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Mythbusting Energy Factsheet

Contents

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- EV batteries can catch fire
- There is no way to put out EV fires
- EVs don't have a big enough range
- EVs take too long to recharge when on a journey
- There isn't the required EV charging infrastructure
- Many EV charging networks require membership cards to be able to find and use a charger
- EV charge points taking up parking places
- EVs are too expensive - only affordable by the 'haves'
- There's no second hand EV market
- EVs are uninsurable / too expensive to insure
- Electric vans or utility vehicles are not available
- EVs can't tow / take a roof rack / carry weight as they don't have sufficient torque
- EVs are so heavy they cause car parks and bridges to collapse (or require reinforcement)
- EVs are responsible for increase in potholes due to increased weight
- EV car tyres are more polluting

Heat Pumps and Heat Networks

- Heat pumps are more expensive than gas heating (because cost of electricity per kWh higher than gas)
- Heat pumps only work if you have insulated your house
- Heat pumps are too expensive
- Air Source Heat Pumps cost more to run
- Heat pumps can't heat water enough for baths / showers
- Heat pumps have to be left on all the time
- Heat pumps need all radiators to be replaced with underfloor heating
- Heat pump installations are invasive and require significant changes to home including bigger radiators, underfloor heating, space for a water tank
- Heat pumps are noisy
- Heat pumps are unattractive
- Heat pumps are unreliable

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Solar Photo-Voltaic (PV)

Concern	Response	References
Can't rely on solar PV for all energy needs	In the UK, solar PV on its own will not provide all of our energy needs. But, as with our existing energy system, a diverse mix of energy sources including solar PV, wind, nuclear, interconnectors, hydropower, large-scale storage and potentially tidal energy. Just because solar PV cannot meet all of the country's energy needs does not mean that it is not a valuable part of the future energy system in the right volume (the UK Commission for Climate Change targets 75-90GW of solar PV capacity by 2050 to provide 10-15% of the UK's total energy needs). For some regions near the equator with reliable sunshine, solar PV plus battery storage does have the potential to meet all of a country's energy needs. It has also been suggested that a 100kmx100km area of solar generation (PV and thermal) in desert regions could meet the entire world's energy demands, although transmitting that energy to all consumers would be a significant challenge.	https://www.iea.org/energy-system/renewables/solar-pv https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Electricity-generation.pdf
PVs don't work in winter	Solar PV still generates some electricity in winter, although far less than in summer (about a sixth to a seventh of peak summer generation). But solar PV is just one part of the future energy system (which also includes wind, nuclear, interconnectors and large-scale storage). Winter daily average generation is about a sixth or a seventh of the summer daily average. This is because of the length of the day, the amount of cloud cover and the intensity of sunlight.	https://www.viridiansolar.co.uk/resources-1-2-seasonal-variation-solar-energy.html https://www.theecoexperts.co.uk/solar-panels/winter

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PVs don't work at night	Solar PV doesn't generate substantial electricity at night. However, energy demand is much lower at night too, and most solar farms are now being installed with battery storage which can store a significant portion of the daytime generation. The same is also true for domestic PV, where batteries (like the Tesla Powerwall) can store enough electricity for most nighttime usage. There are some claims of solar panels that can generate electricity at night through radiative cooling and/or rainfall. But, while possible, they generate far less electricity than during the day and the cost-effectiveness of the technologies is unclear.	https://www.energy.gov/eere/solar/solar-integration-solar-energy-and-storage-basics https://www.solarguide.co.uk/can-i-use-solar-power-at-night#:~:text=Yes%20and%20no%2C%20solar%20panels,there's%20little%20to%20no%20sunlight. https://en.wikipedia.org/wiki/Tesla_Powerwall https://www.weforum.org/agenda/2022/05/solar-panels-work-in-dark/
PVs only produce 10% of claimed output	In the UK over a year, a typical solar PV farm generates about 11% of its theoretical maximum (the amount that it could generate if the sun shone at full strength all day and night every day). This is called the load factor. But when claims are made such as “generates enough power for 1000 homes”, this does (or should) take this 'load factor' into consideration. Typically 3.9kW of installed solar PV will generate enough electricity through the year to meet the annual demand of an average house 3731kWh/(11%*24*365). Or, the other way around, each megawatt (MW) of installed solar PV will generate enough electricity to supply all of the electricity needs of just over 250 homes.	https://assets.publishing.service.gov.uk/media/64c132501e10bf000e17cf7f/DUKES_6.3.xlsx https://www.ovoenergy.com/guides/energy-guides/how-many-solar-panels-to-power-a-house

PV doesn't pay / make economic sense	For large-scale ground-mounted solar, in September 2023 (the last "contracts for difference" auction), developers of solar PV projects agreed to be paid £64.68 (£47.00 in 2021 prices) for each megawatt hour of electricity generated. At that time, the actual wholesale cost of electricity from all sources (including gas, oil, coal, nuclear and other renewables) was £84.39. In 2023, Government estimates were that the cost of electricity from solar PV farms built in 2025 would be £41/MWh (36% of the costs of gas, at £114/MWh). For roof mounted, domestic solar PV, the payback period depends greatly on when you use electricity. If you spend a lot of your day at home and use most of your power then, you could break even in around 6 to 10 years. But, if your daytime energy usage is low, the payback period could be much longer, perhaps 20 years. That's because the main financial benefits of domestic solar PV are if you can use your own power; electricity exported to the grid pays much less. For some users, returns can be increased substantially by installing storage batteries that allow electricity generated in the day to be used at night. Price of modules in China during April 2024 is only 11 US cents a watt, down about 40% over the past year. Solar panels are now so cheap, they are being used to make garden fences in Germany and the Netherlands.	https://www.statista.com/statistics/589765/average-electricity-prices-uk/ https://www.regen.co.uk/relief-as-government-confirm-increased-administrative-strike-prices-for-offshore-wind/ https://assets.publishing.service.gov.uk/media/6556027d046ed400148b99fe/electricity-generation-costs-2023.pdf https://www.greenmatch.co.uk/blog/2014/06/solar-panels-are-they-worth-it https://www.theguardian.com/money/2022/aug/20/solar-panels-how-to-fix-your-energy-bills-while-the-sun-shines https://www.theguardian.com/environment/2022/aug/26/solar-power-payback-takes-much-longer-than-you-think https://www.woodmac.com/news/opinion/chinas-solar-growth-sends-module-prices-plummeting/

PV upfront capital costs are unaffordable	For large-scale solar, developers only apply to build a solar farm where financing the upfront cost can be paid for by income from electricity generation. For domestic solar PV, even though they are widely considered to be a good investment which recoups costs in 6-20 years (see above), the initial installation cost (typically about £7000) make them unaffordable for many people without savings. Many government, local authority, or energy supplier grants are available to partially or wholly cover installation costs, but these are not typically available for everyone. Currently some of the schemes available are: - The Energy Company Obligation (ECO) scheme - Local Authority Home Upgrade Grants - Warmer Home Nest Scheme Wales - Home Energy Scotland Grants and Loans - Tomato Energy 'Tomatopia' scheme.	https://www.moneysavingexpert.com/utilities/free-solar-panels/ https://www.theecoexperts.co.uk/solar-panels/government-grants
PV panels are very carbon intensive to produce	Modern solar panels offset the CO2 used to create them in less than 2 years, and in some cases, less than one year. As the panels are designed to produce energy for 25 years, they save about 10–20 times the CO2 used to produce them. PV panels do require a lot of high-temperature manufacturing processes to manufacture, with the energy often coming from fossil fuels. But this question has been researched in great detail and many times, with most estimates suggesting that PV panels saving 6-20 times more CO2 than was used in their manufacture. There was one study (by Ferroni and Hopkirk) that suggested that solar panels only save 80% of the CO2 used in their manufacture (which may be one of the sources of this 'myth'), but that has been widely debunked in scientific literature.	https://www.sciencedirect.com/science/article/pii/S0301421516307066 https://heatable.co.uk/solar/advice/carbon-footprint-of-solar-panels https://www.solarbeglobal.com/understanding-the-carbon-footprint-of-solar-panel-manufacturing/#:~:text=Manufacturing%20solar%20panels%20requires%20high,(gCO2%2FkWh)%20produced.

PV panels can't be recycled	Solar panels can be, and are, recycled. They're constructed almost entirely from aluminium, glass, and silicon, which are all very easy to break down and use again. But, as most solar panels have not come to the end of their lives, the recycling industry is not currently set up to recycle the volume of panels that will need to be replaced in 10-20 years. Currently there's only one recycling centre in the UK that operates on an industrial scale: Recycle Solar, located in Scunthorpe. Other UK panels are taken to a solar recycling plant in south-eastern France that's owned by Veolia. Under EU regulations (which still apply after Brexit), your solar panel installer is legally obliged to take your defunct solar panels off you, or at least fund a Distributor Take-back Scheme (DTS). You do not have to pay for this. Solar panels start to lose efficiency after 20-25 years, but usually continue working until they're 35-40 years old. There are already solar panel recycling plants, including one in the UK, and these are expected to increase substantially when the first generation of solar panels come to the end of their lives.	https://www.greenmatch.co.uk/blog/2017/10/the-opportunities-of-solar-panel-recycling https://www.theecoexperts.co.uk/solar-panels/solar-panel-recycling
PV transformation and transmission losses make generation unviable	By generating electricity closer to consumers, solar PV has the potential to actually reduce electricity losses from transformation (increasing and decreasing the voltage of the electricity) and from transmission and distribution (carrying the electricity from where it's generated to where it's consumed). However, to achieve the full benefit, it will be necessary to balance supply and demand as far as possible using storage and demand-management incentives such as flexible pricing.	https://www.sciencedirect.com/science/article/abs/pii/S0360544216308027 https://energysavingtrust.org.uk/time-use-tariffs-all-you-need-know/ https://www.nationalgrideso.com/industry-information/balancing-servic

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		es/power-responsive/demand-side-response-dsr

Ground Mounted Photovoltaic (GMPV)/Solar Farms

Concern	Response	References
Solar farms increase flood risk	Solar panels mounted in fields are usually mounted on posts driven into the ground or attached to small concrete feet. Most of the earth remains uncovered and can absorb rainwater. However, rainwater falling from the lower edge of the panels can produce rivulets or channels that can cause the water to run off more quickly or erode topsoil. So all ground-mounted solar PV developments should provide a drainage strategy and include sustainable drainage (SuDS) measures such as: buffers and swales; maintaining vegetation between and under the panels; and infiltration basins. After construction the soil under and around the panels should be ploughed to mitigate soil compaction during construction and increase water absorption. It is possible to capture the rainfall from solar panels and store it for use locally and to clean the panels.	https://www.essexdesignguide.co.uk/suds/further-guidance/solar-array-development/ https://britishrenewables.com/facts-about-solar-parks https://www.gov.wales/sites/default/files/publications/2023-08/impact-solar-photovoltaic-sites-agricultural-soils-land-spep21-22-03-work-package-3.pdf https://www.researchgate.net/figure/Categories-of-typical-ground-mount-solar-foundations_fig2_312600024
Solar farm storage batteries can catch fire	There have been instances of storage batteries at solar PV farms catching fire. These incidents have become more frequent as the volumes of installed batteries increase. There are emerging standards designed to reduce the risk of fire and the risk of spread, including fire-suppression systems, battery management and monitoring solutions, and grouping storage units into physically-separated units to prevent fire spread. By their nature,	https://www.firetrace.com/fire-protection-blog/can-solar-farms-cause-fires https://www.pv-magazine.com/2023/10/10/germany-austria-hit-by-multiple-solar-battery-fires-in-september/

	solar farms tend to be away from homes, reducing the risk of fatal fires. It's probably also worth remembering that gas and solid fuel also cause fires, both in homes and on industrial sites.	https://www.independent.co.uk/news/uk/home-news/solar-panel-fires-safety-fears-energy-bills-b2407950.html https://www.pv-magazine.com/2023/09/14/three-steps-to-reduce-battery-storage-fire-risk/#:~:text=Installing%20water%2Dbased%20fire%20suppression,fire%20on%20the%20battery%20until
Solar farms don't benefit the local community	A significant source of opposition to solar farms is the perception that communities lose amenity (countryside, views, farming jobs) when a solar farm is constructed, and that they don't receive any of the benefits. While the loss of some amenity may be unavoidable, there are many ways in which solar farms can offer benefits to nearby communities, including: 'planning gain' (section 106) payments to local groups (e.g. to sports and social facilities); local community offtake (supply) schemes; biodiversity net gain, electric vehicle charging hubs. There are many examples of solar farms that have contributed to local communities through section 106 ('planning gain') payments to local communities, including payments to sports and social clubs, and community benefit funds for local community projects. This can be ensured through Local Plan conditions and the Planning process. There are some solar farms (and wind turbines) owned by the community which offer local people the opportunity to purchase some of the energy generated by the installation, e.g. Energy Local schemes which allow people on the same transformer as the solar	https://www.sciencedirect.com/science/article/pii/S0264837722003714 https://northtawtontowncouncil.gov.uk/wp-content/uploads/2018/12/Appendix%205.3.6.2%20DCC_solar_farm_community_benefit_briefing_Jan_2015-1.pdf https://files.bregroup.com/bre-co-uk-file-library-copy/filelibrary/pdf/Brochures/BRE-NSC_Good-Practice-Guide.pdf https://researchbriefings.files.parliament.uk/documents/CDP-2023-0168/CDP-2023-0168.pdf https://powerforpeople.org.uk/ https://energylocal.org.uk/

	farm to take power from the installation, often at lower rates sleeved through an Energy Company. It may be possible to include this requirement for community benefit or local off taking opportunities as a policy in Local Plans. There is also a 'Power for People' campaign which is trying to build Parliamentary support for a Local Electricity Bill that would require generators to sell electricity to local consumers, meaning cheaper, cleaner energy for the local community first.	
Solar farms harm views	Most people (understandably) prefer a view of a green field to solar panels. A 'Visual Impact Assessment' is required if the application site lies within, or would impact upon, a National Landscape (previously known as Area of Outstanding Natural Beauty); National Park or World Heritage Site, and is good practice for any solar farm development. Sites that are highly visible (e.g. on the side of hills or in valleys close to publicly-accessible hills) are not generally approved. This also applies to security fencing, where applicants should: minimise the use and height of security fencing; utilise existing features, such as hedges or landscaping, to screen security fencing; use natural features, such as vegetation planting, to assist in site security; minimise the use of security lighting. Mature trees and hedges on the site should be maintained. And in many cases developers will agree to (or be required to) increase the height and/or width of hedges to shield the farm more effectively from nearby roads, footpaths and housing.	https://researchbriefings.files.parliament.uk/documents/CDP-2023-0168/CDP-2023-0168.pdf https://commonslibrary.parliament.uk/research-briefings/cbp-7434/ https://www.cpreherts.org.uk/wp-content/uploads/sites/30/2021/10/The-Problem-with-Solar-Farms.pdf https://files.bregroup.com/solar/KN5524_Planning_Guidance_reduced.pdf

	While some solar farms (especially adjacent to motorways or main roads) are highly visible, there are many others that are very well shielded and noticed by very few people. It is perhaps also worth remembering that some fields, such as those planted with maize, may be green in summer, but are bare earth for much of the year, and are hardly 'natural', requiring high volumes of fertiliser and pesticides to be applied.	
Solar farms cause a loss of agricultural land	The National Planning Policy Framework (NPPF) guides development, including renewable energy projects, away from the “best and most versatile” (BMV) agricultural land, generally grades 1, 2, and 3a. Planning Authorities are also instructed to consider whether a proposal allows for continued agricultural use or encourage biodiversity improvements. Planning Authorities in England are required to consult Natural England on planning applications that will result in the loss of over 20 hectares of BMV agricultural land if the development of that land is not in accordance with their local plan. It is possible for some agriculture to exist alongside PV panels. If panels are mounted high enough, grass and other crops will still grow and animals (typically sheep) can graze under and around the panels. There are also examples of food crops being grown alongside solar panels, in some cases benefiting from the shade and protection offered by the panels (although in more northerly areas the panels need to be spaced more widely to allow sufficient irradiation for the crops).	https://researchbriefings.files.parliament.uk/documents/CDP-2023-0168/CDP-2023-0168.pdf https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land#developers-check-if-your-proposal-affects-agricultural-land https://www.cpreherts.org.uk/wp-content/uploads/sites/30/2021/10/The-Problem-with-Solar-Farms.pdf https://www.sciencedirect.com/science/article/abs/pii/S221462962100116X https://www.cerogeneration.com/insights/agrivoltaics-how-solar-and-farming-can-go-hand-in-hand/#:~:text=Agrivoltaic%20solar%20farms%

	Where agriculture is not possible alongside the panels, planting native wildflowers and other species can increase biodiversity, attract pollinators (potentially increasing yields of adjacent agriculture or allowing honey production) and allow previously intensively-used land to lie fallow and recover. It has also been pointed out that current solar PV land usage (230km2) is 0.1% of UK land area (242,495km2) and significantly less than that used by airports (493km2) and golf courses (1256km2). And also that 85% of UK agricultural land is used for meat production (providing 32% of calories consumed in the UK), so reducing meat consumption even slightly could free up more productive land than required by solar farms.	20share%20the,farm%20machinery%20to%20pass%20underneath. https://www.dezeen.com/2022/09/30/agrivoltaic-solar-farms-feature/ https://www.carbonbrief.org/factcheck-is-solar-power-a-threat-to-uk-farmland/ https://www.wwf.org.uk/press-release/transform-uk-farmland-boost-food-resilience-tackle-nature-crisis#:~:text=The%20latest%20report%20in%20WWF's,total%20land%20use%20for%20agriculture.
Solar farms concrete over fields	From a distance, solar farms do appear to cover all of the land. This impacts on visual amenity (covered in “Loss of views). However, as described in “Increase flood risk”, very little land is actually concreted - just the area for electrical inverters, switchgear, any batteries, and sometimes a small area around each post (typically less than 1%??) of the total area of the solar farm. And, as described in “Loss of agricultural land”, solar farms should not be built on high-quality agricultural land, and can offer biodiversity and other agricultural benefits. Solar farms usually get planning permission for a limited period (20-35 years typically) after which they should be completely decommissioned and all traces removed. Although clearly, many will apply for extended operation of repowering.	https://www.stephens-scown.co.uk/specialist-sectors/renewable-energy/closing-down-a-solar-farm/#:~:text=Any%20decommissioning%20strategy%20needs%20to,cabling%20or%20substations)%20and%20the https://www.pinsentmasons.com/out-law/analysis/solar-power-generation-uk-planning-policy

Can't get grid connections for solar farms	Delays in obtaining a suitable connection to the National Grid are a very significant restriction on the construction of more solar farms, especially in the South-West of England where high irradiance levels have resulted in rapid solar deployment. According to the Local Government Association (LGA), of the 1,300 energy projects with planning permission, only 150 are currently under construction, with the others unable to progress due to unavailability of grid connections. Ofgem, National Grid, and Distribution Network Operators (DNOs) are taking action to enable additional and faster grid connection, including: prioritising schemes that are 'connection ready'; providing Local Authority oversight of grid operation and reinforcement through the 'Regional Energy Strategic Planner' (RESP) role, and 'export-limited' grid connections that restrict output when the grid is under strain.	https://www.rpsgroup.com/insights/consulting-uki/overcoming-grid-connection-delays-a-crucial-challenge-for-the-growth-of-solar-technology/ https://www.newcivilengineer.com/latest/over-1000-clean-energy-projects-with-planning-permission-cant-be-built-due-to-grid-connection-issues-13-07-2023/ https://www.ofgem.gov.uk/publications/ofgem-announces-tough-new-policy-clear-zombie-projects-and-cut-waiting-time-energy-grid-connection https://www.nationalgrideso.com/news/new-regional-energy-strategic-planner-role https://blackfinch.com/news/blackfinch-energy-s-horsey-levels-makes-history-as-first-accelerated-solar-grid-connection-in-uk/ https://www.nationalgrideso.com/document/281171/download
Solar farms create lots of traffic on rural roads	There are often concerns about additional traffic that would be generated by solar farms, often on small rural roads.	https://assets.publishing.service.gov.uk/media/635273f8d3bf7f1935658646/Construction_Traffic_Management_Plan_-CHECKED.pdf

	The only significant extra traffic is during the construction phase (and, presumably, during decommissioning). A 50MW solar farm anticipates requiring 350 HGV deliveries during the 6-month construction phase (about 2 journeys a day on average (although busier at some times than others). The construction of a solar farm does not typically require equipment to be delivered by abnormal loads (i.e. vehicles over 16.5m in length). During operation, solar farms require little maintenance. Sites are usually unmanned, and just require occasional (weekly??) visits to undertake checks, maintenance and adjustments to infrastructure as required.	https://www.lincsonline.co.uk/spalding/news/fears-solar-farm-plans-could-increase-construction-traffic-o-9332027/ https://www.strategiclandgroup.co.uk/insights/what-makes-a-site-suitable-for-a-solar-farm https://www.cpreherts.org.uk/wp-content/uploads/sites/30/2021/10/The-Problem-with-Solar-Farms.pdf
All PVs should go on roofs, not on the ground	Many people and organisations, including CPRE (the Countryside Charity, formerly known as the Council for the Preservation of Rural England) suggest that solar PV should be placed on roofs instead. Few people, if any, would disagree that it would be more desirable to have PV panels on roofs than on the ground if possible. But there are many additional challenges and costs to installing PV panels on existing commercial structures including: - additional weight and windage that the structure probably isn't certified for - additional complexity, costs and risk of installation - increased risks of fire for the building - higher risks for firefighters dealing with any fires at the site - higher costs due to the smaller 'sites' areas available - many more grid-connections required because of the smaller sites (although some might be possible via the building's existing connection) - additional building insurance costs	https://www.cpreherts.org.uk/wp-content/uploads/sites/30/2021/10/The-Problem-with-Solar-Farms.pdf https://www.cross-safety.org/uk/safety-information/cross-safety-report/safety-issues-when-adding-pv-panels-existing-roofs-1015

	- issues of ownership and liaising (who installs, owns, operates and benefits from the panels) There are also visual-amenity and heritage concerns about putting solar panels on domestic properties, especially those that are listed or are in conservation areas. The Government has created a “Solar Taskforce” to explore the 'untapped potential' of commercial building for solar power. Although it is highly unlikely that there will be enough suitable commercial roof space to completely remove the need for ground-mounted solar to reach the Government's target of 70GW of installed capacity by 2050.	

Roof Mounted Photovoltaic (PV)

Concern	Response	References
Roof mounted PV is not allowed in conservation areas	There is no blanket ban on roof mounted PV (or other energy retrofit measures) in conservation area planning legislation or guidance. The 2023 National Planning Policy Framework specifically emphasises the need for sustainable development, and the move to a low-carbon economy. Clearly there will be some buildings in a Conservation Area that would be substantially harmed by roof mounted solar PV, but these are likely to be a small minority. Some specific Conservation Area Management Plans MAY outlaw solar panels on all roofs within a CA, although that's not typical, and the Council would be able to review and amend that guidance if it was considered to be overly restrictive. Many CAMPs will differentiate between the street-facing aspect of buildings, and aspects that are not visible from the public highway. The Architects' Climate Action Network have developed a 'Climate Emergency Conservation Area Toolkit' that has specific advice on retrofitting within Conservation Areas.	https://assets.publishing.service.gov.uk/media/65a11af7e8f5ec000f1f8c46/NPPF_December_2023.pdf https://www.architectscan.org/conservation-area-toolkit-retrofit-homes https://www.hertsad.co.uk/news/21751270.council-bans-solar-panels-one-conservation-area-allow-building-anoth/
Roof mounted PV ruins the look of homes and the streetscape	This is a subjective opinion, and attitudes are changing as solar panels become more common, as the climate crisis deepens, and as energy prices rise. There seems to be a significant difference in opinions between older and younger people, with the majority of older people (ages 57-72) saying they thought solar panels were unattractive, but 87.5% of younger people finding panels either ‘attractive’ (50%) or	https://www.theecoexperts.co.uk/solar-panels/are-they-too-ugly https://www.architecturaldigest.com/reviews/solar/most-visually-appealing-solar-panels

	'acceptable' (37.5%). There is also a 'contagion' effect where solar panels are increasingly taken up in areas where other panels have been installed. This all suggests that public opposition to panels is likely to lessen, as it did for satellite dishes. There are different types of solar panels. Polycrystalline panels are generally considered to be the least attractive with a bluish hue; monocrystalline are mainly black and more efficient, but also more expensive. PV 'slates' are also available, although 4-5 times as expensive as panels, so generally not typically favoured by homeowners.	https://www.lse.ac.uk/granthaminstitute/publication/what-drives-social-contagion-in-the-adoption-of-solar-photovoltaic-technology/
Not many roofs face in the right direction	In the UK, solar panels that generate the maximum-possible electricity would face due south and be tilted at an angle of 30-40 degrees from the horizontal. But few house roofs are perfectly aligned. However, total output is not very sensitive to the exact orientation and elevation of panels, with even panels that face due east or west producing up to 90% of the output of ideally-aligned panels. There are also significant benefits of panels that do not face due south: they extend the period over which electricity is generated; they generate more when electricity demand is at its highest (morning and evening); and they are more efficient as they operate at the cooler times of day. There are some calls for new build properties to be aligned for maximum solar gain, although that often applies as much (or more) to passive heating of the house by the sun warming walls as to solar PV. And other site constraints (geography, hills, access etc) are likely to limit how perfectly buildings can be aligned. As any even-slightly south-facing roof has a good potential to generate	https://www.eco-home-essentials.co.uk/solar-panel-orientation.html https://www.thegreenwaysolar.co.uk/guide/expertsguide/maximisingsolarpvpotentialoneastandwestfacingroofsintheuk/ https://www.alternative-energy-tutorials.com/solar-power/solar-panel-orientation.html https://www.merthyr.gov.uk/media/1213/spg-4-sustainable-design-chapter-4.pdf https://www.theecoexperts.co.uk/solar-panels/new-builds https://www.gov.uk/guidance/standard-assessment-procedure

	electricity, the priority for development (and Local plans) should be to ensure that all new builds have solar panels, which are relatively cheap to install at construction time and can save homebuyers many thousands of pounds during operation. All new builds do have a requirement by law to incorporate energy-saving measures through the SAP (Standard Assessment Procedure) regulations.	
New build should all have PV tiles, rather than solar panels	This requirement would be enforced by a policy requirement in Councils' Local Plans or if it was included in the National Planning Policy Framework. Most existing Local Plans do not require new builds to have solar tiles, solar PV or be net zero, although many Councils are looking to include a requirement along these lines if approved by the Inspectors. PV tiles or slates are the least visually-obtrusive way to provide roof mounted generation, but they are 4-5 times as expensive as panels, so it might be better just to require solar PV on each new roof and not specify the exact design. Solar panels are relatively cheap to install at construction time and can save homebuyers many thousands of pounds during operation (easily offsetting the additional construction costs). Currently all new builds do have a requirement by law to incorporate energy-saving measures through the SAP (Standard Assessment Procedure) regulations. The Government is consulting on "Future Homes and Buildings Standards", which are widely-expected to require solar PV on most new builds.	https://www.architecturaldigest.com/reviews/solar/most-visually-appealing-solar-panels https://solarenergyuk.org/news/solar-panels-set-to-be-standard-on-new-homes-and-buildings/ https://www.gov.uk/government/consultations/the-future-homes-and-buildings-standards-2023-consultation/the-future-homes-and-buildings-standards-2023-consultation#performance-requirements-for-new-buildings

Roof mounted PV damages roofs and tiles, especially on older buildings	Properly-installed solar panels do not damage roofs. But they can cause damage if they're not installed correctly. Proper installation will need to consider: whether the roof is suitable for solar panels (some older roofs and those with combustible roof material, such as thatch, are not suitable); how the panels are fixed to the roof; and whether the installer is properly accredited (in the UK, installers should be accredited to the MCS Contractor Certification Scheme and BS7671 IET Wiring Regulations). When installing panels on existing roofs, the installer needs to be careful to avoid cracking or otherwise damaging the existing roof. Guides are available online (see links) to help homeowners understand the risks and how to avoid them.	https://www.zurich.co.uk/news-and-insight/roof-mounted-solar-panels https://myroofhub.com/solar/can-solar-panels-damage-roof/
PV panels are only affordable by rich people	As discussed under “upfront costs unaffordable”, the initial installation cost of domestic solar PV (typically about £7000) does often make them unaffordable for people without savings. Financing (e.g. via a loan) is available from some installers, banks or mortgage lenders. And some 'subscription' models are becoming available where you avoid upfront costs by paying a monthly fee, or by 'leasing' your roof to an installer/generator. For domestic solar PV, even though they are widely considered to be a good investment which recoups costs in 6-20 years, the initial installation cost (typically about £7000) make them unaffordable for many people without savings. Many government, local authority, or energy supplier grants are available to partially or wholly cover installation costs, but these are	https://www.moneysavingexpert.com/utilities/free-solar-panels/ https://www.theecoexperts.co.uk/solar-panels/government-grants https://www.tomato.energy/tomatopia

	not typically available for everyone. Currently some of the schemes available are: - The Energy Company Obligation (ECO) scheme - Local Authority Home Upgrade Grants - Warmer Home Nest Scheme Wales - Home Energy Scotland Grants and Loans - Tomato Energy 'Tomatopia' scheme, which offers solar panels and home batteries with no upfront costs. There are also a small number of firms offering solar panels on subscription, where you can either own the panels (and pay a monthly fee) or 'rent' the panels (by leasing your roof to an installer/generator). Many installers offer financing via loans, although better terms may be available from banks or mortgage lenders.	
Can't receive any money for electricity exported to the grid from solar PV	Electricity that is generated but not used by the owner of the panels is 'exported' back to the grid and can receive payments through the smart export guarantee (SEG) scheme (or via the feed-in-tariff for panels installed before 31 March 2019). Energy suppliers with over 150k customers are required to offer a SEG 'tariff' to UK households which pay a set rate for each kilowatt hour (kWh) of electricity exported. But the rate is not set, and varies widely (from 1p/kWh to about 40p/kWH. To receive a SEG tariff, the householder needs to be with a supplier that offers the scheme (not all do, but it's possible to switch suppliers), and the panels will probably need to be certified (via the Microgeneration certification Scheme, MCS, or National Inspection Council for Electrical Installation Contracting, NICEIC).	https://www.ofgem.gov.uk/environmental-and-social-schemes/smart-export-guarantee-seg#:~:text=SEG%20payments%20are%20calculated%20by,best%20for%20their%20individual%20circumstances https://www.moneysavingexpert.com/utilities/free-solar-panels/ https://solarenergyuk.org/resource/smart-export-guarantee/

	But even the best SEG tariffs are usually well below the cost of importing electricity from the grid. So owners of solar panels will make better returns if they match their electricity usage to the times when they are generating electricity.	

Onshore Wind

Concern	Response	References
Wind turbines interfere with the local radar facilities	There are restrictions on where wind turbines are allowed due to the presence of radar installations at airports and MoD airbases. There is a 15 kilometre (km) consultation zone and 30km or 32km advisory zone around every civilian air traffic radar, although objections can be raised to developments that lie beyond the 32km advisory zone. There is a c.15km statutory safeguarding consultation zone around Ministry of Defence aerodromes. There are a range of mitigation options available which would allow radar to continue to operate unimpeded, but these are often quite expensive and often not cost-effective for smaller sites.	https://www.gov.uk/guidance/renewable-and-low-carbon-energy https://www.gov.uk/government/publications/safeguarding-aerodromes-technical-sites-and-military-explosives-storage-areas https://www.internationalairportreview.com/article/12201/wind-farms-and-radars-living-together/
Wind turbines are not efficient in the UK because of low wind speeds	The siting of wind turbines is an important factor in maximising their output and efficiency. Typically wind turbines generate very little in windspeeds below 5m/s (11mph), output 100% capacity from about 10-25m/s (22-55mph) and do not operate about that for safety reasons. In the UK as a whole, the distribution of windspeeds gives a “load factor” of 27.6% (the amount of electricity actually generated, divided by the amount that it would produce if the wind blew at the optimum speed 24/ hours/day and 365 days/year). The load factor for England is slightly lower, at 25.6%. Looking at a map of average windspeeds across the UK, there are areas with good average windspeeds (mainly north and west), and	https://www.researchgate.net/figure/Illustrative-examples-of-aggregate-power-curves-for-large-onshore-and-offshore-wind-farms_fig2_272380776 https://www.carbonbrief.org/factcheck-which-parts-of-the-uk-are-windy-enough-for-windfarms/ https://www.mpoweruk.com/wind_power.htm

	also areas with quite low average windspeeds (mainly south and east). Unfortunately (and fairly typically), the areas of higher windspeeds are often protected areas such as National Landscapes (AONBs) because they tend to be on hills and moorland.	
Wind turbines can't be recycled	85-95% of a wind turbine (the tower, nacelle / turbine hub, and the generator) are made of materials such as steel, aluminium and copper, which can be easily recycled. But turbine blades are made of fibreglass with a tough plastic coating designed to withstand years of exposure to the elements, which makes them hard to recycle. There are a number of recycling technologies being developed and investigated, as well as innovations in their manufacture to make them easier to recycle at end of life.	https://www.nationalgrid.com/stories/energy-explained/can-wind-turbine-blades-be-recycled https://www.bbc.co.uk/news/business-68225891
Noise from wind turbines disturbs neighbours and damages health	All wind turbines will produce sound when rotating. This usually falls into two categories: Aerodynamic Noise (generated by the movement of the blades through the air); and Mechanical Noise (from the generator and any associated gearbox). Planning authorities have a duty to consider the effect of noise as part of the planning process. A noise report, undertaken by a qualified acoustician, is required as part of the wind turbine planning application. To enable an assessment to be made as to whether the level of noise produced by the turbine will have an adverse effect on the amenity of nearby noise sensitive premises, either on its own, or with any other turbines in the area. Typical limits on noise are about 35 decibels, perhaps up to 45 decibels for people who have invested in the windfarm and are willing to accept higher noise. That typically means that no-one	https://assets.publishing.service.gov.uk/media/5a798b42ed915d07d35b655a/ETSU_Full_copy__Searchable_.pdf https://www.ioa.org.uk/sites/default/files/IOA%20Good%20Practice%20Guide%20on%20Wind%20Turbine%20Noise%20-%20May%202013.pdf https://www.cornwall.gov.uk/environment/environmental-protection/wind-turbines/

	should live within 350m of the windfarm, and that the noise they hear should be similar to the noise from a car travelling at 40mph makes when heard from 100m away (also described as a similar level to refrigerator or computer hum). There is planning guidance on acceptable noise levels from wind turbines and windfarms, known as ETSU-R-97. The Institute of Acoustics has produced “A Good Practice Guide To The Application of ETSU-R-97 For the Assessment and Rating of Wind Turbine Noise” that Council Planning departments will often refer to. One common objection to this approach is “amplitude modulation”, the fact that the noise is not constant but periodic, producing a 'swish' which is louder than the average. The Government are considering further guidelines with specific advice on this issue. A wind turbine a mile away should be essentially silent. Wind plants are very, very quiet compared to other types of industrial facilities, such as manufacturing plants, but most industrial plants are not located in rural or low-density residential areas.	https://www.dickbowdler.co.uk/content/publications/ETSU-R-97_-_The_Alternative_-_Incl_figures.pdf https://www.wiltechacoustics.co.uk/news/how-to-reduce-wind-farm-noise/ https://www.ioa.org.uk/news/new-report-review-onshore-wind-noise-guidelines https://windexchange.energy.gov/projects/sound#:~:text=On%20average%2C%20land%2Dbased%2C,to%20a%20home%20or%20building)
Wind turbines kill birds	If inappropriately located wind turbines could have an impact on birds through collision, disturbance or habitat damage. Natural England has guidance on siting, assessing and monitoring the impact of new wind farms to which Planning Authorities should adhere. The Royal Society for the Protection of Birds (RSPB) has stated that it supports a significant growth in onshore wind power generation in the UK, provided that it is located and designed to	https://www.gov.uk/guidance/wild-birds-surveys-and-monitoring-for-onshore-wind-farms https://www.sciencefocus.com/science/how-many-birds-are-killed-by-wind-turbines-in-the-uk

	minimise impacts on bird populations. This means avoiding locating turbines close to major migration pathways and important habitats. Estimates suggest that between 10,000 and 100,000 birds are killed by turbine blade strikes annually in the UK. In comparison, it's estimated that 55 million birds are killed in the UK each year by domestic cats. There is ongoing research and development to reduce the risks of wind turbines for birds, bats and other wildlife, for example, by painting some of the blades.	
Wind turbines are unreliable and are often broken down	There are multiple reasons why a wind turbine might not be turning, including: - lack of wind or (rarely) too much wind - routine maintenance - lack of grid capacity to export all power from a windfarm - turbine failure (of blades, gearbox, generator, control system etc). The first two of these are not really failures and are included in the calculation of the "load factor" for UK onshore wind turbines as 27.6% (covered under "not efficient in UK wind speeds"). The third is an issue with grid capacity. Regarding mechanical or electrical failure of wind turbines, determining what is a failure and what is maintenance makes getting a single figure for the number of failures and downtime hard to assess. A University of Edinburgh study calculates that the "technical availability reduction" due to "corrective maintenance" is 2-3.5% for offshore wind turbines. However, there have been some wind turbine designs, especially older ones, that were more prone to failure. Anecdotally, older	https://onlinelibrary.wiley.com/doi/full/10.1002/we.2404 https://www.mdpi.com/2077-1312/10/12/1965 https://iopscience.iop.org/article/10.1088/1742-6596/2626/1/012025/pdf https://rebeccawindemer.wordpress.com/2021/08/25/why-arent-old-wind-turbines-being-removed/ https://assets.publishing.service.gov.uk/media/6556027d046ed400148b99fe/electricity-generation-costs-2023.pdf

	turbines in the 100-250kW range installed about 20 years ago are reported to have frequent gearbox problems. Newer designs should address these flaws. Another way to assess wind turbine failures is to look at the "levelised cost of electricity" of different types of generation, which include the costs of repair and downtime of different generation technologies. A 2023 UK Government report found that the LCOE of onshore wind (£38/MWh) was the lowest of all technologies considered including large-scale solar (£41/MWh), offshore wind (£44/MWh) and gas-powered generation (£114/MWh). Complete failures of wind farms, including fire and collapse do occur. But these are quite rare (although often widely-reported). One estimate is that there's one catastrophic fire each year for every 19,230 wind turbines, and another reports 47 tower collapses between 2000 and 2016 (in 2012 there were 225,000 wind turbines installed globally, so that would equate to roughly one collapse each year for every 75,000 turbines).	https://www.carbonbrief.org/factcheck-how-often-do-wind-turbines-catch-fire-and-does-it-matter/ https://pure-oai.bham.ac.uk/ws/files/48895024/6._Cases_review_paper_06_Rev_3.pdf
Wind turbines require more energy to manufacture than they generate in their lifetime	A selective and mis-appropriated quote was widely circulated saying "a windmill could spin until it falls apart and never generate as much energy as was invested in building it." The full quote was "At a good wind site, the energy payback day could be in three years or less; in a poor location, energy payback may be never. That is, a windmill could spin until it falls apart and never generate as much energy as was invested in building it." And the original author explained that his point was that "it would be pointless to put wind turbines in poor locations".	https://fullfact.org/online/wind-turbines-energy/ https://www.theguardian.com/environment/2012/feb/29/turbines-energy https://www.sciencedirect.com/science/article/abs/pii/S096014810900055X https://www.ewea.org/wind-energy-basics/faq/

	Many other studies have found that wind turbines recoup their energy investment in a year or less, and that on average they produce 20 times more energy than they took to produce. An evidence review published in the journal Renewable Energy in 2010, which included data from 119 turbines across 50 sites going back 30 years, concluded that the average windfarm produces 20-25 times more energy during its operational life than was used to construct and install its turbines. It also found that the average "energy payback" of a turbine was 3-6 months.	
Wind turbines only work financially because of Government subsidies	This is not correct. Onshore wind turbines are now the cheapest way to generate electricity - slightly cheaper than solar PV and offshore wind, and much cheaper than generation using gas. The Levelised Cost of Electricity (LCOE, the total cost of building an operating a generation asset for its lifetime divided by the amount of electricity generated) for onshore wind stations is £38/MWh, compared with £41/MWh for solar PV, £44/MWh for offshore wind and £114/MWh for gas (CCGT). Early on in UK renewable deployment, projects did need support, which was offered through the "Renewables Obligation" (RO) scheme which gave renewable generators one "Renewable Obligation Certificate" (ROC) for each MWh of renewable electricity generated. The value of ROCs changes year-on-year, but in 2023-24 it was £59.01, effectively giving generators on the scheme an extra £59.01/MWh. As renewables deployment increased and prices fell, the government concluded that renewable generators were being over-subsidised, so replaced the RO with a new "Contracts for Difference" (CfD) scheme. In this scheme, generators bid for how	https://assets.publishing.service.gov.uk/media/6556027d046ed400148b99fe/electricity-generation-costs-2023.pdf https://www.lse.ac.uk/granthaminstitute/explainers/do-renewable-energy-technologies-need-government-subsidies/ https://www.ofgem.gov.uk/environmental-and-social-schemes/renewables-obligation-ro https://www.ofgem.gov.uk/publications/renewables-obligation-ro-buy-out-price-mutualisation-threshold-and-mutualisation-ceilings-2024-2025 https://researchbriefings.files.parliament.uk/documents/CBP-9871/CBP-9871.pdf

	much they would need to receive (the “strike price”) for each MWh of electricity generated - from both the wholesale price of electricity and any subsidy. When the wholesale price of electricity is below the strike price, the CfD scheme subsidises the generator; when the wholesale price is above the strike price (as it was after mid-2021) the generator returns money to the government (effectively subsidising fossil fuel generation). Countries within the Organisation for Economic Co-operation and Development (OECD) subsidise green energy more than poorer, non-OECD countries. While renewables are often criticised for being heavily subsidised, in fact fossil fuels and nuclear power receive more financial support. The IEA calculated that fossil fuels received about US$260 billion of subsidies in 2016 compared to US$140 billion for renewables. This is in addition to the ‘implicit’ subsidy to fossil fuels, by not requiring them to pay for the environmental costs they generate in the form of climate change and local air pollution.	

Bioenergy/Biofuels

Concern	Response	References
Biofuels are driving up the cost of land and other crops	Biofuels can be produced from waste products (e.g. food and agricultural waste) or from dedicated crops. If dedicated crops, such as maize, wheat or miscanthus are used a\s the source for biofuels, then these can compete with food crops for land. Most grown biofuel crops are the same as those used for animal feed and cooking oils but are being used for anaerobic digestion (AD) rather than consumption.	Royal Society: Review of environmental sustainability of biofuels
Growing maize causes soil erosion and pollutes farmland	Maize is a nutrient hungry plant requiring lots of manure on the fields which can cause run off into water ways potentially causing pollution. But maize doesn't pollute the land itself as is an arable crop like any other. A cover crop on maize fields over winter can greatly lower the soil runoff.	Royal Society: Review of environmental sustainability of biofuels Investment Monitor: Maize sustainability
Biofuel production produces more greenhouse gases than it saves	We need to differentiate biofuels that are for anaerobic digesters from fuels destined to be burnt. It is important not to confuse the two very different types of biofuel. Biofuel produced for anaerobic digester recycles the CO2 and uses all of the methane. Biofuels or biomass produced for burning has a very high transport cost if it is not produced locally, which includes CO2 production.	Royal Society: Review of environmental sustainability of biofuels

Biomass (woodchip) usage is driving deforestation	Biomass production does not drive deforestation unless the woodland it is sourced from is not replaced. If the biomass is grown where it is combusted for energy, it is reabsorbing the CO2 in the way that biofuel produced from anaerobic digester does also when the plant is growing.	Royal Society: Review of environmental sustainability of biofuels
Biofuels produced from waste can cut methane emissions	Organic wastes (including livestock manure, agriculture wastes, and food wastes) generate large amounts of methane as they decompose without the presence of oxygen e.g. in landfill. Nutrients and other chemicals present in organic wastes can contaminate surface and ground waters through runoff or by leaching into soils. Excess nutrients cause algal blooms, harm wildlife, and affect drinking water. Using organic waste to produce biogas (by capturing it through anaerobic digestion) can reduce methane emissions escaping into the atmosphere, will reduce nutrient runoff and contamination, as well as providing a useful source of energy. All hydrocarbons are a mixture of carbon and hydrogen, methane (CH4) is the simplest. It is produced as marsh gas, in cattle digestive systems, and in oil and gas usage by humans. If you put a carbohydrate through an anaerobic digester you in effect produce marsh gas which is not released to the atmosphere because it is burnt.	EESI: Biogas - Converting Waste to Energy Science Direct: Sustainability of biofuels

Please note: This resource was put together by a third party consultant for a bespoke project for Somerset Council, supported by UK100 in Summer 2024. It is not being updated. The responses (and links referred to) do not represent the official view of UK100 and we would always advise to undertake independent research on these topics.

Electric Vehicles (EVs)

Concern	Response	References
EVs have a higher carbon footprint than Internal Combustion Engine (ICE) vehicles when manufacturing emissions are accounted for	Over the lifetime of the vehicle, total emissions associated with manufacturing, charging, driving and maintaining an EV are lower than those for an internal combustion engine (ICE). Carbon footprint calculations for vehicle construction vary dramatically between manufacturers. Most claim to achieve this through certified offsetting and carbon neutral targets. Electric vehicles (EVs) have much lower life cycle carbon emissions than petrol and diesel vehicles using ICE. Carbon emissions over the EV life cycle are falling fast as the UK electricity grid is decarbonised and the UK moves towards Net Zero. Total life cycle carbon emissions of a medium-sized battery EV will be about one-quarter of a petrol car sold in 2025, with UK-manufactured EV batteries 12% greener than the European average.	https://www.ricardo.com/en/news-and-insights/press-releases/2022/electric-vehicles-on-the-road-to-greener-future https://www.faraday.ac.uk/wp-content/uploads/2021/11/Faraday_Insights_12_FINAL.pdf
Lithium will run out	Lithium is an abundant mineral found in rocks and in brine water after the water has been evaporated off. There is even Lithium in the graphite found in Cornwall. Lithium is also fully recyclable. Lithium will not run out.	https://www.sustainabilitybynumbers.com/p/lithium-electric-vehicles
Lithium mining is environmentally damaging	Some lithium extraction practices can cause environmental degradation and can use water unsustainably. There are more environmentally safe methods now being used such as Direct lithium extraction (DLE) which is an innovative technology that aims to simplify the lithium extraction process and reduce the environmental footprint. Lithium extraction is under scrutiny and many lithium extraction companies are improving their methods to reduce environmental impacts such as implementing water recycling and conservation measures. Exploring alternative lithium	https://sustainablereview.com/sustainable-lithium-extraction-how-is-lithium-mined-and-processed/ https://www.innovationnewsnetwork.com/working-towards-environmentally-friendly-lithium-extraction-methods/27712/

	sources can help mitigate the impact of lithium extraction on water scarcity. Lithium production to be used in EVs is overall helping to reduce greenhouse gas emissions as it is replacing very high carbon emissions and polluting fossil fuels.	https://www.nationalgrid.com/stories/journey-to-net-zero/electric-vehicles-myths-misconceptions
Lithium batteries aren't recyclable	Lithium is recyclable. Approximately 95% of a lithium-ion battery can be recycled into new batteries. In fact, the metals used in lithium-ion applications, such as lithium, nickel, and cobalt, hold their value beyond the life of the battery, allowing recycling facilities to reclaim these materials.	https://www.commonsense-energy.org/myth-or-fact-electric-vehicles-ev-batteries-cant-be-recycled https://www.nationalgrid.com/stories/journey-to-net-zero-stories/what-happens-old-electric-car-batteries
EV batteries can catch fire	EV batteries can only catch fire where the container of the battery has been punctured, there are impurities in the battery or the charging system is at fault. You should never charge your electric bike or scooter in the house unattended. The charging system on the smaller cheaper devices is not very sophisticated. There used to be fires when charging mobile phones but these are a thing of the past as the control of the batteries has increased. Research into actual cases has shown that EVs are much less likely to combust than their petrol or diesel equivalents.	https://www.topgear.com/car-news/mythbusting-evs/mythbusting-world-evs-are-electric-cars-susceptible-catching-fire https://businessmotoring.co.uk/insight-the-myths-behind-electric-vehicle-fires/ https://spectrum.ieee.org/lithium-ion-battery-fires
There is no way to put out EV fires	Emergency services have been developing bespoke means of dealing with EV fires – several European Fire services are adopting large containers into which a smouldering EV will be lowered and the container then filled with water, the whole being left for several days to ensure the fire truly is out. A large Li-ion fire, such as in an EV, may need to burn out. Water with copper material can be used,	https://www.ctif.org/news/new-revolutionary-method-extinguishes-lithium-ion-ev-fires-ten-minutes-minimal-water

	but this may not be available. A small lithium-ion fire can be extinguished using a foam extinguisher, CO2, ABC dry chemical extinguisher, powdered graphite, copper powder, or soda (sodium carbonate) or the Class D extinguishers are used for lithium-metal fires only. But Lithium Ion fires can be extinguished with water.	https://www.evfiresafe.com/ev-fire-suppression-methods
EVs don't have a big enough range	The average UK daily mileage in a car is 18 miles (source Department for Transport 2022). EVs have more than enough range for the average daily use - the average range of an electric car fully charged is 236 miles (source The Society of Motor Manufacturers and Traders) and EV batteries are rapidly evolving to increase range. However unless you regularly have long journeys a long range EV isn't essential as you can access more EV charging stations and potentially charge at home. EVs are cheaper to drive than fossil fuel cars especially if you have PV solar panels to charge your car using the free energy harnessed from the sun.	https://www.gov.uk/government/statistical-data-sets/nts09-vehicle-mileage-and-occupancy#car-mileage https://www.smmt.co.uk/2023/05/britains-new-car-market-boosted-by-battery-electric-vehicle-choice
EVs take too long to recharge when on a journey	Depending on how big the EV battery is, how empty it is and the rate of power of the charging point will vary the time it takes to recharge. Most EVs now have rapid charging capability enabling a DC charge from the public rapid chargers – this method can charge a car to 80% (maximum charge when using a rapid charger to protect the battery) from around 20 mins – about the same time as stopping for a comfort break and most motorway service stations have DC EV Charging.	https://www.zap-map.com/ev-guides/connector-types
There isn't the required EV charging infrastructure	There are more Charging Points across the UK than there are fossil fuel petrol/diesel pumps. More petrol stations are closing than there are EV charging stations being installed. In 2019 it was reported that EV charging points in the UK surpassed the number of petrol stations. Since then an exponential number of EV charging points have been installed for public EV charging.	https://www.intelligentliving.co/uk-electric-vehicle-charging-points/

Many EV charging networks require membership cards to be able to find and use a charger	All EV charging points are registered on the free apps and web maps showing all EV charging locations - see Zap-Map for UK and Open Charge Map for international charging point locations. Some networks may have required you to have an RFID card to use their charging points but there is now a requirement for all EV charging to be paid for by contactless payments to make it easier and more accessible to use EV charging networks across the UK. From autumn 2024 all new EV charging installed must be able to take contactless payments.	www.zap-map.com www.openchargemap.or https://www.gov.uk/government/publications/the-public-charge-point-regulations-2023-guidance/public-charge-point-regulations-2023-guidance#:~:text=in%20more%20detail.-,Contactless,than%20one%20public%20charge%20point. https://www.zap-map.com/ev-guides/how-to-pay-public-ev-charging
EV charge points are taking up parking places	EV charging is added to EV designated parking bays to support the uptake of EVs and ensure they aren't blocked by Internal Combustion Engine/fossil fuelled cars to ensure an EV can park at a designated EV charging point, just as you would expect to be able to access a fuel pump at a petrol station. EV charging is being made available at public and visitor car parks because EV charging is best located where electric vehicles are being parked for several hours to make best use of electricity while parked. A car spends on average 90% of its time parked so it is most effective to enable charging during the times cars are parked and not being used.	https://www.cenex.co.uk/app/uploads/2019/11/IUK-Car-Park-Study-V2.0-FINAL-marketing-version.pdf
EVs are too expensive	Though some high end EVs are expensive, just as high-end fossil fuelled cars are, there are some EVs that are getting more competitive on new purchase costs and as the running cost of an EV is less than that of a fossil fuelled car, overall EVs are cheaper. Running on electricity is more efficient as you can go further distances per kW of energy used and maintenance costs are less	https://www.carbonbrief.org/factcheck-21-misleading-myths-about-electric-vehicles/ https://www.rac.co.uk/drive/electric-cars/choosing/electric-car-leasing-explained-ev-financing-vs-buying/

	as oil changes are not required and There is less wear and tear on a motor compared to an engine. It is worth considering leasing an EV which is cheaper than buying one, or purchasing a second-hand EV from a reputable second hand EV dealer such as Drive Green.	Drive Green
There's no second hand EV market	Second hand EVs are available and many car dealers are now also selling second hand. As the market increases there are also second hand EV-only dealerships too (like Drive Green) that exclusively sell EVs.	AutoTrader: Secondhand EVs Drive Green
EVs are uninsurable / too expensive to insure	EVs are insurable but recently costs to insure all vehicles have increased and insurance for EVs has increased the most. There are a few reasons for this: repair cost and parts availability – EVs are newer to the market than other fossil fuelled cars, meaning parts may be less readily available or specialised and their purchase costs could be higher than the average fossil fuelled car and batteries may be insured in addition to the vehicle. Insurance comparison sites are a good way to find the best price.	https://www.electriccarscheme.com/blog/why-is-electric-car-insurance-so-expensive https://www.cleangreencars.co.uk/car-insurance/electric-car-insurance/
Electric vans or utility vehicles are not available	There are now ranges of electric vehicles that include every type of transport from bicycles and buses, to vans.	https://energysavingtrust.org.uk/advice/electric-vehicles/ https://www.cenex.co.uk/app/uploads/2021/05/Intro-to-BEV-2.pdf https://www.rac.co.uk/drive/electric-cars/choosing/buyers-guide/ https://electriccarhome.co.uk/electric-cars/

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EVs can't tow / take a roof rack / carry weight as they don't have sufficient torque	Towing or transporting on a roof rack with an EV is certainly possible. EVs typically have higher power and torque outputs, making towing almost seamless in an EV. As electric vehicles are advancing all the time many EVs are now capable of towing – check the technical details of the EV. Bear in mind the more wind resistance and weight you carry, the more energy it will use.	https://www.evspecs.org/comparison-chart/towing-capacity
EVs are so heavy they cause car parks and bridges to collapse (or require reinforcement)	In general many vehicles are now much heavier than they used to be when multi-storey car parks were designed and built. The extra weight of electric cars is not likely to accelerate the destruction of roads, bridges and car parks and, as EVs evolve, the battery packs are getting lighter. Many roads and ramps need general reinforcement to cope with overall increasing weight and use of vehicles.	https://www.theguardian.com/business/2024/mar/25/are-electric-cars-too-heavy-for-british-roads-bridges-and-car-parks#:~:text=Extra%20weight%20from%20electric%20cars,add%20to%20road%20maintenance%20costs.
EVs are responsible for increase in potholes due to increased weight	Potholes have increased due to greater fluctuations in temperatures, increased rainfall and more heavy goods vehicles on the roads causing more wear in general and reduced road maintenance.	https://www.nationwidevehiclecontracts.co.uk/blog/pothole-britain-why-are-our-roads-so-bad#:~:text=Poor%20road%20maintenance%20%2D%20Local%20councils,materials%20can%20contribute%20to%20potholes.
EV car tyres are more polluting	All car tyres are polluting as they wear down on roads leaving small particulates of rubber. Faster travel causes greater wear so faster roads have more particulate pollution. Electric vehicles produce less particulates from brakes than fossil fuelled cars because they use regenerative braking - where the electric motor works in reverse, converting kinetic energy from the moving vehicle into electricity, which is used to charge the battery when slowing down. This not only reduces the use of the mechanical brake discs and pads, but adds more range to the vehicle, too.	https://stopburningstuff.org/myths-facts/ev-myth-evs-cause-more-tyre-brake-pollution/ https://www.rac.co.uk/drive/electric-cars/running/do-electric-vehicles-produce-more-tyre-and-brake-pollution-than-petrol-and/

Heat Pumps and Heat Networks

Concern	Response	References
Heat pumps are more expensive than gas heating (because cost of electricity per kWh higher than gas)	Heat pumps are just the reverse of a fridge. Removing heat from the atmosphere or the soil, accumulating it to the temperature required to heat hot water systems or air. If you keep the required temperature low, a heat pump will efficiently reach that temperature. But if you try to run a heat pump at high temperatures it will require more electricity. Important to help reduce heating demand by removing draughts and increasing insulation and get heat pumps specified correctly as well as run heat pumps continuously and not expect them to give higher heat boots when required like current gas central heating systems.	https://www.nationalgrid.com/stories/energy-explained/how-do-heat-pumps-work#:~:text=A%20heat%20pump%20uses%20electricity,building%20and%20moving%20it%20inside. https://energysavingtrust.org.uk/advice/in-depth-guide-to-heat-pumps/
Heat pumps only work if you have insulated your house	Heat pumps work at a lower temperature than a conventional gas fired boiler. This means that insulation is advisable so that the heat pump doesn't over-work requiring more electricity to heat the home. Insulating the house will also reduce the amount of heat lost through the walls and roof saving energy on heating the internal space. You can run a heat pump without insulating the home but it will require more electricity to do so and bills will be higher.	https://www.nu-heat.co.uk/blog/heat-pump-insulation-a-complete-guide/#:~:text=Do%20Heat%20Pumps%20Require%20Insulation,be%20addressed%20before%20installing%20one. https://energysavingtrust.org.uk/advice/in-depth-guide-to-heat-pumps/
Heat pumps are too expensive	Heat pump installation requires an average £15k fund to fully install including radiator and pipework replacements. There is currently a Government grant for £7,500 towards installing a heat pump. The energy efficiency and carbon reduction benefits of heat pumps are greater than gas and the installation costs are reducing. They are more efficient than gas boilers as, typically, one unit of electricity produces 3 units of heat (that is, they're 300% efficient, compared to a gas boiler that is typically 60% efficient).	https://www.theguardian.com/business/article/2024/may/13/are-heat-pumps-more-expensive-to-run-than-gas-boilers https://energysavingtrust.org.uk/is-now-a-good-time-to-get-a-heat-pump/

	For homes with solar PV there is the additional benefit of cheaper electricity in addition to carbon emission reduction and overall costs of running a heat pump will also reduce. People who currently have electric heating will likely save on their energy bills when switching to a heat pump.	
Air Source Heat Pumps cost more to run	Heat pumps are considerably cheaper to run then current electrical heating as they are more efficient. The higher the heating demand, however, the more energy is required and the higher the energy bills. Running a heat pump at much more than 32° will raise the cost dramatically as the accumulation takes much longer. As the electricity prices reduce, running costs for heat pumps will reduce too. They are more efficient than most types of heating. Home insulation will increase efficiency and reduce heat loss.	EST: Is now a good time to get a heat pump?
Heat pumps can't heat water enough for baths / showers	Heat pumps should produce enough hot water for showers and baths. However, a thermal heat store or water cylinder will be required that is compatible with a heat pump, as the rate of flow would not be sufficient without. Make sure you use an accredited heat pump installer – you can find MCS-certified heat pump installers on the MCS Certified directory.	https://www.evergreenenergy.co.uk/heat-pump-guides/using-a-heat-pump-for-hot-water/ MCS: Find a certified installer
Heat pumps have to be left on all the time	Heat pumps do not have to be left on all the time. But they do run more efficiently left on rather than used on demand. Heat pumps run at lower temperatures than current gas boilers and you can help to reduce the running costs by insulating your home, and aligning with a PV and battery storage system and switching to a time of use of tariffs.	https://energysavingtrust.org.uk/how-to-ensure-a-heat-pump-runs-efficiently/

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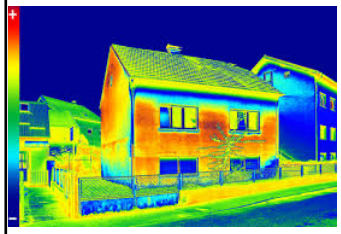
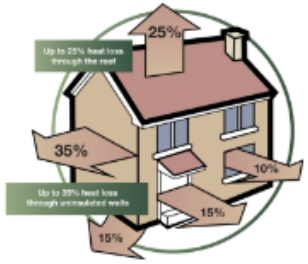
Heat pumps need all radiators to be replaced with underfloor heating	Replacing radiators with larger sized units is likely necessary. Linking the system to underfloor heating is the most effective form of heating but is not essential. A qualified heat pump installer can survey your home and design the best heat pump solution for your needs and they will advise you if you need to upgrade your radiators	https://www.carbonbrief.org/factcheck-18-misleading-myths-about-heat-pumps/ https://mcscertified.com/find-an-installer/
Heat pump installations are invasive and require significant changes to home including bigger radiators, underfloor heating, space for a water tank	This will depend on the scale and size of the heat pump system required. Installation of a hot water storage tank may be required, as well as replacement of radiators with larger units. Linking the system to underfloor heating is the most effective form, but not essential. A qualified heat pump installer can survey your home and design the best heat pump solution for your needs, advising on the need to upgrade radiators.	https://www.carbonbrief.org/factcheck-18-misleading-myths-about-heat-pumps/ https://mcscertified.com/find-an-installer/
Heat pumps are noisy	Heat pumps are no noisier than a fridge.	https://www.carbonbrief.org/factcheck-18-misleading-myths-about-heat-pumps/
Heat pumps are unattractive	Heat pumps come in a large box either outside (for air-source heat pumps) or inside (for ground-source heat pumps) and how you incorporate that box into your house is no different from your fridge or freezer. There may be ways to screen the heat pump outside if the visual impact is an issue. Discuss with your qualified heat pump installer.	https://mcscertified.com/find-an-installer/
Heat pumps are unreliable	Heat pumps are no more unreliable than a fridge.	https://energysavingtrust.org.uk/how-to-ensure-a-heat-pump-runs-efficiently/
Heat pumps are a failing technology	Heat pumps are a long tried and tested technology and their efficiencies and costs are improving. More heat pumps are being installed than ever before to support energy efficiency and reduced carbon emissions.	https://www.wired.com/story/myth-heat-pumps-cold-weather-freezing-subzero/

Heat networks don't work	Some early heat networks failed because there was no returned line for the cooled water. If you have a system that takes the hot water out to a housing estate, the houses at the end will only receive cold water. If your system removes the heat, with a heat exchanger in each house, returning the cooler water to the heat source, every house will receive hot water. There are new heat networks being installed using heat pumps for entire communities.	https://www.nesta.org.uk/data-visualisation-and-interactive/switching-streets-to-low-carbon-heat/

Home insulation / retrofit

Concern	Response	References
Insulation causes damp and mould	In some previous insulation schemes there were issues with the creation of damp and mould. Ventilation is required to manage water vapour within the home, which can otherwise condense on walls causing damp and mould. Some wall insulation products settled over time which left a gap at the top of the internal cavity of the walls creating thermal bridging leading to condensation and mould. Insulation installations now need to meet higher standards, be matched to the type of construction (whether permeable/breathable or non-permeable construction) and include installing improved ventilation. Reviewing the condition of the home for remedial works to repair and prevent water ingress from cracked tiles, wall repairs such as repointing or removal of incorrect cement render used on previous home improvement works which can restrict walls drying out, is advisable. Retrofit plans will help to look at whole house retrofit and include a condition report of the home identifying what remedial works are required prior to improvement works. Using contractors who are PAS2030 certified will meet the requirements for the best practice PAS2035 British Standard for retrofitting. As part of the retrofit best practice PAS2035 for retrofitting homes when installing insulation and other energy efficiency improvements, first a conditions review is undertaken to assess the type of building construction and if there are any remedial works required to prevent water ingress into the walls, roof or ground floor. This will prevent water coming into the building when insulated. This will also improve the thermal performance of the home. Insulation now has to be matched to the type and location of the	https://energysavingtrust.org.uk/energy-at-home/reducing-home-heat-loss/ https://homeupgradehub.org.uk/storage/uploads/1678291650_HUG_2_Myth_buster_-_Condensation_Damp_and_Mould.pdf

	home and in some cases will require the old insulation to be removed to install the correct type of insulation. Homes must also have improved ventilation to ensure the moisture is removed from the home to prevent condensation. If external insulation is suitable, doors and windows may need to be relocated to be within the insulation layer to prevent cold bridging causing condensation to occur.	
Energy-saving measures increase the cost of new homes	The initial cost of a home with all the energy saving solutions may possibly be higher but the running costs will be considerably lower along with improved comfort of living. The energy savings will cover the initial cost over time. Retrofitting the installation of insulation of existing homes will reduce energy loss and save on energy bills. Insulation improves the efficiency of the home, can improve EPC and make home more comfortable and healthy to live in and can make it more attractive to buy in the future.	https://www.cse.org.uk/advice/energy-saving-myths/
Retrofit is expensive	The cost of retrofitting a whole home will depend on the condition and age of the building, as well as energy efficiency measures already installed. Retrofit requirements will vary from house to house and can be done in stages. Overall the energy costs and comfort of temperature, reduced moisture and the air quality can improve and retrofitting will make the home more resilient to the effects of climate change, as well as making the home a healthier place to live. Some whole house retrofits will be expensive, but starting with insulation, ventilation and draught proofing are lower cost and have effective improvements.	https://www.renewableenergyinstaller.co.uk/2023/12/the-impact-of-myths-and-misconceptions-on-retrofitting/
Don't get a return on investment when the house is sold	Some of this will depend on when the property is sold post-retrofit, but a better insulated home will be more attractive to new buyers and costs can be recouped through savings on energy bills.	https://www.summitenvironmental.co.uk/blog/why-you-should-consider

		-retrofitting-and-is-retrofitting-worth-the-investment
It's impossible to know from where most heat is being lost	Getting a retrofit assessment done and using a thermal imaging camera will help to identify sources of heat loss. A thermal imaging camera attachment can be borrowed from the local library to use with a smartphone or tablet device. Heat is lost through walls, roofs, doors, windows and floors.	https://www.cse.org.uk/news/thermal-imaging-cameras-for-warmer-winters/  
Cavity wall insulation fails	Correctly installed cavity wall insulation will not fail. Some previously installed insulation was not suitable for the type of building and has caused problems. Inappropriate insulation may require removal before reinstating properly.	https://www.cse.org.uk/advice/energy-saving-myths/
Natural materials are better for the environment than plastic / foam solutions	Some homes will not be suitable for natural materials and plastic or foam-based solutions can last longer. A retrofit assessment will review the type of construction of the home and determine which type of insulation product will be most suitable.	https://collectiveworks.net/2023/01/09/can-you-retrofit-with-natural-materials/
Can't retrofit homes in conservation areas	You can install retrofit measures / make energy-efficiency improvements to homes in conservation areas and even to ones	Retrofitting in a conservation area

	that are listed. However, these are likely to need planning advice and some measures may not be allowed. A retrofit plan will identify which retrofit solutions are suitable and whether planning permission is needed. A retrofit plan will advise on the best solutions for the age and type of construction as well as the occupant's energy needs. Every home, and therefore retrofit plan, is unique, designed to be most suitable for the individual home. The Architects Climate Action Network has advice on installing retrofit measures in Conservation areas.	ACAN: Climate Emergency Conservation Area Toolkit
LED bulbs much more expensive than filament bulbs	LEDs are more energy efficient saving money on bills and they last longer than filament bulbs which are now less available, having been phased out.	https://www.savemoneycutcarbon.com/learn-save/overturning-the-myths-about-led-lights/
Should replace strip lights (fluorescents) with LEDs	LEDs would be beneficial but only when the strip light fitting needs replacing. LEDs also give a better light.	https://energysavingtrust.org.uk/advice/lighting/
Solar thermal systems are more cost-effective / beneficial than PV	PVs are now more affordable and cost effective and can include a bit of kit known as a diverter for using some of the electricity generated from the PV to heat the hot water and store in a thermal store/water tank, if applicable in the home, therefore replacing the need or benefit of a separate solar thermal panel and hot water store.	https://innasol.com/solar-thermal-vs-solar-pv-a-comprehensive-comparison/
Batteries are flammable	Battery storage is safe in homes when installed correctly. Where fires have occurred they have been due to battery powered appliances being charged incorrectly or use of uncertified second hand batteries.	https://www.tuvsud.com/en-us/resource-centre/stories/lithium-ion-battery-fires-myth-vs-reality
It's not safe to have batteries in the house (particularly in loft space)	Batteries are safe in homes when installed correctly. Batteries may be better located elsewhere than in a loft space and best to get advice from a qualified MCS Certified PV and battery installer.	https://www.tuvsud.com/en-us/resource-centre/stories/lithium-ion-battery-fires-myth-vs-reality

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		https://mcscertified.com/find-an-installer/
Householder can't make money using a battery	There are opportunities to make some money when a battery is linked to a PV system and any excess power is sold to the grid. Check out the Smart Export Guarantee SEG tariffs and you can sell through a different supplier to the electricity supply to your home.	https://www.sunsave.energy/solar-panels-advice/exporting-to-the-grid/best-seg-rates
Batteries don't last	Batteries have a life span of 5-15 years and in some cases longer. They can be repurposed for other types of energy storage or back up power for data centres.	https://www.sunsave.energy/solar-panels-advice/batteries/lifespan
There are risks of electromagnetic radiation from batteries	Batteries do not produce health impacting electromagnetic radiation.	https://www.who.int/news-room/questions-and-answers/item/radiation-electromagnetic-fields#:~:text=Despite%20extensive%20research%2C%20to%20date,is%20harmful%20to%20human%20health.

Hydrogen

Concern	Response	References
Can be used as a direct replacement for North-Sea gas (methane)	To remain in its liquid state (as opposed to a gas), hydrogen needs to be either cooled to and stored at -253°C, or to be greatly compressed. This is unviable with existing infrastructure. Hydrogen (H), in its natural state in an ambient environment and at standard atmospheric pressure, (such as in your house or your garden), is a gas. In its gaseous state it has a very low energy density, which means that for a given volume of the fuel, such as one cubic metre, it carries far less potential to do useful work through combustion than, for instance, natural gas or petrol. We can get around this energy density problem by either cooling the gas so that it becomes a liquid, or by compressing the gas into a smaller, and therefore more densely packed, container (this is what SCUBA divers do with the air in the tanks on their backs). The current natural gas infrastructure is designed and built in such a way as to transport the natural gas fuel at normal ambient temperature and pressure. To move across to the transportation and supply of H to domestic and commercial properties would require a complete rebuilding of the national grid system, and for every part of that new system to be absolutely airtight or refrigerated to -253°C. In fact, hydrogen, with its much smaller molecular structure, would require a far greater degree of “airtightness” as it would easily leak through connections and joints that are able to contain normal atmospheric air or gas.	https://www.energy.gov/eere/fuelcells/hydrogen-storage#:~:text=Hydrogen%20can%20be%20stored%20physically,pressure%20is%20%E2%88%92252.8%C2%B0C https://spectra.mhi.com/4-ways-of-storing-hydrogen-from-renewable-energy https://www.terega.fr/en/our-activities/hydrogen/hydrogen-storage-a-challenge-for-the-development-of-the-industry/#:~:text=Since%20hydrogen%20is%20a%20very,low%20temperature%20or%20high%20pressure https://climate.mit.edu/ask-mit/can-we-use-pipelines-and-power-plants-we-have-now-transport-and-burn-hydrogen-or-do-we-need

Hydrogen is zero carbon and will be the future solution; other technologies are just stepping stones and a waste of effort and money	While it is true that hydrogen (H) is the most abundant element in our universe, current technological advances only allow us to extract it by, for instance, splitting molecules of water (H2O) into its constituent parts of hydrogen and oxygen (O) by using more energy (in the form of electricity) than we would gain from the resultant pure H. Going right back to our school days, Newton's second law of thermodynamics tells us that in any transition between states, or in any situation which requires an energy source to do work, there will always be an energy loss. This means that we will always need an energy input to receive an energy output, and that the output can never be greater than the input. To produce a useable quantity of H we need to use great amounts of electrical energy, and our current level of technological advancement dictates that the amount of electricity used to produce H would be far more efficiently used for, for example, directly heating a house or charging a battery cell for a motor. As it stands, around 30% of the UK's electricity is still generated by burning natural gas, and gas is likely to remain on the table as a “transition fuel” as an increasing amount of our power comes online from solar and wind farms, and nuclear power plants. This means that until we reach a stage where 100% of our electricity is generated using zero-carbon technologies, the generation of hydrogen itself can never be zero-carbon. While it’s also true that “something is better than nothing” with regard to reducing carbon emissions, producing viable quantities of H is a far less efficient manner of using the electricity that we do have, as opposed to using the electricity itself to do work.	https://www.livescience.com/50941-second-law-thermodynamics.html https://www.energy-uk.org.uk/insights/electricity-generation/ https://grid.iamkate.com/ https://www.nationalgrid.com/stories/energy-explained/hydrogen-colour-spectrum

Hydrogen will replace petrol/diesel in existing combustion engines	The transport and storage of hydrogen, both at filling stations and within the vehicle itself, is a very different proposal to that of petrol or diesel. While hydrogen is extremely combustible in the presence of oxygen (which is why they are used as rocket fuel), storing the hydrogen in a vehicle at -253°C, then transporting the hydrogen, still in a cooled and insulated infrastructure within the vehicle to the location of its combustion for use, is, currently, unviable as the infrastructure would be so unwieldy and prone to damage as to be currently impractical for standard, everyday vehicles. A second problem for daily-use vehicles is that for hydrogen to remain in its liquid form for convenient storage and use, it needs to be stored onboard, in a fuel tank, at extremely high pressure. The commonly accepted standard pressure for vehicular use is around 700 Bar (10153 (pounds per square inch, PSI). As a comparison, the air in your car tyres is approximately 2.5 Bar (34 PSI).	https://blogs.nasa.gov/Rocketology/tag/liquid-hydrogen/ https://www.ilpeagalvarplast.com/fuel-cell/ https://h2tools.org/bestpractices/hydrogen-compared-other-fuels

Wave / Tidal

Concern	Response	References
Wave / tidal power will generate all of the energy we need	There have been proposals for tidal lagoons around the UK, including in West Somerset and Swansea. However, the West Somerset lagoon has been in the early design phase for a long time, and there is no obvious route for it to receive the government funding (of about £10.5bn) that it would require. And the proposal for a tidal lagoon of Swansea was never given a Contract-for-Difference, despite appearing to offer similar or better returns to Hinkley C nuclear power station. The difficulties and uncertainties of these projects proceeding mean that it would be unwise to rely on these as a source of renewable energy within the timescales required.	Tidal Engineering: West Somerset lagoon proposal Wikipedia: Swansea Bay tidal lagoon

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General Net-Zero objective

Concern	Response	References
Climate change isn't real	The Earth's climate is constantly changing, however in recent years global patterns of warming have accelerated with changes that typically occur over hundreds of thousands of years now occurring within a matter of decades. There is consensus among over 99% of climate scientists that human actions are behind this recent warming. This heightened pace of warming is primarily driven by human activities, particularly the release of greenhouse gases from the combustion of fossil fuels. In addition to this, it is essential to distinguish between weather and climate. Weather relates to temporary atmospheric conditions, whereas climate refers to the enduring pattern of weather over extended periods. For example, an unusually cold day or winter season in one specific location, does not negate the global trend of rising temperatures.	https://iopscience.iop.org/article/10.1088/1748-9326/ac2966
We can't do anything about climate change	The UN's International Panel on Climate Change (IPCC) suggests that while we are running out of time to reverse climate change there is still a limited window of opportunity to implement policies this decade and take action to ensure we avoid the worst effects of climate change. We already have much of the technology and systems to achieve net zero greenhouse gas emissions, however it now requires collective action across society including from Government, business and individuals. Modelling by climate scientists shows that if humans do nothing to slow climate change, then global temperatures may increase by 4.5	https://www.ipcc.ch/report/ar6/syr/

	degrees Celsius or more by the year 2100. The (IPCC) have described the situation as 'Code red for humanity', highlighting that climate change presents an existential threat to the survival of numerous species and the sustainability of human society. The IPCC report goes on to make clear that while we are running out of time, there is still a limited window of opportunity to take action and implement policies this decade to ensure we avoid the worst effects of climate change. It is still possible for the world to reach net zero and to limit warming to 1.5° C. However, action is needed much more quickly by the end of this decade. We know what needs to be done and in fact already have the technology and systems to achieve net zero carbon emissions by 2050. Through taking collective action now we can halt climate change and create a sustainable future for humans and nature.	
As a nation, we can't afford net zero	The cost of getting the UK to net zero are likely to be significant but certainly not insurmountable and in the long term can deliver net operational savings. This is according to the UK Office for Budget Responsibility's research which has examined in detail the size of the investments required for the UK to reach the statutory target of net-zero emissions of greenhouse gases by 2050. In their July 2021 report on Fiscal Risks, they estimated that following the Climate Change Committee's plan would cost about £321 billion from 2020 to 2050. This includes £1,312 billion in investment costs, but those are mostly balanced out by £991 billion in net operating savings. This evidence demonstrates that it is possible for us to finance net zero. That said it is also clear from the analysis that the relative distribution of costs between consumers and businesses will still be significant.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1128689/mission-zero-independent-review.pdf https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1128689/mission-zero-independent-review.pdf

	Since then the (Conservative) Government commissioned a review into Net Zero, titled 'MISSION ZERO- Independent Review of Net Zero', which suggests that 'investing in net zero today will be cheaper than delaying, as well as increasing the economic and climate benefits.' Its analysis also identified that delaying action by ten years could make UK debt 23% of GDP higher in 2050.	