



Phase 1 Report – Viability assessment of a local supply mechanism to benefit local residents and businesses in Abergwyngregyn

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1. Introduction

This work has been commissioned by Menter Môn Cyf with the objective of setting up and delivering a mechanism for businesses in the Cyd Ynni areas to benefit from local energy tariff. It was procured on Sell2Wales in 2019.

This report summarised the findings from Phase 1 for which this objective is to develop and assess a business model that delivers a local supply model in Abergwyngregyn (Aber) in Gwynedd, North Wales.

The project is working with community hydro scheme Ynni Anafon which is located about 1km to the south of Aber. The overall objective is to develop a local supply model that creates additional financial and environmental benefit for the local community.

The map below shows the location of Aber relative to the Hydro (Blue), Solar site (Orange) and Distillery (Pink).



Figure 1 – Map of site locations and grid network (SPManweb)

2. Community Generator Engagement

At the request of Cyd Ynni, Juno has engaged with the Ynni Anafon Hydro scheme to deliver this project.

A meeting and site visit was held on 22nd January 2020, with Gavin Gatehouse a Director at Ynni Anafon, Huw Davies, Gareth Harrison and James Orme.

2.1. Existing Hydro Generator

The hugely successful Ynni Anafon project represents a great achievement in community energy, with many years of hard work coming to fruition.

The 270kW hydro scheme has been operational for 4 years operational and is owned by Ynni Anafon CIC. It is supported by a favourable Feed in Tariff subsidy of £2.55/kWh which is some 800% the current electricity price, and makes an average profit of circa £40,000 per year which are retained or distributed to community projects via a number of routes. In the most recent year it reportedly made a profit of circa £72,000.

Located in the Snowdonia National Park, Ynni Anafon has an objective to provide cheaper electricity to the community of Abergwyngregyn (Aber), in particular as this was referenced in the planning application as part of the 'policy planning balance' for the project.

The Environmental Statement and Design and Access Statement state that the project could 'reduce local household energy bills through "sleeving", where the hydropower scheme energy contribution onto the grid helps to reduce the unit price of imported electricity'.

It also states that the project is supported by Eryri Development Policy 3: Energy as "Income from the project (after loan repayments) will be used to support the Abergwyngregyn community and surrounding area in further energy efficiency and renewable energy. It is also expected to reduce the energy bills of local residents, whereby the power generated can be used to lower the cost of imported electricity within the area."

The costs of planning permission and project development were paid for by public grant funds from Ynni'r Fro and others and the £1.2m build cost was raised from a combination of £490k in community shares (@5% plus EIS / SEIS) and a bank loan of £570k.

2.2. Local supply potential

Ynni Anafon has determined that there are around 100 households in Aber, comprising around 230-240 people. 36 households have currently expressed interest in a local energy scheme and some have already provided information with respect to who their existing energy suppliers are.

The project has previously engaged with Energy Local, however this has not come to fruition at the time of writing.

In addition, the Aberfalls distillery is a significant local user of power – Cyd Ynni are to confirm usage – However it is clear to say that the electricity and heat usage could provide a stable market for the local supply of hydro electricity.

The usage is typically 7 days a week, 7am – 7pm, with reduced hours at weekends. Electricity usage profile tends to be level during operational hours with 2 periods of extra when pumping. A visitor centre is currently being built with access for other local businesses and a kitchen, café and other facilities.

2.3. Additional generation potential

Ynni Anafon have a plan to install solar on farm buildings next to Aber Falls Kennels and Cattery to increase generating capacity, in particular in the summer months to complement the hydro generation.

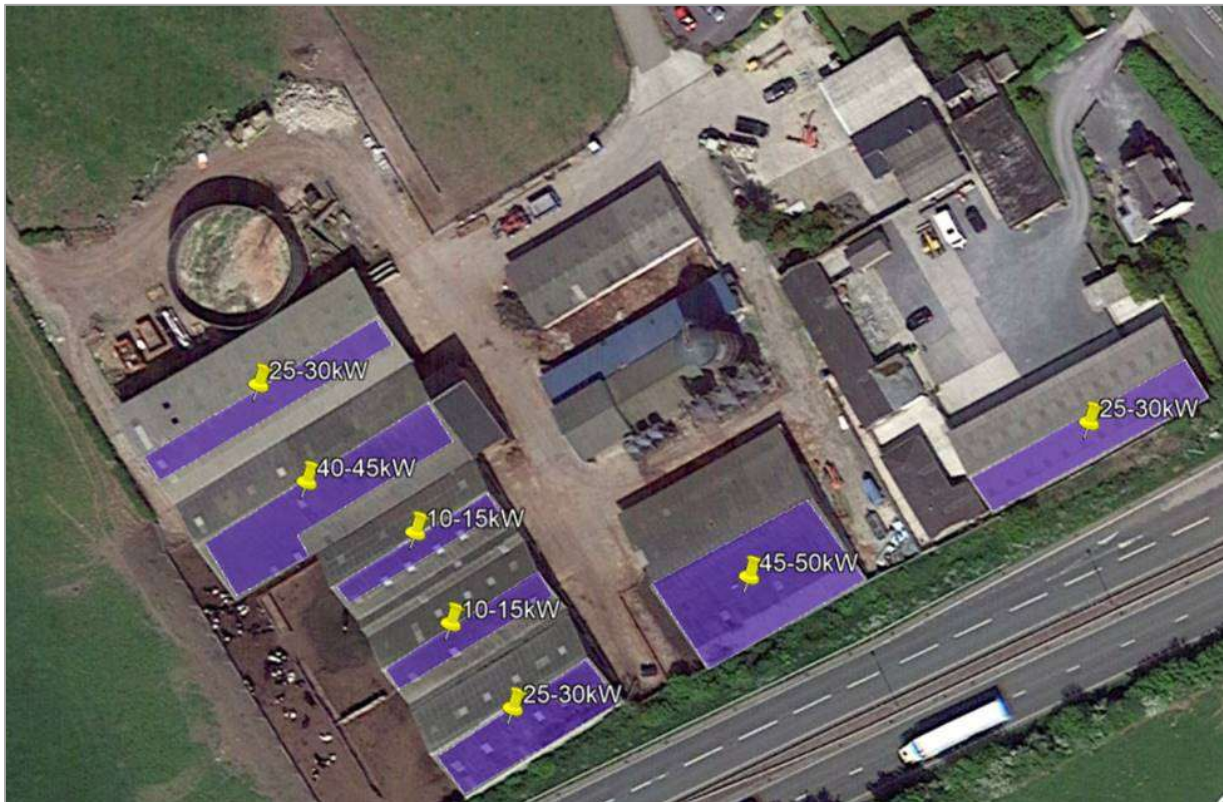


Figure 2 – Potential solar sites (google earth)

An initial analysis has shown that the approximate cost (assuming no asbestos which samples of roof would need to be tested to confirm) would be circa £750/kW installed and this is subject to survey etc and looking at where electrical connections would be.

3. Analysis of supply and demand

An initial half hourly model was developed to assess volumes that could be supplied across the network and concurrently consumed within the same half hour. The Matched Volume is then considered to be the smaller of either the demand or the generation in any specified period.

Hydro data was analysed and interpreted from information sent by Ynni Anafon [Note that this interpretation has not yet been confirmed to be correct by Ynni Anafon]. Solar generation data is synthetic and scaled to a 200kW system with a typical output for a site in this location, note that this is subject to detail design of the system.

Consumer consumption data is based upon the standard domestic profile multiplied by the number of consumers and adjusted for seasonality.

The Aberfalls distillery data is estimated based on reported characteristics of the uses and timings within the facility and then compared to typical annual usage expectations.

A summary of the annual generation and consumption values is given in Table 2.

| | | |
|-------------------------------------|--------------|------------|
| Annual Estimated Generation | | |
| Hydro | 1,025 | MWh |
| Solar | 236 | MWh |
| Total generation | 1,261 | MWh |
| | | |
| Annual Estimated Consumption | | |
| Residential consumers 100 | 381 | MWh |
| Distillery | 169 | MWh |
| Total consumption | 550 | MWh |
| | | |
| Locally Matched Volume | 459 | MWh |

Table 2 – Potential solar sites

The estimated yearly variation is then shown in Figures 3,4 and 5. Note that this is based on historic data and hence is estimated and may be different in future depending on weather, rainfall and consumer circumstances.

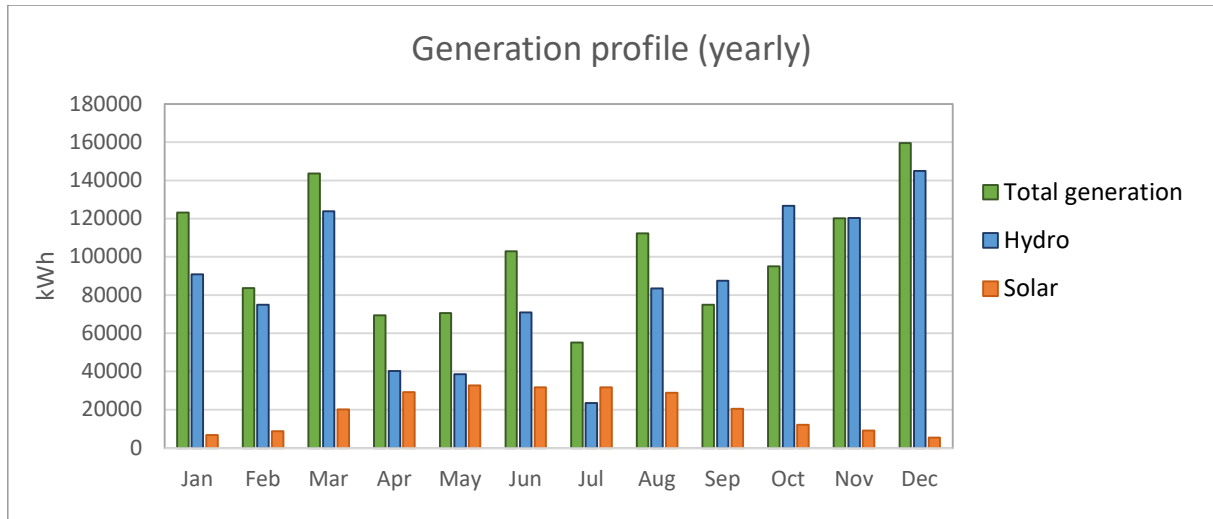


Figure 3 – Generation profile over a year

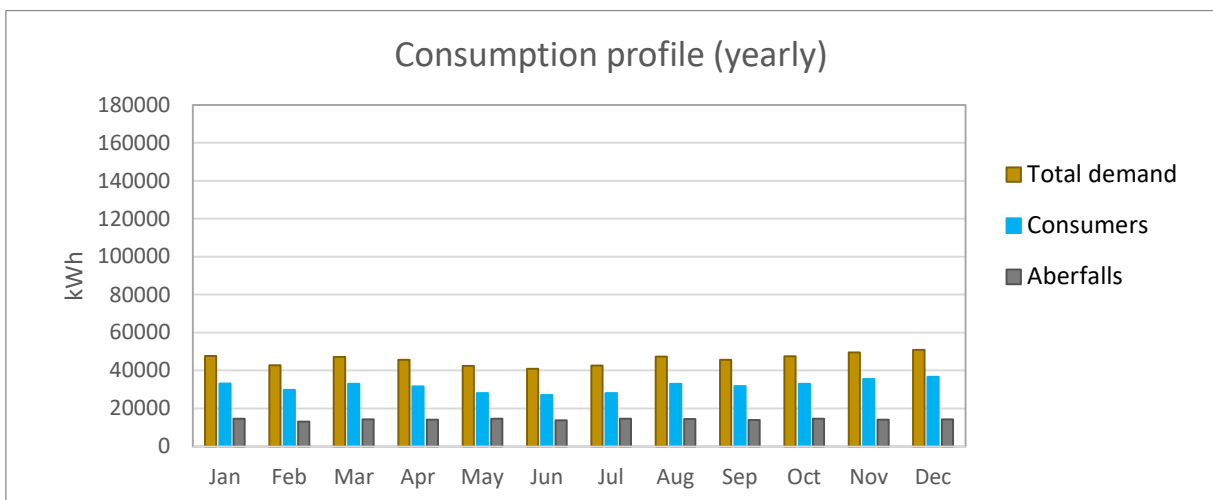


Figure 4 – Consumption profile over a year

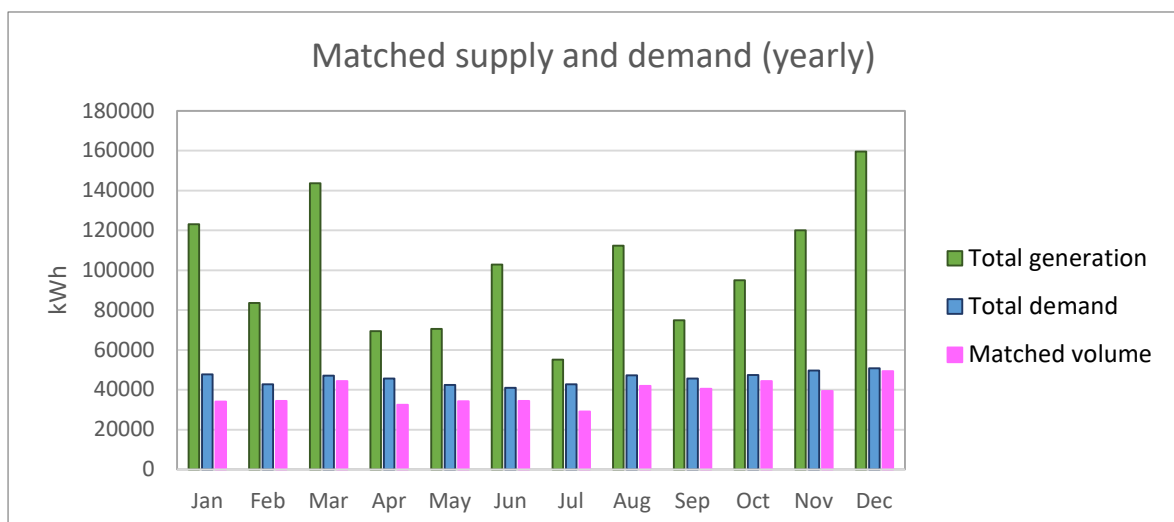


Figure 4 – Matched supply and demand over a year

4. Local supply options

Through consultation with Ynni Anafon, it is clear that the primary objective is to reduce local consumer bills via a local supply mechanism that is quick to implement. However there is also a desire to do this without reducing the amount of funding that is available for existing community benefit projects.

In addition, there are further objectives, in particular creating behavioural change with respect to the magnitude and timing of energy use which is expected to reduce energy use overall and reduce stress on the electricity networks.

Juno initially suggested some simplified options that could distribute financial benefit to energy consumers in Aber without the complications or technical hurdles that generation / demand balancing systems encounter.

4.1. Option 1 - Local consumer grant

The simplest option would be a household local energy grant, whereby any home or business within a certain radius would receive a grant from the hydro company. The advantages of this scheme are that it would immediately allow Ynni Anafon to distribute value to local consumers by postcode without any of the administrative or set up cost or complexity of smart metering. In addition, it could be administered without the need to rely upon an energy supplier. An incentive-based system could also be used to encourage behavioural change, whereby consumers would report their energy bills to Ynni Anafon and the grant amount could be increased if energy bills are decreasing over time. However, it would not act to increase the balance of generation and demand as bills do not provide this level of granularity of usage. It would also not provide an enhanced price of energy to the generator. Lastly, it was noted that the tax implications for recipients would need to be carefully considered, as this could potentially constitute income under some circumstances, however this would need to be fully explored with a tax professional.

4.2. Option 2 - Discounted PPA

The second option would be for Ynni Anafon to accept a lower PPA for the energy from a Licensed Energy Supplier (LES) – possibly even a zero PPA. Note that FITs would be unaffected. A Licensed Energy Supplier could then pass this saving on as a rebate to consumers who were associated with the scheme. Eligibility could be on a geographic postcode basis. Savings could be allocated to consumers on a flat rate basis depending on how much income the hydro scheme wished to sacrifice. For example, £10k per year, split between 100 households, £100 per year would be a meaningful saving. Alternatively, they could be allocated in an incentivised way that rewards reduction in energy usage as described above.

Similarly to Option 1, there is some concern that with no intelligence in terms of time of day tariff or generation / demand matching this would not tackle the bigger issues of energy consumption. In addition, it does not enhance the price for the generator.

Ynni Anafon raised concerns about this approach being unsustainable as it would require a permanent income sacrifice which may not be acceptable to the board of Ynni Anafon and the sustainability of the project.

4.3. Option 3 – Matched Tariff

A matched tariff would allow the relationship between generation and consumption to be defined such that pricing could be varied depending on agreed parameters. Typically this would be set up to give a reduced price to the consumer for energy that was being matched to generation and would be advantageous in that it would be able to motivate the consumer to use power at particular times of day. This would increase connectivity with energy use with the potential to

reduce usage overall. It also offers the potential to take advantage of savings in non-energy costs that could possibly be made as a result of operating in a local area on the network.

However, a matched tariff approach relies upon the installation of smart metering or In Home Devices (IHDs) to be able to observe energy usage accurately in each half hourly period. This will necessarily take longer to install and implement than either Option 1 or 2 and depending on the DCC WAN signal coverage, it may not be possible for every customer at the current time. For example, houses with particularly thick stone walls, or located within enclosed terrain would not be able to operate a smart meter. It is not possible to obtain access to the coverage map in Aber so it will likely remain an unknown until the project is started. It is estimated that to sign up 100 customers and install smart meters would be likely to take 6+ months, plus an unknown amount of time for COVID-19 delays.

In addition there is significant uncertainty about the savings in non-energy costs that can be achieved owing to a series of reviews and consultations in the industry, meaning that a business model predicated on such factors alone is highly exposed to the potential for unfavourable regulatory change. This is discussed further in Section 6.

It is important to note that in the majority of cases, consumer energy prices do not include large profit or contingency elements and whilst the regulatory regime is highly complex, it generally acts with the consent of the industry to create an even distribution of the costs of keeping the lights on. This is important because it means that if the project is going to offer a discount to consumers and an enhanced price to the generator, this value must necessarily be taken from somewhere else.

The energy price is made up of key components, on average in the UK it typically looks similar to that shown in Figure 5.

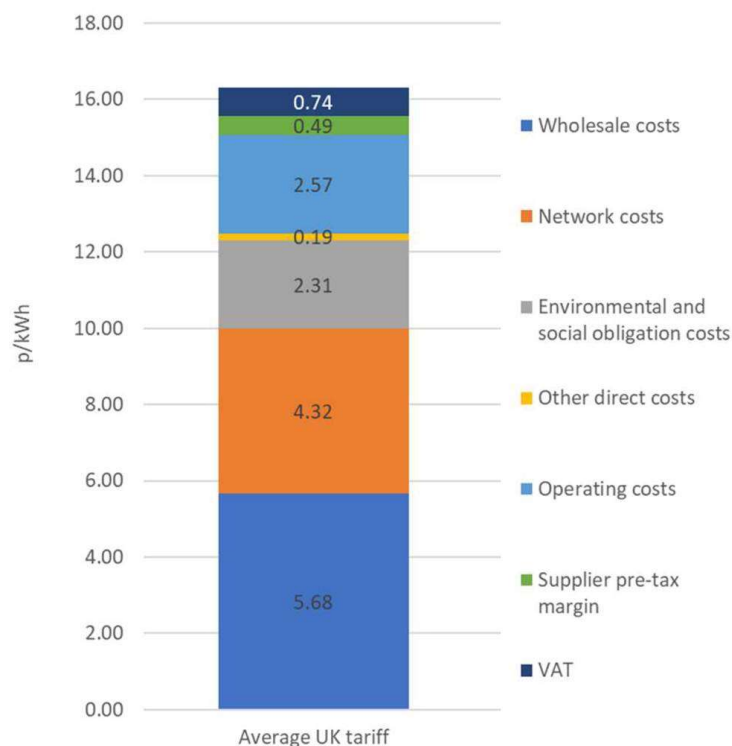


Figure 5 – Typical breakdown of an energy tariff in the UK

It is clear that VAT, Supplier pre-tax margin and other direct costs are not able to be influenced by a locally matched tariff. Similarly, the Operating costs are very unlikely to be reduced and in fact may be increased by the added complexity of the matching process.

A reduction in wholesale prices is what is described in Option 2 above and so will not be considered further here. Therefore, the only real opportunities for cost saving are from Network Costs and possibly Environmental and Social Costs.

There may be opportunities to reduce these, however the whole industry is currently in a state of flux owing to various Charging Reviews and changes proposed under DCUSA as discussed in Section 6. It is therefore not possible to be able to guarantee a certain reduction in costs for any substantial period. In addition, the fundamental principle applied by the industry is that it is of no overall benefit to shift costs around between consumers and that costs should be attributed fairly. For example, it is not acceptable for a certain set of consumers to avoid paying charges if it results in all of the other consumers paying a corresponding increased amount. For this reason and for the time being there is likely to be a circular, cat and mouse style opening and closing of these potential value sources, with developers exploiting them and the regulator closing them. This will of course settle in the event that industry policy decides to support local generation.

5. Licenced Energy Supplier Engagement

As agreed with the client, Juno has engaged with Licenced Electricity Suppliers (LES) to scope their existing offerings with respect to the local supply, and as so far as is possible with the information on generators and consumers available.

5.1. Bristol Energy

Bristol Energy is owned by Bristol City Council and has a strong emphasis on supporting community and renewable energy projects. It aims to go tackle social and environmental challenges such as fuel poverty and climate change and offers lower carbon, wholly green energy supplies of electricity and gas.

The company is in the process of developing a local supply methodology which is able to be replicated to different and novel situations but based on augmenting its existing tariff offering, rather than developing new tariffs for different communities. Bristol Energy is exploring a number of different options with respect to local supply models and the innovation team is involved in several projects which involve trialling new ways of delivering local green benefits to consumers. Juno is currently also working with Bristol Energy on the Gower Power Solar Storage project which aims to offer a discount to consumers who live locally to and co-own the renewable project.

Whilst there is not yet a standardised offering, Bristol have expressed an interest in delivering the Ynni Anafon local supply project as it fits well with their community and low carbon aims. However, at the time of writing Bristol Energy, along with many other suppliers is adapting to the new COVID-19 environment and is unlikely able to support initiation a project such as this whilst mitigating the effects of the pandemic on consumers and operations.

5.2. Ecotricity

Ecotricity is an independent energy company based in Stroud, Gloucestershire specialising in selling green energy to consumers that is largely generated from its wind power portfolio. Ecotricity is a 100% green energy supplier with the stated purpose being the environment including broad ranging aims to promote sustainable living in energy, transport and food.

Ecotricity has an extensive history of innovations in green energy supply since the 1990s and is committed to community benefits from energy generation across its portfolio. The local benefits

typically arise from community benefit funds or operating with local partners, however they are very interested in developing a local supply project at Ynni Anafon.

Ecotricity has a single tariff approach to electricity supply, so any bespoke arrangement would be set up via a consumer rebate rather than a bespoke tariff. This saves administrative and regulatory costs of maintaining a bespoke tariff.

Ecotricity are the most receptive to project development despite the current economic and social climate. The project fits very well with their overall ethos and objectives of supporting community renewable energy. While not always offering the cheapest electricity on the market, Ecotricity consistently rate highly with consumers and have a consistent record of delivering successfully.

Detailed discussions have taken place with respect to energy volumes and delivery mechanisms, and as such Ecotricity are currently the preferred partner for Juno for the project. Please note that this subject to a formal procurement process in the next phase of the project.

5.3. Other suppliers

Juno had had discussions with other energy suppliers about the potential for this project, however these have not been taken further at the current time.

If appropriate Octopus / Coop could potentially engage via the existing 'Energy Local' project that is currently aiming to develop a pipeline of projects around the UK. Note that their approach is detailed online and appears to be subject to the same regulatory uncertainties and challenges outlined in this document.

Initial discussions with EDF suggested that this type of project is too complicated and not at a great enough scale to be of interest at the current time.

6. Regulatory uncertainty

As discussed above, the electricity industry in the UK is in a constant state of regulatory flux. This is especially true at the present time owing to the step change in smart networks and data flows coming online. This is important as some of the policies and regulations being reviewed will have a direct impact on the financial environment for a local supply project. For example, one which relies upon being able to 'net off' grid charges to enable the consumers benefit, could be significantly impacted were the rules to be tightened up to avoid this.

Some examples of potential changes affecting local supply projects are outlined below.

The first example would be a project that is set up to exploit a badly worded section of the BSC (**P502**) which enables the Licenced Energy Supplier (LES) to define a 'complex site' with a pseudo MPAN for the collection of supply and demand sites. This allows the LES to notify the DNO of the net network usage, hence saving all of the locally matched network costs both on consumption and generation as long as they are within the same GSP. This legislation was purportedly intended to allow large industrial consumers with multi-metering a fairer way to pay network charges, so is being pushed to its limit with this model. It is currently working but is currently being looked at by Elexon (Network Charging Issue 88) and it is their published view that this legislation was never intended to allow the netting off of supply and demand.

Similarly, **DCP 268** has been approved and will come into force in April 2021. This removes the differences in charges between intermittent and non-intermittent generators covered under

CDCM (11kV and below). This is expected to result in a change to DNO charges (and hence embedded benefits). Depending on the circumstances of a particular generator, this could be a significant difference in revenue available to the local supply project.

CMP333 was issued for consultation on 13 February 2020. The proposal has been directed by Ofgem as part of its Targeted Charging Review decision and would see Balancing Services Use of System (BSUoS) charges levied on suppliers on a gross demand basis rather than net demand. This could impact network charges being passed through to a local supply project.

Electricity Settlement Reform Significant Code Review (SCR)

The below is taken from "Market-wide Settlement Reform: Outline Business Case" Ofgem 2018

"Settlement reconciles differences between a supplier's contractual purchases of electricity and the demand of its customers. Generators and suppliers trade electricity in the wholesale market in half-hourly periods. Currently, most customers are settled on a 'non half-hourly' basis, as they do not have meters that can record consumption or export in each half-hour period. They are settled using estimates of when they use electricity, based on a profile of the average consumer usage (within a given Profile Class) and their own meter reads (taken over weeks and months).

Smart meters can record the amount of energy consumed or exported within every half hour of the day. This provides an opportunity to make the settlement process more accurate and timely, and act as an enabler for new products and services. These can deliver positive outcomes for consumers through lower bills, reduced environmental impacts, enhanced security of supply and a better quality of service. We want to use smart metering and the settlement arrangements to better link suppliers' costs with the consumption of their customers, exposing the true cost of supplying and transporting electricity in any given half-hour period. This will put incentives on suppliers and other parties to develop new tariffs and innovations to help consumers to manage their consumption. We expect suppliers to offer customers the choice of whether they take these up.

Market-wide electricity settlement reform can play a key role as the energy sector decarbonises and we move towards a smarter, more flexible energy system. It can expose energy suppliers to the true cost of supply and put incentives on them to help their customers shift their consumption to times when electricity is cheaper to generate or transport, enabling significant benefits for consumers and the energy system as a whole."

In summary, the inclusion of domestic customers in Half-Hourly settlement will fundamentally change the way that consumer usage is measured and billed. It is expected that this will have a positive impact on local supply models, however it creates significant uncertainty with how the mechanics of such a model will operate. This is not expected to be insurmountable by any means, but must be considered when understanding how definite a local energy proposal is for the medium to long term.

In summary, **any local supply model will be subject to a significant risk of regulatory change**, and the important thing is that these risks are transparently explained, quantified and understood by the parties involved.

7. Proposed scheme

When considered as a whole, the Ynni Anafon / Aber local supply potential offers a number of opportunities to enable it to proceed. The drivers for the project are explained above, as are some of the uncertainties that it will face. Juno has considered these together and has developed a proposal to initiate and sustain a local supply model. It is intended to strike a balance between simplicity and value, as a deliverable and robust system that is capable of adapting to regulatory uncertainty and technical challenges in a transparent way.

In summary, the project proposes to take advantage of potential savings in non-energy costs through local supply and demand matching. It will use smart metering and In-Home Devices to maximise the financial and social benefits to the consumers and the generator. The proposal also anticipates the installation of 200kW of roof mounted solar to join the scheme and the participation of the local Aberfalls Distillery to add further value.

This is intended to allow a reduction in energy prices for local consumers, and provides a baseline on which to create a local supply arrangement. Further benefits from reductions in Network Charges and Environmental and Social Costs could also provide further benefits from Day 1, but could not be guaranteed, and hence would be difficult to pin down in a tariff offering.

7.1. Key elements

Key elements of the proposal are as follows:

- i. The primary generator is 270kW hydro (Ynni Anafon)
- ii. A 200kW solar system would also be installed
- iii. The consumers will be located in Abergwyngregyn
- iv. Businesses and domestic customers can participate (circa 100 initially)
- v. Aberfalls distillery would be supplied by the project
- vi. Smart meters will be installed with communications devices (IHDs)
- vii. A web interface will be provided to give consumers near-realtime information about energy generation and demand. This will be accessible through a web browser.
- viii. The locally matched supply and demand will be calculated, and a discount offered to consumers and an increased price offered to the generator. The discount is based on the assumption that network charges can be reduced by only paying charging on the net of generation and demand by setting up under a pseudo MPAN and defining all users as a 'complex site' under the BSC as described in Section 6.
- ix. The discount on supplied energy is expected to be 3.16p/kWh, equating to an estimated saving of £120 per year for a typical household using 3,800kWh. The base tariff to which this is applied will depend on the LES partner chosen and their standard tariff offering at the time the consumers make the switch.
- x. The increased price on generated energy is expected to be 0.11p/Wh, equating to an estimated increased revenue of £1,400 per year for Ynni Anafon.
- xi. The discount on energy supplied to Aberfalls is expected to be 0.4p/kWh, equating to an estimated saving of £707 per year
- xii. The above figures assume the benefits are split 85% to consumers 5% to the generator and 5% to Aberfalls. Note these benefits could be allocated in proportions to suit the project eg. more to consumers, or more to either or both the hydro and solar, or otherwise to business consumers as desired.

- xiii. The generation PPA will provide a mechanism for the enhanced price to be passed through the Ynni Anafon. In addition, whilst not essential, it would be very advantageous if in the initial period Ynni Anafon could provide seed funding through its PPA arrangement with the LES to discount consumer bills if uncertainty with respect to the non-energy costs causes a delay (Up to a maximum of £10,000 in total and more likely less).
- xiv. The project as envisaged would save c 130 Tonnes of CO₂ per annum, 0.3 tonnes of Methane and 0.7 tonnes of Nitrous oxide [*UK Government GHG Conversion 2018 on Factors for Company Reporting*]
- xv. If, after a period of 12 months (TBA) the project is not able to provide additional value as anticipated, consumers would be informed and switched to the LES standard offering (there would be no interruption of supply or billing)
- xvi. The project will be managed by Juno Energy Ltd in conjunction with the LES under the existing procurement.

7.2. Project delivery

The project will set up a mechanism for business and residential customers to benefit from a local energy tariff that offers consumers a reduced price and generators an enhanced price.

7.2.1. Ynni Anafon Board approval

Juno Energy has already been procured by Cyd Ynni via Menter Môn to deliver this scheme. It is understood that Ynni Anafon Board approval will be required to enable the project to start.

7.2.2. Consultation

Consultation will be undertaken with local businesses and residents as an open call, with appropriate advertising via Cyd Ynni to ensure a fair and transparent process in selecting businesses and residents to participate in the scheme. This will consider annual energy use and temporal variation and ask what the energy is used for to understand the load. Existing contract status will also be determined with respect to duration, end date, standing charge and power price.

7.2.3. Set up tariff structure and web interface

The tariff structure and information flows will be set up with the LES. The project as envisaged does not require a specific community entity to be set up (ie a CBS or CIC). Customers will join the scheme which will be administered by the LES. Data protection (GDPR) legislation will be addressed to ensure the necessary information can be shared with the appropriate parties.

The Ynni Anafon PPA will be agreed with the LES including any agreed provisions to allow the up to £10,000 seed funding to be passed to consumers as a discount in the initial period. [with express permission of the Ynni Anafon board if given]. Alternately consumers will be made aware that benefits may not come online for the first 6-12 months.

A web-based interface will be created to community with consumers with respect to the tariff available and current hydro generation available. Juno will manage the supplier creating and implementing the web interface alongside Cyd Ynni to ensure fitness for purpose. It will be ensured that participants are able to access and understand the interface.

7.2.4. Customer sign up

Juno will then assist project participants in signing up to the scheme. A participant register will be maintained with the key parameters for each participant and their status. A GDPR notice will

be provided as necessary. Ynni Anafon's local influence is expected to be of great value as experience shows that it is challenging to catalyse consumers into actually making the switch to the new supplier. It is recommended that a series of local or online events are held where consumers can be prompted and talked through the process.

7.2.5. Commissioning

In the first instance, it is expected that consumers will be switched to the scheme in batches such that initially there may be only 20-30 participants. Similarly, as customer switching is expected to be the task with greatest duration uncertainty (ie because many individuals are involved) other elements will be progressed in parallel. This would include the setting up of the LES internal mechanisms to reduce non-energy costs including smart meter data transfer and provide the additional matched tariff value.

7.2.6. Long term operation

At the end of the commissioning period, the c. 100 consumers would be signed up and the project would effectively operate independently, being managed internally by the LES. Ynni Anafon would be involved to continue to raise awareness of the project and introduce new customers as required. A mechanism will be set up such that new customers could sign up to the LES standard tariff online and then be moved across to participate in the scheme by mutual agreement.

7.2.7. Review points

The benefit of the project to consumers and the generator will be regularly assessed for example on a 12 monthly basis. This will offer an opportunity to fine tune or re-distribute benefits depending on the circumstances. In addition, if the project is not able to provide additional value as anticipated, consumers would be informed and switched to the LES standard offering (there would be no interruption of supply or billing).

7.3. Timeframes

Whilst the current situation with COVID-19 gives an unprecedented level of uncertainty with respect to immediate timeframes, it is reasonable to consider that from initiation to the end of the commissioning period is likely to be circa 12 months. The first Customers could be switched to the project after circa 3 months.

7.4. Financial and environmental benefits

In accordance with the assumptions set out in this document, primarily those with respect to being able to net network charges by using a pseudo MPAN and creating a single 'complex site', the locally matched supply and demand is calculated and a discount offered to consumers and an increased price offered to the generator.

A basic analysis of different configurations is presented in Appendix 1. This shows expected levels of benefit if for example the solar is omitted or the distillery is omitted. It also shows the difference between 100 and 150 consumers.

In the base scenario (4), the hydro, solar and distillery all participate in the project. On this basis, the discount on supplied energy is expected to be 3.16p/kWh, equating to an estimated saving of £120 per year for a typical household using 3,800kWh. The increased price on generated energy is expected to be 0.11p/kWh, equating to an estimated increased revenue of £1,400 per year for Ynni Anafon. The discount on energy supplied to Aberfalls is expected to be 0.4p/kWh, equating to an estimated saving of £707 per year.

The above figures assume the benefits are split 85% to consumers 5% to the generator and 5% to Aberfalls. Note these benefits could be allocated in proportions to suit the project eg. more to consumers, or more to either or both the hydro and solar, or otherwise to business consumers as desired.

The generation PPA will provide a mechanism for the enhanced price to be passed through the Ynni Anafon. Both residential and business consumers including the distillery would be issued a discount at the end of each quarter in respect of moneys saved through the local supply. This would allow consumers to target periods of high generation should they so wish.

The project as envisaged would save c 130 Tonnes of CO₂ per annum, 0.3 tonnes of Methane and 0.7 tonnes of Nitrous oxide [UK Government GHG Conversion 2018 on Factors for Company Reporting] when compared to the average mix of electricity in the UK. Ynni Anafon provided the energy suppliers of a sample of 16 interested consumers that broadly corresponds to this assumption.

7.4.1. A note on costs during the commissioning period

Whilst customers are signing up and systems being developed the benefits of the project will not materialise in the same way. There will be fixed costs associated with administering the scheme which will be borne by the LES regardless of the number of consumers. For this reason, in the initial period there may not be value available to provide discounts to the consumers from the proposed sources. In this event, to maintain project momentum and consumer enthusiasm as discussed above, it is proposed that Ynni Anafon accepts a reduced value of its PPA to allow the LES to provide discounts to consumers. These would be accrued on a quarterly basis and would be limited to £100 per consumer over the 12 month commissioning period, up to a maximum of £10,000 [subject to board approval]. Alternatively customers would be made aware that benefits would not accrue fully during this period.

7.4.2. Project termination

If, after a period of 12 months (TBA) the project is not able to provide additional value as anticipated, consumers would be informed and switched to the LES standard offering (there would be no interruption of supply or billing).

7.5. Further additions and refinements

Once the project is up and running, it could be used to add further value to the local energy system and serve as a platform from which to grow and develop further innovations. For example a battery storage system could greatly increase locally matched volumes through time-shifting and also opening new revenue stream in flexibility services. Similarly as Half Hourly metering comes online for domestic consumers, this would provide a demonstration site for controlling demand response.

8. Conclusion

A local supply mechanism is proposed as a result of consultation with Ynni Anafon key business consumers and Licenced Energy Suppliers.

The business model has been considered from first principles given the priorities of the community involved. Simplified options have been proposed but are not considered to meet with the requirements of the community. A model which involves smart metering and specific interpretation of industry codes is therefore planned and the estimated financial and environmental benefits set out.

Key risks are presented in terms of industry compliance, but also in terms of cash flow and value in the commissioning period.

Financial benefits are estimated to be £120 per annum for each of the 100 residential consumers and £707 per year for Aberfalls distillery. In addition, once the project is up and running the annual benefit to Ynni Anafon is estimated to be £1,400.

9. Next steps

1. To present the proposal to the Ynni Anafon board (by video conference)
2. To deliver the next phase of the procured work and set up the local supply model.
3. See original procured proposal for full details.

10. Appendix 1

| No. | Scenario | Matched volume MWh | Total project benefit £ | Each consumer | | | Generator(s) | | | Distillery | | | CO2 saving |
|-----|--|--------------------|-------------------------|---------------------|--------------|---------------|---------------------|--------------|---------------|---------------------|--------------|---------------|---|
| | | | | % Benefit allocated | £ pa benefit | p/Kwh benefit | % Benefit allocated | £ pa benefit | p/Kwh benefit | % Benefit allocated | £ pa benefit | p/Kwh benefit | Saving versus UK average UK GHG 2018 Tonnes per annum |
| 1 | 100 Consumers, Hydro | 276 | 6,825 | 90% | 61 | 1.62 | 10% | 683 | 0.07 | - | - | - | 77.5 |
| 2 | 100 Consumers, Hydro + Solar | 324 | 8,746 | 90% | 79 | 2.07 | 10% | 875 | 0.07 | - | - | - | 91.0 |
| 3 | 100 Consumers, Hydro + Aberfalls | 374 | 10,753 | 85% | 91 | 2.41 | 10% | 1,075 | 0.10 | 5% | 538 | 0.32 | 105.1 |
| 4 | 100 Consumers, Hydro + Solar + Aberfalls | 459 | 14,133 | 85% | 120 | 3.16 | 10% | 1,413 | 0.11 | 5% | 707 | 0.42 | 128.8 |
| 5 | 150 Consumers, Hydro | 390 | 10,894 | 90% | 65 | 1.72 | 10% | 1,089 | 0.11 | | | | 109.6 |
| 6 | 150 Consumers, Hydro + Solar | 464 | 13,838 | 90% | 83 | 2.18 | 10% | 1,384 | 0.11 | | | | 130.2 |
| 7 | 150 Consumers, Hydro + Aberfalls | 474 | 14,247 | 85% | 81 | 2.12 | 10% | 1,425 | 0.14 | 5% | 712 | 0.42 | 133.1 |
| 8 | 150 Consumers, Hydro + Solar + Aberfalls | 583 | 18,595 | 85% | 105 | 2.77 | 10% | 1,859 | 0.15 | 5% | 930 | 0.55 | 163.7 |