Renewable Energy Development in Lancashire

Policy and Practice

Blackpool 23rd June 2011
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Agenda

- Technology Overview
- Summary of renewable energy technologies, outputs, financial viability
- Key characteristics of the technologies that influence suitability to location

- Policy Overview
- What's in use and what's working
- What do you want to see in your area?
- What policies are other LAs using to deliver renewables in their area?
- Discussion

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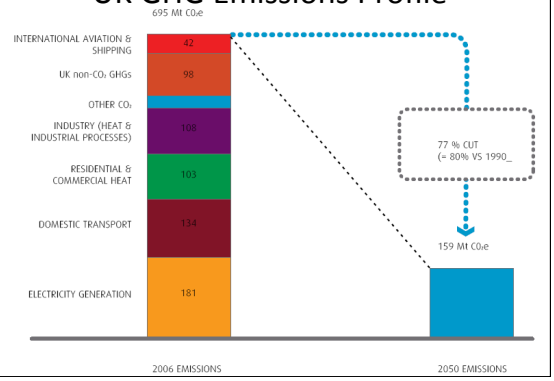
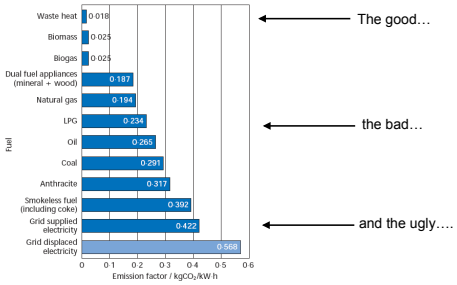
UK GHG Emissions Profile



CO2 Emissions of Fuels



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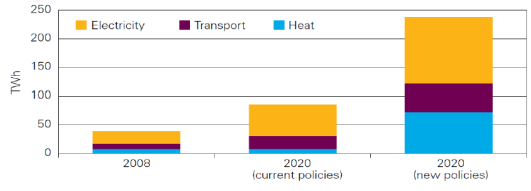
Governments Targets for Renewables

What are we seeking to achieve?
15% - 7x increase in renewables by 2020

DEPARTMENT OF ENERGY & CLIMATE CHANGE



Source: Energy Trends June 2009 and DECC internal analysis

Assumptions

- ***Lancashire is going to try to hit the UK renewable energy target by contributing an amount equivalent to 15% of our energy demand by 2020***
- 30% of the renewable electricity target will be provided from off-shore wind
- No new nuclear will come on-stream before 2020
- Achieving the targets for renewable transport and heat will increase the need for renewable electricity

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Renewable/Low Carbon Energy

Electricity
- Wind farms & single turbines
- Small wind turbines
- Hydro
- Solar PV
- Biomass/AD/Energy from waste
- *Wave & Tidal – unlikely before 2020*

Heat
- Biomass
- Anaerobic digestion
- Energy from waste
- District heating
- Heat Pumps

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How's Lancashire Doing?

	Capacity MW	Output GWh
Large Scale		
Wind - operational	59.5	151
Landfill Gas	33	175
Biomass	9	48
Small scale		
Wind	4	9
PV	1	1
Biomass	?	
Other microgen	?	
Hydro	?	
District Heating	0	
		383

	Wind - consented	41	101
	Wind - in planning	49.5	121
			222

	Electricity GWh	Heat GWh
Renewable Target	1,924	1,734
Current Generation	383	101
Consented Wind	101	
Offshore @ 30%	577	
Remaining target	**863**	**1,633**

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What we need to hit the target

- All consented wind to go ahead, *and*
- 1.8 times more renewable electricity, *and*
- Fifteen times more renewable heat

OR

- Four times more renewable electricity, *and*
- Four times more renewable heat

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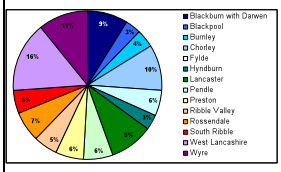
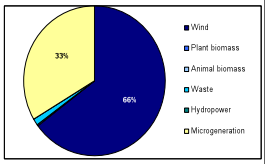
Theoretical Technical Capacity – SQW Study

For Lancashire as a whole – 7,414MWe, 3,210MW heat
Equates to about 10 times Electricity target & 5 times Heat target

- Contribution by local authority



- Contribution by renewable energy resource



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What does that mean for each district – technical capacity?

	Comm. Wind	Small wind	Hydro	Biomass /EfW	Solar PV		
	2.5MW turbines	11kW turbines	50 kW turbines	10MW plant	Dom. 2.5 kW	Comm. 50 kW	1MW solar farm
Blackpool	0	0	0	1	13,000	390	13
Fylde	148	727	0	2	8,000	240	8
Wyre	331	2636	20	2	10,200	306	10

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Area Profiles

Fylde & Wyre: Rural / exposed
- Large & small wind
- Energy from waste/landfill
- Agricultural waste
- Energy crops/biomass
- Microgeneration
- Some CHP/DH
- Some hydro

Constraints/Opportunities
- Off gas grid properties
- Fairly affluent
- Blackpool airport

Blackpool: Dense urban
- Heat distribution networks (DH)
- Combined heat & power (CHP)
- Microgeneration
- Some shoreline wind
- Energy from Waste

Constraints/Opportunities
- Densely populated
- Less affluent
- Regeneration

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Electricity Technologies

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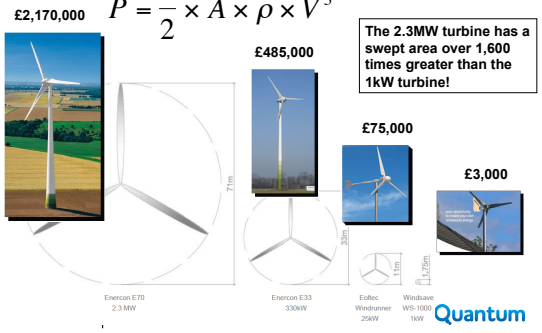
Wind Turbines – Size Matters

$$P = \frac{1}{2} \times A \times \rho \times V^3$$



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Single Large Turbines

- 750kW – 2.5MW turbine, 100m +
- Wind speeds > 6.5 m/s
- Size and location are critical to viability
- Commercial model most likely
  - Developer financed
  - Site owner gets guaranteed (lower) electricity price and/or site lease
- Opportunities on farmland, industrial sites
- Takes very little land out of production
- Planning issues: as wind farms, cumulative impact

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Small Wind

- 6-25 kW turbines
- Mast height 10-25m
- Gaia 11kW popular
  - Output at low wind speed
  - Low grid connection costs for 3-phase
- Feed in Tariff: payback 10-12 yrs at good site
- Location and mast height critical
  - Wind speed > 5m/sec
  - Consistent: no turbulence
- Opportunities on farms, playing fields, industrial sites
- Visual impact & noise issues

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Energy from Waste/Biomass

- Electricity generation using waste materials, landfill gas, sewage, animal waste, biomass etc as fuel
- Mainly large-scale (1 - 300MW) but small-scale AD
- 42% of current renewable electricity
  - Decreasing potential from landfill gas
- Different transformation technologies
  - Combustion
  - Anaerobic Digestion
  - Pyrolysis
- *Potential to use the waste heat needs to be explored – large or small District Heating networks*

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Commercial/Domestic PV

- Driven by FITs
  - 20,000 to Jan 2011
  - Payback 10-12 years
- Domestic systems 1-4kW
  - Roof or stand-alone
- Commercial systems 10-50kW
- Capital available key issue
  - £6-15k domestic
  - £30-150k commercial
  - Bank lending
  - Roof-lease schemes

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Solar Farms

- 1 – 2MW, 2 – 4 ha
- Ideal in SW but NW potential
  - Flat or south-sloping site
  - Coastal areas most likely
- Marginal viability – less likely following FIT review
  - Grid connection distance critical
- Fewer planning constraints – visual impact, screening
- Suitable on some farms & low value land

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Hydro

- Larger schemes possible on Lune, Ribble, Wyre (100kW)
- Possibly 30-50 smaller schemes (20-100kW)
- Many opportunities for very small schemes (< 20 kW)
- EA Opportunities and Forest of Bowland capacity study
- Generally areas of medium-high sensitivity
- High cost (>£.5m) but good viability (<8 year payback) for larger schemes
- Upfront (risk) capital a big problem
- EA Approval difficult and time-consuming
- Planning rarely a barrier

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Low Carbon Heat

- Storage and distribution
- Cost – capital and operating
- Carbon content vs alternative
- *Difficult to compete with gas infrastructure*
  - Replacing other heat sources priority

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Biomass for Heat

- Removes large chunk of carbon emissions
  - Almost carbon neutral
- Wood chip or pellet
  - Running cost issues vs gas
  - Typical efficiency up to 90%
- Other energy crops
- Fuel storage required
  - Dry & accessible
  - Vehicle movements
- Need **local** reliable supply
- Suitable for larger buildings, schools, farms etc
- Drivers – Carbon Reduction Commitment & RHI

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Heat Pumps

- Renewable heat, but use electricity
- Low grade heat so need hot water back-up
  - Best with underfloor heating
- Carbon savings depend on Coefficient of Performance and carbon intensity of grid/fuel replaced
  - Currently need COP > 2.4 to reduce CO2 emissions compared with gas
  - Average installed COP 2.2 -2.5
  - As grid CO2 reduces, heat pumps become better
- Air source heat pumps less efficient than ground source
  - Excluded from Renewable Heat Incentive

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Solar Hot Water

- Domestic system: 2-4 m2, £3,000 - £5,000
- Energy output: 500 – 800 kWh/m^2
  - 40-60% of hot water demand
  - Payback 10-12 years with RHI
- Commercial system
  - Likely to be more interest with RHI
  - Suitable for Sports facilities, Hotels, Hospitals, Care Homes, Universities
- Key issues:
  - South-facing roof
  - Seasonal demand variation
  - Fuel offset cost (off-gas grid most attractive)
  - Requires compatibility with existing DHW system

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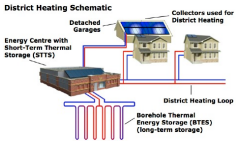
District Heating

- Makes low carbon heat possible for large number of buildings
  - Biomass, waste heat, solar, geothermal, gas
  - Economies of scale
- Very high capital cost project
  - Part of the infrastructure
  - Major disruption to retro-fit
  - Design in for new developments
  - Potential to expand
- Suitable for high density sites
- Needs to be a significant contributor to renewable heat target
- *Needs planning as part of infrastructure and long term management (Energy Services Company)*



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DH Potential Blackpool

- Heat mapping
- Identification of Anchor Sites
- Strategic & policy support
- Funding mechanism
- Delivery vehicle

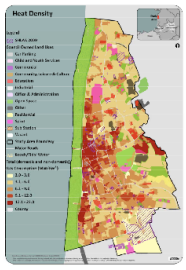

Figure E9: District heating priority areas

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Project Viability

- Site suitability
  - Wind: wind speed, access, grid connection, environmental impact
  - Energy from Waste: waste available, transport/access, environmental impact
  - Biomass: supply, storage, air quality
  - Hydro: river head, flow, access, grid connection
  - Solar: unshaded, south facing roof/land, land value
  - Ground Source Heat: land available, heat distribution
  - District Heating: sufficient even demand, network distance, energy source

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Costs & Who Pays?

- Householders: PV or GSHP £6 - 12k, Solar HW £3-6K: savings/ mortgage
  - Is this investment better than a new car/roof/kitchen?
- Businesses: Small wind or PV £40-70k: bank loan/reserves
  - Would it be better to invest in business growth?
- Community Groups: Hydro, PV, small wind £50 – 800k: share issue/ bank loan/ grants
  - Can we raise the money?
- Developer: Large wind, solar farm, EfW £millions: venture capital/ bank loan/ reserves
  - Is the return worth the risk?

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Planning Permission

- Failure to get planning permission is a significant cost to major developers
  - Where's most suitable?
  - Where's most sympathetic?
  - Will look for alternative sites
- For small projects, planning permission is usually least of their worries, but failure
  - Stops that project
  - Deters others in the same area
  - Unable to go elsewhere

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Scale

	Capacity	Number Equivalent to Scout Moor
Scout Moor Wind Farm	65 MW	1
Caton Moor Wind Farm	16 MW	4
Jameson Rd Landfill Gas (Wyre)	3.8 MW	8
Dewlay Turbine (Garstang)	2 MW	30
2 Hectare Solar Farm	1 MW	154
Small Hydro	100 kW	293
Micro-Hydro	20 kW	1,540
Small wind turbine	11 kW	5,133
Commercial Solar PV	20 kW	6,160
Domestic Solar PV	2 kW	61,600

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How could we hit the target?

	Comm. Wind	Small wind	Hydro	Biomass /EfW	Solar PV		
	2.5MW turbines	11kW turbines	50 kW turbines	10MW plant	Dom. 2.5 kW	Comm. 50 kW	1MW solar farm
Blackpool	0	10	0	0	3,000	100	0
Fylde	8	50	0	1	5,000	100	0
Wyre	16	100	5	2	5,000	100	1
	24	160	5	3	13,000	300	1

Output: 200 GWh/year – roughly 'your' target for electricity only

What about Heat?

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Questions

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How Can Policy Help?

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Policy Overview

- National Policy
- PPS 1
- PPS 22
- Regional Spatial Strategy

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What is working now?

- Envirolink survey of all renewable energy planning applications in North West over 5 year period (2004 – 2009)
- 3 EfW schemes delivered 77% of 571MW consented energy output (just one scheme delivering 360MW thermal power)
- Commercial wind farms made up 33% of potential but 15% of approved capacity
- 75% of all applications were for small wind and approved applications delivered only 0.7% of the consented energy total

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Planning applications 2004 - 2009

- Blackpool – 3 small wind turbines approved, one refused, two pending; one building mounted turbine; solar panels 22.
- Fylde - 7 small wind turbines approved, 3 refused, 2 withdrawn; two CHP AD plants approved, one refused; solar panels.
- Wyre – 1 large wind (plus 3 more recently), 2 refused; 7 small wind turbines approved, 3 refused, 1 withdrawn; solar panels, two AD CHP pending.

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What policies are in place?

Blackpool preferred option of Core Strategy includes addressing climate change issues and embracing sustainable energy measures and policy S7 includes appraisal of development proposals to: incorporate renewable energy sources in appropriate new developments

Detailed renewable energy study by AECOM

Fylde – at issues stage gathering information

Wyre – Local Plan Review to 2016 added: Promotion of the use of renewable energy

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Developer/installer feedback

- Local plans out of date, core strategies too vague
- Few development management policies
- Some councils provide screening opinion (useful)
- Make use of renewable energy balance to decision makers see need to balance harm against wider benefits
- Include robust evidence base work (from RSS) on capacity, targets and constraint mapping in local policy
- Use robust capacity work/constraint mapping or it haunts you at inquiry

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Developer/installer feedback

- If you do identify areas, make it clear that areas outside these are not necessarily unacceptable – up to developer's EIA to show it's acceptable
- Avoid statements like 'proposals which have an adverse impact on landscape, residential amenity, ecology etc will not be permitted' since developments will have some adverse impact and it's too easy to refused… need to be weighed against wider benefits of renewable energy

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Developer/installer feedback

- Don't include standoffs from properties in policy, but use residential amenity assessment to decide, not arbitrary distance
- Refs to AONBs, National Parks, SSSIs are needed, but don't apply buffer zones
- Assess proposals first against renewable energy policy; get this wording right as other policies may well say 'adverse effects will not be permitted'

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Balancing act: planners are used to this…

- Wyre: The aim of the Local Plan is to encourage and guide investment and development in the Borough…in a form which respects the careful qualitative balance between development and the particular characteristics of the local environment.
- "Trade offs will be needed between the long-term survival of landscapes and the security and affordability of energy supplies" Chris Huhne MP, Energy Secretary (Planning Magazine March 2011)
- You will be used to balancing development and environment for housing and other developments against community, economy and social benefits…

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Encouraging renewables in policy

- Some councils have a renewable or low carbon energy strategy
- Some use the energy hierarchy promoting sustainable building principles and energy efficiency as well as renewable energy on site plus off site or 'allowable solutions'
- Some focus on energy but this can drive up carbon emissions and costs to either developer or resident/building user
- Better to focus on carbon rather than energy
- Some have actual targets for renewable energy production in the local area

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Chorley Council

- Sustainable Resources DPD and SPD
- Takes a 'positive attitude to reducing carbon emissions'
- Includes promoting reduction of energy use in new developments plus installed low carbon generation
- 5+ dwellings will have Code level 3 and 15% carbon reduction from renewables
- Policy resulted in a lot more applications for on-site renewables
- Tension with Code level 3 carbon reductions and 15% renewables as Code 3 can be achieved w/out renewables

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Chorley Council…

- Stand alone renewables 'considered positively providing they area sensitively located and designed'
- Significant impacts on landscape/ecology will normally result in refusal unless applicant can demonstrate they are outweighed by wider environmental, social and economic benefits… that includes significant CO2 reduction, secure energy supply and access to secure, affordable energy
- Training needed in carbon calculations and understanding the renewable technologies

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Milton Keynes

- Milton Keynes policy D4 of the Local Plan already requires housing developments over 5 dwellings and other development over 1000 sqm to cut CO2 emissions by 25%, with 10% of the reduction provided through the provision of on site renewables. This includes non-regulated energy.
- However, the delivery of renewable energy must be viable and policy should not place an undue burden on developers by unreasonable local requirements.

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Milton K pref options Core Strategy

- Require provision of renewable energy on all new developments. Developers will be expected to show that they have explored all on-site renewable energy options, including biomass fuelled technology, to contribute towards reducing the CO2 emissions of development, and ultimately 'zero carbon development'.
- Require a significant proportion of energy needed by new development to be supplied from renewable sources- 20% from 2010, 50% from 2012 and 100% post 2014- to support the achievement of zero carbon development.
- Pre-2014, require large scale development proposals to achieve higher levels of on site renewable provision, where viable.
- Support the delivery of standalone renewable energy schemes in areas where the social, economic and environmental impacts are acceptable.

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Milton Keynes lessons

- Carbon offset scheme provided insulation measures
- Low price per tonne (£200) to get policy through – Islington has set its price at £900 p/tonne CO2.
- Government policy now causing uncertainty re allowable solutions
- CHP district heating in city centre, looking at feasibility in other areas w/in Core Strategy
- Next time would set price higher, look at feasible technologies and have mandatory monitoring of technologies proposed (metering/paper based)

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Stockport – Energy Opportunities

- Zoned areas for energy opportunities
- Network Development area – 100+ homes CHP system to be installed
- Microgeneration area
- Strategic developments
- Carbon Management Fund – will fund infrastructure

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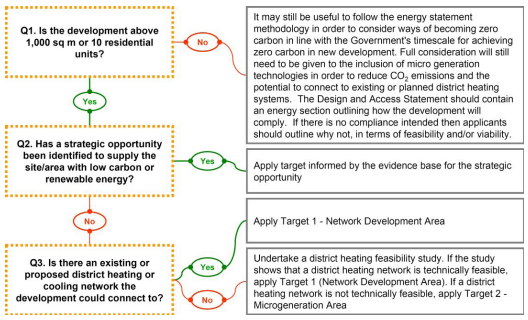

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Shout about it! Engage

- How do I know what you want? What is acceptable, how do you make it easy for me? Do you have information and pictures on your website or someone I can talk to?
- As a farmer wanting to put in a wind turbine, can I easily see what is acceptable and what's not to the planners?
- Can I see an example of a good vs bad planning application?
- Make it easier to apply as a 2 year hydro or large project is costing a lot just to get to planning stage, delays can kill a project

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Council's shared vision

- As a council you need to know what you want for large scale and for small scale (scale needed)
- Numbers of small systems and larger developments
- How to link renewable energy development with other development
- A process of engagement/debate and decisions
- Tie it to economic development

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Issues

- Do you focus on energy efficiency plus renewables?
- Renewables targets can mean less focus on ee
- Tension between CSH Code levels and % of renewables
- Does an energy plan help? Stockport example
- Do some policies promote certain technologies over others? Is this appropriate for developer and for carbon reduction?

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Discussion

- What technologies fit in your local area?
- What policies do you need?
- How do you make them happen?

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