Cost Reflective Pricing Project

Alasdair Muntz

Power Systems Engineer

@EnergySysCat

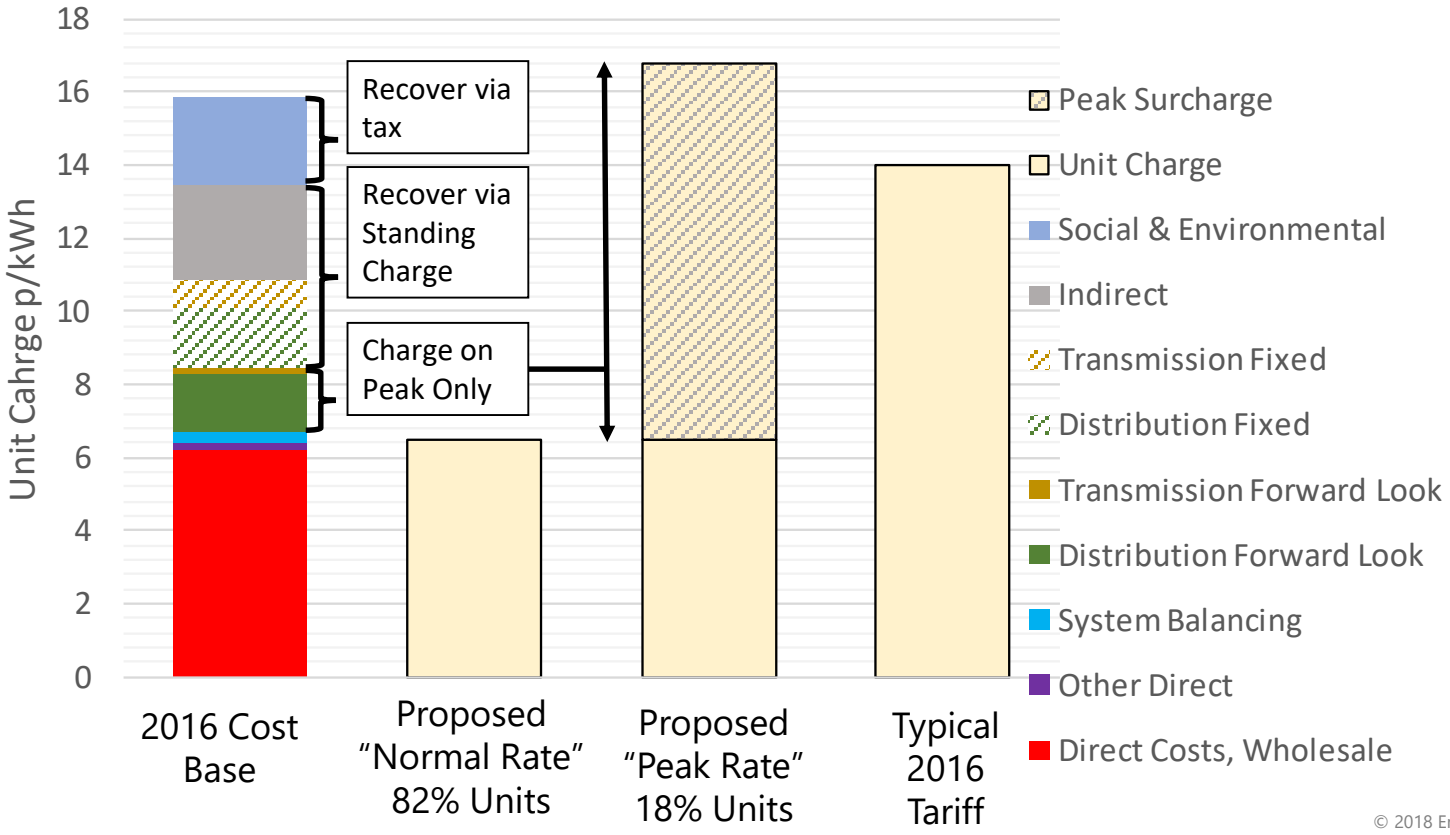
Cost Reflective Pricing Project: Background

- Origin of Project: Warwick University talk on optimising their CHP plant:
    - CHP competes against the retail price of electricity of £100/MWh
    - Compares to marginal price in wholesale market typically in the range £20-£60/MWh
- Oxford Martin School at Oxford University awarded the contract
- The scope of the project was electricity, gas and heat networks
    - Most interesting results relate to electricity

Cost Reflective Pricing Project: Highlights

- Focus on Administered Prices, not wholesale energy market.
- Current pricing **understates** the **fixed costs** of supply and **overstates** the **cost per unit** of energy.
    - Favours the running (and hence construction) of distributed generation over grid connected
    - Increases the costs of low carbon demand technologies such as EV and heat pumps, regardless of whether they drive network reinforcement
- The risk is that distorted prices could drive inefficient customer decisions and, ultimately, increase the cost of achieving the carbon targets.
    - A clear example is that using cost reflective pricing the marginal cost of operating a heat pump would be lower than a gas boiler.
- Not discussed today: Time of Use pricing and dual fuel heating is needed to "flatten the load curve" and minimise need for generation with low utilisation.

Proposed “Cost Reflective” Recovery of Costs



So What: Sample Tariff for Electricity

	Fixed Cost (£/year)	Cost per kWh (£/kWh)	Peak surcharge (£/kWh) *	Transfer to taxation #
Typical (2016)	69.11	0.14		
Cost Reflective	198.00	0.063	0.1029	£90.16

***** Peak surcharge of £66.42 recovered over times corresponding to 18% of typical consumption

Funding more appropriately recovered from tax than electricity charges

So What: Sample Tariff for Gas

	Fixed Cost (£/year)	Cost per kWh (£/kWh)	Transfer to taxation #
Typical (2016)	86.38	0.038	
Cost Reflective	277.02	0.024	£11.38

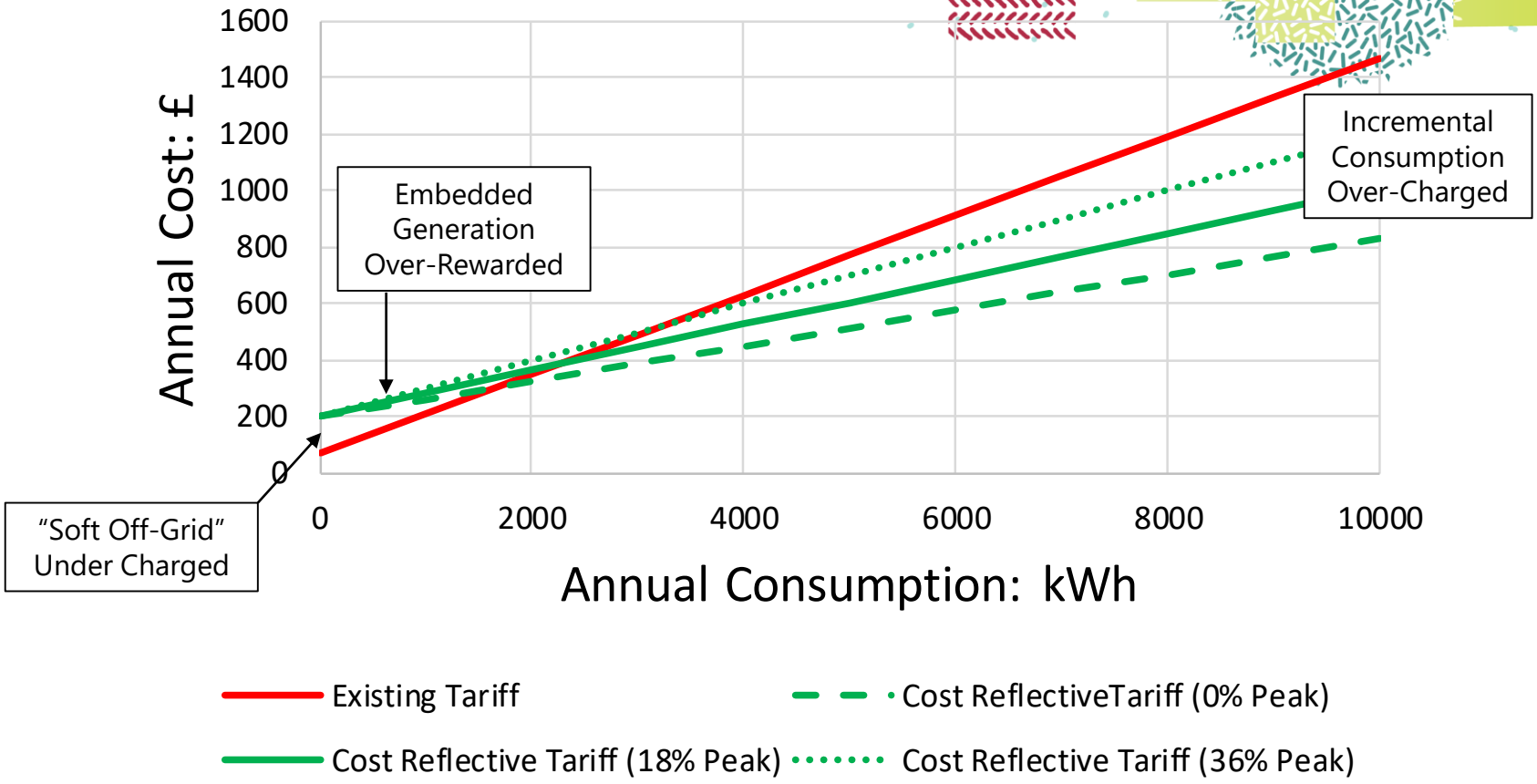
Funding more appropriately recovered from tax than gas charges

Key finding to date: In a cost reflective world (with 2016 load curves) cost of heat:

- Gas cost (p/kWh) 2.4
- Heat Pump (p/kWh) 2.1 (assuming Coefficient Of Performance of 3)

Caveat: Widespread electrification of heat would lower the load factor of electricity and drive prices up.

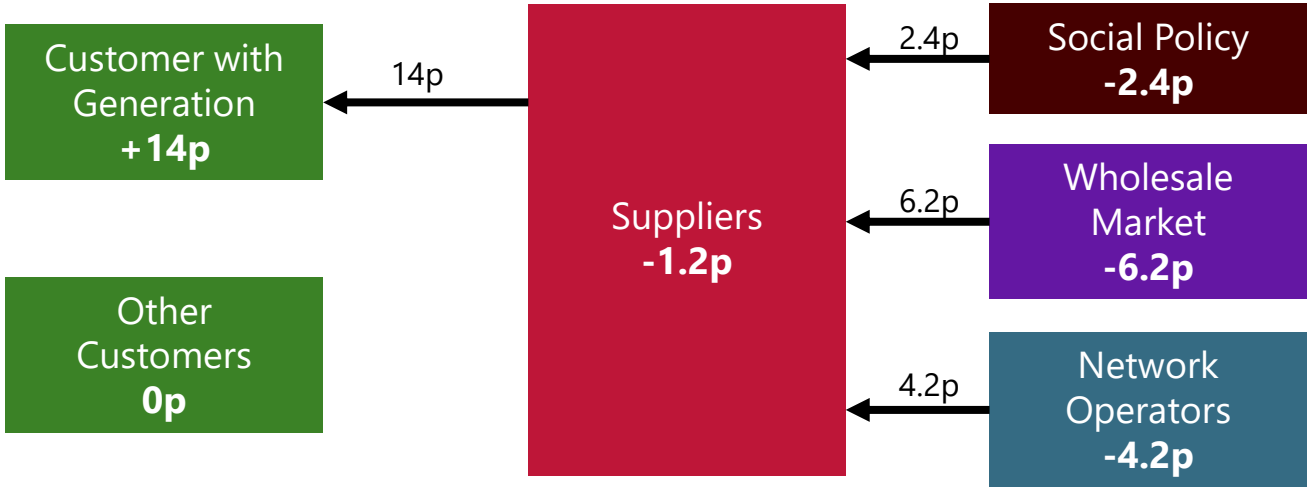
Winners and Losers



So, isn't this a tax on "Light Consumers"?

- The project asked the question: What would a Cost Reflective Tariff Look Like?
- In reality, the actual tariff has to consider economic, social and environmental issues
- It is important to understand the economic realities, so that and social/political interventions:
    - Focus the help where it is needed, e.g. fuel poor over second home owners
    - Avoid potential downsides: e.g. creating a barrier to wider use of heat pumps
- The "do nothing option" i.e. flat pricing 24hrs a day/365 days a year is liable to lead to Heat Pumps running and Electric Vehicles charging at time of peak demand.
    - Typical household demand at peak today: 1kW
    - Typical Electric Vehicle Charger: 3-7kW and rising
    - Typical Heat Pump: 3kW

Example Customer Generates 1kWh: Stage 1



Example Customer Generates 1kWh: Stage 2