Energy Centres - Property

Energy centres are becoming more common as an efficient and cost-effective means of providing and managing utilities to building ranges and communities.

This Loss Prevention Standard provides helpful guidance on reducing the associated risks.

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Energy Centres - Property

Introduction

All buildings require power, water, heating, ventilation and cooling, data and other services or utilities to properly function. These utilities are now increasingly centralised within dedicated energy centres.

The growth in the use of community energy centres has resulted in very large energy centres housing a wide range of energy distribution, generation and recovery systems, including, but not limited to:

Heating Equipment.

- Gas, biofuel, electric and hydrogen (H_2) boiler plant and associated pipework,
- Combined heat and power (CHP) plant to produce electricity while capturing excess heat generated for use within heating systems.
- Heat pumps used to move hot water but more recently associated with renewable heating technologies such as air, ground and water source systems.
- Chiller plant associated with air conditioning systems and including absorption equipment used in the heat recovery process.
- Heat recovery systems from industrial processes, sewage and other sources.

Electrical Equipment.

- Transformers and backup generators.
- Distribution panels, switchgear and wiring.
- Solar photovoltaic (Solar PV) equipment such as inverters.
- Battery Energy Storage Systems (BESS).

Water Systems

- Incoming water supplies.
- Tanks, vessels and cooling towers.
- Drainage systems and wastewater handling/treatment.

Ancillary Equipment.

- Ventilation and air conditioning.
- Compressed air.
- IT and communications services.
- Building management systems.
- Monitoring systems.

This document discusses the risks associated with energy centres and provides guidance to help reduce the potential for loss, damage and interruption.

Note: This Loss Prevention Standard relates to energy centres and is focussed on asset loss prevention and related risk management guidance. It is not intended to address liability/general liability exposures. The presumption is that all local regulatory territory requirements, and compliance with national/local building regulations, codes, or standards take precedence and have, or will be, met. In territories where local authorities have jurisdiction, compliance with applicable laws and regulations is assumed as a minimum requirement. The recommendations in this document are intended to supplement, not replace, local requirements.

Understanding the Risks

The potential causes of loss or damage are varied and include, but are not limited to:

Business Impact. The criticality of the energy centre must be fully understood, particularly the impacts of downtime or a more serious loss event. Without this understanding, the full impact of any interruption in service to any of the utilities, etc. will not drive the correct risk management decisions.
Electrical Systems. Faults, damage, insulation failure, arcing, etc., can lead to overheating, sparking and ignition.
Fuels. Gas, liquid or biofuels can ignite causing fire and explosion damage.
Malfunctioning or overworked cooling and heating equipment. Thermal oils can ignite upon contact with air in the event of leaks.
Batteries. Faults in BESS batteries can result in overheating and ignition. Fires in battery cells can cascade to adjoining cells and given the difficulties in extinguishing, can burn for significant periods.
Escape of Water. With such concentrated exposures in a single area, any escape of water (clean or foul) has the potential to expose all infrastructure to a major loss event. Energy centres housed in basement areas may be particularly vulnerable. Understanding total water volumes and water compartmentation is critical.
Fire Compartmentation. As with water, a fire in a concentrated single location has the potential to expose all infrastructure in one event. Effective fire and smoke compartmentation is critical.
Accessibility. Whether located on elevated floors, roofs or within basement areas, the location and accessibility of the energy centre are critical. From construction through to operation this is especially relevant if replacement equipment is needed or a significant loss event occurs such as fire or escape of water.
Mechanical Failure. Lack of appropriate or rigorous commissioning and acceptance, together with stressed, worn or poorly aligned components can cause equipment to fail, leading to extensive damage to equipment. Delays in acquiring or installing spares and implementing repairs can result in prolonged interruption.
Ongoing Care. Poor or inadequate self-inspection, testing and maintenance can result in developing problems being missed before failure. Poorly controlled hot work is a leading cause of fire.
Security. Energy centres may be attractive to thieves and/or targeted with malicious intent, therefore the security measures implemented may be critical in protecting against physical loss and data security breaches. Issues include:

- Poor, or inadequate locks, security grilles and shuttering, etc.
- Inadequate access control arrangements.
- Compromised intruder alarm protection.
- Shielded or damaged video surveillance systems.
- Inadequate cyber protections.

The quality and speed of emergency response to loss related incidents can often be the factor that helps prevent a small issue from becoming a significant loss event. Failing to implement robust emergency procedures and business continuity arrangements can expose the organisation to potentially larger than expected interruption losses including sourcing alternative accommodation for any residential occupants.

Property damage losses can also result in waste, contamination, and environmental impacts which negatively impact Environmental, Social and Governance (ESG) policies and reputations.

Consequences of a Loss Event

The consequences of a loss incident or event can be exacerbated by:

- Inadequate building resilience and inappropriate fire resistance rating or fire compartmentation strategy.
- Inadequate fire stopping which may allow the fire and smoke to spread beyond the energy centre, and potentially to critical buildings and other valuable assets.
- Inadequate or faulty automatic fire detection and protection systems and associated interlocks which can result in more extensive damage.
- Poor housekeeping such as stored goods and spares, filing, furniture, etc.
- Heavy rainfall, localised flooding, and overflowing drainage, particularly where facilities are located in basements or at ground-floor level.

Aviva are aware of escape of water incidents in energy centres which have resulted in both significant damage to equipment and relocation of building occupants for prolonged time periods.

Managing the Risks

Material Damage and Business Impact Assessment

Before initiating risk management controls or designing/installing detection and protection systems, an assessment of the anticipated or potential financial losses, for both material damage and business interruption exposures, in the event of a significant or catastrophic loss event should be undertaken.

This assessment should include the current expected impacts and also future impacts as a result of planned business changes or expansions, and helps ensure risk controls, detection and protection systems, etc., are sufficient and reflective of the potential loss estimates.

Refer to the Aviva Loss Prevention Standards **Material Damage Risk Assessment** and **Business Continuity - Business Impact Analysis and Risk Assessment** for further guidance.

Management and Oversight

Stakeholders. Engage your insurer, broker, and any authority having jurisdiction at the earliest opportunity when considering energy centre risk management. Early collaboration helps ensure that, beyond simply meeting regulatory building requirements, standards, and codes, the energy centre is designed with resilience in mind, minimising the potential for physical damage, business interruption, and environmental loss.

Management of Change. Any changes to existing energy centre infrastructure should be managed through a formal Management of Change process to help ensure works are progressed with minimal exposure to the existing arrangements.

Refer to the Aviva Loss Prevention Standard **Managing Change – Property** for further guidance.

Contractor Controls. Choose qualified, accredited and experienced companies to install and maintain energy centres and associated equipment. Ensure contractors are appropriately managed.

Refer to the Aviva Loss Prevention Standard **Managing Contractors – Property** for further guidance.

Hot Works. Hot work, where permitted, must be conducted in strict accordance with the Aviva Loss Prevention Standard **Hot Work Operations.**

Redundancy

Given the reliance on the energy centre, often by significant numbers of people and organisations, it should be designed with appropriate redundancy arrangements to ensure that all systems (such as power, water (clean and waste), heating and ventilation, data, and security/access systems) continue to operate in the event of a primary system failure.

This may be achieved through one or more of the following approaches:

- Systems are fully duplicated within separate, dedicated areas or buildings.
- The energy centre is subdivided into separate fire/smoke-resisting and escape of water resisting compartments, each housing mirrored equipment.
- Alternatively, subject to a formal risk assessment and documented continuity planning, certain critical services—specifically power, water (clean and waste) and communications—may be sourced from third-party providers within agreed recovery timescales following an incident.

In such cases, appropriate planning and preparation should be undertaken to ensure that:

- The supplied equipment and proposed arrangements are capable of meeting operational demand; and
- Suitable locations, connections, and infrastructure are in place to enable rapid deployment, and that these are planned and tested. This should include engagement with public authorities, local businesses and residents, where required.

Aviva recommends resilient systems, that are capable of providing continuity in service without any delay or interruption. Guidance on continuity planning is provided in the Aviva Loss Prevention Standard **Business Continuity – Seven Steps to Continuity**.

Efficiency

Running energy centre equipment at, or near, maximum capacity increases the risk of failure and can shorten asset life. Ensure systems are designed with sufficient spare capacity to reduce stress on individual components and lower maintenance, repair, and cooling costs. This should consider current and future capacity requirements, form part of a wider strategic development plan, and take account of environmental conditions, e.g., peak summer temperatures and severe winter conditions.

Environmental and Sustainability

Flooding and Inundation. Energy centres should not be built in areas that are at risk of flooding or where surface water from heavy rainfall or downpour events can expose the assets. Where a risk assessment suggests there is such an exposure, the energy centre should be designed and arranged to eliminate the risk.

If this is not possible, then robust protective measures need to be installed, e.g., drainage backflow prevention, flood barriers, flood resilience cable and piping routes, and locating critical equipment above projected flood levels, etc.

Appropriate emergency response planning should be undertaken and the impacts of a flood event considered in the Business Continuity Plan.

Renewable Energy. Battery Energy Storage Systems (BESS) should not be installed in or within 10 metres of buildings housing energy centres. Where this is unavoidable, the BESS must be installed within a dedicated fire and smoke compartment. Given the risks of significant damage and loss, any plans to install a BESS within, or on a building **must** be discussed with your insurer, broker or authority having jurisdiction.

Gas and Liquid Fuels. Ensure fuel tanks are adequately bunded to contain up to 110% of the largest expected volume. Leak detection devices should be installed within secondary containment and configured to operate automatic isolation valves to safely isolate heating equipment and shut off the fuel supply. Similarly, the heating and fuel supply should be interlocked to automatically shut down upon actuation of the fire alarm.

- Fusible link-based shut off valves are not recommended, as they are susceptible to being compromised.

Fire Service. Invite the local Fire Service to inspect the premises, review plans, evaluate the fire risk exposures and determine their firefighting water supplies and firefighting water run-off containment provisions, etc.

Refer to the Aviva Loss Prevention Standards for further guidance:

- **Flood Guidance and Mitigation (UK)**
- **Flood Guidance and Mitigation (Global)**
- **Small Scale Battery Energy Storage Systems**
- **Planning a Battery Energy Storage System - 12 Top Tips**
- **15 Top Tips for Roof Mounted Photovoltaic Solar Panel Systems**
- **Emergency Response Planning with Fire and Rescue Services**

Fire and Smoke Resilience

External Exposures. Energy centre buildings should be sited at least 10 metres from externally sited equipment, e.g., cooling and ventilation plant, BESS enclosures, transformers, generator containers, and from other buildings or valuable assets. Where this cannot be achieved then additional fire compartmentation, fire detection or protection measures may be warranted.

Construction. Energy centre buildings should be of non-combustible construction, including roofing systems.

Compartmentation. Where the energy centre adjoins other areas of a building or is sub-divided into fire resisting compartments, ensure at least two hours' fire and smoke resisting compartmentation (insulation, integrity and load bearing capacity), including any glazing and fire doors/shutters, is provided between compartment walls and floors.

Firestopping. Any openings for cabling and pipework, etc., between fire compartments should be fire-stopped and/or fitted with intumescent collars or fire dampers to achieve a fire resistance rating commensurate with the fire compartment walls and floors.

Smoke Control. Minor smoke contamination can cause disproportionate damage to energy centre components. Even small BESS or Uninterruptible Power Supply (UPS) battery, or cable fires can generate a significant amount of smoke. In areas where these are housed, specific attention is required. Installing smoke control systems can reduce the potential for such damage. These should be robust and compatible, and interlocked with heating and ventilation systems to ensure optimum performance.

Refer to the Aviva Loss Prevention Standards **Fire Compartmentation, Fire Doors, Shutters, Dampers and Collars** and **Heat and Smoke Venting Systems** for further guidance.

Escape of Water and Other Fluids

Escape of water/fluid incidents in energy centres are easily overlooked and can cause significant damage to buildings, infrastructure and equipment. Without careful design and accompanying detection and protection measures, any incident has the potential to track and/or accumulate water in the affected area or adjacent/neighbouring areas. Buildings, facilities and drainage systems, that are not designed to cope with such volumes of water or without appropriate water containment / management, can cause extensive damage and contamination. Escape of water / fluid incidents in energy centres can cause significant damage to buildings, infrastructure and equipment.

The risks associated with escape of water incidents should be thoroughly risk assessed to identify the key sources and exposures, including the potential volumes and ensure commensurate controls are in place, including:

Containment. The use of 'water compartmentation' floors and walls (including appropriate door configurations, the careful location of wall and floor penetrations and their associated sealing, etc., bunding, storage tanks, ditches, etc., should be considered and installed where the worst possible volume of water released is capable of being contained. Such measures can also 'buy time' to allow service engineers to arrive and isolate leaks.

- In basement areas, the risk and exposure associated with water leaks should be carefully assessed, as any release can rapidly fill the available volume and the water will be contained within a 'watertight' basement construction. In a relatively short amount of time, equipment can be fully submerged and the area may become inaccessible to personnel.

Drainage. The drainage systems should be designed based on foreseeable and worst case fluid flows. These should be capable of handling the maximum anticipated water release safely, with as little impact on nearby property and infrastructure, such as storm and foul drainage systems, as possible.

Even nominal amounts of water release, e.g., heating/ventilation condensate can cause corrosion and disproportionate damage to sensitive equipment and components, often with serious consequences. Ensure such releases are released safely to an external area.

Leak Detection. Install leak detection and flow monitoring devices on all wet services within the energy centre. Ensure such systems are interlocked to safely isolate water services upon detection and activation.

Frost Protection. Lag all exposed pipework and install monitored trace heating as necessary.

Refer to the Aviva Escape of Water webpages for an all Aviva Escape of Water related guidance.

Cooling and Ventilation

Energy centres can generate significant heat and require effective cooling and ventilation systems to prevent overheating and breakdown incidents.

Cooling and environmental control systems should be specifically designed for the energy centre, based on the planned equipment load and anticipated heat output, and should allow for future growth in order to minimise the risk of disruption and costly infrastructure upgrades. System design and cooling calculations should be carried out by a suitably competent person or specialist organisation, and these should consider environmental conditions such as summer peak temperatures.

Detection and Fire Protection

Gas Detection. Automatic gas detection systems (appropriate for the gases expected to be released or emitted) should be installed to provide early warning of gas leaks and, where BESS are installed, the off-gassing of lithium-ion batteries. These systems should be linked to automatic isolation valves to ensure gas and power supplies are automatically shut off upon activation

Fire Detection. All areas of the energy centre should be covered by an automatic fire detection system. Aspirating detection technology, which provides faster detection of smoke and fire events, than traditional point detection, is recommended.

Fire Protection. Where appropriate and based on the exposure, automatic sprinkler protection should be installed throughout the entire energy centre building.

Important. Any detection and fire protection systems should be designed, installed and maintained in accordance with recognised and accepted local or national regulations, standards or codes by competent and accredited companies. System designs and proposed interlock strategies should be reviewed and accepted by the property insurer or authority having jurisdiction prior to installation.

Security

The security protections should be based on the findings of security risk assessments and consider:

- The requirement for good quality perimeter protection, e.g., site fencing and secured vehicle and pedestrian gates.
- Authorised access control to the energy centre building, including systems to remove authorisation immediately upon persons leaving the business, or when they are no longer authorised to access the facility.
- Access for security personnel, should an emergency occur when duty holders are not available.
- Monitored Video Surveillance Systems (VSS).
- Monitored Intruder and hold-up alarm provision.
- Cyber security arrangements.
- An appropriate level of response based on the nature of the security event.

Please refer to the following Aviva Loss Prevention Standards for further guidance:

- **Security - Computer Equipment**
- **Security - Doors and Windows**
- **Intruder and Hold-up Alarms - General Guidance**
- **Video Surveillance Systems - Introduction**
- **Cyber - Top 12 Tips to Protect Against a Cyber Attack**
- **Cyber - Ransomware**

Housekeeping

Energy centre buildings should be kept sterile and clear of combustible materials including furniture, storage boxes and waste.

Refer to the Aviva Loss Prevention Standards **Housekeeping** and **Management of Combustible Waste** for further guidance.

Self-Inspection

The energy centre building, all equipment therein, containment and housekeeping arrangements, etc., should be subject to a formal self-inspection programme. This can help to identify faults, issues and concerns that could develop into breakdown, damage and/or downtime.

Thermal imaging cameras should be used to check equipment for unusual heat patterns, electrical faults, leaks, etc.

Refer to the Aviva Loss Prevention Standards **Self-Inspections** and **Use of Thermographic Cameras – General Considerations** and **Checklist** for further guidance.

Maintenance, Inspection and Testing

Energy centres and all equipment therein should be subject to formal maintenance arrangements in accordance with the Original Equipment Manufacturer (OEM) or installer guidelines.

Maintenance programmes should be routinely audited to ensure ongoing adequacy of arrangements, compliance with standard operating procedures and that corrective actions are being completed appropriately.

Refer to the Aviva Loss Prevention Standards **Maintenance Regimes** for further guidance.

Emergency Response Planning

Effective emergency response planning can assist with the management of unexpected events or incidents. Appoint a dedicated Emergency Response Team (ERT) to help manage emergency events, and ensure key responsibilities are allocated and appropriate training provided.

Any emergency response plan should be practised and tested. Based on the configuration of the energy centre, factors that could prevent the plan from being enacted or completed as designed need to be fully considered, e.g., the location of the energy centre; basement or roof; the number of commercial or residential occupants or tenants directly affected and who will require immediate support; local council or other authorities having jurisdiction, or other local businesses or residents who may challenge the plan enactment, etc.

Refer to the Aviva Loss Prevention Standards **Emergency Response Teams** and **Business Continuity – Step 7: Test and Exercise Plan** for further guidance.

Business Continuity Planning

Business Continuity Plans should be formalised to ensure disaster recovery and continuity arrangements are in place and aligned with the business impact assessments and any contractual obligations.

The following Aviva Loss Prevention Standards provide further guidance.
Business Continuity – Seven Steps to Business Continuity
Business Continuity – Step 1: Roles and Responsibilities
Business Continuity – Step 2: Incident Management Plan
Business Continuity – Step 3: Communications Plan
Business Continuity – Step 4: Business Impact Analysis and Risk Assessment
Business Continuity – Step 5: Solutions Design and Implementation
Business Continuity – Step 6: Policy
Business Continuity – Step 7: Test and Exercise Plan

Contact Information

United Kingdom

Please visit Aviva Risk Management Solutions or email us at riskadvice@aviva.com. To speak to one of our advisors, call 0345 366 6666.*

*The cost of calls to 03 prefixed numbers are charged at national call rates (charges may vary dependent on your network provider) and are usually included in inclusive minute plans from landlines and mobiles. For our joint protection telephone calls may be recorded and/or monitored.

Canada

Please visit Aviva Risk Management Solutions | Aviva Canada or email us at arms.canada@aviva.com

Ireland

Please visit Insurance Risk Management | Business Risk Management Insurance - Aviva Ireland or Email us at armsireland@aviva.com

Specialist Partner Services

Aviva have created a network of Specialist Partners to complement our in-house capabilities and to enable our policyholders to benefit from a wide range of risk management solutions at preferential rates and terms. Together, we provide solutions to help with the significant challenges of modern-day risk management.

Note: These partner relationships are wholly for the benefit of our policyholders with no income to Aviva.

The following Specialist Partners provide products or services in relation to risk guidance provided, discussed or referenced in this Loss Prevention Standard.

United Kingdom

- Leak detection **Leaksafe**
- Escape of Water Leak Prevention **Quensus**
- Thermal Imaging Cameras **Pass**
- Specialist electrical inspections - Bureau Veritas

For more information please visit: Aviva Risk Management Solutions – Specialist Partners

Ireland

- Leak detection **LeakSafe**
- Thermal Imaging Cameras and PAT Testing Equipment - **PASS**

For more information please visit: Insurance Risk Management | Business Risk Management Insurance - Aviva Ireland

Canada

- Leak detection **Water Leak Detection System | Water-Protec**
- Leak detection **AkiSens**
- Thermal Imaging Cameras and PAT Testing Equipment - **Electrical Service & Solutions Toronto | IPE Canada**

For more information please visit: Our Specialist Partner Network | Aviva Canada

Standards, Sources and Useful Links

Canada

- CAN/ULC-S524 — Standard for the Installation of Fire Alarm Systems
- NFPA 13 – Standard for the Installation of Sprinkler Systems
- NFPA 25 – Inspection, Testing, and Maintenance

Ireland

- I.S. 3218:2013+A1:2019 Fire detection and alarm systems for buildings - System design, installation, commissioning, servicing, and maintenance and Amendment.
- I.S. EN 12845: Fixed firefighting systems - Automatic sprinkler systems - Design, installation and maintenance

United Kingdom

- BS 5839-1:2017 - Fire detection and fire alarm systems for buildings - Code of practice for design, installation, commissioning, and maintenance of systems in non-domestic premises.
- LPS 1204 : Issue 3.2 Requirements for Firms Engaged in the Design, Installation, Commissioning and Servicing of Gas Extinguishing and Condensed Aerosol Systems.
- BS EN 12845:2015+A1:2019 Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance

Other

- NFPA 72 — National Fire Alarm and Signalling Code
- VdS 2095 — Automatic Fire Detection and Fire Alarm Systems
- EN 12845: Fixed firefighting systems - Automatic sprinkler systems - Design, installation and maintenance

Additional Information

Loss Prevention Standards

These documents set out best practice recommendations to help reduce the likelihood and impact of losses.

Relevant Aviva Loss Prevention Standards include:

- **Managing Change – Property**
- **Managing Contractors – Property**
- **Emergency Response Planning**
- **Self-Inspections**
- **Maintenance Regimes**
- **Hot Work Operations**
- **Use of Thermographic Cameras – General Considerations** and **Checklist**
- **Flood Guidance and Mitigation (UK)**
- **Flood Guidance and Mitigation (Global)**
- **Small Scale Battery Energy Storage Systems**
- **Planning a Battery Energy Storage System – 12 Top Tips**
- **15 Top Tips for Roof Mounted Photovoltaic Solar Panel Systems**
- **Emergency Response Planning with Fire and Rescue Services**
- **Fire Compartmentation**
- **Fire Doors, Shutters, Dampers and Collars**
- **Heat and Smoke Venting Systems**
- **Material Damage Risk Assessment**
- **Business Continuity – Step 4: Business Impact Analysis and Risk Assessment**
- **Business Continuity – Seven Steps to Continuity**
- **Escape of Water – Introduction**
- **Security – Computer Equipment**
- **Security – Doors and Windows**
- **Intruder and Holdup Alarms – General Guidance**
- **Video Surveillance Systems – Introduction**
- **Cyber – Top 12 Tips to Protect Against a Cyber Attack**
- **Cyber – Ransomware**

Please visit Loss Prevention Standards to view the full library.

Aviva Risks Training Solutions (United Kingdom Only)

Aviva Risk Training Solutions, delivered through our Specialist Partner, SafetyCulture, provide free, bite-sized learning modules exclusively for Aviva policyholders.

Please visit Aviva Risk Training Solutions for further guidance.

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