

## RESPONSE TO OFGEM CONSULTATION DOCUMENT 123/05

Arthur Cooke  
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London SW1P 3GE

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Dear Mr. Cooke:

This response is being written on behalf of the Lower Carbon Futures research group (LCF) at the Environmental Change Institute (ECI), University of Oxford. LCF is currently studying several aspects of domestic-scale microgeneration and we hope that our findings can inform some of these important policy decisions. In particular, this response draws upon recent research on microgeneration and consumer behaviour<sup>1</sup>, as well as the future of domestic energy consumption in the UK<sup>2</sup>.

This consultation is particularly timely because of recent uncertainty over the future of microgeneration technologies in the UK. For example, the DTI's Major PV Demonstration and ClearSkies programmes are being wound down in favour of a new integrated energy-efficiency and microgeneration support scheme. However the lack of details on this new programme, combined with the outstanding issues surrounding BETTA and difficulties in acquiring ROCs for renewable microgeneration, has created significant apprehension about the degree of support for domestic microgeneration technologies in the UK. This consultation can help remove some of this uncertainty, thus making it more likely that the government's stated renewable energy and carbon-dioxide reduction targets are met (10% renewables by 2010; CO<sub>2</sub> reductions of 20% by 2010 and 60% by 2050). Specifically there is an opportunity to provide regulation that allows microgeneration technologies to compete on a level-playing field both now and in the long-term; at the very least, regulation should not be a further obstacle to achieving these targets. These basic principles inform our responses below.

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<sup>1</sup> Behavioural responses to PV in the UK domestic sector, <http://www.geog.ox.ac.uk/~jkeirst/solar>

<sup>2</sup> The 40% House, <http://www.eci.ox.ac.uk/lowercf/40house.html>

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### **Duty to purchase microgeneration output**

Much of the LCF's recent work has focused on consumer behaviour and energy consumption, including issues such as labelling initiatives, billing information and electronic feedback devices. Most recently the experiences of nearly 100 PV households in the UK have been examined, shedding light on some of the assumptions taken in the consultation document. For example, re: Sec. 5, *Selling exports from microgeneration*, our research has shown that the majority of PV households expect a fair payment for their generated electricity (whether paid for generated or exported units). These early-adopting households, whose strong environmental beliefs have been the primary motivation for purchasing a PV system, are fully aware that PV is currently not an economic proposition; however even they do not believe that spilled energy is of "little consequence" and are disappointed by current payment schemes, as indicated by the following quotes:

"...as a consumer, I feel ripped off by not having net metering... I've paid the capital expensive of putting it on my system, I'm helping them generate their ROCs, why are [electricity suppliers] not paying me a decent price?"

"I got a letter saying my cost of using electricity was going to go up, and I phoned them up and said well am I going to get more for my money, for my electricity that I generate, and they just said well that's a separate system... You know, they can't put up what they're selling me and then not what they're buying from me; they've got to put that up as well haven't they? So I felt, oh, a bit cheated really"

These opinions represent only one micro-generating technology but similar findings are expected with other technologies as well. The issue of fair payment is likely to be of even greater significance for non-renewable microgenerating technologies where environmental motives may be less important in the purchase decision.

The 40% House report, which outlines a scenario by which the domestic sector could achieve a 60% CO<sub>2</sub> reduction by 2050, notes that by 2050 each household will have on average two microgenerating technologies (especially

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micro-CHP) and the domestic sector will be a net exporter of electricity. In other words, widespread adoption of microgeneration technologies is essential if the government's renewables and carbon dioxide emission targets are to be met. As a key selling point of microgeneration technology is the ability to generate and sell one's own electricity, encouraging the long-term growth of microgeneration means providing the conditions under which microgeneration output can be sold at a fair price. Therefore suppliers should be obliged to purchase microgeneration output and unpaid "spillage" should not be permitted in any circumstance.

A fair price must account for the unique features of microgeneration such as its use within the local electricity network and not the national grid. Since consumers pay a retail price for electricity which includes generation and transmission (high and low-voltage) costs as well as profit margins, a level-playing field for microgeneration means that consumer should receive a payment based on a similar price structure; that is, microgeneration is treated the same as any other supplier. Assuming that microgeneration output is sold to other customers within the low-voltage network at full price, the obliged fair price for **exported** microgeneration electricity should be the sum of four elements:

1. A representative wholesale price. Ideally this would be linked to the cost of generating electricity at that time of day; for example, CHP displaces the need to generate expensive peak electricity and therefore should be reimbursed accordingly.
2. All of the national grid transmission costs. Microgeneration output is embedded and does not use the national grid so the supplier should not charge other customers for its use when selling microgenerated units. As separate charging schemes for microgenerated and other units are likely to be too difficult administratively, the microgenerator should be paid this cost to prevent an unfair profit for the supplier.
3. A reduced fraction of the low-voltage transmission costs. Microgeneration output will use some of the low-voltage network, most likely between the generating household and another household in the same neighbourhood. Therefore charging for the full use of the low-voltage network (e.g. from the HV connection to the home) is

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inappropriate and microgenerators should be paid for a fraction of the low-voltage transmission costs that suppliers charge all customers.

4. An optional incentive. We recognize that setting such an incentive is a political decision that may depend on the microgenerating technology and therefore not within Ofgem's remit.

Microgeneration can also come from renewable sources which will be eligible for lucrative renewable obligations certificates (ROCs). Therefore fair pricing must also include payment for the total renewable electricity units **generated**, not exported. This is already recognized under the sell-and-buy-back agreements but we would like to stress that fair payment must include both exported units and generated units (for renewables). We also note that, currently, qualifying for ROCs as an individual is too complex, which can act as a barrier to households getting a fair payment for their ROC electricity.

Failing to provide a fair price for microgeneration not only makes the economics of installing microgeneration less appealing but it may also lead to perverse consumer behaviours which are not in the long-term interest of the electricity system. For example, households may invest in batteries removing themselves from the national grid altogether.

In practice, the obligation to provide a fair price might be implemented in a manner similar to the arrangements for metering services between electricity suppliers and DNOs. That is, the household's incumbent supplier must purchase exported units at the price outlined above; if the microgeneration is ROC-eligible, the purchase of generated units should also be obliged. However the household should also be free to shop around for more favourable payments, for both export and renewable generation. This is contrary to paragraph 9.5, which states that there is no reason that the incumbent supplier must also purchase exported units, but it does ensure a level-playing field.

In summary then, there should be an obligation on suppliers to purchase microgenerated output at a fair price (paragraphs 7.23-7.25), as well as ROCs where applicable. The government's emission reduction targets, both for 2010 and 2050, are driven by a recognition that climate change represents a

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significant challenge to our society and environment; as such, achieving these goals is a “social necessity” and therefore regulatory intervention is justifiable. Furthermore this levels the playing field, recognizing that microgenerating households are electricity suppliers like any other. LCF research has shown that microgeneration will be an integral part of the government’s desired low-carbon electricity system; providing an effective regulatory framework now can help remove the barriers to this goal.

### **Metering and tariff arrangements**

Receiving a fair price for microgenerated electricity requires effective metering arrangements. As Ofgem correctly noted, the situation is complicated by the difference between renewable microgeneration, which can qualify for lucrative ROCs, and ordinary microgeneration, which does not (Sec 10).

Given the difficulties of reverse-flow meters and backstopping, we strongly agree that “net metering” (i.e. one meter which registers imports and reverses when exporting) is not the preferred solution. In addition to the reasons outlined by Ofgem, such arrangements are inflexible and hide the payment for generated electricity; that is, consumers can only be paid for exports at the same rate as imports and they have no way of seeing the amounts of imported and exported electricity separately. Having such information available to the consumer can be very beneficial; in certain PV households where this information is visibly displayed (i.e. on an accessible display screen, not hidden in the metering cupboard), increased awareness of electricity consumption has led to a conserving behavioural effect, reducing total electricity consumption by as much as 20% from pre-microgeneration levels. We therefore support separate import and export metering with clear monitoring facilities.

A generation meter is vital in the case of renewable microgeneration so that ROCs can be accumulated by the customer. Again there is evidence that visibly displaying this information can change behaviour with many PV households indicating that they have shifted loads, such as the washing machine and dishwasher, to times of peak generation similar to what one might see in response to an Economy 7 dual-rate tariff. This reduces the

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peak load on the distribution system and alters the import and export load profile. Generation metering is also crucial for CHP, as co-generated electricity may become exempt from the supplier's renewables obliged baseload under proposals in the DTI's 2005-6 Renewables Obligation review. Metering generation also provides vital information for national energy statistics and IEA reporting – if the potential for microgeneration is achieved, then this will be a useful contribution to electricity supply and must be identifiable. Finally with the new requirement to display the sources of delivered electricity on customer billing, this information will enable suppliers to describe their electricity sources accurately; this will be particularly valuable for those suppliers seeking to build their renewables portfolio.

In summary, there is a strong case for collecting import, export, and generation information as this facilitates fair payment for microgeneration (based on exported and generated units) and can also change consumer behaviour leading to further emissions savings from the domestic sector. In this regard, we are particularly keen to hear if electricity suppliers believe it is feasible to add such information to bills (paragraph 10.38).

Clearly, there are issues to be resolved regarding the payment for additional meters and we will be interested to see how DNOs and electricity suppliers propose to resolve this situation (e.g. paragraph 10.15). However an important distinction needs to be made between those households who require a new meter because they are installing a microgenerating technology and those who are having their meter replaced on a routine basis. Bearing in mind that meters are replaced infrequently and that by 2050 microgeneration could be commonplace, it makes sense that existing meters should be replaced with import/export meters as part of routine meter changes, as well as with the purchase of new microgeneration. Furthermore the Smart Metering Working Group noted the potential of new metering technologies to add features such as remote meter reading, time-of-day pricing, and consumer feedback, the importance of which we have shown above. Therefore, the imperative of microgeneration provides a wonderful opportunity to ensure that the right metering equipment is installed to meet the future needs of the electricity suppliers, to provide better information to

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consumers, and to facilitate growth of microgeneration technology. The difficulty is ensuring that these metering changes occur without placing undue costs on early-adopting microgeneration households, as negative experiences with these trend-setters could damage future prospects for microgenerating technologies as a whole.

### **Customers experiences with metering and tariffs**

As Ofgem correctly noted there have been reports of negative experiences for customers trying to access export meters recently (paragraph 10.35). Our research has shown that this is a growing problem, as PV households who acquired their systems more than 2 years ago are significantly more likely to have an export meter than newer installations (75% and 41% ownership respectively). At present the difficulties in acquiring these meters appear to be linked to availability (i.e. some companies simply do not want to provide them) and the requirements of particular tariff structures:

“...when I did ring these six different utilities, each of them pays on different things – ...some pay on the exported units, whereas some pay on generated units – and therefore that determines whether or not you need the meter and whether they'll pay for it; and also the price of the meter varies wildly anything from £40 up to £400 which is ridiculous because it's the same people putting it in and it's the same meter. [I] saw a list of who the utilities [unintelligible] them to do it, it's still going to be [the metering company], that's the person for this area, and it's still the same meter. It's quite stupid.”

Some expert respondents believed that this growing reluctance to provide a monitor is in part due to confusion over Ofgem's guidance on related issues, such as how ROCs from microgeneration will be counted and concerns over stranded assets (i.e. the 28 day rule). Suppliers understandably do not want to provide devices if they are going to lead to an administrative burden or financial loss and therefore it is preferable that Ofgem resolves these issues as soon as possible.

The quote above alluded to switching suppliers following the installation of a microgenerating technology, an issue raised in paragraph 7.2. Our research

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with PV households has shown that the number of households on a green electricity tariff changed from 50% to 76% following the installation of PV. This is partly because of an arrangement between the particular PV installer and an electricity supplier, but the symbolism of PV also plays a role: why install a green generating technology and then purchase your imported electricity from a non-renewable source? Switching suppliers is also driven by dissatisfaction with the poor rate of payment offered by many suppliers, as noted above.

However it is extremely difficult to get information on the tariffs offered by alternative suppliers and to compare this information, as some suppliers pay for generated units, some for exported units, and some a flat fee. The quote below describes a typical experience, supported by a search of supplier websites where details on generation or export purchase arrangements are almost impossible to find.

“I know, for example, with [the respondent’s supplier], they’ve come back to me and tried to persuade me to join them again. I used to be one of their customers and I do know that they have a facility now for taking solar power but every time that I take it up with the normal accounting, the normal staff there, they deny it, and the supervisors deny it,... but if you take it up, further up the chain in [the supplier], they say that they do have the facility so they don't really know themselves. You would be put off if you tried to approach them to sign up for taking solar electricity, you would be put off completely by the sales staff to start with, you wouldn't get passed them unless you were very lucky.”

One respondent noted that even once he had identified an alternative supplier, the old supplier was uncooperative and would not work with the new supplier to take a final meter reading; in the end, Energywatch had to be contacted to resolve the matter.

Perhaps as a result of these administrative difficulties, it appears that electricity suppliers are shunning per-unit tariffs in favour of technology-specific flat fee compensation, based on microgeneration technology profiles



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currently being collected by the DTI. While full details of how such a scheme would work have not been released, there are reasons to be apprehensive about flat-fee tariffs. To avoid fraudulent claims, some form of meter reading would still need to be taken to ensure that the system was actually generating during the billing period, reducing any proposed administrative savings. Flat-fee tariffs also create no incentive to use electricity responsibly unlike per-unit tariffs and their associated metering requirements. While this issue is not explicitly mentioned in the consultation document, it is an important consideration and underlies our proposed unit-based fair payment outlined above. Involving consumers in their use of electricity and creating responsible, informed citizens is a major component of our proposals.

### **Conclusion**

Ofgem is right to be exploring the regulatory environment for microgeneration, especially now when there is a great deal of uncertainty about whether or not the necessary conditions – both regulatory and funding – will be in place for continued growth in the industry. The sooner these issues can be resolved the better, as microgeneration technologies (especially renewables) have a key role to play in meeting the government's renewable energy and carbon dioxide emission targets, goals which the ECI considers to be of national importance. Such issues are important not only in the short-term (to 2010) but as recent ECI research has shown, microgeneration will be ubiquitous by 2050: the question is whether or not current regulation will be able to get us onto this path.

Research on consumer experience with domestic PV has shown a few of the key barriers. First, the lack of fair payment for generated or exported electricity is a disappointment to those who have invested so much in these technologies. This issue is going to be of growing importance as microgeneration technologies spread to households which are not motivated primarily by environmental issues, and for whom the ability to sell surplus generation will be a key selling point. To this end, we would support a mandatory purchase of microgeneration output which confirms a level playing field by recognizing microgeneration households as electricity suppliers.

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Metering services facilitate fair payment and our research has shown the difficulties facing current customers in both switching suppliers and getting associated metering devices. These difficulties may be resolved when Ofgem clarifies some outstanding issues, for example, on stranded assets and registering for ROCs. We believe that moving towards import, export, and generation metering – and away from net metering – is a pre-requisite for providing fair payment for microgeneration. Furthermore if this information is incorporated into billing, or even household display devices, there is evidence to suggest that further conservation behaviours may be triggered in consumers, making it easier to reach emission reduction targets.

Table 1 below revisits the payment and metering options and how they vary by microgeneration technology.

**Table 1 - Summary of payment and metering options**

	Microgeneration technology		
	Renewable	CHP	Other
<b>Elements of fair payment</b>			
Exported units (wholesale price) <sup>1</sup>	✓	✓	✓
High-voltage transmission <sup>2</sup>	✓	✓	✓
Low-voltage transmission <sup>3</sup>	✓	✓	✓
Extra incentive <sup>4</sup>	✓	✓	✓
Generated units <sup>5</sup>	✓		
<b>Metering requirements</b>			
Import	✓	✓	✓
Export	✓	✓	✓
Generation <sup>6</sup>	✓	✓	✓

In summary, Ofgem's December 2005 policy document should:

- Clearly assert that microgeneration technologies are vital in meeting national climate change and energy policy goals, both now and in the future;
- Note that these goals are of societal importance and therefore some regulation is justified to support these aims;

<sup>1</sup> Ideally based on time-of-day cost of generation

<sup>2</sup> Full reimbursement as the HV network is not used, though customers who buy microgen output are charged for its use; paid on exported units

<sup>3</sup> Part reimbursement as LV network is only partially used, though customers who buy microgen output are charged for its full use; paid on exported units

<sup>4</sup> A political decision, may vary by technology; most effective if paid on generated units

<sup>5</sup> Payment for renewable obligation certificates, requires a generation meter

<sup>6</sup> Required for all technologies for accurate national statistics and energy-supply labelling; also needed for renewables (ROCs) and CHP (as co-generated electricity may become exempt from RO baseload, see DTI 2005-6 Renewables Obligation Review)

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- Note that microgeneration is currently facing an uncertain future and therefore a clear regulatory environment should be in place to encourage long-term investment;
- Oblige electricity suppliers to purchase microgenerated supply at a fair price, accounting for the price of ROCs in the case of renewable microgeneration.
- Require electricity supply, DNOs and metering service companies to replace current meters with import and export meters, as part of new microgeneration installations and general meter replacements, in anticipation of significant microgeneration penetration over the lifetime of these meters.
- Encourage electricity suppliers to provide import, export and generation information to customers with their regular billing, or advanced metering technologies where possible;
- Encourage electricity suppliers to be more open about their tariffs for the purchase of microgeneration output, allowing customers to freely choose the supplier that best suits their import and export needs, with separate suppliers if desired.

We recognize that there are many issues associated with the implementation of these goals but hopefully the examples provided here demonstrate the importance of resolving such issues as soon as possible. If you have any questions about the research discussed here, please do not hesitate to contact us. We look forward to the responses from the other consultees and Ofgem's decision in due course.

Sincerely,

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