Cynllun Ynni Ardal Leol

Gweithdy opsiynau strategol

Local Area Energy Planning

Strategic options workshop

Mehefin 2023

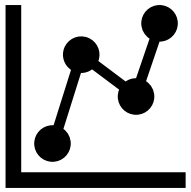
June 2023

Pwrpas y gweithdy

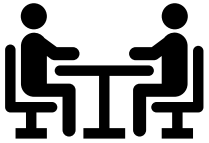
Rôl y rhanddeiliad a phwrpas y gweithdy

(i) Adolygu a chytuno ar linell sylfaen y system ynni lleol, h.y. y galw (adeiladau, trafnidiaeth, diwydiant); y seilwaith (rhwydweithiau trydan a nwy, storio); a'r cyflenwad (ynni adnewyddadwy, carbon isel arall)

(ii) Adolygu a chytuno ar y blaenoriaethau ar gyfer Cynllun Ynni Ardal Leol, h.y. nodweddion pob elfen o'r system ynni y dylid eu cyflawni'n lleol



(iii) Trafod senarios posibl i'w defnyddio wrth fodelu Cynllun Ynni Ardal Leol



Purpose of workshop

Stakeholder's role and purpose of workshop

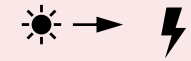
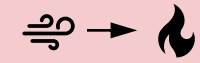
(i) Review the local energy system baseline, i.e. demand (buildings, transport, industry); infrastructure (electricity and gas networks, storage); and supply (renewables, other low carbon)

(ii) Consider the priorities for the LAEP, i.e. the specifics for each energy system element that should be undertaken locally

(iii) Discuss potential scenarios to be used in the LAEP modelling

Trafodaethau grŵp

Termau a diffiniadau allweddol

Technoleg	Diffiniad	Symbol	Effeithlonrwydd
Teithio llesol	Math o deithio gan bobl sy'n cynnwys cerdded neu feicio		-
Treulio anaerobig	Prosesu biomas (deunydd planhigion) yn fio-nwy (methan) y gellir ei ddefnyddio ar gyfer gwresogi a/neu gynhyrchu trydan		0.4
Boeler biomas	Cynhyrchu gwres drwy losgi tanwydd pren (e.e. logiau, naddion coed) mewn boeler		0.7
Uchafswm o ran y galw	Dyma faint o gapasiti sydd ar gael mewn MW yn y grid trydan y gallai datblygiadau newydd, cerbydau trydan, pympiau gwres ei gysylltu hefyd		
Electroleiddiwr	Defnyddio trydan i hollti dŵr yn hydrogen ac ocsigen		0.65
Gwynt arnofiol	Defnyddio gwynt i droi tyrbin i gynhyrchu trydan gan ddefnyddio strwythurau sy'n arnofio ar y môr		0.18
Uchafswm cynhyrchu	Dyma faint o gapasiti sydd ar gael mewn MW yn y grid trydan y gall generaduron adnewyddadwy ei gysylltu hefyd		
Ffotofoltäig daear	Mae'n trosi golau'r haul yn drydan gan ddefnyddio celloedd ffotofoltäig sydd wedi'u gosod ar y ddaear		0.12
Pwmp gwres	Mae'n defnyddio system cyfnewid gwres i gymryd gwres o'r aer/tir ac yn cynyddu'r tymheredd i gynhesu adeiladau		2.5
Storio gwres	Storio ynni thermol i'w ryddhau'n ddiweddarach, gan ddefnyddio trydan neu thermo-gemegion yn aml		0.75
Trydan dŵr	Defnyddio dŵr sy'n disgyn rhwng dwy gronfa ddŵr i droi tyrbinau i gynhyrchu trydan		0.35

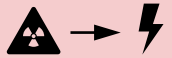
Breakout room discussion

Key terminology and definitions

Technology	Definition	Symbol	Efficiency
Active travel	Transport powered by human activity, such as walking or cycling		-
Anaerobic digestion	Processes biomass (plant material) into biogas (methane) that can be used for heating and/or generating electricity		0.4
Biomass boiler	Generate heat by burning wood-based fuel (e.g. logs, chippings) in a boiler		0.7
Demand headroom	This is the amount of available capacity in MW in the electricity grid that new developments, EV, heat pumps could connect too		
Electrolyser	Use electricity to split water into hydrogen and oxygen		0.65
Floating wind	Harness wind to turn a turbine to generate electricity using floating structures offshore		0.18
Generation headroom	This is the amount of available capacity in MW in the electricity grid that renewable generators can connect too		
Ground PV	Converts solar radiation into electricity using photo-voltaic cells mounted on the ground		0.12
Heat pump	Uses a heat exchange system to take heat from air/ground and increases the temperature to heat buildings		2.5
Heat storage	Stores thermal energy to be released at a later time, often using electricity or thermo-chemicals		0.75
Hydroelectricity	Use water falling between two reservoirs to turn turbines to generate electricity		0.35

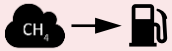
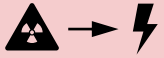
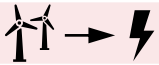
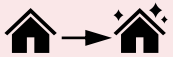
Trafodaethau grŵp

Termau a diffiniadau allweddol

Technoleg	Diffiniad	Symbol	Effeithlon-rwydd
Boeler hydrogen	Boeler sy'n gweithio yn yr un modd â boeler nwy traddodiadol, ond sy'n cael ei bweru gan nwy hydrogen		0.84
CCGT Hydrogen	Mae tyrbinau nwy cylch cyfun (CCGT) yn cyfuno tyrbin nwy hydrogen â thyrbin stêm		0.4
OCGT Hydrogen	Mae tyrbinau nwy cylch agored (OCGT) yn dyrbinau nwy hydrogen syml heb unrhyw ddull o adfer gwres gwastraff		0.54
Diwygio methan	Mae stêm tymheredd uchel yn adweithio â methan i ffurfio hydrogen		0.72
SMR Niwclear	Mae adweithyddion modiwlar bach (SMRs) yn adweithyddion niwclear sydd â chapasiti o dan 300 MWe.		0.35
Gwynt ar y tir	Defnyddio gwynt i droi tyrbin i gynhyrchu trydan ar y tir		0.18
Gwres o wrthiant	Cynhyrchu gwres drwy basio cerryntau trydanol drwy wifrau		1
Ôl-osod	Uwchraddio perfformiad adeilad, er enghraifft, gosod mwy o inswleiddio neu ffenestri dwbl		-
Ffotofoltäig ar ben to	Mae'n trosi golau'r haul yn drydan gan ddefnyddio celloedd ffotofoltäig sydd wedi'u gosod ar ben to adeilad		0.12
Nwy carthion	Mae micro-organebau mewn carthion yn cynhyrchu nwyon fel methan y gellir ei ddefnyddio fel gwres a/neu i gynhyrchu trydan		0.58

Breakout room discussion

Key terminology and definitions

Technology	Definition	Symbol	Efficiency
Hydrogen boiler	A boiler that operates in the same was as a traditional gas boiler, but powered by hydrogen gas		0.84
Hydrogen CCGT	Combined-cycle gas turbines (CCGT) combine a hydrogen gas-fired turbine with a steam turbine.		0.4
Hydrogen OCGT	Open-cycle gas turbines (OCGT) are simple hydrogen gas-fired turbines with no waste heat recovery.		0.54
Methane reformation	High temperature steam reacts with methane to form hydrogen		0.72
Nuclear SMR	Small modular reactors (SMRs) are nuclear reactors with capacity lower than 300 MWe.		0.35
Onshore wind	Harness wind to turn a turbine to generate electricity on land		0.18
Resistance heating	Generate heat by passing electrical currents through wires		1
Retrofit	Upgrading the performance of an existing building, such as installing more insulation or double glazing		-
Rooftop PV	Converts solar radiation into electricity using photo-voltaic cells mounted on the roof of a building		0.12
Sewage gas	Micro-organisms in sewage produce gases such as methane that can be used to heating and/or generating electricity		0.58

Llywodraeth Cymru
Welsh Government
Uchelgais Gogledd Cymru
Ambition North Wales
CARBON TRUST
ARUP

Cyflwyniad gan Gyngor Sir y Fflint Y Cynghorydd David Healey

Introduction from Flintshire County Council Cllr David Healey

Rhaglen

1. Croeso a threfniadau
2. Trosolwg o'r Cynllun Ynni Ardal Leol (gan gynnwys sesiwn holi ac ateb)
3. Y llinell sylfaen; y polisi lleol; a chynhyrchu, allyriadau a'r galw am system ynni lleol
4. Adolygu'r llinell sylfaen – "beth ydyn ni wedi'i fethu?"
5. Opsiynau strategol – opsiynau/amrywiadau allweddol i'w hystyried ar gyfer senarios – 2 grŵp trafod
   - Y galw yn lleol (ar draws pob sector a defnyddiwr)
   - Y system ynni lleol – cynhyrchu a seilwaith lleol yn unig
6. Senarios lleol posibl o ran y galw / system ynni
7. Crynodeb
8. Beth all rhanddeiliaid ei ddisgwyl nesaf

Agenda

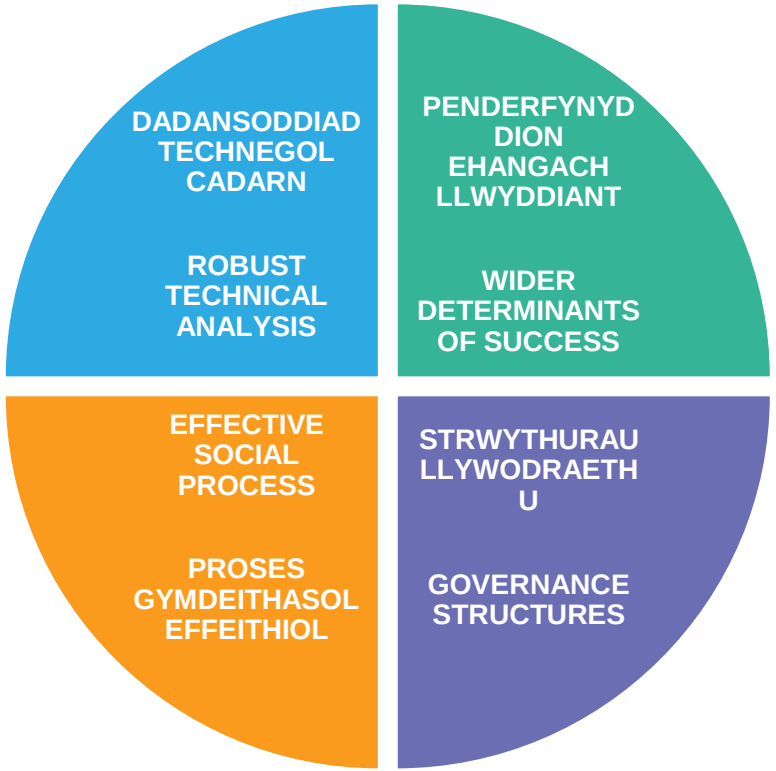
1. Welcome and housekeeping
2. LAEP overview (incl Q&A)
3. Baseline, local policy and local energy system demand, generation and emissions
4. Review of baseline - "what have we missed?"
5. Strategic options - key options/variables to consider for scenarios – 2 breakout groups
   - *Local demand (across all sectors and users)*
   - *Local energy system - local generation and infrastructure only*
6. Local possible scenarios for demand / energy system
7. Summary
8. What stakeholders can expect next

Trosolwg o'r Cynllun Ynni Ardal Leol

LAEP Overview

Beth yw Cynllunio Ynni Ardal Leol?

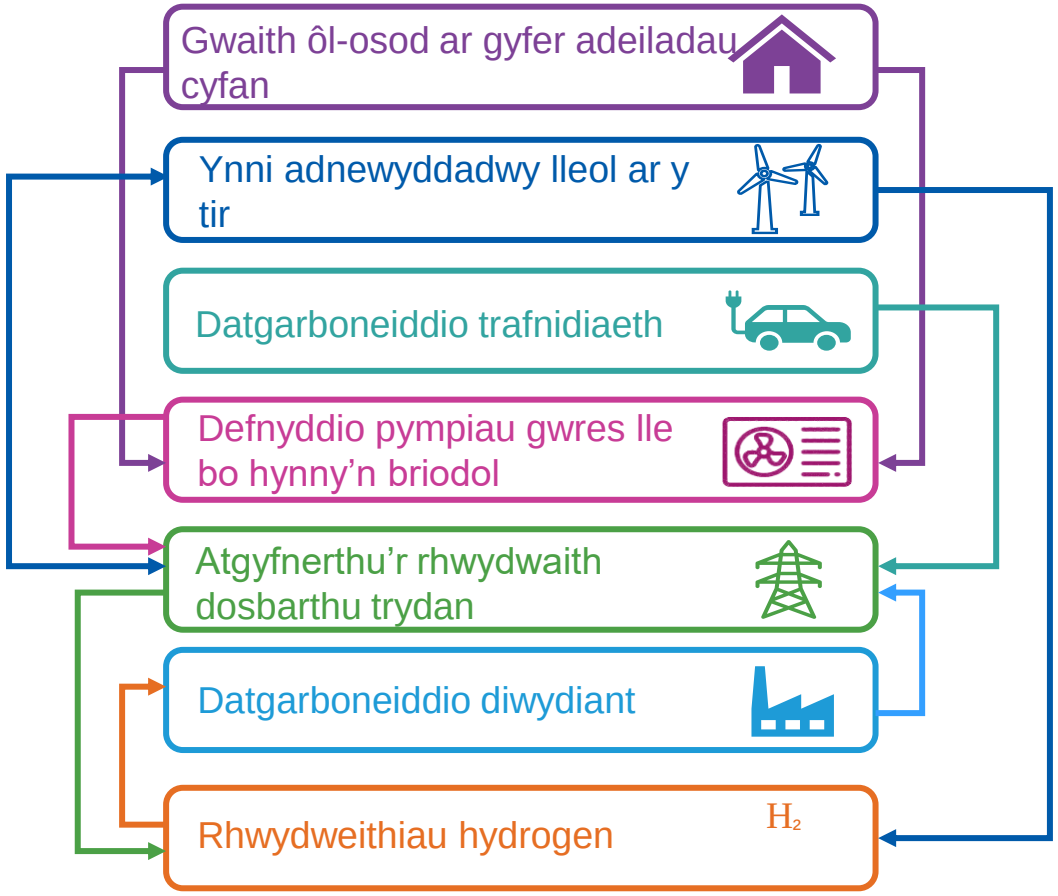
Proses sy'n ystyried y system ynni gyfan mewn ardal leol, sydd â'r potensial i lywio, siapio a galluogi agweddau allweddol ar y newid i system ynni carbon sero net.



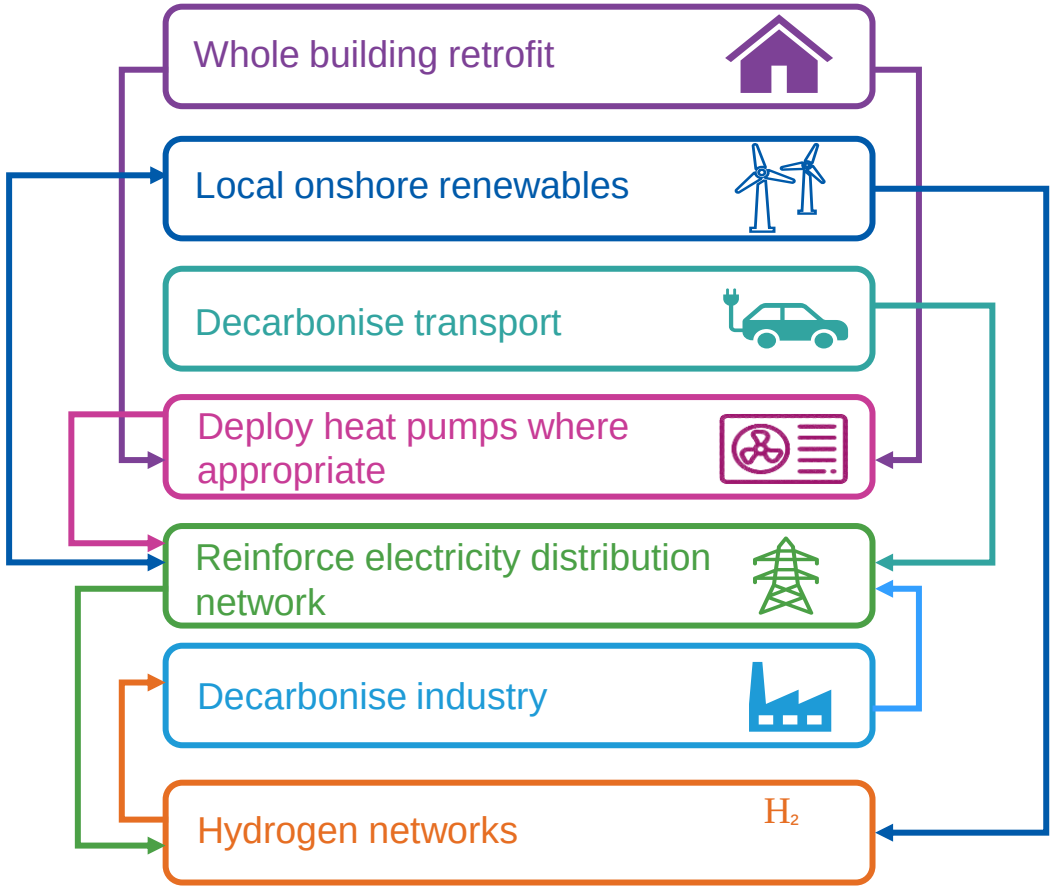
What is Local Area Energy Planning?

A process considering the whole energy system in a local area, which has the potential to inform, shape and enable key aspects of the transition to a net zero carbon energy system.

Beth yw eich system ynni lleol?

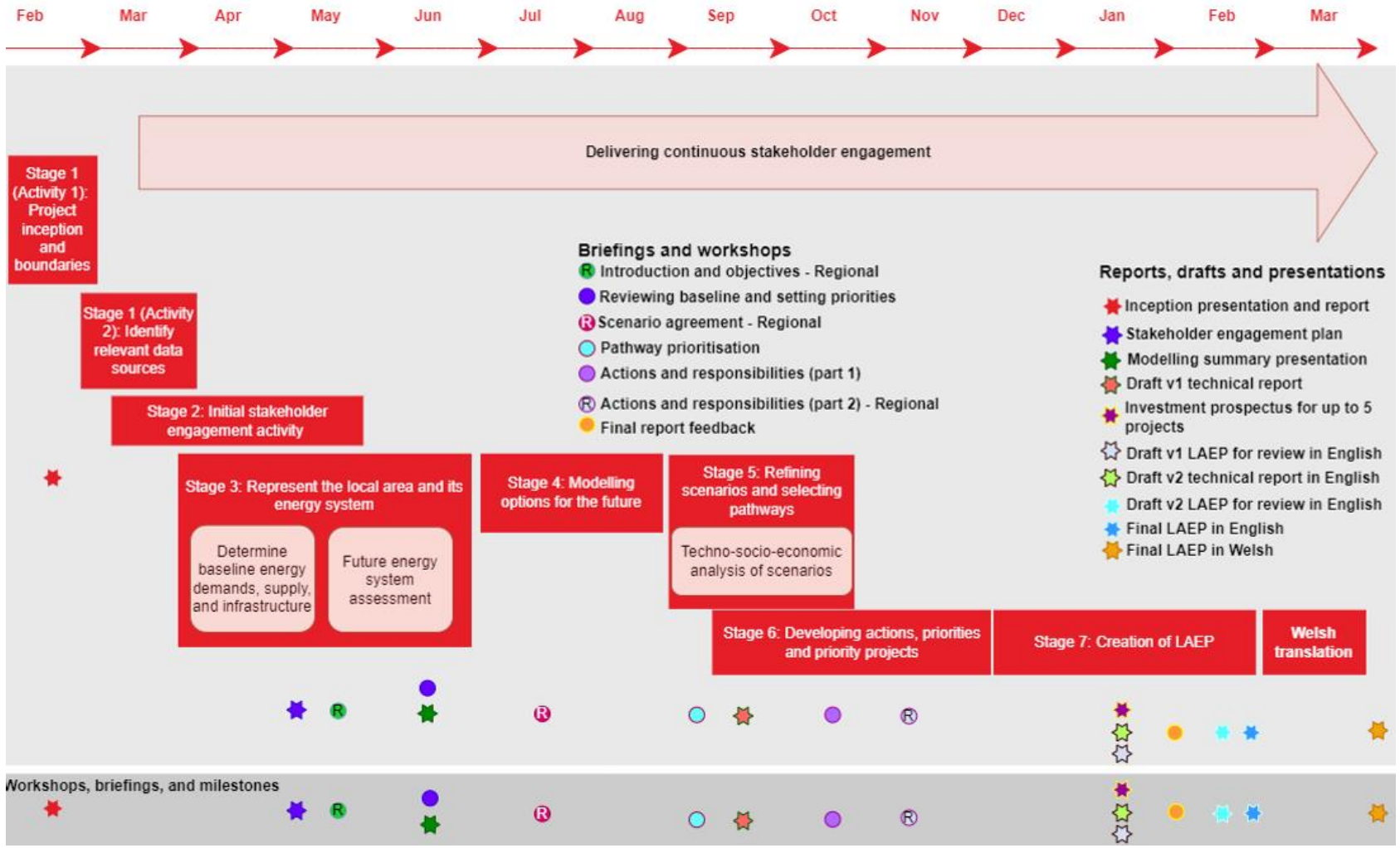


What is your local energy system?



Trosolwg o'r dull

Method overview



Y llinell sylfaen a'r cyd-destun

Baseline and context

Allyriadau carbon sylfaenol

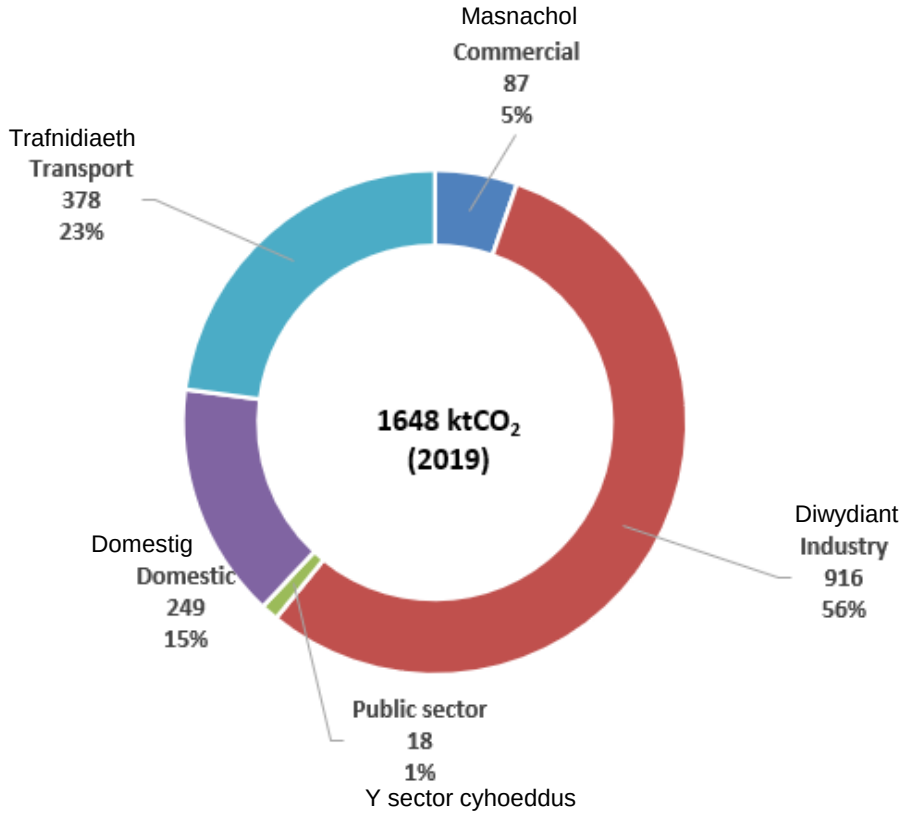
Roedd Sir y Fflint yn cyfrif am 7% o allyriadau carbon Cymru yn 2019 gyda 10.6 tCO_2 y pen

Mae allyriadau Sir y Fflint yn lleihau dros amser

Y sectorau sy'n gyfrifol am yr allyriadau carbon mwyaf yn 2019:

- 56% diwydiant
- 23% trafnidiaeth
- 15% domestig

Baseline carbon emissions



Flintshire accounts for 7% of Wales's carbon emissions in 2019 with 10.6 tCO_2 per capita

Flintshire's emissions are reducing over time

Largest carbon emission sectors in 2019:

- 56% industry
- 23% transport
- 15% domestic

Ffynhonnell: Ystadegau cenedlaethol allyriadau carbon deuocsid awdurdodau lleol a rhanbarthau'r DU: 2005 i 2019 [ac eithrio defnydd tir, newid defnydd tir a choedwigaeth]

Source: UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2019 [excluding LULUCF]

Defnydd ynni sylfaenol – diagram Sankey

- Mae diagram “Sankey”, wrth ddarllen o’r chwith i’r dde, yn dangos sut mae gwahanol ffynonellau ynni (h.y. tanwydd ac adnoddau ynni adnewyddadwy) yn diwallu gwahanol fathau o alw drwy fectorau ynni neu dechnolegau trosi.
- Mae diagramau Sankey yn ffordd o ddarlunio sut mae ynni’n trosglwyddo rhwng ffynonellau a’r galw drwy gludwyr.
- Mae diagramau Sankey yn cael eu llunio i raddfa ac maen nhw’n ddefnyddiol i nodi llifoedd ynni mawr neu fach.
- Mae ochr chwith y diagram yn cynrychioli’r gwahanol ffynonellau ynni, gan gynnwys technolegau cynhyrchu a’r hyn a fewngludir o’r grid cenedlaethol.
- Mae ochr dde’r diagram yn cynrychioli’r galw terfynol am bob fector ynni: y galw am wres, y galw am drydan, y galw am drafnidiaeth.

Baseline energy use – Sankey diagram

- A “Sankey” diagram, when read from left to right, shows how different energy sources (i.e., fuels and renewable energy resources) meet various types of demand via energy vectors or conversion technologies.
- Sankey diagrams are a way of visualising energy transfers between sources and demands via carriers.
- Sankey diagrams are drawn to scale and are helpful to identify large or small energy flows.
- The left hand side of the diagram represents the different energy sources, including generation technologies and imports from the national grid
- The right hand side of the diagram represents the final demands for each energy vector: heat demand, electricity, demand, transport demand.

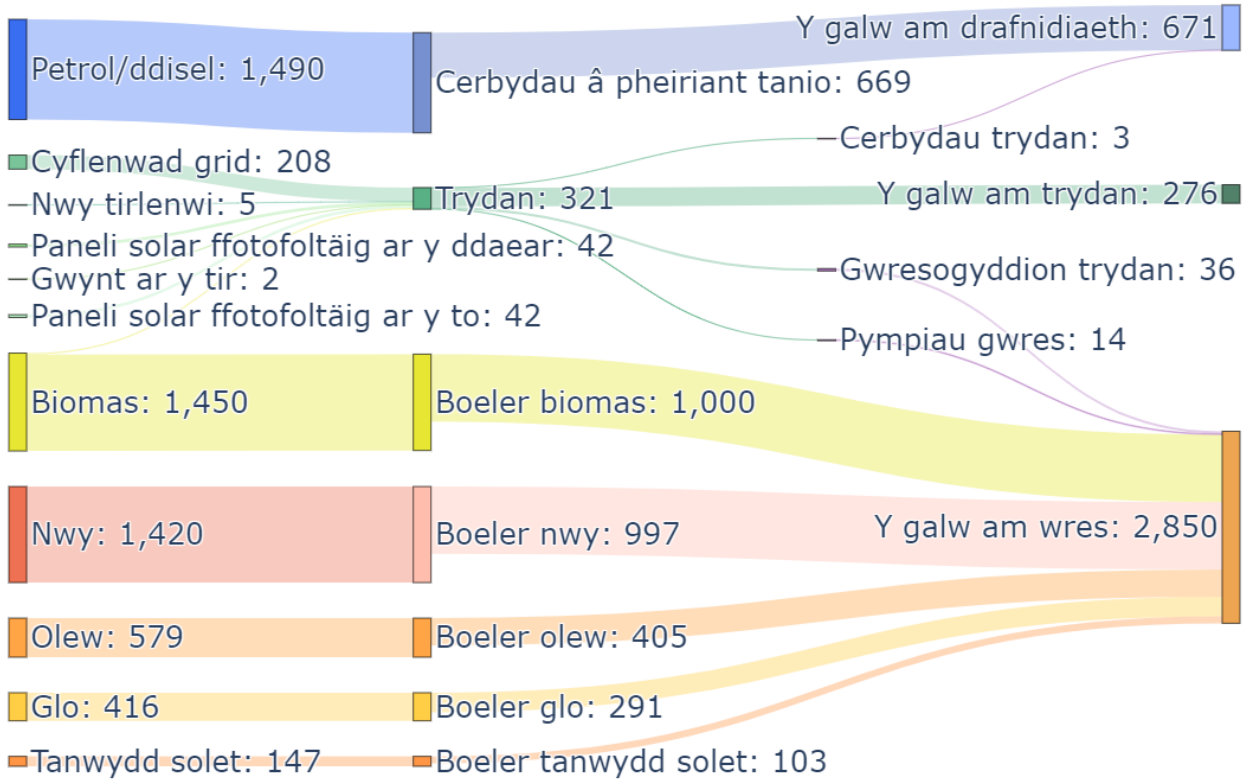
Defnydd ynni sylfaenol – diagram Sankey

Defnydd ynni sylfaenol – diagram Sankey (mewn GWh y flwyddyn, 2019)

Mae bron yr holl alw am drafnidiaeth yn cael ei ddiwallu gan injans tanio petrol neu ddisel

Y grid cenedlaethol sy'n cyflenwi'r rhan fwyaf o'r trydan (65%)

Mae'r rhan fwyaf o'r galw am wres yn cael ei ddiwallu gan raniad bron yn gyfartal o foeleri nwy ffosil a biomas (70%)



Tair system ynni bron ar wahân ar gyfer trydan, gwres a thrafnidiaeth

Colledion aneffeithlonrwydd rhwng ffynonellau ynni a'r galw

Gwresogi yw'r gydran fwyaf o'r galw am ynni (75%)

Ffynonellau:
Ystadegau BEIS - defnyddio tanwydd ar gyfer trafnidiaeth ffyrdd is-genedlaethol, Ystadegau BEIS - defnyddio nwy a thrydan ar lefel is-genedlaethol, Amcangyfrifon BEIS - eiddo nad ydynt wedi'u cysylltu â'r rhwydwaith nwy, Trydan adnewyddadwy yn ôl awdurdod lleol, BEIS

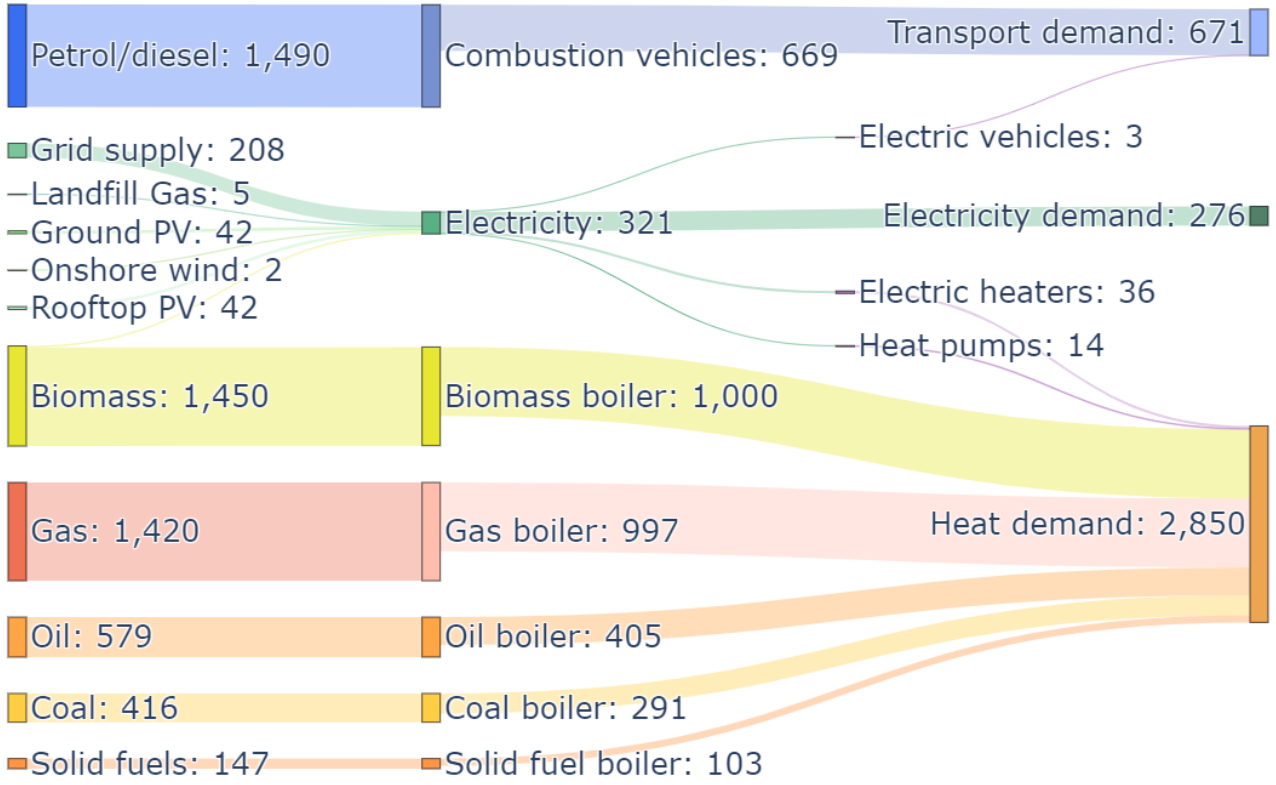
Baseline energy use – Sankey diagram

Baseline energy supply/use – Sankey diagram (in GWh per year, 2019)

Almost all transport demand met by petrol or diesel combustion engines

Majority of electricity supplied by the national grid (65%)

Majority of heating demand met by an almost-equal split of biomass and fossil gas boilers (70%)



Three near-isolated energy systems for each of electricity, heat, and transport

Inefficiency losses between energy source and demand

Heating comprises the largest component of energy demand (75%)

Sources:
BEIS Sub-national road transport fuel consumption statistics, BEIS Sub-national gas and electricity consumption statistics, BEIS Estimates of properties not connected to the gas network, BEIS Renewable electricity by local authority

Ystadegau allweddol y system ynni yn 2019 (1)

Y Cyd-destun

Cyfran yr eiddo preswyl gydag EPC D ac is: 58%

Y galw am ynni yn uchel iawn o safbwynt adeiladau preswyl: 72,000 o gyfeiriadau domestig; 6,000 o rai annomestig

Y Cyflenwad

Ynni gwynt ar y tir: 1.8 MW

Solar PV: 53.1 MW

Capasiti tanwydd ffosil: 14 MW

Key stats of the energy system in 2019 (1)

Context

Proportion of domestic properties with EPC D and below: 58%

Highly residential energy demand: 72,000 domestic addresses; 6,000 non-domestic

Supply

Onshore wind: 1.8 MW

Solar PV: 53.1 MW

Fossil fuel capacity: 14 MW

Ystadegau allweddol y system ynni yn 2019 (2)

Y Galw

- Cyfran ddomestig o gyfanswm y defnydd o nwy: 45%
- Cyfran ddomestig o gyfanswm y defnydd o drydan: 21%

Seilwaith

- Cyfran yr eiddo sydd ddim ar y grid nwy: 18%
- Cyfran yr eiddo sydd ddim ar y grid nwy sy'n defnyddio olew neu LPG i wresogi: 62%

Key stats of the energy system in 2019 (2)

Demand

- Domestic proportion of total gas consumption: 45%
- Domestic proportion of total electricity consumption: 21%

Infrastructure

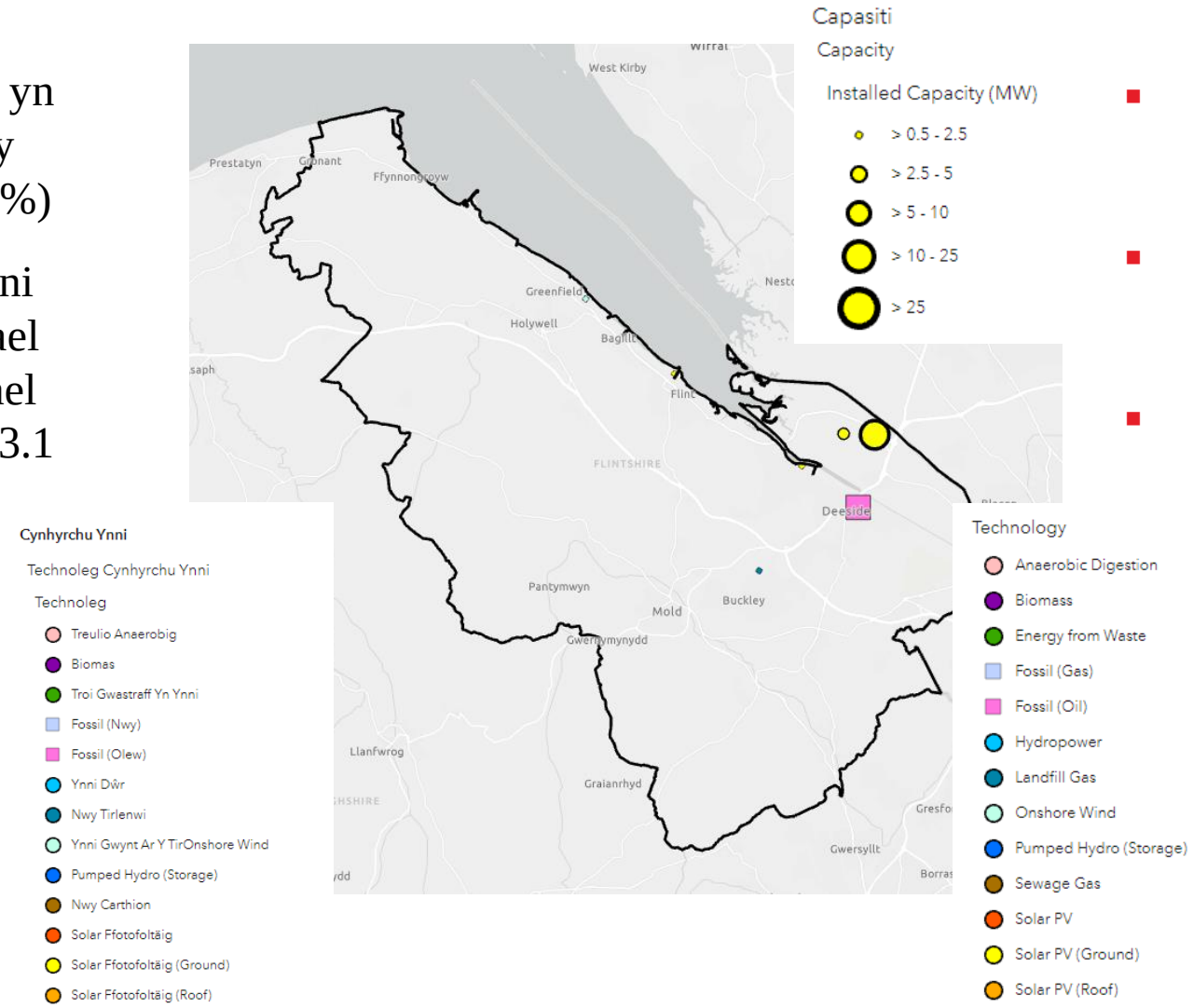
- Proportion of properties off the gas grid: 18%
- Proportion of off-gas properties that use oil or LPG for heat: 62%

Cyflenwad – cynhyrchu'n lleol

- Rhan fwyaf o drydan yn cael ei gyflenwi gan y grid cenedlaethol (65%)
- Lefel sylweddol o ynni adnewyddadwy yn cael ei gynhyrchu, sy'n cael ei ddominyddu gan 53.1 MW o solar PV
- 14 MW yn cael ei gynhyrchu gan danwyddau ffosil

Supply – local generation

- Majority of electricity supplied by the national grid (65%)
- Significant renewable energy generation dominated by 53.1 MW of solar PV
- 14 MW generated by fossil fuels



Seilwaith – Tai

- 72,000 o gyfeiriadau domestig a 6,000 o gyfeiriadau annomestig
- Stoc dai eithaf newydd, gyda 72% o dai wedi cael eu hadeiladu ar ôl 1930
- Cyfran isel o fflatiau (9%)
- Cyfran isel o dai cymdeithasol (16%)
- Mae'r niferoedd sydd wedi'u cysylltu â'r grid nwy yn Sir y Fflint (82%) yn eithaf tebyg i gyfartaledd Cymru (79%)
- Mae llai yn ardal Orllewinol y rhanbarth wedi'u cysylltu â'r grid nwy nag yn yr ardal Ddwyreiniol
- Cymhareb fawr o ran y galw am nwy:trydan yn y sector domestig, sy'n awgrymu lefelau gwael o inswleiddio

Infrastructure - Housing

- 72,000 domestic addresses and 6,000 non-domestic addressees
- Relatively new housing stock with 72% built after 1930
- Low proportion of flats (9%)
- Low proportion of social housing (16%)
- Flintshire has similar connectivity to the gas grid (82%) as the Wales average (79%)
- West of region is less connected to the gas grid than the East
- Large gas:electricity demand ratio for domestic sector, suggests poor levels of insulation

Seilwaith – Tai

Infrastructure - Housing

Oddi Ar Y Grid Nwy

% Amcangyfrifedig O Eiddo Oddi Ar Y Grid Nwy

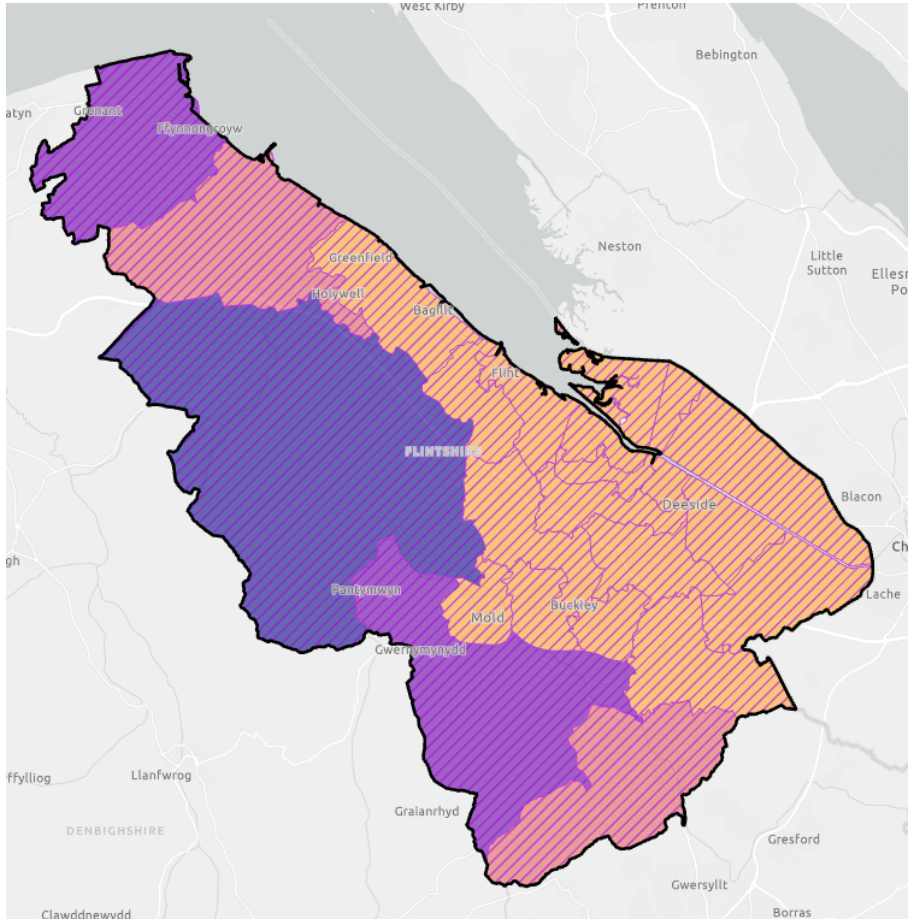
- 0 (100% Ar Y Grid Nwy)
- > 0 - 20
- > 20 - 40
- > 40 - 60
- > 60 - 80
- > 80 - 100

Oddi Ar Y Grid Nwy

Prif Fath O Wresogi

Prif Fath O Wresogi Oddi Ar Y Grid Nwy

- Trydan
- Olew
- Ddim Yn Berthnasol - 100% Ar Y Grid Nwy



Off Gas Grid

Estimated % of Properties Off Gas Grid

- 0 (100% on Gas Grid)
- > 0 - 20
- > 20 - 40
- > 40 - 60
- > 60 - 80
- > 80 - 100

Off Gas Grid

Main Heating Type

Off Gas Grid Main Heating Type

- Electricity
- Oil
- N/A - 100% on Gas Grid

Y Galw – Gwres

- Mwy o alw am wres yn rhan ddwyreiniol yr ardal
- Llwythi diwydiannol mawr mewn sawl man
- Galw mawr – nad yw'n cael ei ddangos yma – am danwyddau eraill, fel biomas, olew a glo. Mae'r tanwyddau hyn yn ffurfio cyfran sylweddol o'r galw diwydiannol a masnachol am wres (tua 74%)
- Ardal ddiwydiannol Glannau Dyfrdwy yw canolbwynt llawer o'r galw am wres a llwythi pwynt (point loads)

Demand - Heat

- Higher heat demand in the east of the area
- Multiple points of significant industrial loads
- Not shown here, is the significant demand for other fuels, notably biomass, oil and coal – these fuels form a significant proportion of industrial and commercial heating demand (approx. 74%)
- Much of the heat demand and point loads are centred around the Deeside industrial zone

Y Galw – Gwres

Demand - Heat

Gwres/Nwy

Llwythi Diwyddiannol Mawr

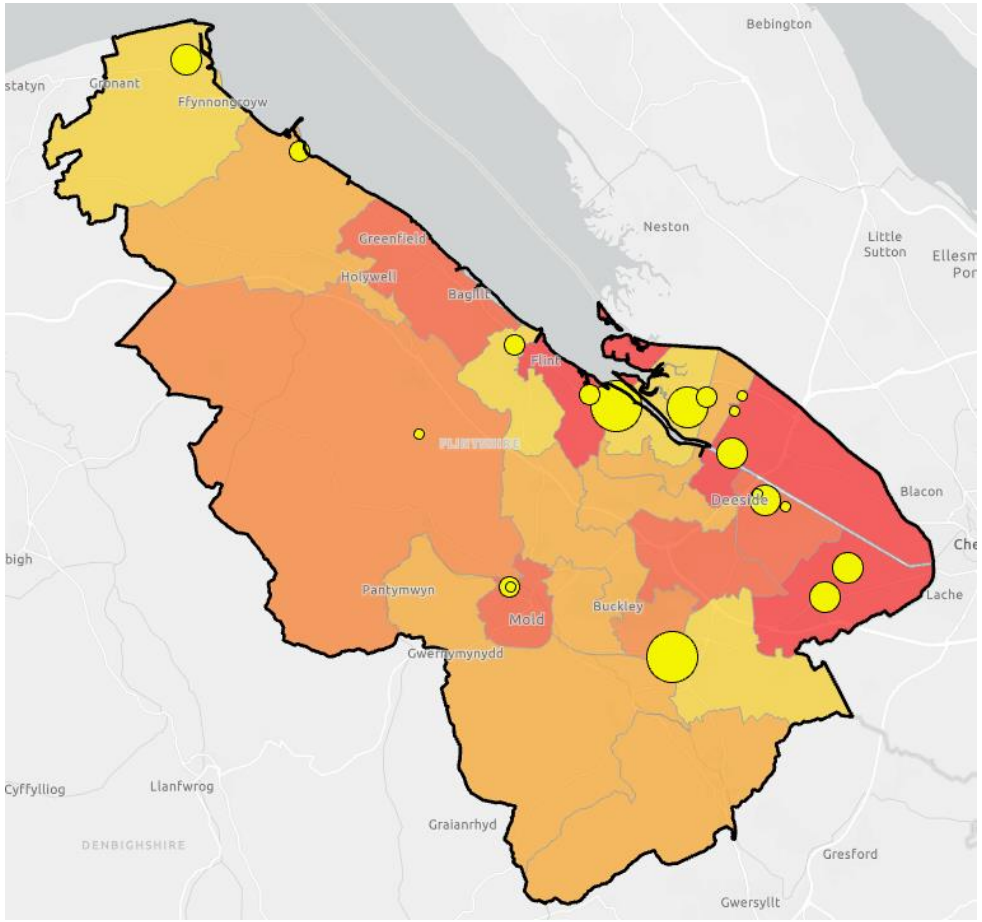
Defnydd Cyfwerth O Nwy Naturiol (kWh Gros CV)

- ≤ 10,000
- > 10,000 - 50,000
- > 50,000 - 100,000
- > 100,000 - 250,000
- > 250,000

Defnydd O Wres

kWh

- ≤ 15,000,000
- > 15,000,000 - 30,000,000
- > 30,000,000 - 45,000,000
- > 45,000,000 - 60,000,000
- > 60,000,000 - 75,000,000
- > 75,000,000



Heat/Gas

Major Industrial Loads

Equivalent Natural Gas Consumption (kWh gross CV)

- 0 - 10,000
- >10,000 - 50,000
- >50,000 - 100,000
- >100,000 - 250,000
- >250,000

Heat Consumption

kWh

- ≤ 15,000,000
- > 15,000,000 - 30,000,000
- > 30,000,000 - 45,000,000
- > 45,000,000 - 60,000,000
- > 60,000,000 - 75,000,000
- > 75,000,000

Y Galw – Trydan

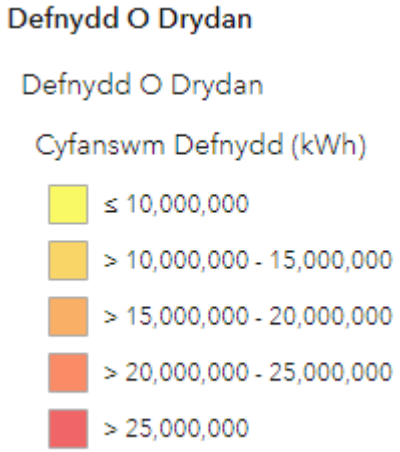
- Mae'r galw am drydan wedi'i wasgaru'n gymharol gyfartal
- Mae mwy o alw mewn ardaloedd diwydiannol (sef Glannau Dyfrdwy), ac mewn rhai ardaloedd lle mae llai wedi'u cysylltu â'r grid nwy.

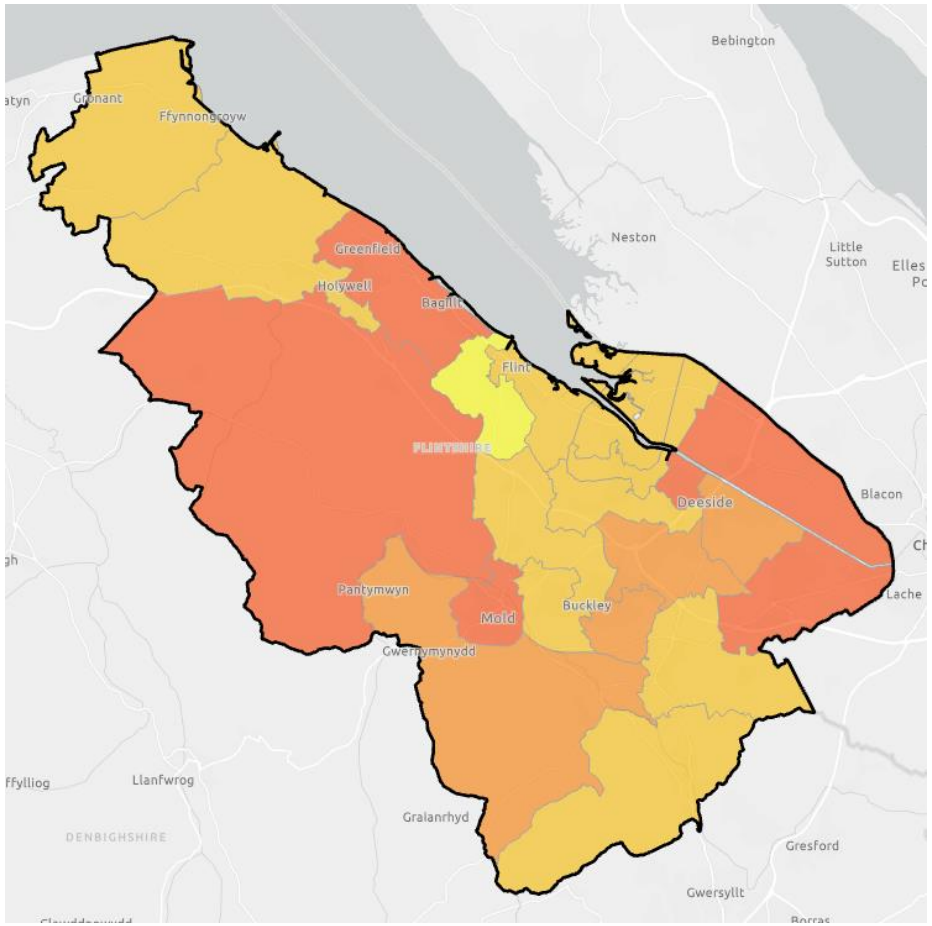
Demand - Electricity

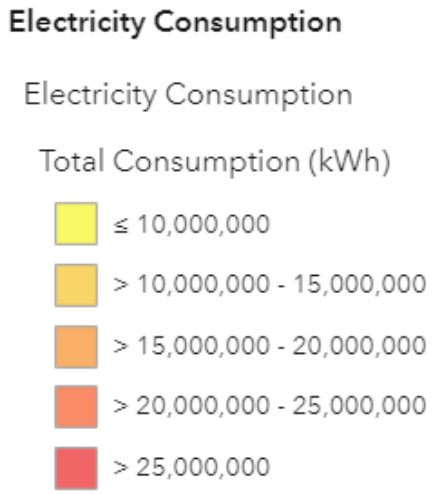
- Demand for electricity is fairly evenly spread
- There is greater demand in industrial zones (namely Deeside), as well as some areas which are less connected to the gas grid.

Y Galw – Trydan

Demand - Electricity







Y Galw – Tradnidiaeth

- Galw mawr o ran trafnidiaeth ar y ffordd ar draws yr ardal gyfan
- Mae'r mannau gwefru'n brin, a gerllaw trefi mae'r rhan fwyaf ohonyn nhw
- 0.24% o'r cerbydau wedi'u cofrestru sy'n gerbydau trydan/hybrid, o'i gymharu â gwerth Cymru gyfan, sef 1%
- Er ei bod yn anodd gwahanu'r galw, ardaloedd yr A55 ac A494 yw canolbwynt y galw uwch o ran trafnidiaeth.

Demand - Transport

- High road transport demand across the whole area
- Charge points are relatively few and mostly near towns
- 0.24% of registered vehicles are electric/hybrid compared to a Wales-wide value of 1%
- Although difficult to disaggregate, higher demand for transport is focussed on areas with the A55 and A494 running through it.

Y Galw – Tradnidiaeth

Demand - Transport

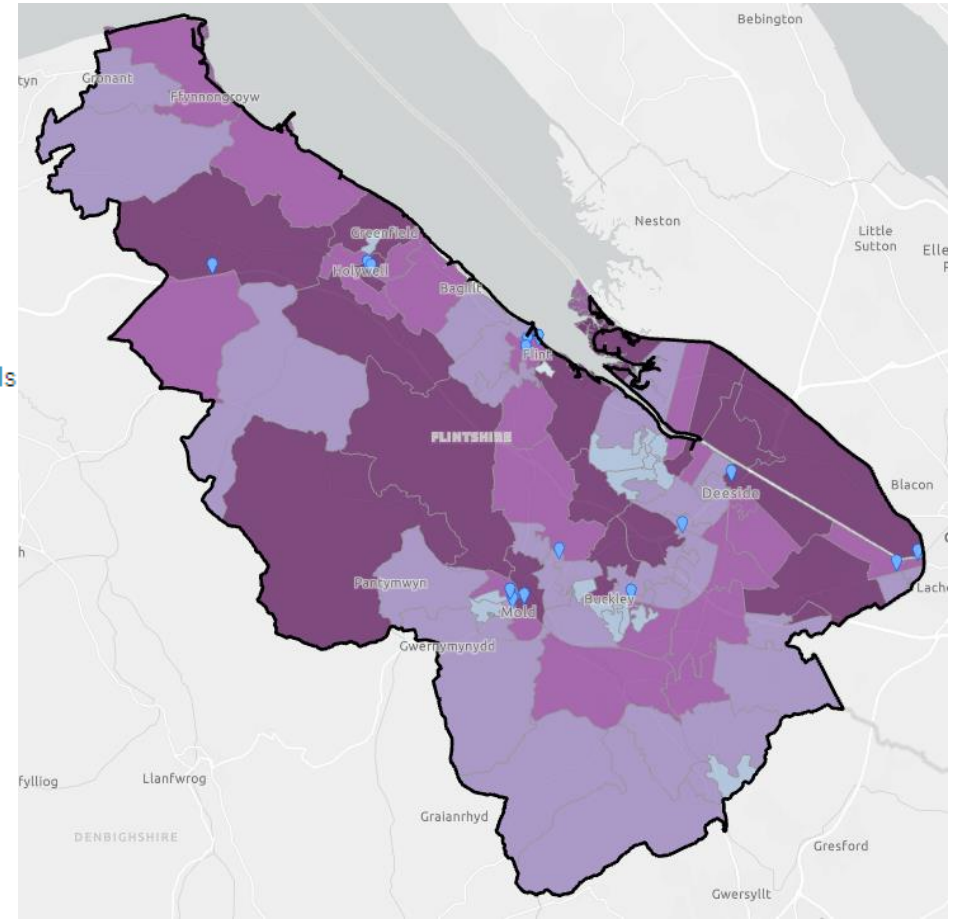
Trafnidiaeth

Mannau Gwefru Cyhoeddus Ar Gyfer Cerbydau Trydan

Trafnidiaeth

Defnydd Blynyddol fesul Ardal Gynnyrch Ehangach Haen Is (kWh)

- ≤ 2,500,000
- > 2,500,000 - 5,000,000
- > 5,000,000 - 10,000,000
- > 10,000,000 - 15,000,000
- > 15,000,000 - 20,000,000
- > 20,000,000



Transport

Public EV Charge Points

Transport

Annual Consumption per LSOA (kWh)

- ≤ 2,500,000
- > 2,500,000 - 5,000,000
- > 5,000,000 - 10,000,000
- > 10,000,000 - 15,000,000
- > 15,000,000 - 20,000,000
- > 20,000,000

Seilwaith

Gofod Ar Gyfer Galw

Gofod Ar Gyfer Galw Fesul Ardal Gynnyrch Ehangach Haen Ganol

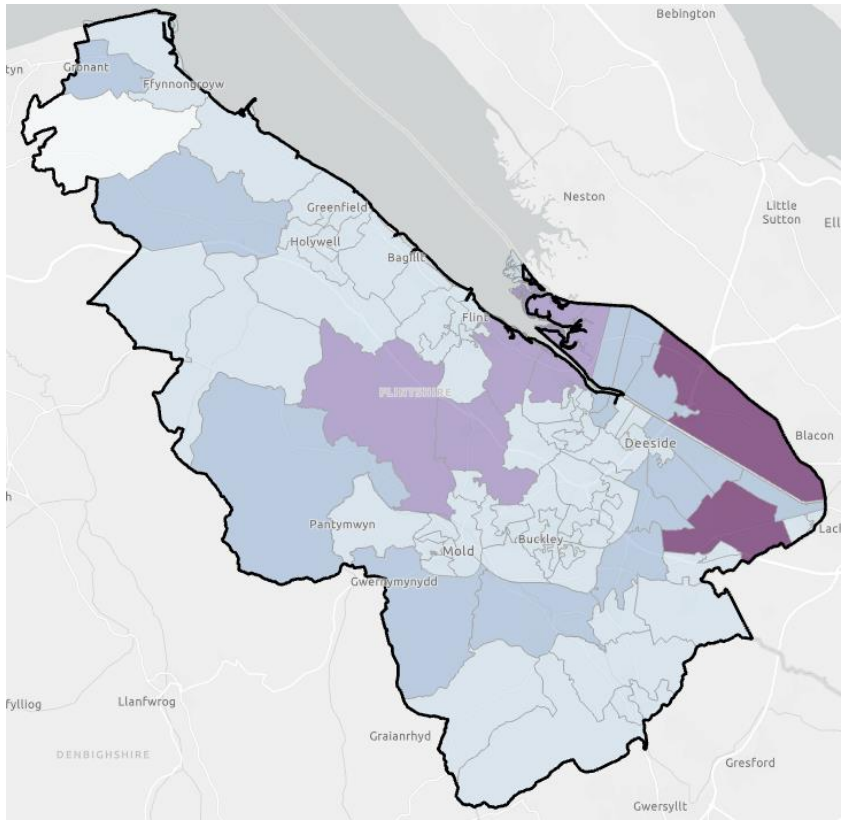
MW

- ≤ 0
- > 0 - 2
- > 2 - 4
- > 4 - 6
- > 6 - 8
- > 8
- Dim Data

Uchafswm o ran y Galw

Mae'r uchafswm o ran y galw yn dangos y capasiti sydd ar gael i gysylltu datblygiadau newydd, pympiau gwres a cherbydau trydan. Mae'r lliwiau tywyllach yn dangos lle mae mwy o gapasiti ar gael

Infrastructure



Demand Headroom

Demand Headroom per LSOA

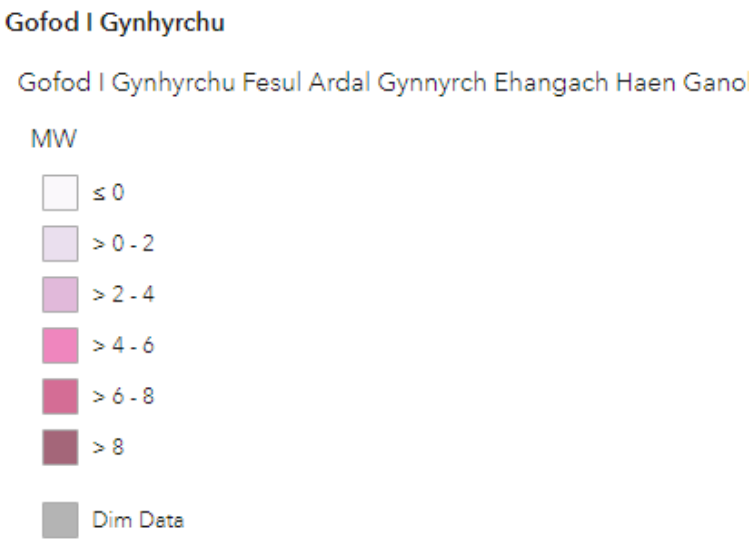
MW

- ≤ 0
- > 0 - 2
- > 2 - 4
- > 4 - 6
- > 6 - 8
- > 8
- No Data

Demand Headroom

The demand headroom shows the capacity available for new developments, heat pumps and EV to connect, the darker colours show where there is more available capacity

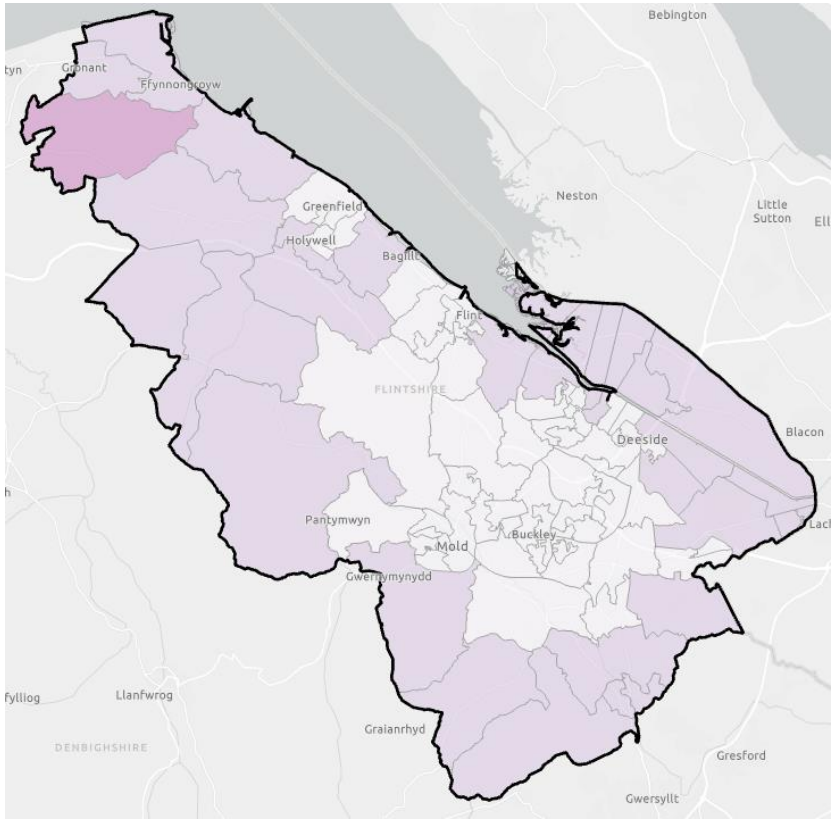
Seilwaith

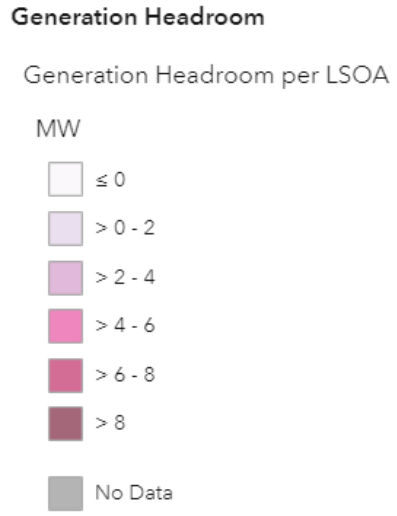


Uchafswm Cynhyrchu

Mae'r uchafswm cynhyrchu yn dangos yr ardaloedd lle mae capasiti ar gael i gysylltu ynni adnewyddadwy. Mae'r lliwiau tywyllach yn dangos lle mae mwy o gapasiti ar gael

Infrastructure





Generation Headroom

The generation headroom shows areas where there is available capacity for renewables to connect, the darker colours show where there is more available capacity

Opsiynau strategol

Strategic options

Adolygiad sylfaenol o'r system ynni

- Y cyd-destun economaidd-gymdeithasol
- Effeithlonrwydd ynni'r stoc adeiladau bresennol

- Gofynion domestig ac annomestig adeiladu
- Gofynion diwydiannol
- Gofynion trafnidiaeth

- Seilwaith trydan
- Rhwydweithiau gwresogi
- Cynhyrchu ynni'n lleol

Energy system baseline review

- Socioeconomic context
- Existing building stock energy efficiency

- Domestic & non-domestic building demands
- Industrial demands
- Transport demands

- Electricity infrastructure
- Heat networks
- Local energy generation

Dadansoddi'r system ynni yn y dyfodol

- Y cyd-destun economaidd-gymdeithasol yn y dyfodol

- Gofynion domestig ac annomestig adeiladu yn y dyfodol
- Gofynion diwydiannol yn y dyfodol
- Gofynion trafnidiaeth yn y dyfodol

- Uwchraddio seilwaith trydan yn y dyfodol
- Rhwydweithiau gwresogi yn y dyfodol
- Cynhyrchu ynni'n lleol yn y dyfodol
- Rhwydweithiau hydrogen yn y dyfodol

Future energy system analysis

- Future socioeconomic context

- Future domestic & non-domestic building demands
- Future industrial demands
- Future transport demands

- Future electricity infrastructure upgrades
- Future heat networks
- Future local energy generation
- Future hydrogen networks

Grŵp trafod y galw

Opsiynau strategol posibl

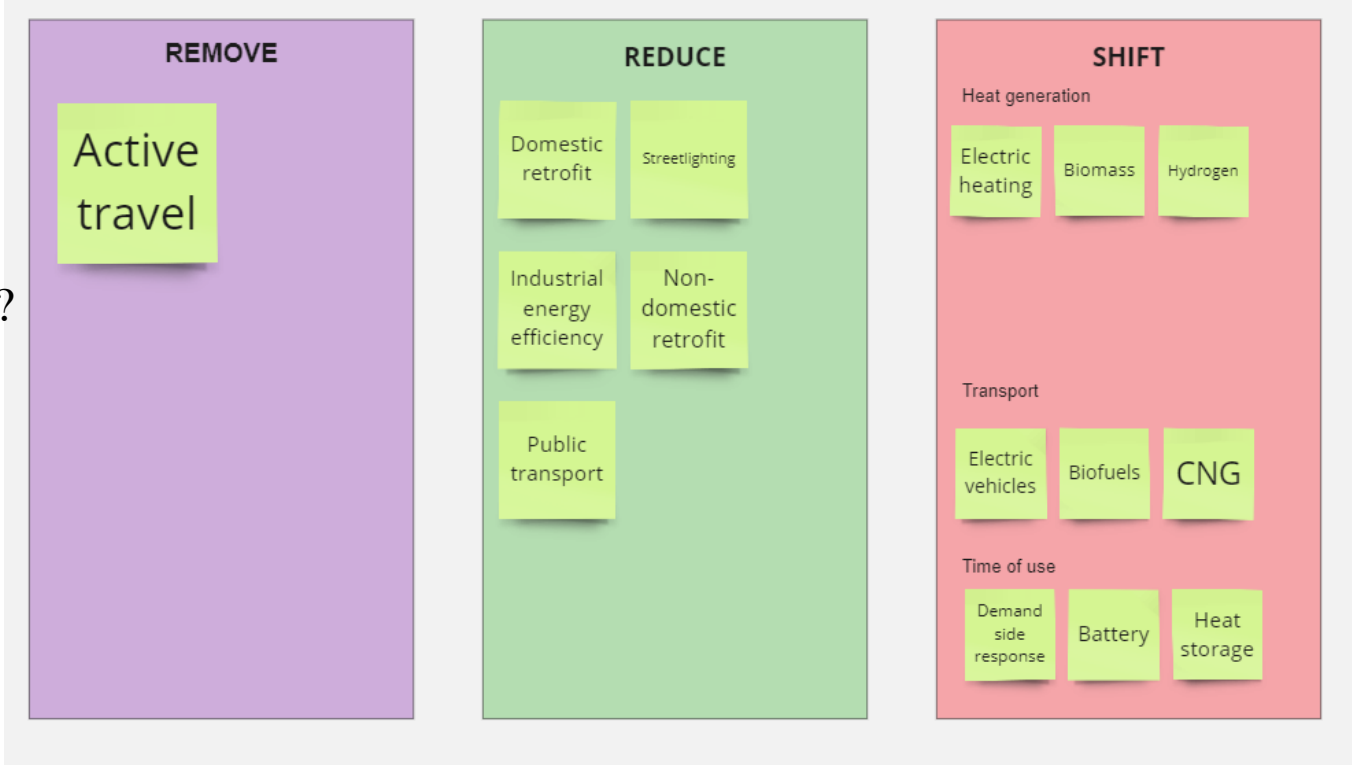
Pa rai o'r rhain sy'n fwyaf perthnasol i Sir y Fflint?
A oes unrhyw beth ar goll a fyddai'n effeithio ar y galw?
Pa brosiectau sydd ar y gweill / sydd wedi'u hymrwymo?

Beth yw'r opsiynau a allai gyfrannu at newid yn y galw lleol o bob rhan o'r system ynni?

- Camau cyflym ymlaen
- Dim llawer o ofid
- Tymor hwy

Demand breakout

Potential strategic options



Which of these are most relevant for Flintshire?
Is there anything missing that would impact demand?
What projects are underway / committed?

What are the options that could contribute to a change in local demand from across the energy system?

- Quick wins
- Low regrets
- Longer term

Grŵp trafod cynhyrchu / seilwaith

Opsiynau strategol posibl

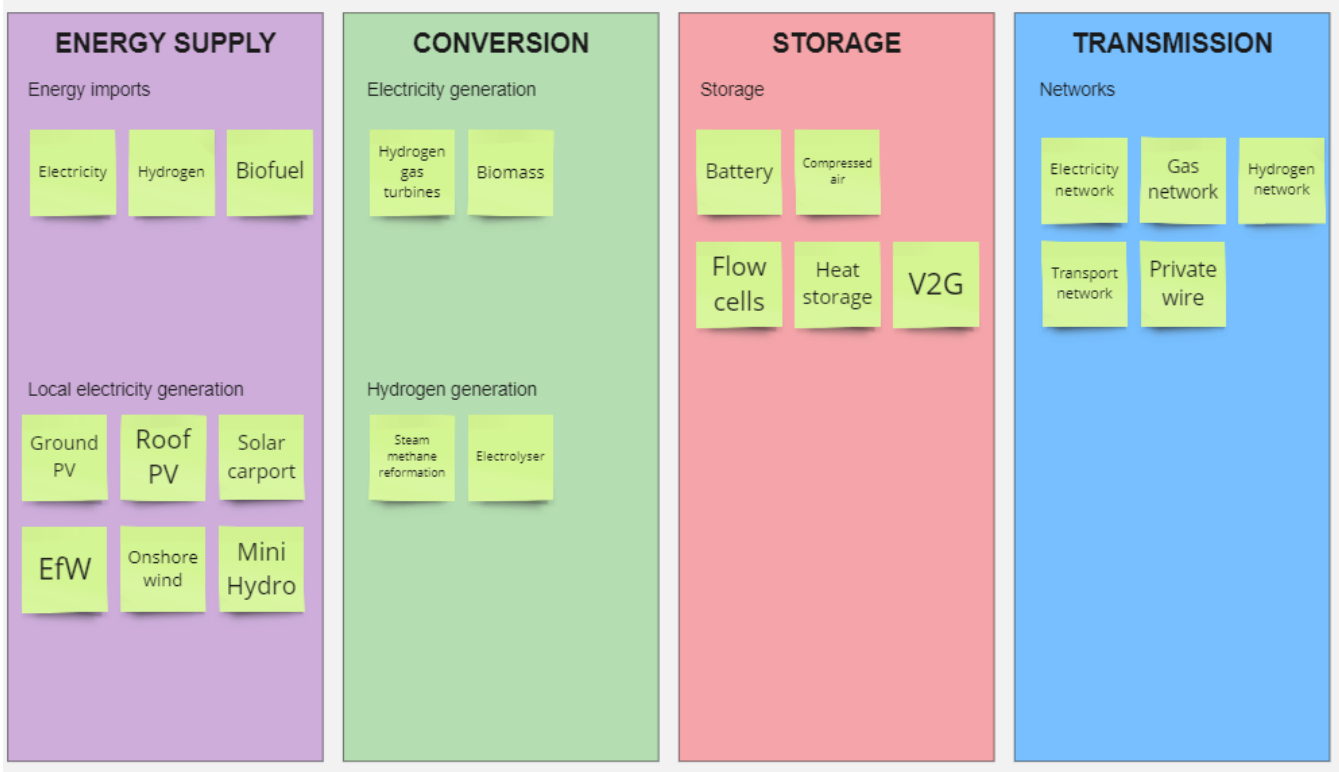
Generation / infrastructure breakout

Potential strategic options

Pa rai o'r rhain sy'n fwyaf perthnasol i Sir y Fflint?
Oes yna unrhyw beth ar goll?
Pa brosiectau sydd ar y gweill / sydd wedi'u hymrwymo?

Beth yw'r opsiynau a allai gyfrannu at newid yn y seilwaith / cynhyrchu lleol o bob rhan o'r system ynni?

- Camau cyflym ymlaen
- Dim llawer o ofid
- Tymor hwy



Which of these are most relevant for Flintshire?
Is there anything missing?
What projects are underway / committed?

What are the options that could contribute to a change in local generation / infrastructure from across the energy system?

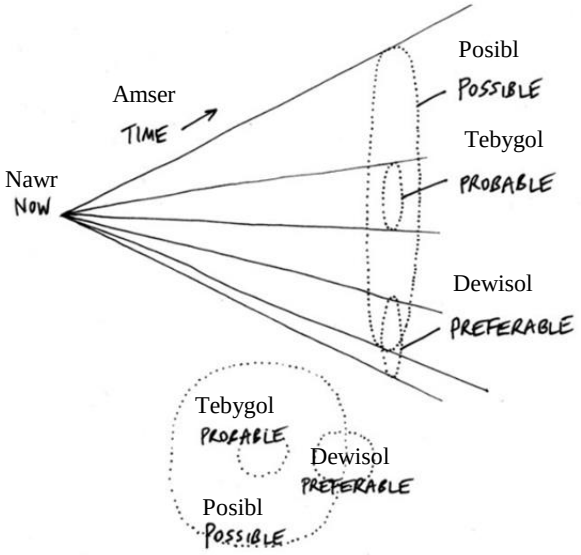
- Quick wins
- Low regrets
- Longer term

Pam ydyn ni'n defnyddio senarios?

- Allwn ni ddim rhagweld y dyfodol
- Rydyn ni'n defnyddio senarios i archwilio gwahanol opsiynau posibl yn y dyfodol
- Mae profi'r rhain yn ein helpu i ddeall effaith y mathau hyn o ddyfodol
- Yna gallwn ddatblygu cynlluniau cadarn sy'n ystyried yr ansicrwydd y gwyddom sy'n bodoli

Edrych ar ddyfodol posibl

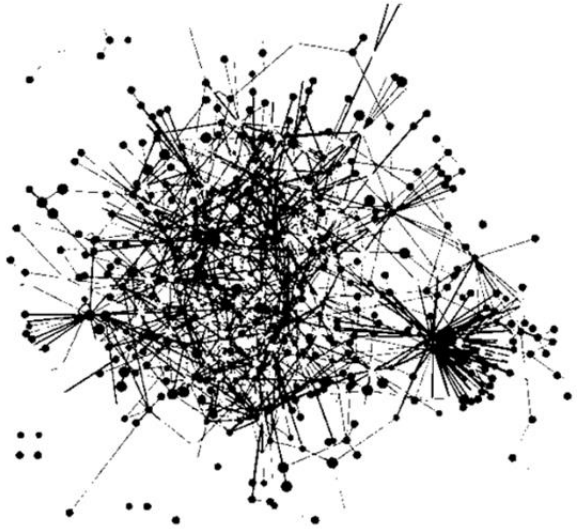
Exploring possible futures



Why do we use scenarios?

Lleihau cymhlethdod

Reducing complexity



- We can't predict the future
- We use scenarios to explore different potential futures
- Testing these help us to understand the impact of these futures
- We can then develop robust plans that take into account the uncertainty that we know exists

Beth yw senarios?

What are scenarios?

Senarios
Profi gwahanol fathau o ddyfodol (e.e. gwahanol fathau o alw, mathau o danwydd)

Scenarios
Testing different futures (e.g. different demands, fuel types)

Sensitifrwydd
Profi ffactorau critigol yn y senario mwyaf ansicr (e.e. costau)

Sensitivities
Testing critical factors in the most uncertain scenario (e.g. costs)

Modelau optimeiddio
Y set "orau" o atebion i gyrraedd sero net ym mhob senario

Optimisation modelling
"Best" set of solutions to get to net zero in each scenario

Gweithdy i randdeiliaid
Trafod sut mae cyrraedd y set hon o atebion – llwybrau a chamau gweithredu

Stakeholder workshop
Discuss how to get to this set of solutions – pathways and actions

Senarios ar gyfer modelu

Beth rydyn ni'n ceisio ei wneud

Mae ein gwaith modelu wedi'i ddylunio i ateb cwestiynau penodol fel:

- Faint o gynhyrchu lleol sydd ei angen arnom? A oes angen i ni sicrhau'r swm gorau o ynni adnewyddadwy ym mhob senario?
- Faint o le storio lleol sydd ei angen arnom? Sut dylid dosbarthu hyn?
- Faint o alw am ynni y gall fod ei angen arnom mewn gwahanol senarios?
- Faint o hydrogen sydd ei angen mewn gwahanol senarios ac a yw hyn yn debygol yn fy ardal leol?
- Faint o fuddsoddiad sydd ei angen mewn seilwaith i gyrraedd sero net?

Scenarios for modelling

What are we trying to achieve

Our modelling is designed to answer specific questions such as:

- How much local generation do we need? Do we need to maximise the amount of renewables in all scenarios?
- How much local storage do we need? How should this be distributed?
- How much dispatchable energy demand could we need in different scenarios
- How much hydrogen is needed in different scenarios and is this likely in my local area?
- How much investment is needed in infrastructure to reach net zero?

Senarios sy'n gyson yn genedlaethol

Nationally consistent scenarios

Gwneud dim	**Sero net cenedlaethol**
Yn ystyried polisi wedi'i ymrwymo (h.y. gwahardd ceir petrol/diesel, gwahardd boeleri nwy)	Yn adlewyrchu'r targed sero net ar gyfer Cymru (2050). Ystyried targedau allyriadau canolradd sydd wedi'u pennu gan Lywodraeth Cymru.

Do nothing	**National net zero**
Considers committed policy (i.e. ban on petrol/diesel cars, ban on gas boilers)	Reflects net zero target for Wales (2050). Considering intermediate emissions targets set by Welsh Government.

Sesiwn ar y cyd – trafod senarios

Hydrogen Yn ystyried mwy o hydrogen na thrydaneiddio – er enghraifft hydrogen ar gyfer cartrefi, trafnidiaeth hydrogen	**Galw isel** Yn ystyried y galw isaf posibl (byddai hyn yn cynnwys llawer o ôl-osod, llawer o drosi i deithio llesol, twf isel yn y boblogaeth, ac ati)
Ynysedig Yn ystyried system nad yw'n mewnforio nac yn allforio trydan, felly mae cydbwysedd rhwng y cynhyrchu a'r galw	**Busnes fel arfer** Yn ystyried anghenion lleol a chynlluniau a pholisïau cenedlaethol, gan ragweld sut gallai'r system ynni edrych yn 2050 ar sail tueddiadau cyfredol parhaus
Sero net 2030 Yn ystyried targed sero net 2030, lle mae ardal yr awdurdod lleol yn cyrraedd sero net erbyn 2030	**Galw mawr** Yn ystyried y galw mwyaf posibl (byddai hyn yn cynnwys ychydig o ôl-osod, ychydig o drosi i deithio llesol, twf mawr yn y boblogaeth, ac ati)

Combined session – discuss scenarios

Hydrogen Considers a higher amount of hydrogen than electrification – for instance hydrogen for homes, hydrogen transport	**Low demand** Considers the lowest potential demand (this would include high retrofit, high conversion to active travel, low population growth, etc)
"Islanded" Considers a system that does not import or export electricity, therefore generation is balanced with demand	**Business as usual** Considers existing local and national plans and policies, predicting what the energy system could look like in 2050 based on continuing current trends
Net zero 2030 Considers a net zero 2030 target, where the local authority area reaches net zero by 2030	**High demand** Considers the highest potential demand (this would include low retrofit, low conversion to active travel, high population growth, etc)

Llywodraeth Cymru
Welsh Government
Uchelgais Gogledd Cymru
Ambition North Wales
CARBON TRUST
ARUP

Y camau nesaf

Next steps

Y camau nesaf

Gweithdy heddiw:

- Cam 3 – Gweithdy opsiynau a blaenoriaethau strategol ym mis Mehefin 2023

Gweithdai nesaf:

- Cam 5 – Gweithdy blaenoriaethu llwybrau ym mis Medi 2023, i gyflwyno allbynnau'r gwaith modelu a phenderfynu ar lwybrau tymor byr/tymor hir 'dim gofid'
- Cam 6 – Gweithdy camau gweithredu a chyfrifoldebau ym mis Hydref 2023, i gyflwyno blaenoriaethau'r Cynllun Ynni Ardal Leol a chyd-greu'r camau gweithredu lleol sydd eu hangen ar gyfer pob un
- Cam 8 – Adborth ar yr adroddiad drafft ym mis Chwefror 2024, i adolygu'r adroddiad drafft ac i gefnogi'r gwaith o lunio'r map llwybr a'r argymhellion

Next steps

Today's workshop:

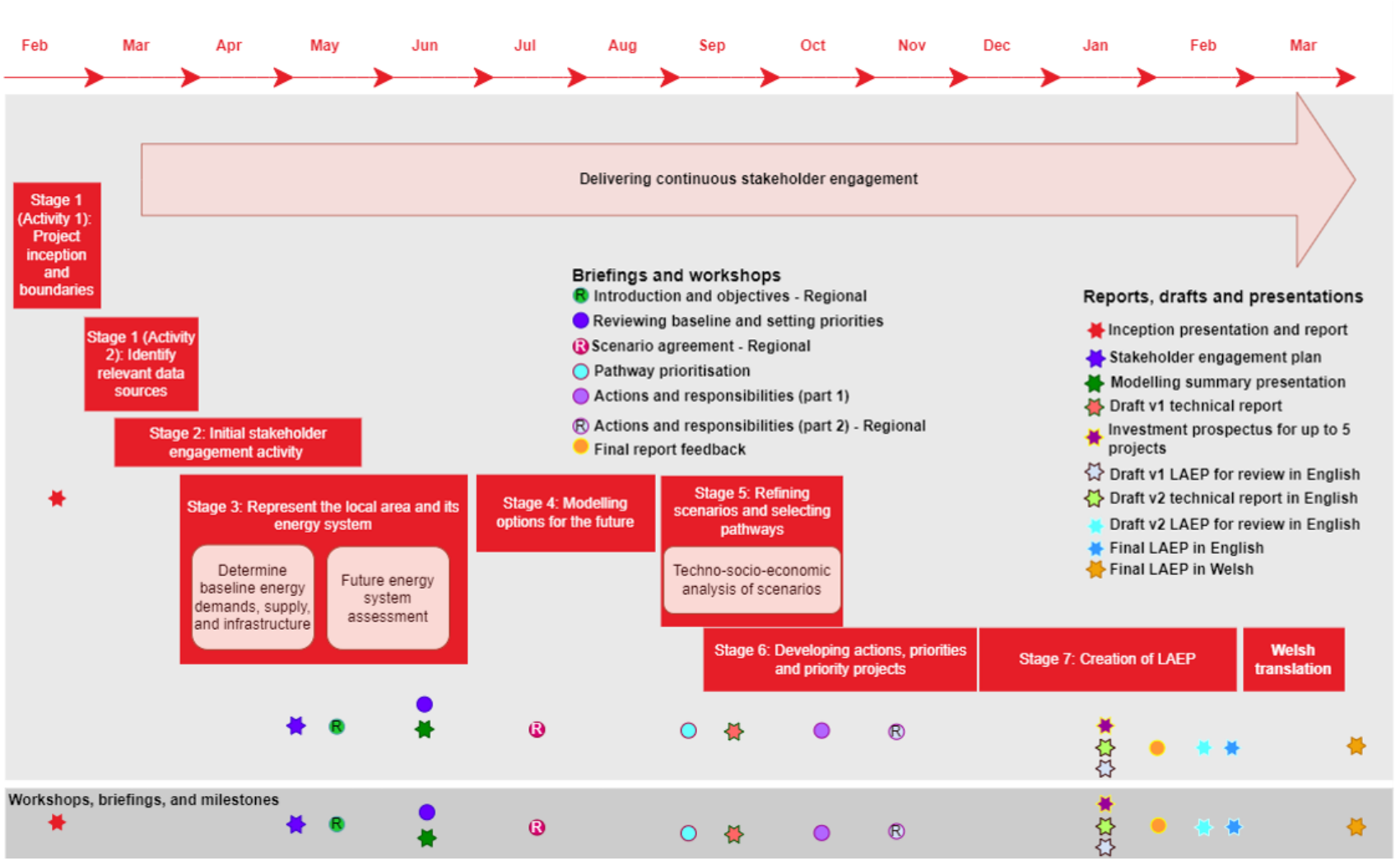
- Stage 3 – Strategic options and priorities workshop in July 2023

Next workshops:

- Stage 5 – Pathway prioritisation workshop in September 2023, to present the outputs of the modelling and to determine 'no regrets' short-term/long-term pathways
- Stage 6 – Actions and responsibilities workshop in October 2023, to present the LAEP priorities and co-create the local actions required for each
- Stage 8 – Draft report feedback in Feb 2024, to review draft report and support shaping the routemap and recommendations

Y camau nesaf

Next steps



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