Politics and Policy

The politics of sustainably transitioning energy systems is highly complex. Politics can act as both an enabler and as a constraint upon sustainable change, whilst political decisions can often dictate which technologies are used in decarbonising the economy, who pays the costs, and who benefits.

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The Politics of Sustainable Energy Transitions

- Energy is technical and political – inter-related:
 - Energy systems exist to meet social needs (essential services, income, jobs)
 - Politics of driving specific social outcomes (clean, reliable and affordable energy) – almost every positive climate scenario assumes policies drive changes
 - Political outcomes of change as fossil fuels as phased out and alternatives phased in
- Local – as sites of some transformation
 - Climate Change Committee, 6th Budget Report: *can only be achieved if government, regional agencies and local authorities work seamlessly together*
 - Leadership: localities acting on local drivers, ideas and interests (100% RE ([UK100](#)))
 - Co-ordination (public-private-third sector, innovation (policy & technology))
 - Huge variety across UK authorities

Local constraints

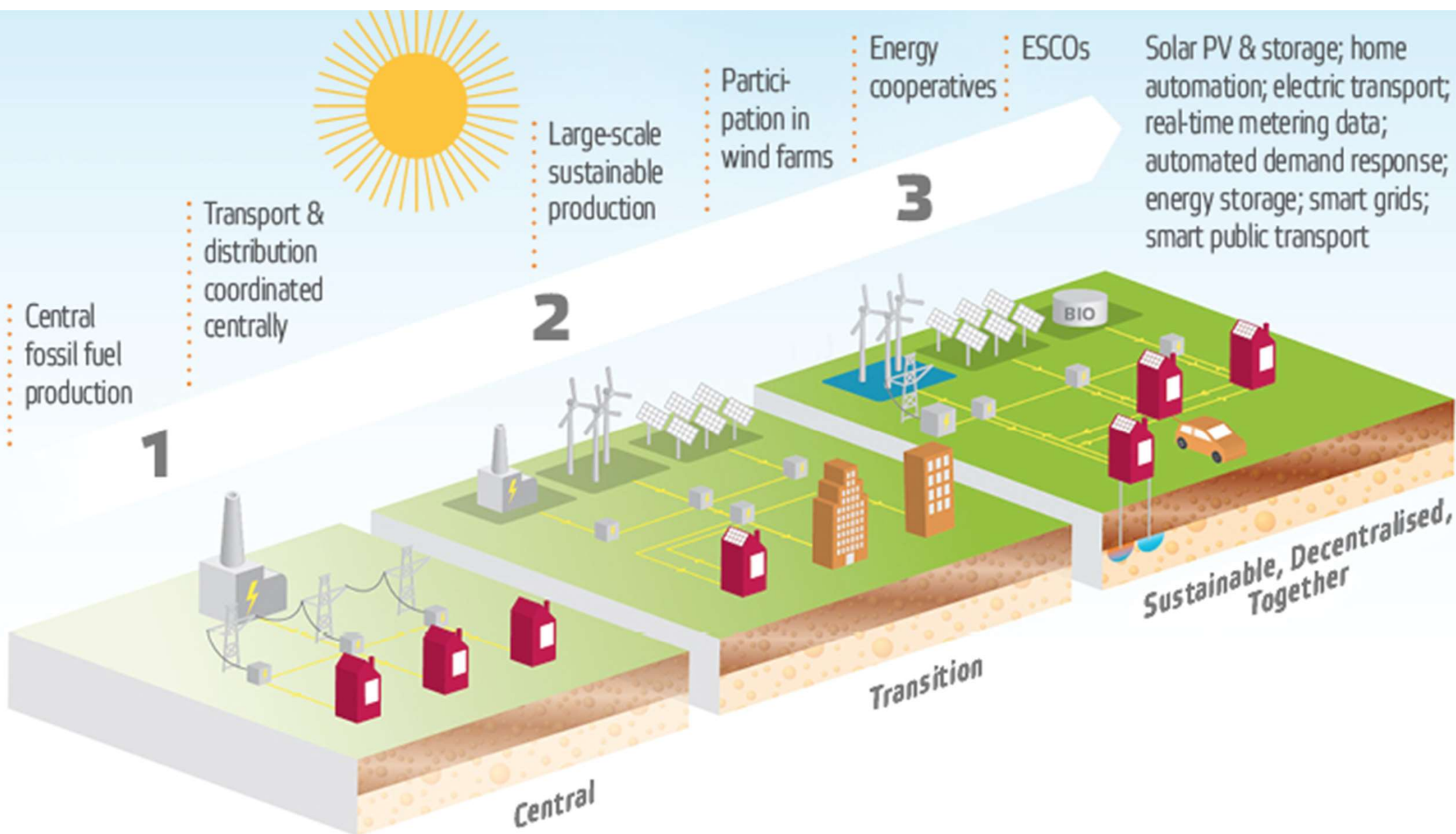
- Finances
 - Austerity, Covid-19 – cost of social services increasing
 - If LAs are to be given responsibilities need extra funds
- Responsibilities & Authority:
 - Hard to invest local resource if not justified by statutory requirement
 - Have local citizens provided a mandate for sustainable energy action?
- Knowledge:
 - Material/technical: **what** is possible locally (land, weather, geology)
 - WHO to work with, who has knowledge/skills
 - HOW to proceed

Technological change

- Innovations (renewables, ICT/smart, storage/batteries)
- Local roles/opportunity – capacity change:
 - Change in scale and where energy can be generated
 - More generation closer to where used
 - New opportunities for electricity network balancing and flexibility
 - Energy efficiency, retrofit/insulation ([Nottingham Mustbe0](#)) & energy poverty reduction
 - Lessons learnt/off-the-shelf models ([Swindon Public Power Solutions](#))
- Examples: Cornwall and wind/geothermal (also a source of income)
- Universities: Technological innovation; Warwick Campus [Masterplan](#); Toolkits

Decentralisation

- Decentralisation:
 - Technical: UK increase in generation connected to distribution networks
 - Political: devolution of powers, often with sustainable transitions in mind
- Local Roles/Opportunity – capacity change:
 - More local/small and medium-scale opportunities for involvement in clean energy
 - Place (and local weather) can be important to balancing RE electricity
- Examples: WMCA EIZs (devolution); [Hamburg Smart Heat Grid](#)
- Raises questions about where energy should be governed and about who pays grid costs
- Universities: [LoT-NET](#) (Low temperature heat recovery, Warwick); [RESO](#) (Energy Capital, Warwick)



Circular Economy

- Increasingly part of sustainability solutions, an area relatively less explored by local authorities
- Local Opportunities:
 - Related to meeting recycling targets, manage waste and involving local citizens
 - Local job opportunities (reverse supply chain and secondary markets)
- Examples: [BLUEPRINT/Essex](#); Coventry (pathways to a circular economy)
- Universities: how to develop clean energy tech that can be better recycled/re-used; partner in research

Thank you!



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