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Grid electricity at the University of Sheffield: powering ahead with a low carbon supply

A briefing on the University of Sheffield's grid electricity procurement practices and the benefits of switching to a low carbon supply.[1]

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Executive Summary

The University of Sheffield Clean Energy Switch Team commends the steps already taken by the University towards the goal of becoming one of the most sustainable universities in the UK. This briefing takes on the task, set out in the 2018 Sustainability Strategy, of investigating the University's current electricity procurement practices and setting out feasible, pragmatic alternatives.

Current electricity supply

The University's electricity is currently generated at a biomass-burning generator. Biomass should not be considered sustainable. Burning biomass emits as much carbon dioxide as burning coal, in addition to emissions resulting from deforestation, its production process, and intercontinental transport of wood pellets. There are compelling scientific and moral reasons to switch to a low carbon energy supply.

Why switch to a clean energy supplier?

University of Sheffield (UoS) students care deeply about climate change and how UoS sources its energy. Switching to a low carbon energy source would allow UoS to be a green energy leader among UK universities, creating opportunities for deepening links with industry and attracting prospective students. UoS stands to gain financially from switching to a low carbon energy source.

The feasibility of switching to a clean energy supplier

The University's contract with the current energy generator is due to end in 2020, which means that the current energy procurement policy should be amended by Summer 2019. Our research indicates that low carbon energy contracts do not come at a premium. Switching can almost certainly be achieved cost neutrally, and it is even likely that savings can be made. Entering into a power purchase agreement (PPA) with a supplier is the most environmentally sound, secure, and economically viable approach to the purchase of low carbon electricity.

Abridged recommendations

The University should set up a low carbon electricity supply contract. To this end, an action plan for switching should be established, detailing what will be done up to September 2019, which is the deadline for changing or terminating our current contract with Inenco. One of the best value options, when accounting for both financial and environmental costs of energy, is setting up a PPA with a low carbon generator. UoS energy procurement guidelines should be established to institutionalise the buying of low carbon electricity and reflect the pioneering leadership of UoS in genuinely sustainable solutions to climate change. If cost savings arise from the new contract, we suggest that funds made available are ring fenced, to develop a UoS 'sustainability fund'.

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Introduction

The University of Sheffield takes its obligations to sustainability extremely seriously, as is evident from the considerable work already being done on campus and further afield, and through its world-leading sustainability research.[1] Starting from this laudable position, the University's Year 1 Sustainability Strategy boldly commits to the ambition that UoS becomes "one of the most sustainable universities in the country".[2] We wholeheartedly commend the steps already taken towards this goal. This briefing is offered in the spirit of collaboration and admiration for progress already made.

A large proportion of the University's carbon emissions derive from its mains electricity. Thus, the 2018 strategy identifies switching electricity supply as a key area where considerable progress can be made to reduce the University's environmental impact. The commitment was made to "consider the viability of switching the University's electricity consumption to an ultra-low carbon energy provider".[3] This briefing explores the area in more depth and sets out some feasible alternatives to the University's current electricity contract.

> "There are compelling scientific and moral reasons to switch to a low carbon electricity supply… Our research indicates that low carbon electricity contracts do not come at a premium. Switching can almost certainly be achieved cost neutrally, and it is even likely that savings can be made" (p.3 & 9)

The University's electricity is currently supplied by a biomass-powered generator. This should be commended, as eschewing fossil fuels demonstrates our existing commitment to procure energy from renewable sources. However, the scientific consensus now suggests that burning biomass for electricity is an unsustainable solution that is potentially as harmful as the fossil fuel alternatives. Section 1 surveys the relevant scientific literature which demonstrates the unsustainability of biomass.

Apart from reducing the University's environmental impact, we can expect numerous positive outcomes from switching our energy supply. These include reputational, recruitment, and economic advantages for the University, as well as allowing the University to demonstrate its capacity for innovation and leadership. Section 2 sets out this positive case for switching to low carbon source of electricity.

Our findings indicate that switching to a low carbon energy source is both practically and economically feasible. But how exactly can it be done? Section 3 gives an overview of the university's current energy procurement policy, and then sets out the main lessons we have learnt from our research.

Finally, in the last section, we make recommendations for action going forward.

1. UoS current energy supply

The University of Sheffield currently sources its electricity from Drax power station, which produces the majority of its energy from biomass, and the remainder from coal. We focus on the former because UoS buys biomass-generated electricity, and because Drax will soon have converted all of its generation to biomass.

What is biomass?

Biomass is organic (naturally derived) material, used as an energy source. In this briefing, biomass refers to woody biomass dried and compacted into pellets, used for electricity generation by combustion.

Currently, biomass is classed as a renewable energy source and, due to this, is often held to be sustainable. However, authoritative sources, including the UK Committee on Climate Change, have challenged this conclusion and called for the use of biomass for large scale electricity generation to be reconsidered.[4 5 6 7 8 9 10]

Indeed, the UK government itself has recognised the unsustainability of biomass; in late 2018 it introduced a stringent carbon emissions threshold for all new-build biomass generation.[11] If this threshold was applied retrospectively, Drax would no longer be eligible for the substantial subsidies it currently receives. Below, we provide an overview of the environmental and human impacts of biomass, and briefly define 'low carbon electricity'.

Key points:

- Biomass should not be considered carbon-neutral. Burning biomass emits as much carbon dioxide as burning coal, in addition to emissions resulting from deforestation, its production process, and intercontinental transport of wood pellets.
- Biomass production results in degradation and clear-cutting of native forests in the southern US, threatening biodiversity in that region.
- Biomass pollutes the air surrounding power stations, leading to increased health risks.
- Biomass contributes to 'carbon lock in'.

Carbon emissions of biomass are comparable to fossil fuels

Biofuels are considered 'green' because, unlike fossil fuels, they are renewable and in theory, the emissions produced by their burning are cancelled out by the continued growth of the forest from which they were harvested, which sequesters carbon from the atmosphere through photosynthesis. However, this optimistic scenario ignores the time lag of at least twenty years in the growth of the trees to replace those lost, and does not consider the continual carbon storage potential of the unfelled forest.[12 13 14] Furthermore, the scenario assumes that the cut trees will be replaced by trees with the same carbon sequestration capacity, an assumption that relies on an unwarranted faith in future practices. Finally, the removal of forest residues leads to significant losses of carbon and nutrients from the forest floor, resulting in a decline in soil and forest health in the long term, further reducing productivity and carbon storage.[15 16]

The most recent IPCC report has re-emphasised that cuts in emissions must be made urgently.[17] Given the scale and urgency of this issue, we should not be establishing carbon debts that, at best, will not be repaid for decades.

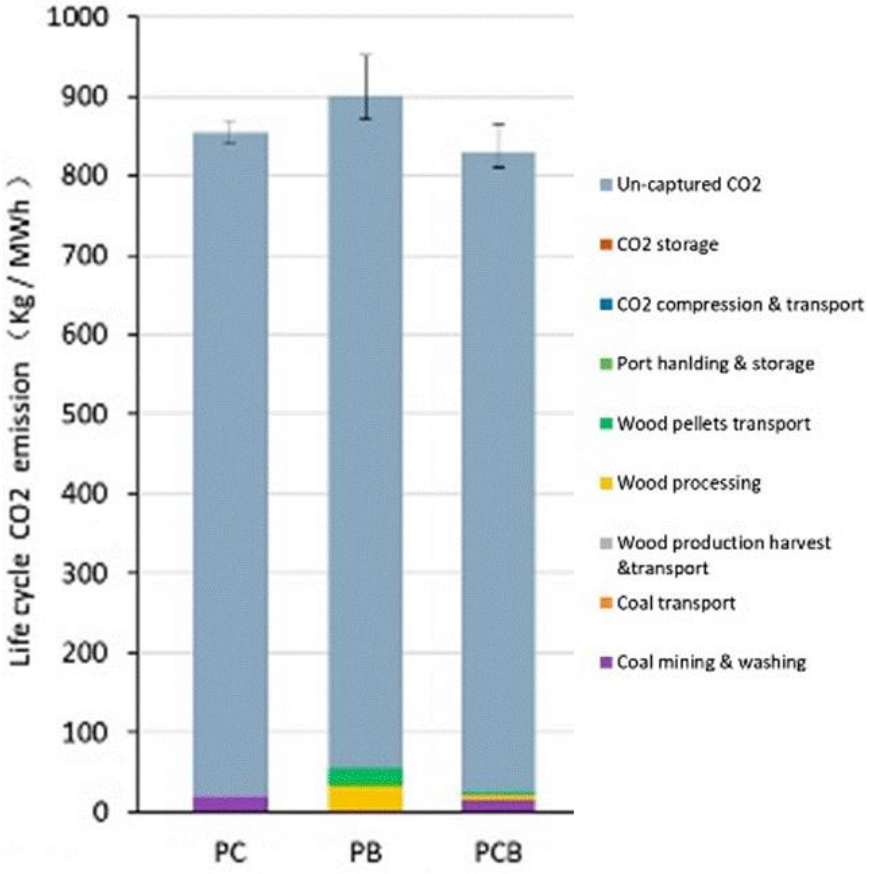


Figure 1 Comparison of life cycle CO2 emissions among different types of power plants (PC = coal, PB = biomass, PCB = coal/biomass). 'Un-captured CO2' refers to direct smokestack emissions. Adapted from Figure 7 in Yi et al., 2018.

There are also significant emissions associated with the production of pellets, the transport of biomass (across continents and shipped across the Atlantic), and the methane emissions produced during storage.[18] As biomass is generally equivalent or worse than fossil fuel in smokestack emissions per kWh electricity produced, when the emissions from processing and transport are included in a life cycle assessment, biomass emissions can exceed coal emissions by 73%.[19] Indeed, researchers at UoS demonstrated that without carbon capture and storage (CCS) technology there is no CO2 emission reduction advantage of biomass-fired power plants over coal-fired power plants.[20] As Drax and other biomass power stations in the UK do not use CCS, their burning of biomass cannot currently be considered carbon neutral. It may be that CCS becomes viable in the future, but relying on this assumption is dangerous as large scale CCS and BECCS technologies are not yet technically or economically feasible, and their ability to mitigate climate change is not yet proven.[21] Despite the advances being made in CCS technology, it is not a silver bullet for the goal of remaining under the 1.5/2°C warming scenario.

Impacts of unethical and unsustainable forestry practices on local wildlife and communities abroad

In 2016, Drax Power Station burned pellets made from 13.2 million tonnes of wood[22], equivalent to 120% of the UK's total wood production that year. UK biomass production contributed only 0.07% of Drax's feedstock last year.[23]

Drax source their wood from forests and plantations across North America, mainland Europe and to a minor extent the Brazilian rainforests.[24] These forests house many rare and endangered species, already threatened by logging and land use changes. Environmentally unsound practices and the

expansion of monoculture (intensively managed plantations of a single species of crop tree) are seriously threatening these environments. Diverse forests are essential for maintaining biodiversity, and contribute to the resilience of ecosystems to pest outbreaks or extreme weather events.

The majority of Drax biomass is sourced from the southern states of the US.[25] In 2016, the US exported 4.9 million metric tons of pellets, and nearly 85% of this went to the UK, an area the size of the New Forest.[26] This growing demand cannot be met by harvest residues and waste products alone, meaning that healthy, whole trees and clear cut wood is being used.[27] Indeed, the UN's 2018 Global Land Outlook explicitly cites the practice of importing woody biomass to the EU as potentially problematic.[28]

One of the UK's largest suppliers, Enviva, has been explicitly linked with clear-cutting of sensitive wetland habitats otherwise untouched.[29] They are also implicated in the expansion of softwood monoculture plantations replacing and degrading native bottomland hardwood forests in the region, which has resulted in many species dependent on these forests now being classified as rare, declining, and of conservation concern.[30] This degradation also threatens the capacity of forests to provide key ecosystem services for local communities.

Biomass and air pollution - impacts on the local community in Yorkshire

The burning of biomass in the form of wood pellets also has a large impact on air pollution in the UK. Wood burning power stations have been shown to significantly increase the number of PM10 pollutants - small particulates which are linked to heart disease, cancer and neurological disorders[31] - in comparison to coal-burning power stations.[32] The emission of PM10 particles from Drax power station alone has increased by 135% since 2008, when Drax converted from burning coal to burning wood pellets.[33] This increase is the equivalent of adding 3 million new diesel cars on the road.[34]

Biomass exacerbates 'carbon lock in'

To avoid double counting emissions, international climate rules stipulate that the emissions associated with biomass should be counted in the land use and forestry sector, rather than the energy sector. Because the systems accounting for forestry are flawed and often ignored, this has allowed the emissions associated with biomass to be ignored.[35] At the same time, such accounting allows the UK government to claim that it is supporting reductions in carbon emissions by awarding substantial subsidies to biomass generators.[36] Furthermore, being classed as a carbon-neutral power generator in the EU amounts to a *de facto* subsidy because the plants are not included in the EU Emissions Trading System.

As well as the high environmental cost entailed, this is problematic because it contributes to carbon lock-in; biomass is utilised by existing infrastructure, rather than requiring low carbon infrastructure and the policy that supports it. Thus, continuing to invest in biomass as a power source hinders progress towards genuinely low carbon electricity generation.

The alternative - genuinely low carbon generation

Low Carbon Electricity

This report defines low carbon electricity generation as electricity derived from wind, solar, or hydro.

Transitioning to a low biomass, 100% renewable energy system has been demonstrated to be feasible and cost-neutral to the current energy system in Europe.[37]

2. Why should the University switch to a low carbon electricity source?

This section sets out the positive case for switching to a low carbon (defined p.9) electricity supply.

Key points:

- Switching is an excellent opportunity to directly support technologies that tackle climate change, setting the stage for the University to meet its 'Climate Action' and 'Clean and Affordable Energy' targets in its Sustainability Strategy.
- UoS students care deeply about climate change and how UoS sources its energy.
- Switching to low carbon electricity source would allow UoS to be a green energy leader among UK universities, creating opportunities for deepening links with industry and attracting prospective students.
- UoS stands to gain financially from switching to a low carbon electricity source.

Supporting the transition to a low carbon future

The UK has committed to radical emissions cuts through the 2008 Climate Change Act. By 2050, the country must achieve an 80% reduction in CO2 emissions (compared with a 1990 baseline). To be compliant with the 2015 Paris Agreement, cuts will need to be greater still. This means that we are on the cusp of a low carbon revolution, and UoS has the opportunity be at the forefront of this movement.

Transitioning to a low carbon electricity source is the next logical step after the University's commitment to divest from fossil fuels. When the University buys electricity, it is paying a company for putting that amount of electricity into the grid. Thus, we have an opportunity to support technologies that help tackle environmental disaster. Doing so would align with our Sustainability Strategy vision to "act decisively and lead the way in tackling climate change [and] to demonstrate our capacity for innovation and leadership".[38]

Engaging with student voice

UoS strives to prioritise the student voice, and students care deeply about how the University is powered. Nationally, 74% of staff and students believe that their university should buy renewable electricity, and 57% agreed that their university should make a commitment to being powered by low carbon electricity.[39] During clearing in 2018, over one-third of external visitors to the University website were categorised as "Green Living Enthusiasts". This was the biggest single interest group among all clearing applicants.

> "Preliminary results show that 90% of respondents think that it is 'extremely important' or 'very important' that the University sources its electricity from a low carbon generator" (p.8)

In 2017, action on climate change was afforded the highest priority by student participants in a Students' Union consultation about sustainability issues[40]. The University has responded by making Climate Action and Clean and Affordable Energy one of its priorities in its Sustainability Strategy, including to "consider the viability of switching the University's electricity consumption to an ultra-low carbon energy provider".[41]

The Sustainability Committee is currently conducting a survey of UoS students' attitudes towards the University's energy supply. Results show that 92% of respondents think that it is 'extremely important' or 'very important' that the University sources its electricity from a low carbon generator (336 out of 349 respondents were current students). In light of this, it would be extremely advantageous for UoS to demonstrate itself as a true champion of sustainability and climate action.

Competitive advantages and strengthening ties with low carbon industry

As well as constituting a genuinely impactful action, switching our electricity supply will also publicly demonstrate our commitment to sustainability at Sheffield. We could be one of the first UK universities to switch to a low carbon electricity supply. We would be the first of the Russell Group Universities to do so.

Furthermore, if we negotiate a power purchase agreement (see Section 3), we would be in the remarkable position of being able to tell our students, prospective students, and the general public exactly where our electricity comes from. A contract with a low carbon generator would deepen links with the rapidly developing low carbon industry, creating further opportunities for academic and student collaboration and enterprise. This would also be in line with the vision of the Energy 2050 research group, whose aim is to advance clean energy research and innovation.

"A contract with a low carbon generator would deepen links with the rapidly developing low carbon industry, creating further opportunities for academic and student collaboration and enterprise" (p.8)

Finally, and importantly, as discussed in greater detail below, a change to our procurement practices might save the University money. Indeed, market research suggests that businesses committed to 100% renewable electricity consistently outperform those that do not make such commitments.[42] Universities have also demonstrated that renewable electricity systems are a cost-effective model.[43] Financial savings and improved financial performance is an incentive in itself, and presents exciting opportunities for the University. For example, funds made available could be used to create a sustainable development fund at the University. This could fund areas of sustainability at UoS, creating sustainability leadership opportunities for passionate and engaged students.

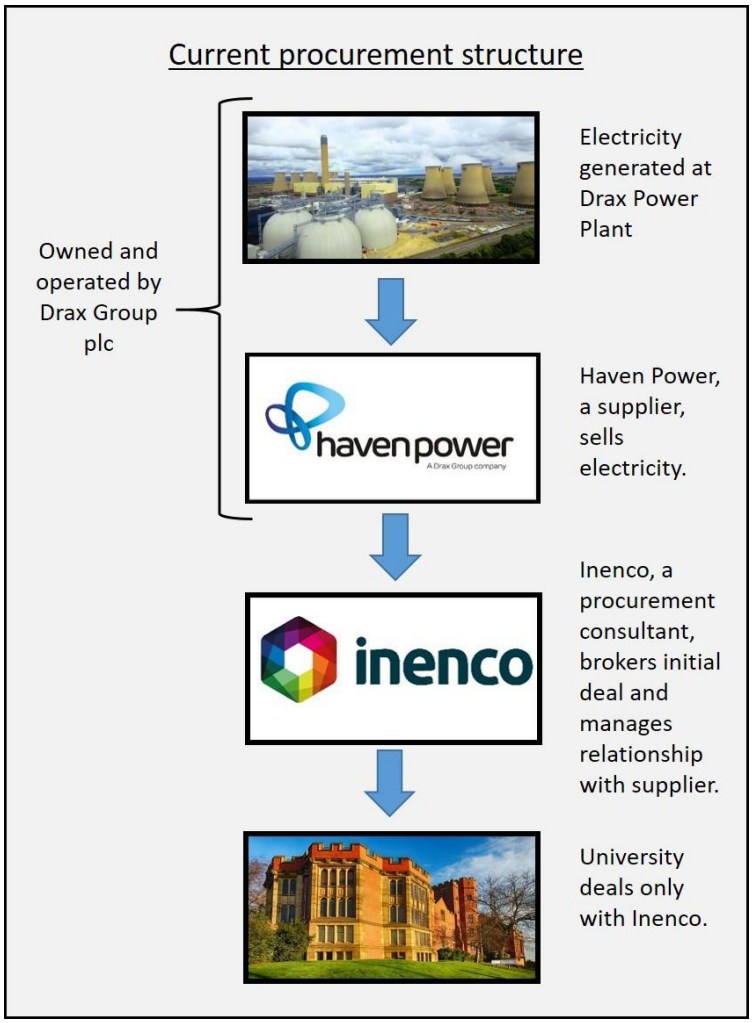
3. The practical and economic feasibility of switching

We've talked to almost twenty suppliers, had detailed discussions with industry insiders, and surveyed relevant literature. This section details the main outcomes of our research.

Key points:

- The University's contract with the current electricity generator (Drax) is due to end in 2020, which means that the current energy procurement policy should be amended by Summer 2019.
- Entering into a power purchase agreement (PPA) with a supplier is likely the most environmentally sound, secure, and economically viable approach to purchase renewable energy.
- Our research indicates that low carbon electricity contracts do not come at a premium. Switching can almost certainly be achieved cost neutrally, and it is even likely that savings can be made.
- There are multiple electricity suppliers that would be willing to provide us with a competitive low carbon PPA.

Overview of current UoS electricity procurement



The University outsources the buying of electricity to a utility procurement company, Inenco. Periodically, Inenco puts supplying UoS out to tender. At the last tender round only three companies submitted bids, and the University opted to contract with Haven Power, a subsidiary of Drax Group. Drax's electricity is currently generated entirely from Drax Power Station, located near Selby in North Yorkshire.

Due to the complexities of the electricity market, it is necessary to outsource much of the day to day administration of electricity procurement. Currently, this is handled by Inenco (although some providers are able to offer the same service in house).

Biomass generation was the 'greenest' option offered by Inenco at the last tender round. Therefore, UoS may need to consider switching to an alternative utility procurement company if Inenco is unable to meet the demands of a new procurement policy. The University's contract with Drax is due to end in 2020, which means that the current energy procurement policy must be amended by Summer 2019.

Procurement terminology

Generator: asset that produces electricity (e.g. a wind farm)
Supplier: organisation that buys and sells electricity on behalf of a generator (e.g. 'Bulb')
Procurement consultant/broker: organisation that brokers initial deal and manages ongoing complexities of contract (e.g. Inenco)
Consumer: user of electricity (e.g. UoS)

'Renewable Energy Guarantee of Origin' (REGO) vs 'Power Purchase Agreement' (PPA)

One way of 'greening' an organisation's electricity supply is acquiring 'Renewable Energy Guarantee of Origin' certificates (REGOs). REGOs are allocated per unit of electricity generated. Each REGO distinguishes between the technology used to generate the electricity and the geographical location of the generator. For example, a REGO generated from wind power in the Humber can be distinguished from a REGO generated from biomass combustion in Hull.

In theory, by purchasing REGOs the consumer supports the market for REGOs, which increases demand for them and ultimately increases the pay-out for the renewable generator. However, the current price of REGOs stands at less than 15p per electricity unit (1 megawatt hour (MWH)). Meanwhile, the total price of electricity per unit is around £40-80, so the consumer cannot legitimately claim to support low carbon generation, as the extra income to the generator is negligible.

In addition, REGOs may be bought separately from their 'parent' unit of power. This means that it is possible for organisations to buy electricity from any generator (e.g. a gas-fired power station), and legally 'greenwash' their supply by buying a corresponding set of REGOs, when in fact buying its electricity from a low carbon generator.[44]

For these reasons, we believe that switching to a contract which relies solely on purchasing REGOs is not aligned with the University's sustainability goals. Instead, we propose that an alternative is worth investigating: UoS establishes a power purchase agreement (PPA) with a low carbon generator.

What is a PPA?

A Power Purchase Agreement is a contract between a consumer and an electricity generator, where the generator agrees to supply a certain amount of electricity over a time period for a set price. PPAs provide both parties with security as the generator has a guaranteed income from the sales of the energy they generate, and the buyer is not subject to fluctuations in market price.

PPAs drive investment in new low carbon generation. Therefore, setting up PPAs genuinely helps aid the transition to a low carbon energy system, thus reducing the environmental impact of UoS.

Two main types of PPA

Corporate PPA. Where a consumer agrees to buy electricity from a generator with already existing capacity for a period of 3-10 years. No capital investment is required from the consumer side. In the (extremely unlikely) scenario that the generator is unable to provide the required electricity, they, not the consumer, are liable.

Sleeved PPA. A consumer agrees to buy electricity generated by a renewable asset not yet built for a period of 10-30 years. For a customer the size of UoS, such an agreement is generally agreed upon 1-2 years in advance. Again, the generator is liable for failing to provide electricity, and no capital investment is required from the consumer.

Benefits of PPAs for the consumer

Apart from providing a supply of low carbon electricity, PPAs can provide significant benefits to the consumer. These include long term budget control and reduced energy costs. Indeed, large organisations such as UoS willing to commit to a ten-year contract can expect commodity costs of two-thirds market price.

Electricity costs breakdown

The costs per unit of energy are:
1) Commodity costs, the price charged for the electricity. On a conventional contract these represent around 44% of the total cost.
2) Pass-through costs, the price incurred by charges to use the grid, taxes, supplier fees, etc.

Many of the discussions we have had emphasised that, as a large organisation, the University is in a strong position to negotiate a bespoke and competitive deal. This is because a PPA contract provides the generator with the security of a large volume of fixed sales and prices, an advantage sought by many generators. This increases the likelihood of a competitive deal.

There are numerous high profile examples of companies that have moved their electricity supply into low carbon PPAs. BT has PPAs with three wind power sites across Britain, which cater for all the company's electricity needs in Scotland. Microsoft recently committed to a 15-year PPA with GE for all the electricity generated by the 37MW Tullahennel wind farm in County Kerry, Ireland. Other examples in Britain include Ford, Sainsbury's, and Lush.

> "Large organisations like UoS willing to commit to a ten-year contract can expect commodity costs of two thirds market price" (p.12)

While we are not aware of any examples of British Universities establishing PPAs, as of 2017 over 60 universities in the USA have signed a solar PPA, including Cornell University, Stanford University, George Washington University, and Michigan State University.[45] Many of these universities have long-term solar and wind PPAs of 20-30 years, with capacities ranging from 1.5 kW to 152 GW.[46] This demonstrates that low carbon PPAs are a viable option for universities, and we expect that they will become mainstream in the UK over the coming decades.

We have spoken to several generators who have expressed strong interest in establishing PPAs with UoS, which we detail below. Globally, the share of PPAs in the renewable electricity market is growing rapidly. In the first half of 2018 alone, 7.2GW of renewable electricity capacity from PPAs were purchased by businesses.[47] Given this positive market trend, UoS can stand to benefit if it chooses to set up a PPA.

Pragmatic considerations regarding PPAs

PPAs vary in length. The economic benefits of PPAs increase with the contract length. So the savings generated from a short-term corporate PPA will be less than those of a long-term sleeved PPA.

PPAs with small generators can be high risk, so it is important to contract with a supplier with a good credit rating, and high enough generation capacity to meet all our electricity needs. However, the UK's low carbon generation sector is sufficiently mature that this does not present an obstacle.

As with any energy contract, managing PPAs is complex. So it is essential we deal with a supplier (and potentially procurement consultant) with the appropriate administration capacity.

Financial and administrative viability of switching to a low carbon supply

As already touched upon, the overall message regarding PPAs is that they are likely to be extremely cost competitive, because generators are willing to reward a long-term commitment from large organisations. Given the opportunity and required data, the suppliers to which we have spoken would generate competitive quotes for the University, and several have stressed that low carbon electricity does not come at a premium to fuel based alternatives. Furthermore, PPAs are generally only tied to inflation, not the energy market, so they protect from long-term price increases.

Several suppliers or generators with the capacity to set up corporate PPAs are equipped to handle the administrative demands of the contract. See below for a list of companies we have done preliminary research on and/or contacted in the Appendix following this document.

Case studies

Below, we provide some details from discussions with two low carbon suppliers/generators. We do not endorse these companies in particular, rather we include them as illustrative examples of the viability of PPAs in general. Note that the specific price estimates included are estimates given to us based on non-granular data. Real prices, post-negotiation, will be different and are likely to be lower, for the reasons given above.

Statkraft - a leading developer and operator of wind and photovoltaic energy projects in Europe.

Statkraft can provide a low carbon PPA (uses REGOs evidenced from Wind and Solar only), administered via their subsidiary Bryt Energy, which has an office in Sheffield. This could be in the form of a 10+ year sleeved contract, based on the creation of new renewable assets and with no capital investment required. Or a short-term corporate PPA through its partner Squeaky Clean Energy, which would utilise existing assets. For a 3 year PPA contract, they would expect costs to be competitive with our current contract. Longer-term agreements would likely be even cheaper.

Ecotricity - an energy company based in Stroud, specialising in selling green energy to consumers. It owns approximately ⅕ of its generation capacity, with the remainder coming from long-term contracts with generators, mostly offshore wind.

Ecotricity can offer a 10+ year sleeved contract, based on the creation of new renewable assets and with no capital investment required. The new assets could be solar PV (6-12 months to set up the contract) or wind (12-24 months). These contracts are likely to be extremely price competitive, on average commodity costs will be ⅔ of the market price. They can also offer conventional fixed rolling contracts, which would likely be cost neutral compared to our current contract. Finally, they are able to deal with all the administration required for maintaining either of these types of contracts. In this regard, their systems are not automated so they offer a bespoke service to corporate buyers; EFM staff could set up the administration to be compatible with current systems.

4. Conclusion and recommendations

In this briefing note, we first outlined how scientific research demonstrates the imperative to shift away from our current electricity supply. We then set out the considerable benefits to UoS associated with switching. We finally presented the case that transitioning to a low carbon source of electricity is economically attractive and administratively feasible. Thus, we believe that switching electricity supply represents a win/win/win situation.

Given the above, UoS Clean Energy Switch believe it is pragmatic to make the following recommendations:

1) In line with the Sustainability Strategy, the University sets up a low carbon electricity supply contract (defined on p.8). The new electricity supply contract **should not**:

    a) include electricity generated from biomass.

    b) rely solely on the REGO system of regulation.

2) To this end, an action plan for switching should be established, detailing what will be done up to September 2019, which is the deadline for changing or terminating our current contract with Inenco.

3) One of the best value options, when accounting for both financial and environmental costs of electricity, is *setting up a PPA* with a low carbon generator. The first stage of setting up a PPA should be producing a feasibility report, potentially alongside an appropriate supplier or procurement consultant.

4) UoS energy procurement guidelines should be established to institutionalise the buying of low carbon electricity and reflect the pioneering leadership of UoS in genuinely sustainable solutions to climate change.

5) If cost savings arise from the new contract, we suggest that senior management continues to innovate in transitioning to a low carbon institution by ring-fencing funds made available, and developing a 'sustainability fund'. This could be used to progress additional low carbon projects in and around the university.

We would appreciate receiving regular updates regarding the progress of this plan, perhaps via the student representative on the Sustainability Delivery Group, or via scheduled meetings. We will continue to communicate to students the University's commitment and actions to decarbonise its energy supply.

Appendix: List of energy suppliers and/or generators

The following are energy suppliers and/or generators we have done preliminary research on, and/or contacted by phone/email/in person:

1. Bulb
2. Co-operative energy Green Tariff
3. Good Energy
4. Ecotricity - *See details in briefing text.
5. Tonik - *Do not provide corporate supply
6. Green Star Energy - *Can't find evidence for corporate supply
7. Pure Planet - *Can't find evidence for corporate supply
8. Octopus Energy
9. Renewables Exchange – PPA supply broker
10. Opus
11. Smartest
12. Belltown Power
13. ENGIE
14. Community Windpower - *A generator, not supplier
15. Lightsource BP
16. Anesco
17. RES
18. Statkraft - *See details in briefing text.
19. Vattenfall
20. Amber energy - *Procurement consultant
21. Inenco - *Current university procurement consultant

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