Financing Decentralised Energy

Asset Finance – A Scalable Solution?

A discussion paper published by Delta Energy & Environment with the Finance and Leasing Association

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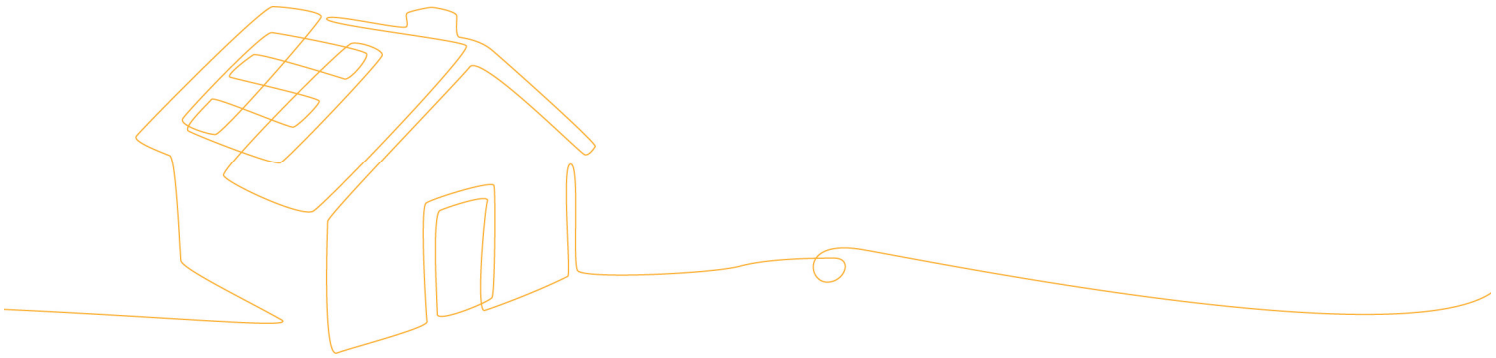

Asset Finance for Decentralised Energy

Decentralised energy – energy assets on the customer side of the meter – is one part of the solution to meet the UK's energy challenges. The International Energy Agency calculates that investments in buildings on the customer side of the meter will comprise around $382 billion in the next 20 years, around one quarter of all European energy investments required to limit global temperatures rises to 2°C. Investments in electric vehicles will require around $350 billion.

The upfront capital cost for the customer can be a critical barrier to decentralised energy and electric vehicle growth. Asset finance has the potential to be a highly scalable solution to this barrier, perhaps unlocking much of the market potential.

Delta Energy & Environment, a specialist decentralised energy consultancy, has published this paper – with the Finance and Leasing Association, as a first step to exploring the financing requirements of decentralised energy and what can be done to unlock asset finance solutions.

For some technologies, such as small wind and combined heat & power, asset finance minimises upfront customer investment while generating positive cash flows.

Delta's next paper will explore different financing solutions for decentralised energy.

1 What is Decentralised Energy and What is Asset Finance

Decentralised Energy

Decentralised energy comprises products that generate electricity or low carbon heat at or close to energy consumers' premise. **Figure 1** below illustrates decentralised energy's relationship with the wider electricity system, and **Table 1** (page 3) identifies selected decentralised energy technologies.

FIGURE 1: DIFFERENTIATING THE SUPPLY AND DEMAND SIDE
Decentralised energy products are deployed at or close to customer sites. This figure illustrates the difference between supply and demand side investments

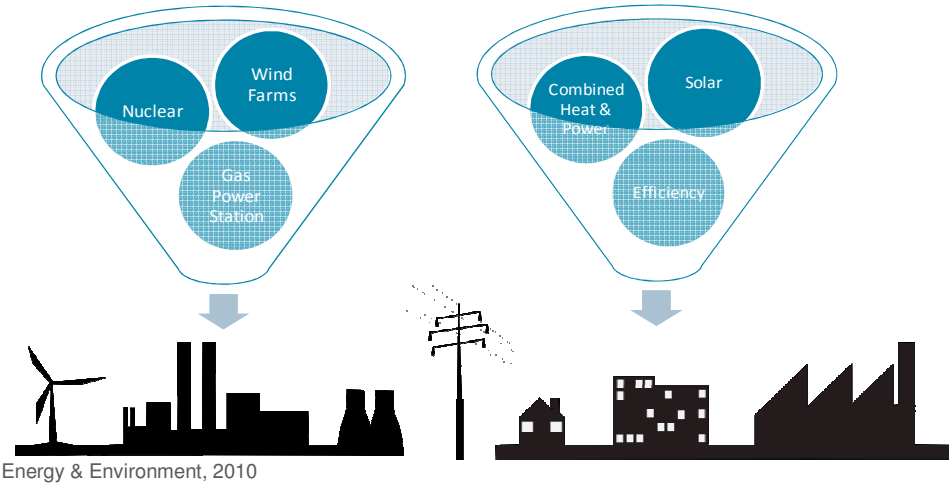

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TABLE 1: EXAMPLE DECENTRALISED ENERGY AND END-USE TECHNOLOGIES
This table shows examples of energy technologies that can be deployed at customer sites. Electric vehicles are a transport technology but have in important interface with the electricity system.

Electricity	Heat	Combined heat and power	Other
• Solar photovoltaics • Onsite wind turbines • Hydro-electric	• Biomass heating • Solar thermal • Heat pumps	• Natural gas fuelled • Biogas fuelled	• Efficiency measures • Smart metering • Electric vehicles

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Asset Finance and Decentralised Energy

If businesses are to invest in using decentralised energy, some will need an affordable, secure means of finance. Often they would prefer to pay for the equipment as they save or generate energy.

Asset finance, including leasing and hire purchase, **funds around 30% of UK business equipment investment**. Under an operating leasing agreement, the leasing company ("lessor") buys and owns the equipment. **The customer** ("lessee") then **hires the equipment, paying rental over a fixed period** of typically three to five years. At the end of the contract, the lessee usually has a choice of extending the lease, buying the asset or simply returning it to the lessor. A finance lease agreement is typically for a longer period, considered to be the full economic life of the asset.

2 Customer-Sited Investments – Requiring the Majority of Energy Investments

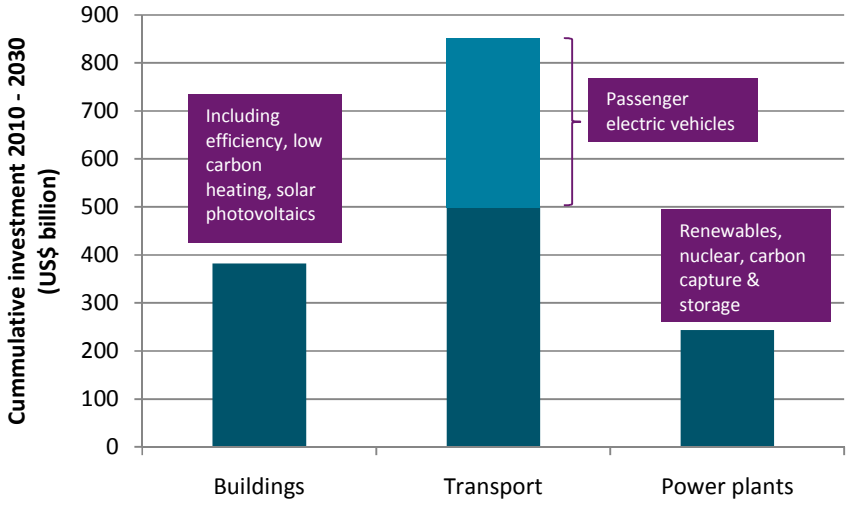
End use efficiency– not nuclear power, renewables or carbon capture & storage **will be the biggest single contributor to reducing global carbon emissions**.

The International Energy Agency (IEA) has analysed investments required to reduce global temperature rises to 2°C compared to a 'business as usual' 6°C rise. For the EU, their scenario reduces EU energy-related emissions by 20% from 2010-2030. **Figure 2** (page 4) shows, perhaps surprisingly, that investment in buildings and passenger electric vehicles outstrip those in power plants.

The UK Government's Renewable Heat Incentive[1], Feed-in Tariffs[2] , Carbon Reduction Commitment[3] and emerging incentives for electric vehicles are powerful new incentives that will drive rapid and significant UK market growth in customer-sited energy technologies.

[1] Incentives for production of renewable heat – proposals published February 2010
[2] Bonus payment for production of onsite renewable electricity < 5 MW, and for micro-CHP <2 kW
[3] A carbon trading system for mid-sized business energy users that are not part of the European Emissions Trading Scheme

FIGURE 2: THE INTERNATIONAL ENERGY AGENCY'S FORECASTS OF EUROPEAN ENERGY INVESTMENTS UNDER THEIR 450 PPM SCENARIO



Delta Energy & Environment, source data from the International Energy Agency, 2010

3 The Financing Challenge for Decentralised Energy

Can energy consumers provide the $700+ billion investment for energy investments on the customer side of the meter? We believe that they can provide part, but by no means all of this investment.

Numerous market research studies suggest that high capital cost is a critical barrier to decentralised energy market growth – even when project economics are attractive over a timeframe of several years.

Supply side energy investment models designed for large power plants do not readily translate to the customer side of the meter. While several forms of finance are being used today for decentralised energy investments (and will be examined in Delta's next paper), asset finance provides a potentially scalable solution for part of the decentralised energy market.

4 Asset Finance as a Solution

Asset finance appears to be an attractive solution for some decentralised energy technologies – offering energy users attractive project economics for only a limited upfront investment.

The Finance & Leasing Association, supported by Delta, has developed a number of case studies exploring the viability of asset finance for decentralised energy technologies. The headline figures are presented in **Table 2** (page 5).

For small wind and combined heat and power a six year lease provides the customer with positive project economics. For solar PV, a longer lease may be more appropriate and would show much more attractive economics.

TABLE 2: EXAMPLE DECENTRALISED ENERGY AND END-USE TECHNOLOGIES

This table presents the project economics (in the form of net present value – NPV) for the end user, together with key assumptions for different technologies. The calculations below assume a 6 year operating lease with a residual value of 10% of the initial lease value, and an after-tax interest rate on the lease of 10%.

	Small wind	Solar PV	Combined heat & power	Electric vehicles
Capacity	11 kW	30 kW	95 kW	Electric van
Project cost	£40,000	£120,000	£90,250	£40,000[1]
Cost of leased equipment	£32,000	£84,000	£72,200	£40,000
Indicative lease cost per year	£6,700	£17,600	£15,200	£9,600
Incentives	Feed-in tariff (26.7 p/kWh)	Feed-in tariff (31.4 p/kWh)	None	Avoid congestion tax (£2,000) – for London
NPV to lessee (user)	£30,000	-£76,700	£17,800	-£10,300

Notes: 1. The cost of the batteries on top of the £25-30,000 cost of a Modec electric van.

Assumptions: After-tax interest rate on lease of 10%; retail electricity price of 9.5 p/kWh; and retail gas price of 2.4 p/kWh. For small wind, capacity factor of 18%. For PV, annual generation of 800 kWh / kW. For CHP, 64% capacity factor.

Source: FLA analysis

Small Wind

The market for small, onsite wind turbines is small but rapidly growing. Popular installations are on farms, at schools, or at relatively exposed situations near commercial buildings.

The installed cost is around £3,000 - £4,500 per kilowatt, with around 80% of this leasable.

Over 650 wind turbines between 1.5 and 50 kW capacity were installed in the UK in 2008 – with nearly 2,500 smaller turbines less than 1.5 kW in capacity. This makes the UK the world's second biggest small wind market, after the U.S.

FIGURE 3: GAIA 11 KW WIND TURBINE INSTALLED AT A FARM.

Source: Gaia-Wind; Irish PV and Wind Ltd

Solar Photovoltaics

Feed-in tariffs will see the small UK photovoltaics (PV) market grow rapidly from a very low base of around 10 MW per year. In Germany, feed-in tariffs have seen the market grow to around 3,000 MW per year.

PV is typically installed on residential roof tops (system sizes of a few kilowatts) or on commercial buildings, where installations can be tens of kilowatts or larger.

FIGURE 4: A 16 KW PV SYSTEMS INSTALLED ON A WAREHOUSE

Source: EcoFirst

Combined Heat and Power

Often known as CHP, this technology generates electricity and heat. It is used in industry, in commercial buildings and for district heating, and now in individual households.

Typically running on natural gas, CHP systems reduce carbon as they use the waste heat associated with power generation (in most power stations this heat is wasted). By recovering this heat, boilers use less fuel.

A few hundred systems suitable for commercial buildings are sold in the UK every year.

FIGURE 5: THIS 185 KW SYSTEM SUPPLIES HEAT AND POWER TO A LEISURE CENTRE

Source: ENER.G

Electric Vehicles

Electric vehicles use a battery to drive an electric motor (hybrids use a battery and an internal combustion engine).

High battery costs make electric vehicles more expensive than internal combustion engine vehicles, but this is offset by lower running costs and incentives.

An increasing number of models are available from companies such as Mitsubishi, Modec, Daimler, and Allied Vehicles.

FIGURE 6: CUSTOMERS SUCH AS M&S, FEDEX AND TESCOS ARE USING ALL-ELECTRIC VANS

Source: Modec

5 Going Further with Asset Finance

With the new feed-in tariffs, leasing decentralised energy equipment is now beginning to appear viable for many businesses for the first time, but considerable risks remain for leasing companies. It is likely that lessors will enter the market cautiously at first until they can assess, balance and manage those risks.

To help accelerate the provision of asset finance for decentralised energy, the FLA has called for the Government to extend tax allowances (Enhanced Capital Allowances) to cover purchases by lessors of decentralised energy equipment. In addition, the FLA has suggested a form of risk sharing with the Government, whereby the Government would share a small part of any shortfall between the actual and expected value of equipment at end of lease, in return for a fee.

About Delta Energy & Environment

Based in Edinburgh, Scotland, Delta is a research company with deep decentralised energy and low carbon strategy expertise. We provide commercial insight and market expertise for utilities; policy makers; the finance sector; and technology companies. Our clients span Europe, North America and the Far East.

For more information visit www.delta-ee.com or contact Andy Bradley on andy.bradley@delta-ee.com, +44 131 476 4259.

About the Finance & Leasing Association

The FLA is the leading trade association for the asset, consumer and motor finance sectors in the UK. Our members include most UK asset finance and leasing companies. For more information visit www.fla.org.uk or contact Julian Rose on Julian.Rose@fla.org.uk, 020 7420 9610.

Acknowledgements

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