

Consultation comments on policy CN7 – energy storage

- Support - 16
- Neither support of object - 5
- Object - 4

The changes to the supporting text and the Local Plan policies have not only been informed by the responses to the Regulation 18 consultation but they have also taken on board any additional feedback that has come out of discussions/meetings with statutory consultees and members in order to improve the clarity and understanding of the contents of the Local Plan.

Comments in support of policy CN7 – energy storage		
Respondent number	Comment	Officer comment
ANON-KSAR-NKDW-5 Littleton and Harestock Parish Council	Littleton and Harestock Parish Council warmly welcomes the intentions to put climate change, adaptation and mitigation at the heart of the Plan’s strategy. Given the challenges we face, there is no other option than to address these head on. Of course future practice needs to match the good intentions, but whenever there is a perceived balance between climate considerations and other factors, the imperatives of addressing climate change should be uppermost. Littleton and Harestock Parish Council supports these policies. Support policies CN1-7 inclusive.	Support welcomed and comments noted.
ANON-KSAR-N85J-P	As per response to CN5, Bloor support this policy	Support welcomed and comments noted.

<p>BHLF- KSAR- N8TG-J</p>	<p>CPRE understands the developing need for energy storage to 'smooth out' the demand for electricity. We are concerned that no mention has been made of the specific need to protect tranquillity. Battery storage facilities (BESS) can be a significant source of noise. We are pleased to note these will not be permitted at a scale that would involve the installation of cooling fans unless the noise impacts from these is acceptable. We would suggest the low frequency and tonal nature of BESS installations with fans is such that a requirement for them to not exceed 5dB below typical background noise at the boundary should be required, rather than a simple requirement for mitigation.</p> <p>Owing to their industrial nature, we do not consider BESS to be suitable for greenfield in all but exceptional circumstances. They should be treated as industrial infrastructure in appropriate for a rural location. We are also very concerned about the public health implications of BESS. Despite these being very recent technology, there have already been a number of thermal runaway events in this country and internationally which have proved exceptionally difficult to control and have resulted in the release of large amounts of highly toxic gasses as well a large quantity of contaminated water. We would urge WCC to require developers of BESS to:</p> <ul style="list-style-type: none"> • avoid proximity to residences • consult fully with Hampshire Fire & Rescue and all fully adopt all recommendations (mains water provision, fire monitoring and suppression, access etc.) 	<p>Criteria ii does already refer to the built environment. It would not be appropriate to include a criteria to consult with Hampshire Fire & Rescue. If it was considered that there was risk they would be consulted at the planning application stage. Recommended response: No change.</p>
-----------------------------------	--	--

Comments which neither support or object to policy CN7 – energy storage		
Respondent number	Comment	Officer comment
ANON-KSAR-NKS3-G Bishops Waltham Parish Council	CN7 Page 55 Comment: The battery storage is developing daily and it should be a Policy that it is used on every PV array/GSHP/ASHP. It could also include a grant for “Fuel” poverty households.	Unfortunately, providing grants is beyond the remit of the Local Plan. Recommended response: No change.
ANON-KSAR-NKBJ-P Soberton Parish Council	There is no reference to the impact on landscape.	Criteria ii refers to the landscape. Recommended response: No change.
BHLF-KSAR-N8TB-D	Promoting micro generation schemes and storage are sensible ideas, but the practical implications of the proposed policies are unclear other than general words of support.	In recognition that over the LP period there is likely to be an increasing demand for energy storage Policy CN7 sets out the criterion that would need to be considered as and when a planning application is submitted. Recommended response: No change.
BHLF-KSAR-N86T-1	The County Council is pleased to see that the issue of climate change is being addressed via a range of policies to address strategic carbon neutrality and designing for low carbon infrastructure, alongside Policy T1 (Sustainable and Active Transport and Travel) and Policy T3 (Promoting sustainable travel modes of transport and the design and layout of parking for new developments) which consider transport issues. The County Council’s Climate Change Framework for Strategic Programmes (2020 – 2025) sets out the mitigation and resilience programmes which the County	Support welcomed and comments noted.

	<p>Council will be pursuing. These strategic programmes have been designed to deliver outcomes to reach the County Council's targets in 2050 and are therefore very long term and extensive in nature. The County Council is therefore supportive of the Strategic Policy CN1 (Mitigating and adapting to climate change), Policy CN 2 (Energy Hierarchy), Policy CN 3 (Energy efficiency standards to reduce carbon emissions), Policy CN 4 (Water efficiency standards in new developments), Policy CN 5 (Renewable and low carbon energy schemes), Policy CN 6 (Micro energy generation schemes) and Policy CN 7 (Energy Storage) which are all designed to help mitigate and adapt to climate change and which the County Council considers are all aligned with the key milestones set out in the building and infrastructure theme of the County Council's Climate Change Framework for Strategic Programmes.</p>	
--	---	--

Comments which object to policy CN7 – energy storage		
Response ID	Comment	Officer response
ANON-KSAR-NKDG-N	<p>Policy CN7 (i) this point is too restrictive. Co-location of generation and storage is desirable but not always possible because grid constraints exist in both directions (supply and distribution) Point (i) should be amended to allow flexibility (iii) This is too restrictive and should be deleted. All large</p>	<p>Points noted. Recommended response: the wording of criteria has been changed to include the words, 'where possible'.</p>

	batteries require cooling fans. Noise concerns can be addressed through point (ii).	It is considered that criteria iii is a separate issue and has been included to restrict the size of the energy storage facility. Recommended response: No change.
ANON-KSAR-NK1Z-N Shedfield Parish Council	Safety of energy storage facilities is not proven. They should therefore be away from residential property and not affect the surrounding landscape. Access needs to be adequate to avoid any potential disaster. Safety of emergency services is paramount	Points noted. Recommended response: In order to address this point an additional criteria would be added to Policy CN7 'An emergency plan for the battery storage facility to address the risk of fire and any potential contamination run off.
ANON-KSAR-NKXV-R	<p>Whilst I support the general heading of 'energy storage', which technically does encompass a wider range of technologies than just batteries, the policy does seem to be worded to primarily focus on battery storage. I am concerned that this policy has been drafted without expert advice with regards to the issues of safety to do with battery storage.</p> <p>I do not agree that in all instances the energy storage facility should be co-located with renewable energy generation. This is particularly true for large scale solar sites which would require large scale batteries.</p> <p>Whilst the context of the policy appears to be with regards to e-mobility, it will be read as applying to all energy storage. There is currently big financial business to be had from installing large scale batteries, using them to buy (mainly gas) power from the grid in the night-time when it is cheap and sell it back to the grid in the evenings when power is needed. This is not renewable energy storage - simply commercial business of buying and selling. It is not renewable, not energy generation and not carbon reducing. We need to be careful that our</p>	Points noted.

policies do not encourage a growth in energy storage from non renewable energy sources. The embodied carbon cost of batteries is extremely high and they will be unlikely (given their relatively short life) ever to pay back in carbon savings - thus adding to the carbon burden for our district - contrary to our overarching aims.

In the instance of BESS with greenfield solar, there is no need to site the batteries with the solar generation. It could be sited anywhere where there is a grid connection. An old power station site would be perfect (where there are existing grid connections). The National Renewable Energy Centre states that batteries should be located near a load centre (ie not in a remote rural location).

These batteries are extremely industrial units like large shipping containers and siting them in the countryside causes unnecessary harm and change of landscape character from rural agricultural to industrial. They need to be painted white to reduce the risk of overheating (green would of course blend in better but this is not the industry standard). They are very obvious and intrusive in a rural environment.

BESS generally only store power for 1 hour and in order for solar or wind energy to be a reliable source of power, multiple banks of fields of batteries would be required to provide back up for overnight and days of low levels of sunlight / low levels of wind.

They are also extremely noisy (80-100dB) causing a real

<p>change to the tranquility of the countryside.</p> <p>Large BESS ALWAYS require cooling fans to reduce the risk of thermal runaway. These add to the transformer noise. Therefore point iii looks like it has been written without consultation from someone who knows about this technology.</p> <p>There are other safety and amenity aspects with regards to batteries that perhaps should be included:</p> <ol style="list-style-type: none"> 1. Need to involve the Fire Service in the design of the project at the start (rather than as a consultee at the end) 2. Inclusion of sufficient quantities of water on site for firefighting as a requirement to safe site design 3. Consideration of blast walls to protect fire fighters and residents 4. Minimum safe distances from domestic and commercial properties <p>I have covered a number of comments relating to battery safety in my comments on policy CN5 but I will cover some of them again here and provide further references.</p> <p>Battery Storage</p> <p>Experience from around the world has shown that BESS facilities are a major risk to the local community and to the environment. This is because, by definition, BESS facilities store high density chemical energy. This energy</p>	<p>It would not be appropriate to include a criteria to consult with Hampshire Fire & Rescue as part of the design process. If it was considered that there was risk they would be consulted at the planning application stage.</p> <p>An additional criteria has been added 'An emergency plan for the battery storage facility to address the risk of fire and any potential contamination run off. See above point</p> <p>Point noted – however, there is no national minimum safe distances published that could be included in the policy. Recommended response: No change.</p> <p>Points noted.</p>
---	--

can be released in an uncontrolled manner following many initiating events.

A briefing note on BESS and the safety issues, produced by Professor Paul Christensen in November 2021 can be provided. It describes what is termed a "thermal runaway". A thermal runaway event releases chemical energy stored in the battery, in an exothermic reaction. There have been many recorded fires/explosions so far in BESS facilities, including one in Liverpool and one in a brand new facility in Australia 4. The Electric Power Research Institute (EPRI) database has recorded 50 BESS failure events.

The AIG Energy Industry Group has examined risks from BESS facilities and identified thermal runaway as the major risk. It makes the following statements:

"Thermal runaway' – a cycle in which excessive heat keeps creating more heat – is the major risk for Li-ion battery technology. It can be caused by a battery having internal cell defects, mechanical failures/damage or overvoltage. These lead to high temperatures, gas build-up and potential explosive rupture of the battery cell, resulting in fire and/or explosion. Without disconnection, thermal runaway can also spread from one cell to the next, causing further damage".

"Battery fires are often very intense and difficult to control. They can take days or even weeks to extinguish properly, and may seem fully extinguished when they are not. They can also be very dangerous to fire fighters and other first responders because, in addition to the immediate fire and electricity risks, they may be dealing

	<p>with toxic fumes, exposure to hazardous materials and building decontamination issues. Different types of batteries also react differently to fire, so firefighters must be knowledgeable about how they react and how to respond. Otherwise they may decide to contain the fire but leave it to burn itself out leading to the loss of the entire facility".</p> <p>The Energy Institute, London, has published a planning guidance note on battery storage. The guidance note "provides guidance to site owners and developers planning to build battery energy storage, and to local authorities and others who have responsibility for granting planning permission or other consent. It is intended to help all audiences understand the risks and mitigations that should be in place. It should prompt informed and relevant risk assessments for site owners and developers and contains information that should be examined by planning authorities before granting permission". With regard to lithium-ion batteries, it states "The specific chemistry of the battery is important for the planning process because the chemicals released in the event of an accident will determine the level and nature of the risk and how it must be mitigated. For example, it is not sufficient to simply state 'lithium-ion' in the planning application, as each type has widely different characteristics, particularly with regard to fire resistance, fire and explosion propagation, performance, efficiency and resilience to ambient conditions".</p> <p>Table 1 of the guidance note states that for lithium-ion batteries "Catastrophic failure can lead to fire or</p>	
--	--	--

explosion and release of toxic materials". Section 4.6 of the guidance note, headed 'fire risk', considers fire risks and states that "The UK's Regulatory Reform (Fire Safety) Order 2005 places the burden of fire safety on the owner and operator of an installation". A fire and safety plan must be provided and "The fire and safety plan should include a means for containment of water, or other materials used for extinguishing the fire, but avoiding run off into the local environment".

A detailed analysis of the safety of BESS facilities has been provided in 'Safety of Grid Scale Lithium-ion Battery Energy Storage Systems' 5 June 2021, by Eurling Dr Edmund Fordham MA PhD CPhys CEng FInstP, Fellow of the Institute of Physics; Dr Wade Allison MA DPhil, Professor of Physics, Fellow of Keble College, Oxford University; and Professor Sir David Melville CBE FInstP, Professor of Physics, former Vice-Chancellor, University of Kent 8.

The paper notes that of particular concern is the risk of battery overheating resulting from many issues, including mechanical damage or electrical surges. In the process known as 'thermal runaway' - a cycle occurs in which excessive heat keeps creating more heat. Thermal runaway leads to high temperatures, gas build-up and the potential explosive rupture of the battery cell, resulting in fire and/or explosion. Without disconnection, thermal runaway can also spread from one cell to the next, causing further damage and/or explosion.

Li-ion battery fires are very intense and difficult to control. They can be very dangerous to fire-fighters and other first responders because, in addition to the

immediate fire and electricity risks, they may be dealing with toxic fumes (such as carbon monoxide and the highly toxic hydrogen fluoride) and exposure to hazardous materials. Released clouds of highly inflammable gases such as hydrogen and carbon monoxide and toxic gases such as hydrogen fluoride can cause death and serious injury over a wide area and are a significant risk to the general public.

In the event of a fire or explosion, copious quantities of water are needed to cool the structures and prevent wider damage. This water will be heavily contaminated (for example it may contain highly corrosive and toxic hydrofluoric acid) and must not be allowed to escape into the environment. As noted above, the DAS only states that there would be safety and firefighting systems.

This is very new and unregulated technology. Health and Safety England are not currently regulating large scale battery storage units. There have been a number of large scale fires at these sites across the world including one in Liverpool and a number in America and Australia.

They have caused serious and life changing injuries to firefighters. If a battery goes into a chemical thermal runaway it is not a normal fire cannot simply be extinguished with foam/fire suppressing chemicals or water. Extremely toxic gases are given off (hydrogen fluoride amongst others). They are generally cooled with excessive quantities of water (1900l/minute is the recommended amount) and left to burn out. The water cooling is to try to prevent the spread of heat to neighbouring units. These batteries are industrial and should not be sited on greenfield sites. They certainly

should not be sited near properties or people. They should also not be sited next to rivers or where there is a risk of contaminated run off. High volume water supply must be near them. Commercial insurers are becoming less prepared to insure large scale BESS facilities because of the dangers.

There is also evidence that some battery storage facilities should be regulated under the Hazardous Substances Consent - regulations that are not currently being applied for - due to the volume and nature of the materials that they contain.

We can supply plenty of scientific research reports that give more information about the risks from BESS.

I therefore believe that the policy must contain a clause that Hampshire Fire and Rescue Services must be involved in safe site design (ie as part of the upfront site design rather than as an afterthought and a consultee).

Batteries also only generally give 1 or 2 hours of back up power. Unfortunately solar power only works in daylight hours so it doesn't really produce power when we need it (ie. early mornings and evenings with a greater requirement for electricity generation in the winter). Storage is therefore really an essential component of a solar generation (in the UK) BUT to have sufficient storage, we would need acres and acres of batteries.

	<p>And batteries are EXTREMELY bad for the planet in terms of their carbon requirement. A Cranfield University study of a battery and solar plant has demonstrated that it will be net carbon positive over its lifetime.</p> <p>I cannot comment much about battery storage in relation to e-mobility. I would say though that there have been a large number of fires associated with lithium ion batteries particularly in buses and in e-bikes and e-scooters. A number of house fires have resulted from escooter batteries overheating with several properties destroyed completely and one particularly scary fire in a high rise apartment building with a difficult rescue. Transport for London have banned all e-bikes and e-scooters from their whole network. The New York subway is doing the same and if you google electric bus fires in Germany and France, the images are alarming. We need to ensure that we are not designing a system that causes harm to our population.</p> <p>Once again the embodied carbon of batteries ought to be taken into account in order that we have an evidence based approach to carbon reduction and not simply wishful thinking.</p> <p>I would be extremely happy to supply all of our research into battery safety and issues should you wish to contact me. I can also put you in touch with Oxford professors who specialise in this technology.</p>	
ANON-KSAR-NKKV-B	Responses to numbered paragraphs i. This should not rule out energy storage schemes designed to work with the national grid to smooth supply.	Policy CN7 does not rule out energy storage schemes that are designed to work with the national grid to

	<p>ii. These considerations should be applied any more onerously than for other proposed infrastructure developments.</p> <p>iii. Again - these conditions should be applied any more onerously than for other infrastructure such as electricity substations for example.</p>	<p>smooth out supply. Recommended response: No change.</p> <p>Policy CN7 sets out the criterion for energy storage and are particular to this type of facility. Recommended response: No change</p> <p>See above point.</p>
ANON-KSAR-NK1Z-N	<p>Shedfield Parish Council Energy Storage at present is something of an unknown. The potential for environmental disaster is immense and permission should only be granted in extremely remote areas. Good access for emergency services is paramount. Facilities should not be permitted to blot the landscape or risk pollution of watercourses.</p>	<p>Points noted. Policy CN7 has been amended to include a fire and potential contaminated run off.</p> <p>Recommended response: No change</p>

	Recommendations	Officer response
Comments from SA/HRA	No recommendations provided	N/A
Comments from HRA		

Amendments to CN7

Development proposals that involve energy storage will be supported subject to meeting the following criteria:

- i. The energy storage facility is, **where possible**, co-located with existing and proposed renewable energy development;
- ii. The location, scale, design and other measures in connection with the facility are designed in order to avoid or mitigate any adverse unacceptable impact on the built environment, biodiversity, heritage, landscape and the surrounding area in terms of cumulative and indivisibility impact;
- iii **There is an emergency plan for the any battery energy storage facility to address the risk of fire and any potential contamination run off;** and
- iv. The proposals are not of a scale that would involve the installation of cooling fans unless the noise impacts from these have been acceptably mitigated.