Financing Micro-generation: Some Options for the Future

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Overview

Work in progress on the possibilities for owning and operating micro-generation within households

- Brief overview of micro-generation and implications
- Three models for micro-generation ownership and operation
- Initial economic analysis
- Some considerations for future work

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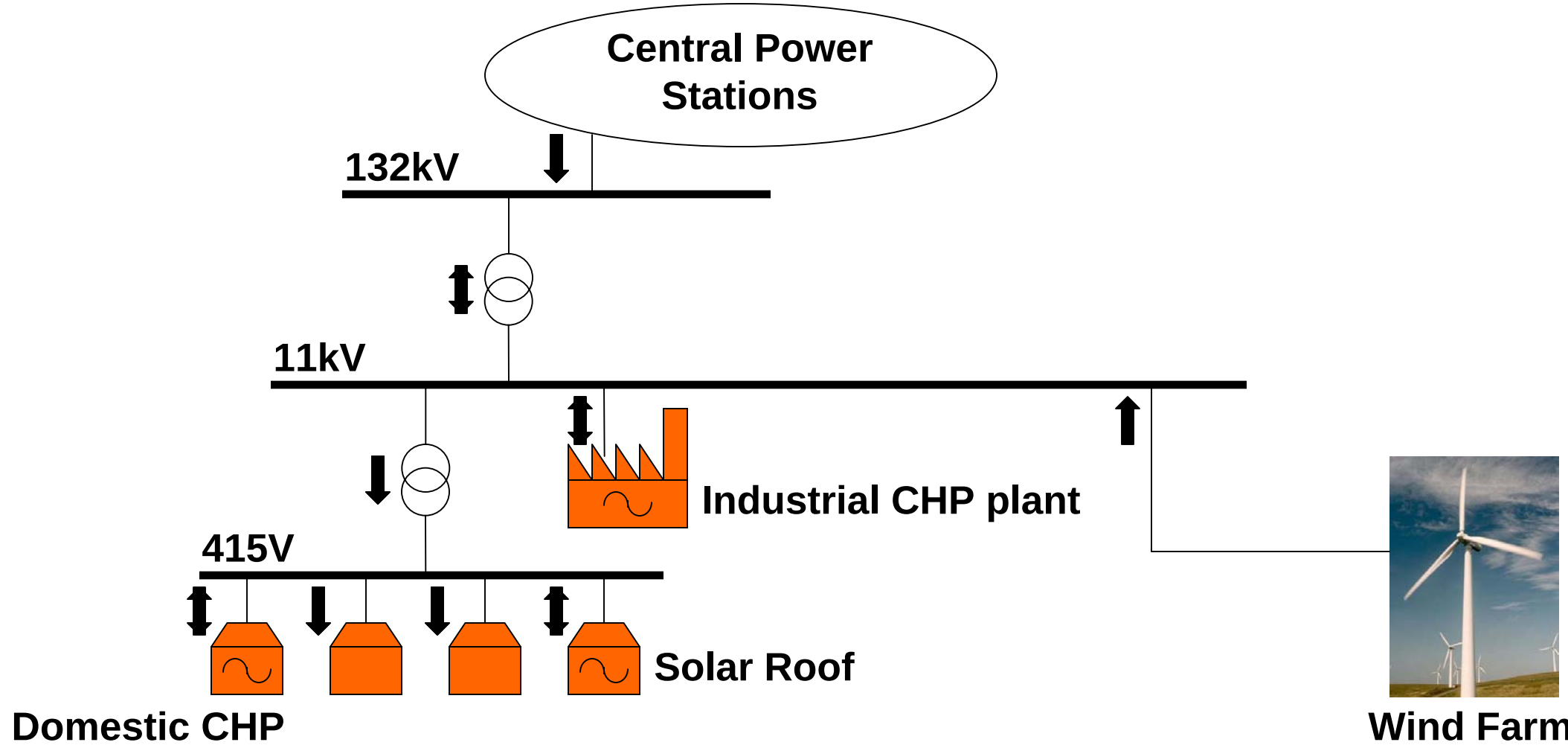
Turning the System Upside Down



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Micro-generation

Micro-generation could be the most radical form of energy system decentralisation:

- Many technology ‘evangelists’ focusing on micro-turbines, fuel cells, solar PV, Stirling engines etc.
- Would blur distinction between energy supply and demand
- Consumers become more active participants in energy system development and operation ?
- 4 million micro-CHP units in the UK alone by 2010 ?

Key questions: What are the possibilities for micro-generation, and what are the implications of these ?

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Possible Models for Micro-Generation

	Plug and Play	Company Ownership	Leasing
rnership	**Householder:**	**Energy Supplier**	**Energy Supplier:** But possible transfer to Householder at end of leasing period
eration	**Householder**: Operation according to Householder needs for power and heat	**Energy Supplier:** Operation to help Energy Supplier balance supply and demand (could take into account Householder preference)	**Shared:**Operation to help Energy Supplier balance supply and demand, taking into account Householder preferences
sts & Benefits	**Householder** saves money on energy bills, but has to pay capital cost. **Energy Supplier** loses kWh sales, and may provide clear terms of grid access and buyback rates.	**Householder** gets cheaper energy in return for hosting micro-generation. **Energy Supplier** avoids buying wholesale electricity, and can balance their system more cheaply ?	**Householder** saves money on energy bills, and spreads capital costs. **Energy Supplier** retains some operational control and recoups capital investment through lease payments.

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Implications of Models

- **Different economics. For example, different tax rates apply to different players in the energy system**
- **Different IT and control system requirements. Some might require new investment for communication/control signals between companies and consumers (models 2&3)**
- **Different levels of consumer involvement - from a passive consumer (model 3) to an active participant in energy system development and operation (model 1)**
- **Different levels of control for energy distribution companies - e.g. 'centralised' control (model 3) to a loss of control (model 1)**

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The Economics of Plug and Play:
Two UK Case Studies

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The Economics of Plug and Play:
Two UK Case Studies

Solar PV

Payback period:
35 years

- **Size: 1.5kWp**
- **Cost: £8,600+VAT (50% paid by government)**
- **Renewables subsidy of £45 per year**

Micro CHP

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The Economics of Plug and Play:
Two UK Case Studies

Solar PV

Payback period:
35 years

- Size: 1.5kWp
- Cost: £8,600+VAT (50% paid by government)
- Renewables subsidy of £45 per year

Micro CHP

Payback period:
14 years

- Size: 1.1kWe/5kWth
- Cost: £2,500+VAT
- No government grants or subsidies

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Complicating Factors

- **Maintenance costs - might be £150 per year for micro-CHP**
- **Technical standards for connection & installation**
- **Availability of renewables subsidies to householders**
- **Reform of electricity network regulation could provide further incentives in some areas**
- **Problem of comparisons:**
  - Claimed micro-CHP paybacks of 3-4 years in other studies
  - These can be misleading - they assume a ‘forced purchase’ and compare only with a normal central heating boiler

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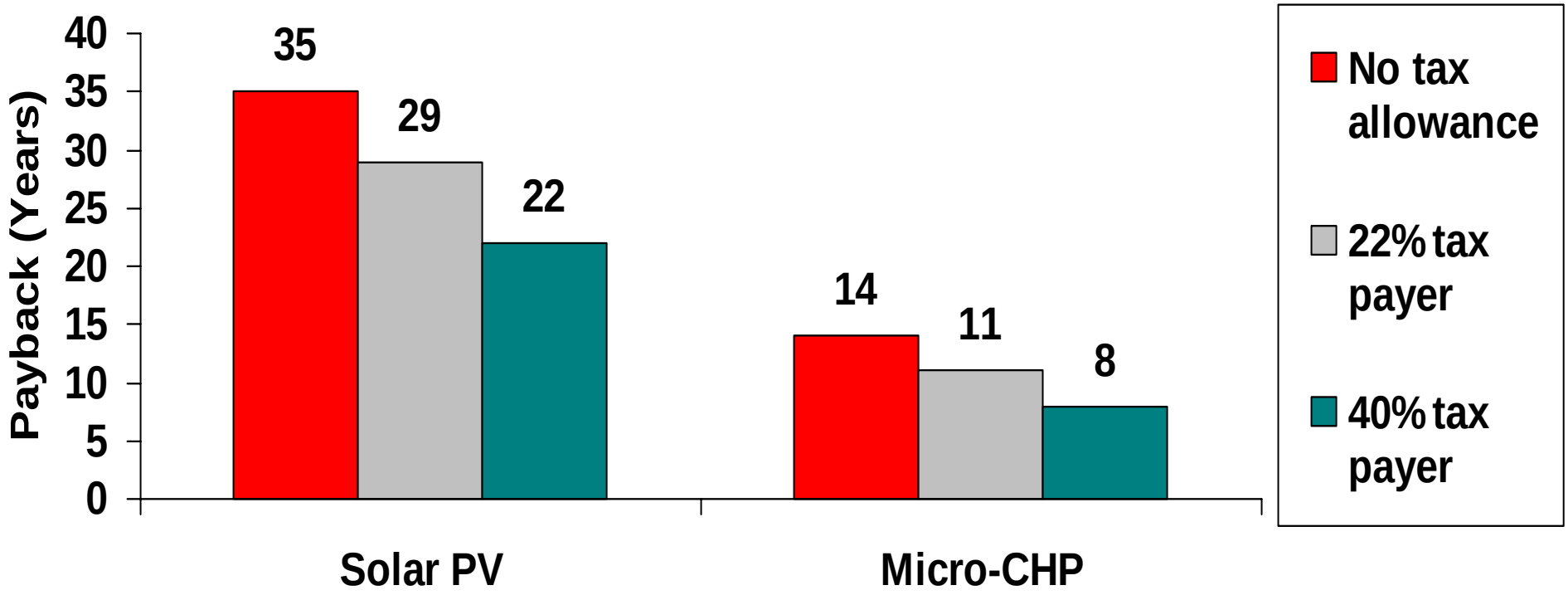
Impact of Tax Changes

What happens if consumers can use tax allowances in the same way as companies ?



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How is Energy Company Investment Different ?

- Access to tax allowances
- Capital costs reduced by bulk purchasing
- Micro-CHP operating costs reduced with cheaper bulk gas
- Micro-generation fleet could help distribution network control

But

- Company investment requires long term relationship with consumer - is this possible in a liberalised market ?
- Economics still poor - 10 year payback for micro-CHP ?
- Will consumers accept centralised control of their generator ?

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Conclusions

Micro-generation could be revolutionary, with far reaching effects on consumer-supplier relationships

Still not clear whether consumers or companies will take the lead in micro-generation investment. Are consumers interested ?

Behind the hype, these technologies have long payback periods which are a significant barrier to investment

A level playing field for taxing energy investment could help - this would also help all demand side investments

Many other considerations - need further research particularly for energy company ownership and leasing models

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