SEPA
Scottish Environment Protection Agency
Buidheann Dìon Àrainneachd na h-Alba

NUCLEAR POWER GENERATION AND DECOMMISSIONING

SECTOR PLAN

DRAFT FOR CONSULTATION

Contents

Why we are consulting

The draft sector plans are our initial ideas on where we can make the most significant impact. Getting feedback early in the process from our communities, partners and stakeholders is important and your feedback is critical to the success of our sector planning approach. If you think that we have got something wrong, missed a critical opportunity or not been as transparent as possible, please let us know your thoughts.

We aim to get these plans finalised in the first months of 2019 and then push on to implement them. Your views will also help to shape the prioritisation for the implementation, which will be completed following the consultation period.

The consultation is open until Friday 15 February 2019. Have your say, by completing the online consultation survey available from https://consultation.sepa.org.uk/sector-plan/nuclear-power-generation-and-decommissioning

SEPA has a strong track record of regulating to improve the Scottish environment. We are proud of what we have achieved since we were set up just over two decades ago in 1996. We know we need to do more over the next two decades to build on this success. Much more.

The mounting scientific evidence about climate change, plastics in our oceans, the pressure on our freshwater and more shows us that humanity must rise to tackle major environmental challenges. This scientific knowledge underpins SEPA's strategy for how we will regulate - One Planet Prosperity. If everyone in the world lived as we do in Scotland, we would need three planets. There is only one.

So, we will regulate to help Scotland prosper within the means of our one planet. Successful businesses in future will be those that use low amounts of water, materials and carbon-based energy and create little waste. Prosperous societies will be comprised of these businesses. This can be Scotland.

In every sector we regulate, this means we will have two simple aims. We will:

1. ensure that every regulated business fully meets their compliance obligations;

2. as many regulated businesses as possible will go beyond the compliance standards.

This draft sector plan outlines how we will do this in regulating the nuclear power generation and decommissioning sector.

The nuclear power generation and decommissioning sector, as would be expected, is a tightly regulated sector. In Scotland, there are very high levels of compliance with environment protection laws. SEPA is determined that this compliance performance will continue. We are also keen to help the sector explore further innovation in other areas, for example, water and solid waste management. We will also be focusing on future activities such as planned decommissioning processes.

That is why this draft sector plan is so important. It explains how we intend to play our role as Scotland's environment protection regulator to (a) ensure there is no slippage at all in relation to compliance and (b) help the sector do even better than the legal standards where possible.

This draft plan is ambitious. It spells out how we will use traditional environmental protection agency (EPA) regulatory tools, such as permits and enforcement, in clearer and more powerful ways. It sets out some completely new ways, such as novel partnerships, that we will develop and use to support innovation in this sector.

We would love to hear what you think of our draft plan. Once it's finalised, we are going to push on and implement it. So if you think we've got something wrong, missed something out or not been as transparent as possible, please let us know your thoughts. We want to get this right and then get on with it.

Terry A'Hearn
SEPA Chief Executive Officer

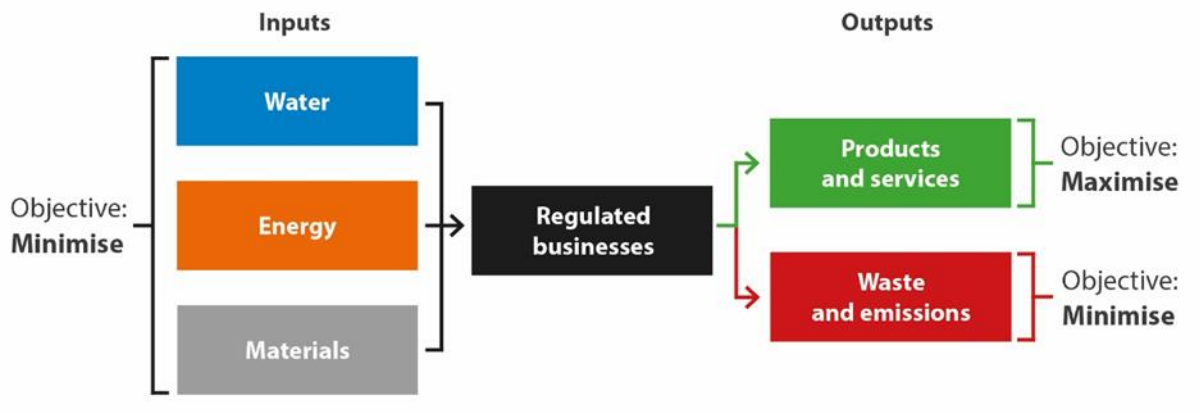
1. Introduction

For SEPA to help create a prosperous Scotland that lives within the means of our one planet, we need to radically change the way we work. In the past our approach to regulation has been grounded in the different set of rules we manage to protect the environment. This has helped us to deliver, for example, improvements in water quality. However, it will not enable us to make the transformational changes needed to tackle today's problems.

We are moving instead to ground our regulation in working across whole sectors. In this way we can systematically identify the compliance issues that need to be tackled by the sector. But mere compliance and small scale incremental change will not be enough. We want to help businesses and sectors to implement successful innovation and support them in their ambitions to do more than they are required to by regulation. We call this 'moving beyond compliance': helping already high performing businesses to do more for the environment because it makes sense for them to grow in a sustainable manner. We will also identify where the biggest opportunities are for us to help the sector to go beyond compliance. In both ways this will help regulated businesses operate successfully within the means of one planet.

All businesses that we regulate in a sector use water, energy and raw materials to produce the products and services they sell. In doing so, they also create waste and emissions. We can think of these as environmental flows that need to be managed by the business (Figure 1).

Environmental flows (Figure 1)



We want to help as many businesses as possible to manage these flows effectively and reduce their use of natural resources and creation of waste in ways that enable them to meet their legal obligations, drive further improvements and operate their business successfully. To do this, we are preparing sector plans for every sector that we regulate.

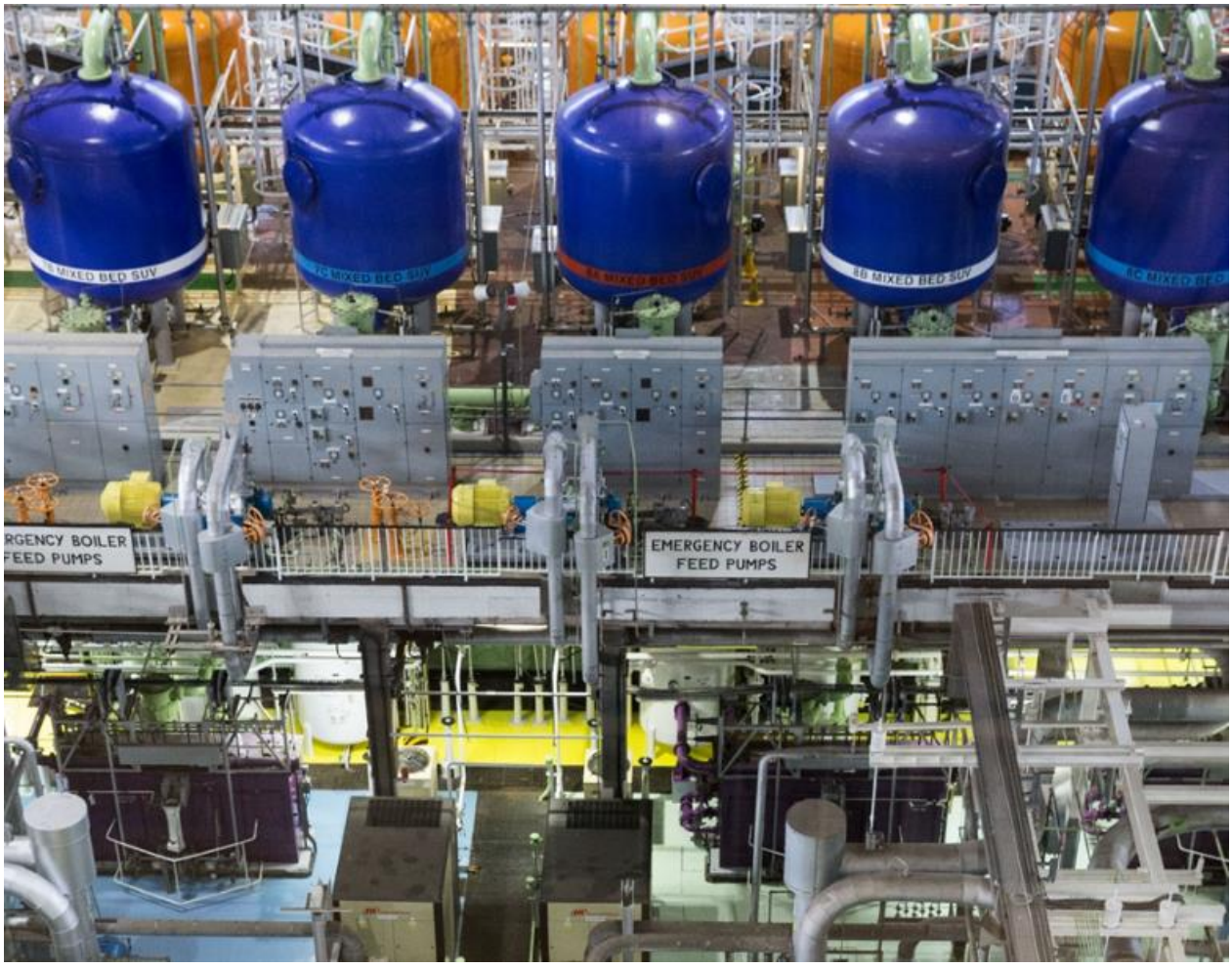
Sector plans are at the heart of everything we do, shaping the interactions with every sector and the businesses in them. Through them, operators will get the relationship that their attitude and performance earns. Those that demonstrate a commitment to good environmental performance and deliver solid outcomes will receive powerful support through guidance and advice. Those that demonstrate behaviour which leads to significant or chronic

non-compliance can expect SEPA to use the most appropriate enforcement tools to bring them into compliance.

This is our plan for the nuclear power generation and decommissioning sector. It details how SEPA is going to regulate the sector and work with it to protect and improve the environment. The plan focuses on the civil nuclear sites in Scotland, which are the two power stations that generate electricity using a nuclear reactor, and three former power stations and research facilities that are undergoing decommissioning because they have reached the end of their working life. It explains how we will work directly with these sites and also includes ways in which we will work with the sector to use our shared influence to improve environmental performance throughout the industry supply chain.

Other industries that manage radioactive materials and radioactive waste but that are not in the nuclear power generation and decommissioning sector are referred to as 'the non-nuclear industries' and are not included in this sector plan. Nuclear activities carried out by the Ministry of Defence are also excluded from the nuclear power generation and decommissioning sector plan.

The sector already has a good level of compliance and in some areas goes significantly beyond compliance. This plan builds on this foundation to achieve our vision for the sector.



2. Our vision for the nuclear power generation and decommissioning sector

Minimising environmental impacts and continuing to go beyond compliance are fundamental to the nuclear power generation and decommissioning sector's operations and are achieved by strong environmental leadership.

Waste materials from the nuclear power generation and decommissioning sector are reused and recycled wherever possible.

The best possible environmental and social outcome is sought for each nuclear site during operation, decommissioning and after final site clearance.

The generating sites continue to produce low-carbon energy efficiently.

There is a high level of transparency in how SEPA regulates the nuclear power generation and decommissioning sector.

Consultation question 4:

Do you agree with the vision?

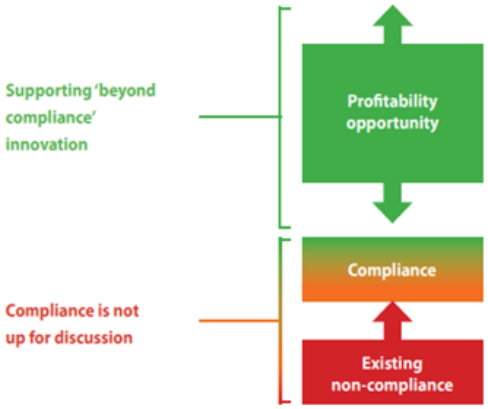
Our objectives

The objectives of the nuclear power generation and decommissioning sector plan are to:

- ensure all operators in the sector maintain full compliance with Scotland's environment protection laws;
- help as many operators as possible in the sector to continue beyond compliance.

This is illustrated by the sector roadmap (Figure 2).

Sector roadmap (Figure 2)



This sector plan sets out how SEPA will work with the nuclear power generation and decommissioning sector. For our vision and objectives to be achieved our staff will work with partners and facilitate liaison between them and the sector to create opportunities that link business success with environmental success.

We want to bring together skilled, experienced and innovative people from across the sector to understand key challenges and opportunities to create innovative solutions. If we get this right, it will mean that the environment is not seen as a constraint, but a platform on which economic and social success can be built, putting the nuclear power generation and decommissioning sector on a pathway to becoming a 'one planet' sector.

3. The nuclear power generation and decommissioning sector

The nuclear power generation and decommissioning sector comprises two power stations that generate electricity using a nuclear reactor as well as a research facility and two former power stations that are undergoing decommissioning because they have reached the end of their working life.

The Scottish Government has a policy[1] that does not allow any new nuclear power stations to be built in Scotland under current technologies, so there are no anticipated new sites in this sector.

There are two nuclear power stations in Scotland that generate electricity: Hunterston B in Ayrshire which started generation in 1976 and is planned to cease operation in 2023; and Torness in East Lothian which started generation in 1988 and is planned to cease operation in 2030 (Figure 5). Nuclear power stations provide 42.8% of the electricity produced in Scotland, equivalent to supplying over 4 million homes with low-carbon electricity.

Both sites are owned by EDF Energy, and each site generates electricity using two advanced gas-cooled reactors (AGRs). Both sites are 100% baseload stations which means that they contribute to the minimum amount of electricity that the grid needs.

When a nuclear reactor reaches the end of its working life, its nuclear fuel is removed. It is then decommissioned to remove the reactor, associated facilities and waste from the site so that it no longer needs to be regulated and can be used for a different purpose.

Decommissioning can take a long time because of the complexity of operations and the time it takes for some radioactive substances to decay to a level that makes the radioactive waste easier to manage; and it may be several hundred years before a site is finally released from regulatory control.

After the initial decommissioning, some sites may enter a stage of care and maintenance when most of the structures, associated facilities and waste have been removed and only a few key structures remain to allow the radioactive waste contained in them to decay to a level which makes it easier to manage; the care and maintenance stage may last for up to several decades.

If there is a care and maintenance stage in the decommissioning programme, this will be followed by a phase of final site clearance where the remaining structures will be removed from the site. When sites have been fully decommissioned, either by a continuous process or including a period of care and maintenance, they may become strategic infrastructure and will be addressed under that sector plan.

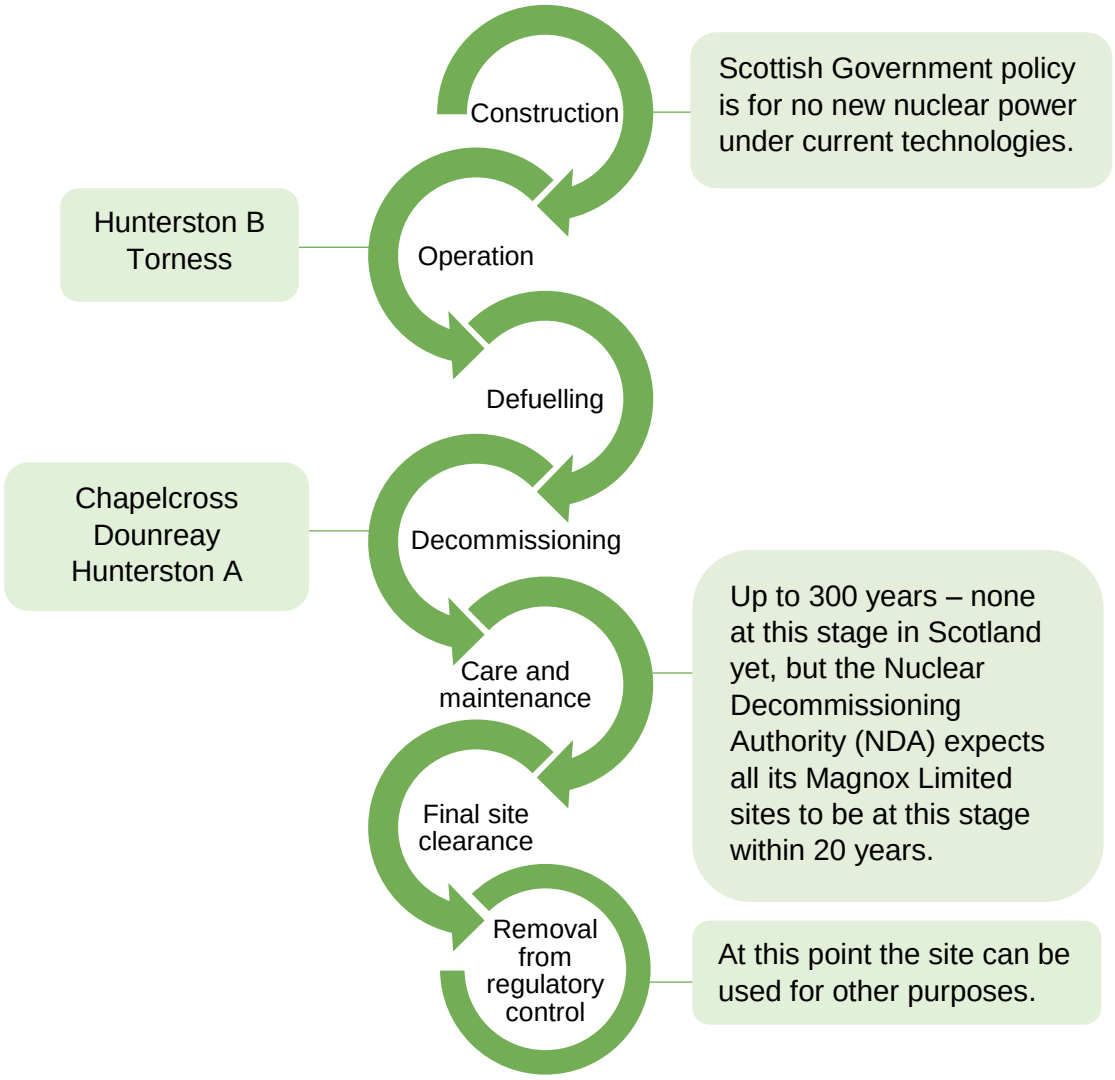
The lifecycle of a nuclear site is shown in Figure 3.

[1] Scottish Energy Strategy: The future of energy in Scotland, Scottish Government, December 2017

How does a nuclear power station work?

All power stations generate electricity in a similar way by heating water to create steam that is used to drive a turbine which generates electricity. In a nuclear reactor, the heat is generated by uranium fuel elements that are contained within a graphite core; the amount of energy created by the uranium fuel is moderated by control rods that can be raised and lowered to increase or decrease the amount of heat created and therefore the amount of electricity generated.

Lifecycle of a nuclear site (Figure 3)



There are three sites in Scotland that are in the decommissioning phase: Dounreay in Caithness; Hunterston A in Ayrshire and Chapelcross in Dumfries and Galloway (Figure 5).

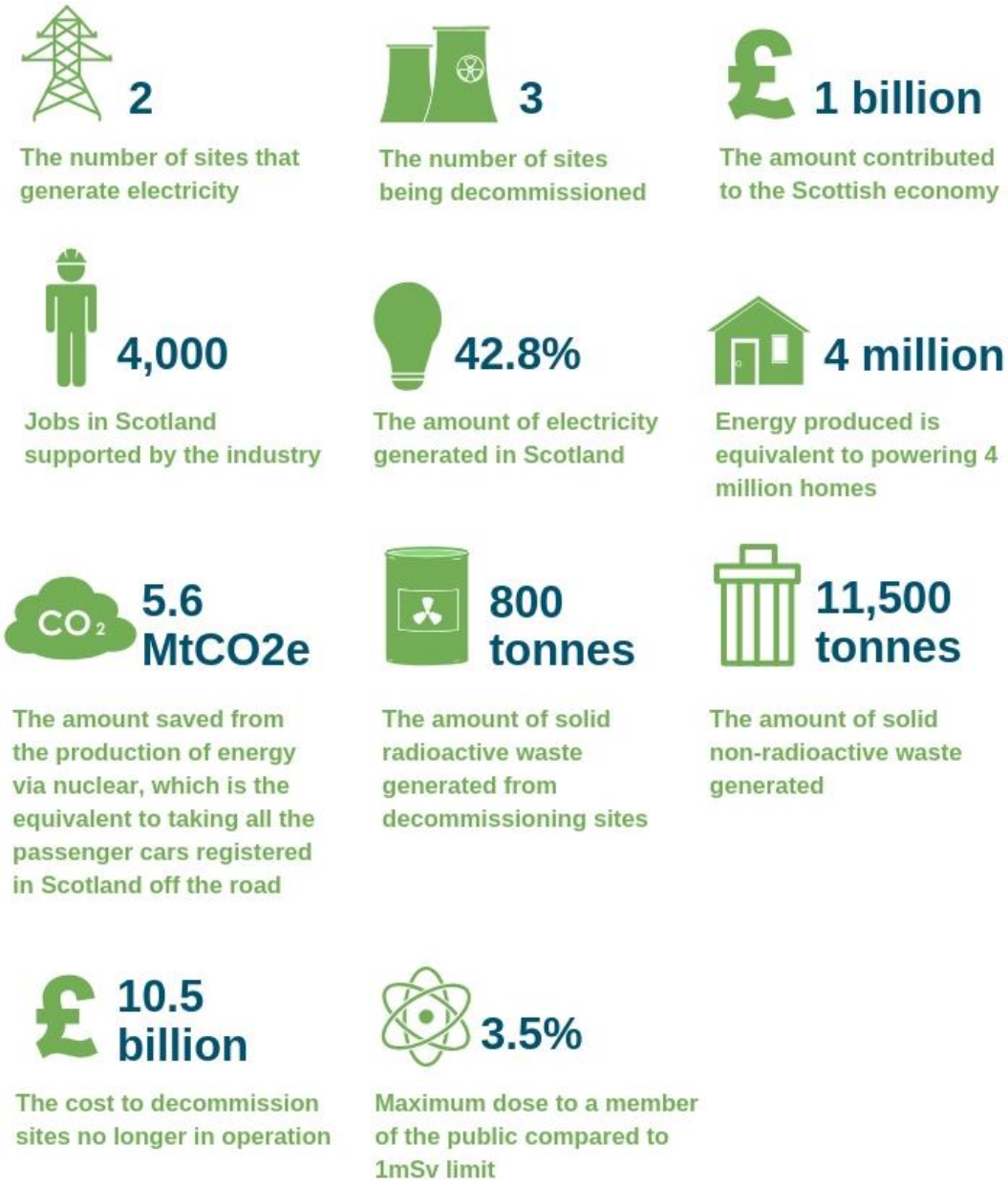
The decommissioning of these sites is overseen and funded by the Nuclear Decommissioning Authority (NDA) which is a non-departmental public body set up under the Energy Act 2004. The NDA owns the facilities and the waste and is responsible for the decommissioning and cleaning up of nuclear facilities and ensuring that radioactive and non-radioactive wastes are managed safely. The NDA does not have a hands-on role in the

actual decommissioning of nuclear sites but it appoints Site Licence Companies (SLCs) to manage the decommissioning.

Dounreay is managed by Dounreay Site Restoration Limited (DSRL) and Hunterston A and Chapelcross are managed by Magnox Limited.

Figure 4 illustrates some of the key facts of the nuclear power generation and decommissioning sector.

Facts and figures (based on 2016 and 2017 data) (Figure 4)



Location of civil nuclear sites included in this sector plan (Figure 5)

4. Environmental impacts and how we manage them

Environmental impacts throughout the supply chain

The nuclear power generation and decommissioning sector carries out operations on its sites that do not involve radioactive substances; these activities can have as much, if not more, of an environmental impact than that caused by radioactive discharges. Such activities include transport, operation of diesel generators, air conditioning and visual impact. Not all activities have an adverse environmental impact, the clean-up of contaminated land is beneficial and many waste materials removed from the site are reused or recycled. Nuclear power provides low carbon electricity, saving several million tonnes of greenhouse gas emissions compared to power generated by conventional gas turbines. Some of the environmental impacts are shown in Figure 6.

Consultation question 5:

Are there environmental impacts which have not been adequately considered?

Environmental impacts (Figure 6)

Sites that generate electricity	▪ Prevent greenhouse gas emissions from electricity generation. ▪ Locally elevated sea temperatures from cooling water that is returned to the sea. ▪ Radioactive pollution from discharges to air and water. ▪ Pollution from discharges to air (*e.g.* fluorinated gases) and water (*e.g.* sewage). ▪ Radiation from fuel rods and waste. ▪ Greenhouse gas emissions and pollution from waste management. ▪ Greenhouse gas emission, pollution and effects on the ecosystem from sourcing and transport of raw materials.
Decommissioning sites	▪ Visual impacts as the landscape changes due to demolition. ▪ Remediation of contaminated land has a positive impact on future land use. ▪ Pollution from trade effluent and sewage to water. ▪ Pollution from non-radioactive particulate to air. ▪ Greenhouse gas emissions and pollution from waste management. ▪ Radiation from fuel rods and waste. ▪ Radioactive discharges from waste stored on site.
Sites in care and maintenance	▪ Remediation of contaminated land has a positive impact on future land use. ▪ Pollution from discharges to air and water. ▪ Radioactive discharge from waste stored on site.
Final site clearance	▪ Brownfield site available for future land-use. ▪ Visual impact from clearance operations, e.g. cranes. ▪ Radiation from low level waste stores.

Environmental regulation of the nuclear power generation and decommissioning sector

SEPA regulates the nuclear power generation and decommissioning sector for its radioactive substances activities involving the management of radioactive waste under the Environmental Authorisations (Scotland) Regulations 2018 (EASR).

Under EASR we permit nuclear sites to manage radioactive waste that may include the receipt of radioactive waste from other sites, the treatment, storage, transfer and disposal of radioactive waste. Permits contain standard conditions and other conditions that aim to minimise environmental harm and protect human health. As well as these general aims, we include conditions that implement international obligations, European Directives and domestic legislation and policies.

All permits for nuclear sites include a requirement to achieve an optimal level of protection of the environment and the public and require the authorised person to use the best practicable means to ensure that no unnecessary radioactive waste is generated.

We have an obligation to ensure that radiation doses to the public are less than one milli Sievert (1 mSv) and we achieve this through setting limits on the discharge of radioactive waste into the environment. We carry out monitoring for radioactivity in the environment and food and publish the results annually in the *Radioactivity in Food and the Environment* report series.

Nuclear sites are large infrastructure units which have a significant workforce and supporting work activities. Nuclear sites may have water treatment works, oil backup generators, waste streams for both recycling and landfill. Once decommissioned, nuclear sites may become strategic infrastructure and may be regulated according to that sector plan. Nuclear sites need to address the issues relating to the chemicals and manufacturing; landfills; metals; water and waste water treatment sector plans. These cross cutting issues will be addressed in the implementation plan. The impact of nuclear sites in these areas mean that some sites are also regulated under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) for the abstraction and discharge of cooling water, the discharge of sewage, trade and surface water and dewatering, the Pollution Prevention and Control (Scotland) Regulations 2012 for emergency diesel generators, auxiliary boilers and waste oil burner and other gaseous discharges and the Waste Management Licensing (Scotland) Regulations 2011 (WML) for transfer station and disposal activities.

Due to the presence of hydrazine and hydrochloride, some nuclear sites are also regulated under the Control of Major Accident Hazards Regulations 2015 (COMAH).

The two generating sites are regulated under the European Union Emissions Trading Scheme (EU ETS) which covers all combustion sources producing carbon dioxide emissions. All sites are regulated under the Fluorinated Greenhouse Gases Regulations 2015 and the Ozone-Depleting Substances Regulations for emissions arising from air handling and chiller units.

Some nuclear sites are located on valuable aquifers, traversed by rivers or are close to other aquatic systems. Groundwater is a valuable natural resource and as such is protected from deterioration and pollution under CAR. This is particularly important for groundwater-dependent ecosystems and for the use of groundwater in water supply for human consumption.

As well as being regulated by SEPA, the nuclear power generation and decommissioning sector is also regulated by the Office for Nuclear Regulation (ONR) for safety, security, transport and nuclear safeguards. SEPA and ONR work closely together to ensure that we apply a consistent and joined-up approach to the regulation of the nuclear power generation and decommissioning sector.

SEPA also works closely with other regulators such as Food Standards Scotland, local authorities and Scottish Government on the regulation of sector.

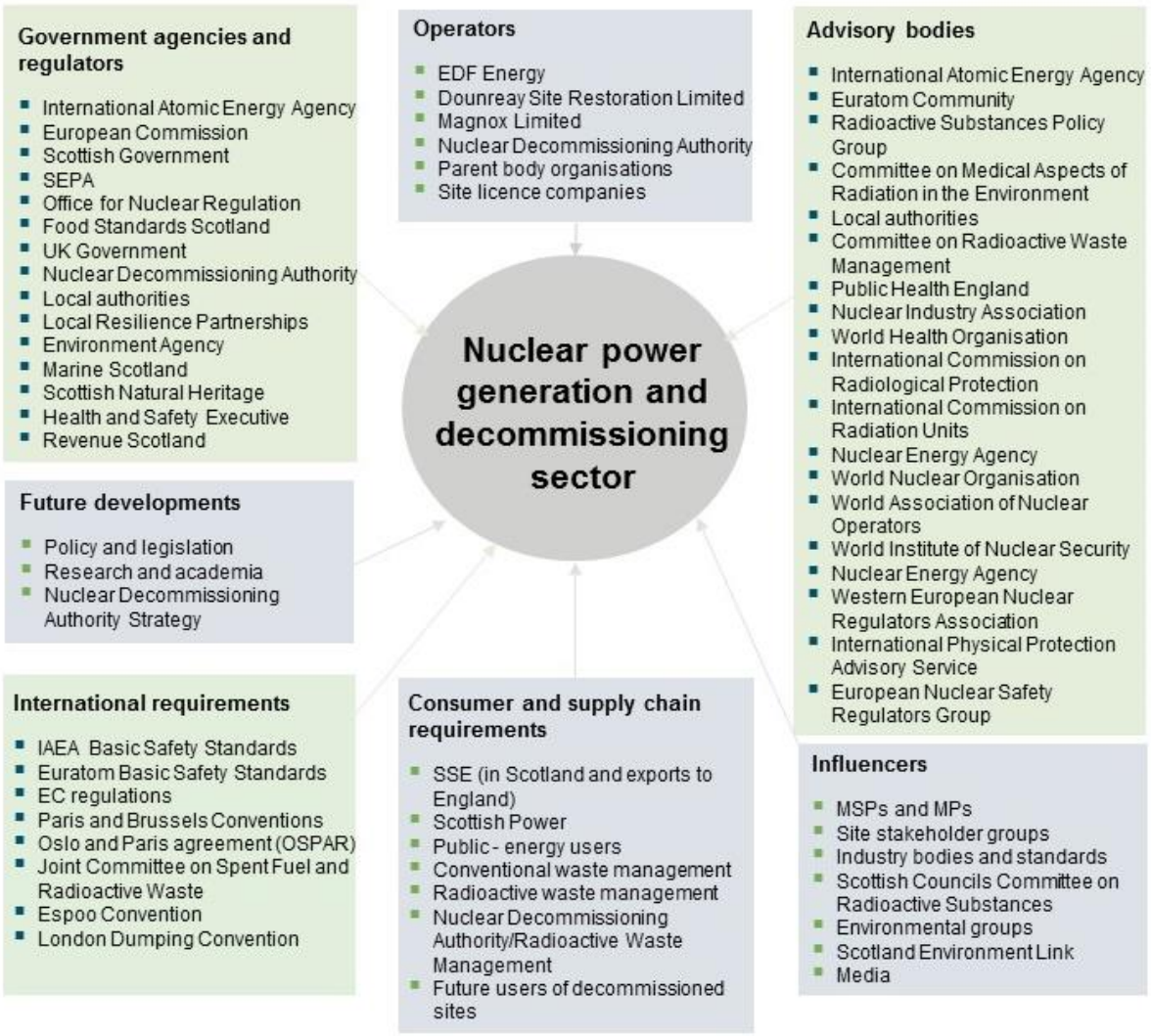
Around 80% of environmental legislation in Scotland originates from the European Union. As the UK leaves the EU and the Euratom Community, changes will, where necessary, be made to domestic legislation to ensure that the standards of environmental protection we enjoy today and the principles upon which they are based are maintained. Therefore, while some of the detail of the legislation we use to regulate may change, our work to protect Scotland's environment will not. Our commitment to tackling non-compliance with environmental laws and, where necessary, taking enforcement action will not diminish as a result of the UK leaving the EU.

Wider influences on environmental performance of the nuclear power generation and decommissioning sector

Full compliance with environmental regulations will not, by itself deliver the transformational change required to secure our One Planet Prosperity objectives. The nuclear power generation and decommissioning sector plan needs to unlock the potential for the sector to gain further strengths in resource efficiency and environmental innovation that will help them to succeed in their markets. We need therefore to combine the actions that we can take to influence the behaviour of a business through our regulatory role with all the other influences. Doing this will be the most effective way to maintain full compliance and to help as many businesses as possible to continue beyond compliance.

Working with the sector, we will place this more sophisticated way of operating at the heart of our work. Figure 7 summarises the main organisations that influence and are influenced by operators in the nuclear power generation and decommissioning sector and identifies those that we are likely to work with in both the short and longer term. As we implement the plan we will consider the opportunities these relationships provide and how we would like them to develop.

Key influences on the nuclear power generation and decommissioning sector (Figure 7)



Consultation question 6:

Are there other key influences on the nuclear power generation and decommissioning sector, which should be included here?

5. Tackling non-compliance and taking opportunities to go beyond

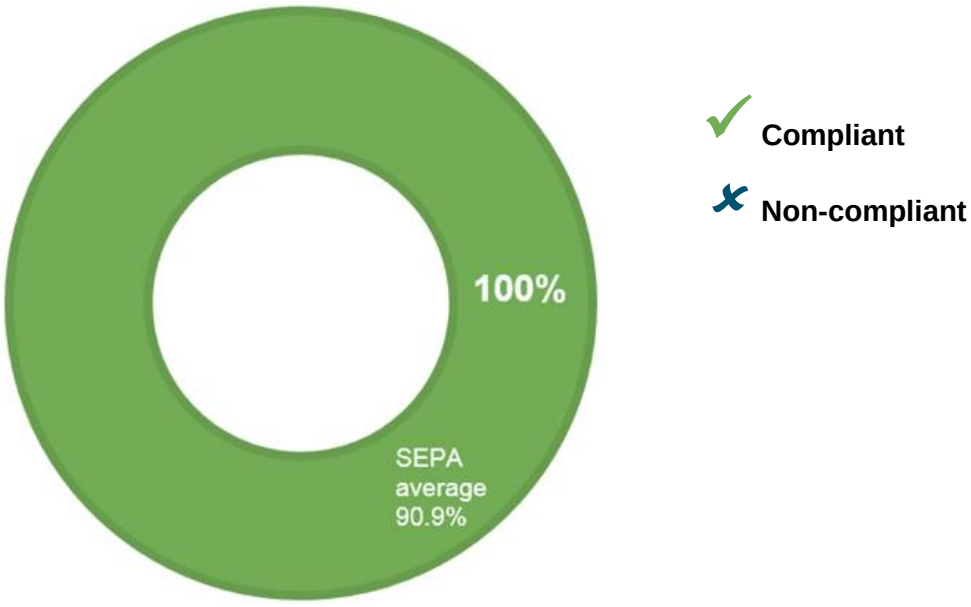
Compliance in the sector

Compliance[2] with environmental law is non-negotiable and regulated businesses in the sector need to comply.

The nuclear power generation and decommissioning sector has a good record of compliance across all the regimes we regulate it under and in 2017 achieved 100% compliance (Figure 8).

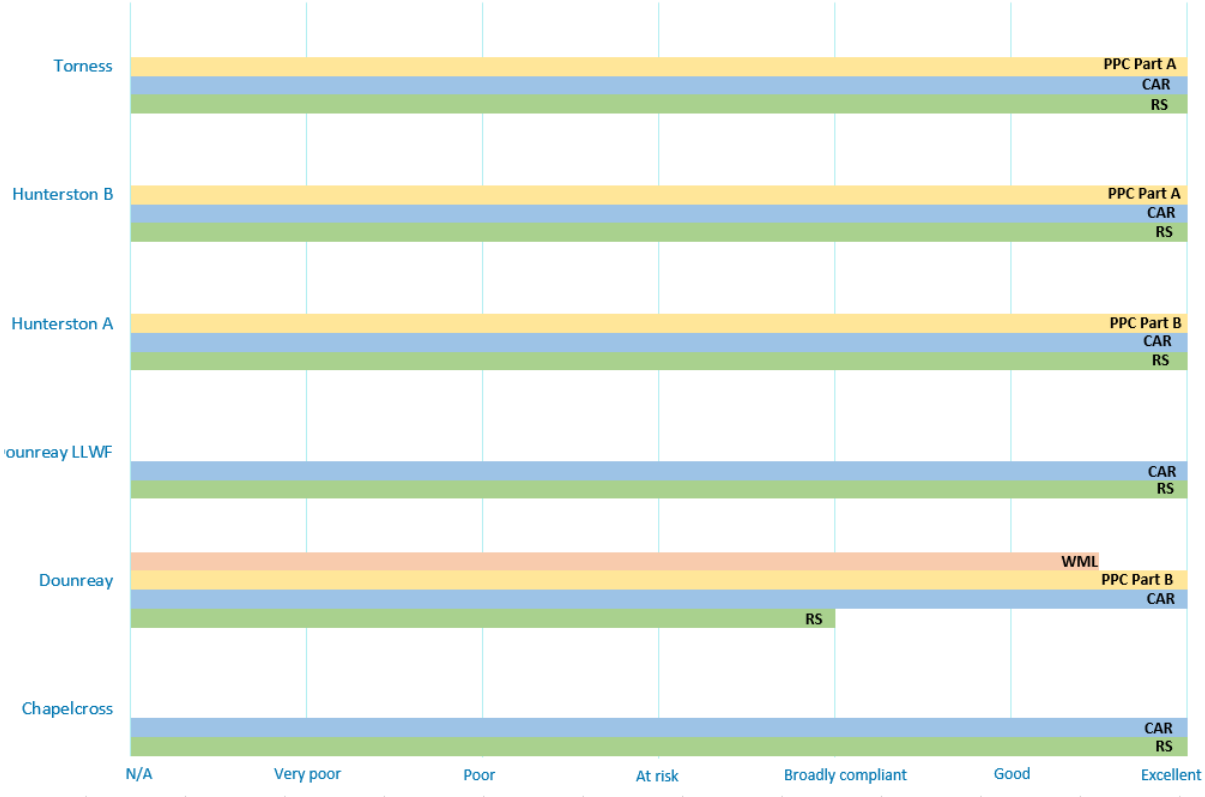
Only one site did not achieve a compliance rating of 'Excellent' and this was mainly due to failures in complying with its management procedures (Figure 9).

Compliance summary for the sector (Figure 8)



[2] Compliance with environmental authorisations is currently measured by our Compliance Assessment Scheme. This scheme is currently being reviewed.

Compliance ratings for the nuclear power generation and decommissioning sector in 2017 (Figure 9)



We will help responsible compliant businesses to operate by making it significantly harder and more expensive for those who persistently fail to comply with environmental regulation to operate. We will achieve this by increasing scrutiny, prescription, fees and the use of enforcement and monetary penalties for those who fail to comply. To ensure future compliance, SEPA will:

- maintain the programme of environmental monitoring around the nuclear sites and publish information on doses to the public in *Radioactivity in Food and the Environment (RIFE*) report series;
- provide support and guidance to the sector on implementing their simplified permits;
- work with Scottish Government to ensure that legislation is integrated so that regulation is harmonised;
- ensure that SEPA has sufficient experienced staff to regulate the nuclear power generation and decommissioning sector and support compliance and beyond, enable all environmental regulation at nuclear sites to be carried out consistently.

What are the opportunities to go further?

We believe that those societies and economies that are low resource use, low energy use, low water use and low waste will be the most successful in the 21st century. Businesses that are the most innovative will best rise to the challenges of our time, such as over use of resources and climate change and create sustainable economic growth.

To do this, every business must reach full compliance with environmental laws. But mere compliance and small scale incremental change will not be enough. At SEPA we want to help businesses and sectors to implement successful innovation and support them in their ambitions to do more than they are required to by regulation.

We call this 'moving beyond compliance': helping already high performing businesses to do more for the environment because it makes sense for them to grow in a sustainable manner.

The nuclear power generation and decommissioning sector already goes beyond compliance and commits to this in the operators' policies:

- Hunterston B and Torness – The Better Plan
- Chapelcross and Hunterston A – Environment, Health, Safety and Quality Policy Statement
- Dounreay – Safety, Health, Environment and Quality Policy

Other examples of how the nuclear power generation and decommissioning sector goes beyond compliance include:

Contributing to protected communities by providing funding for local charities and projects, providing and supporting education initiatives and having socio-economic plans to support sustainable communities when decommissioning is complete.

Case study

There is a Chapelcross site-focussed economic development initiative 'CX Project' that is being led by Dumfries and Galloway Council in partnership with the NDA and Scottish Enterprise. The CX Project is exploring opportunities for future development of the site as decommissioning progresses. The CX Project is linked with the wider Borderlands Growth initiative; future potential use of the Chapelcross site will be part of the considerations of this development initiative.

Contributing to a better environment by having biodiversity action plans, protecting and enhancing sites of special scientific interest (SSSI) adjacent to nuclear sites and committing to ensuring that environmental impacts are minimised from its actions.

Case study

EDF Energy has been awarded the Biodiversity Benchmark by the Wildlife Trust for its work to protect and enhance the unique and diverse wildlife around its sites at Hunterston and Torness.

Contributing to stronger business by providing staff on secondment to share specialist skills with others, funding local regeneration projects and funding research students.

Case study

Dounreay and its parent companies provide staff with specialist skills on secondment to support other companies such as Wick Harbour for the Beatrice offshore windfarm and harbour high water gate projects.

The nuclear power generation and decommissioning sector not only goes beyond compliance itself, but encourages its supply chain to do so as well by requiring suppliers to demonstrate their sustainability credentials and meet appropriate ISO standards, including environmental.

We will support the nuclear power generation and decommissioning sector in going beyond compliance and help it develop further opportunities wherever possible.

Water

Water in the right place, in the right amount and of the right quality underpins our society and economy. We need water to drink, wash, grow food, supply power, build things and maintain the benefits we all receive from a healthy functioning natural environment. Scotland's water resources vary by orders of magnitude in time and space and uncontrolled exploitation of water can affect its availability for other uses. This may be by increasing flood risk, reducing water availability, polluting water supplies or introducing invasive species into rivers, lochs and groundwater. All of these risks may be further enhanced as our climate changes and it is important that sector plans take account of risks from and to water resources.

SEPA is developing a Flood Strategy which will consider themes of future change, social impact and extended engagement in defining our ambition and outcomes to deliver effective flood risk management now and in the future. Early and strong links between this sector plan and flooding will strengthen opportunities for outcome delivery.

The OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic has a Radioactive Substances Strategy. The objective of this strategy is to prevent pollution of the OSPAR maritime area from ionising radiation through progressive and substantial reductions in discharges of radioactive substances with the ultimate aim of concentrations in the environment close to zero for artificial radioactive substances.

The generating nuclear sites use sea water for cooling and all sites discharge aqueous waste into the marine environment.

SEPA's aspirations are:

- Support government and contribute to the ongoing review of the OSPAR Strategy for 2020-2030.
- Continue to require the nuclear power generation and decommissioning sector to use best practicable means to minimise its discharges to the water environment.
- Work with sector partner organisations to ensure that the sector is resilient to climatic changes, especially around flood risk and water scarcity issues.

Consultation question 7:

What other beyond compliance opportunities are there for water?

Energy

Energy is an essential resource that enables social and economic development, however, while energy is fundamental to the economy, electricity and heat production, transmission, storage and use can have significant environmental impacts.

How we use and manage our energy resources is central to our ability to live within the resources of our planet. Energy is one of the most important aspects of the transition to a sustainable low carbon economy and there are often cost savings and other benefits for businesses associated with improving their energy efficiency and making use of alternative sources of energy.

The Scottish Government has made decarbonisation of the energy system by 2050 a core aspect of its energy strategy. SEPA, a delivery agency for the Scottish Government's energy strategy, can use its regulatory tools, experience, knowledge and partnership approach to support the sector to move beyond compliance and help drive the use of the most suitable energy sources, improve energy storage, increase energy efficiency and productivity (increased output from every unit of energy used) while minimising wasted energy.

EDF Energy, that operates Torness and Hunterston B, is already committed to being an efficient, responsible electricity company and champion of low-carbon affordable energy. It is committed to leading the UK's transition to a safe, low-carbon energy system and publishes its vision in 'The Better Plan'.

The nuclear power generation and decommissioning sector already takes action to minimise its energy usage, for example minimising energy usage by moving to LED lighting.

Case study

Torness recognises that one of the key environmental impacts in the supply chain is transport so tries to minimise this by using local suppliers and organising batch deliveries to minimise the amount of transport needed.

By participating in emission trading, companies work towards reducing emissions as there is a price on emitting greenhouse gases – it allows the flexibility to cut emissions in the most economical way and promotes investment in clean, low carbon technologies.

The energy saving opportunity scheme applies to various companies within the sector requiring audits of energy usage across the business. This includes all aspects of energy use including transport and process energy. The purpose of the scheme is to highlight cost effective ways to reduce energy usage. It is not mandatory for business to implement the recommended measures; SEPA, along with its partner agencies will encourage businesses to explore these opportunities to reduce energy and save money.

Each regime focuses on different energy uses and together aim to assist with Scotland moving towards a low carbon economy.

SEPA's aspirations are to work co-operatively with the sector to:

- share best practice in using energy resources efficiently;
- encourage sites to review their energy usage and assess if further energy savings can be made;
- reduce the use of fluorinated gases by substituting with lower global warming gases or alternatives to F gases such as ammonia, carbon dioxide etc;
- Reduce the use of ozone depleting substances such as R22 by substituting them with a non-ozone depleting substances.

Consultation question 8:

What other beyond compliance opportunities are there for energy?

Materials

SEPA views the circular economy as a game-changing opportunity to manage resources within planetary limits, reduce the harms associated with waste management and create economic opportunities. We must dramatically cut waste production across the economy, recover more and dispose of only the very minimum. Where waste is produced, we will always seek to facilitate the productive use within a framework of strong environmental protection. This is particularly relevant to the nuclear decommissioning sites which already reuse or recycle a high percentage of its waste.

Not only can resource efficiency improve productivity, and the bottom line for business, it can bring environmental improvements and reduce our reliance on virgin raw materials.

The nuclear power generation and decommissioning sector already reuses and recycles much of its waste. Some is segregated at source and some is segregated by waste contractors. For example:

- 100% of scaffold boards from Chapelcross are recycled into chipboard once they can no longer be used.
- Over 90% of non-radioactive waste from Hunterston A is recycled.
- Torness has a Freecycle option where items not longer needed can be claimed by staff before they become waste (e.g. office furniture).
- Hunterston B has recycled over 40 m^3 of metal in the last three years.
- Dounreay recycled 274 tonnes of steel from the demolition of a support complex attached to the Dounreay Materials Test Reactor.

- 3 000 tonnes of metal were recycled at Chaplecross in 2017, of this, 2 600t were recycled at a local scrap management site and 400t were sent to Cycliff for re-smeltering.

SEPA's aspirations are to work co-operatively with the nuclear power generation and decommissioning sector to encourage and enable the reuse and recycling of materials wherever possible including using aggregate from demolition on site to infill voids.

Case study

50 tonnes of steel recycled from sodium tank decommissioning

Around 50 tonnes of steel have been sent for recycling after two sodium storage tanks were cut up and removed as part of the decommissioning of Dounreay's Prototype Fast Reactor.

After removing high hazard residual sodium, the steel plates were size-reduced using gas burning cutting techniques.

The steel structures were originally part of a sodium tank farm housing four tanks that contained sodium residues from the operation of the reactor. The clean-up work was carried out in a hazardous radioactive environment by specialist contractors.

Consultation question 9:

What other beyond compliance opportunities are there for materials?

Future land use

Nuclear sites must be decommissioned in a manner that allows their sustainable after-use.

SEPA's aspiration is to work co-operatively with the nuclear power generation and decommissioning sector, communities and partners to promote and develop sustainable land uses for nuclear sites that have been decommissioned and undergone final site clearance. Our approach will include:

- working with operators, developers and partners to ensure that the most appropriate post-decommissioning opportunities are realised;
- developing clear guidance so that operators, potential developers and partners understand the legislative surrender requirements. Ensuring that our requirements are proportionate to the risk posed by the site and are consistent with those of other regulators;
- ensuring a smooth transition to the infrastructure sector following final site clearance.

Consultation question 10:

What other beyond compliance opportunities are there for future land use?

What actions are we going to take?

The following table summarises the actions that we have described above to keep compliance in the sector and, working in partnership, help businesses take opportunities to go beyond compliance. These are described according to the key outcomes that we would like this sector plan to achieve. The actions and aspirations set out, are our initial thoughts on what needs to be done to achieve the aims of this sector plan. We are at an early stage in sector plan development, and the actions that we prioritise will be informed by the findings of this consultation and further discussions between now and March 2019.

Outcome	Actions and aspirations
Protected communities	Maintain the programme of environmental monitoring around the nuclear sites and publish information on doses to the public in Radioactivity in Food and the Environment (RIFE).
	Provide support and guidance to the sector on implementing their simplified permits.
Better environment	Maintain Scotland's reputation as a world leader on the environmental regulation of nuclear sites.
	Ensure that SEPA has sufficient experienced staff to regulate the nuclear power generation and decommissioning sector and support compliance and beyond, enable all environmental regulation at nuclear sites to be carried out consistently.
	Work with Scottish Government to ensure that legislation is integrated so that regulation is harmonised.
Stronger business	Continue to build and maintain relationships and share information and best practice with the sector through workshops, meetings, conferences and events.

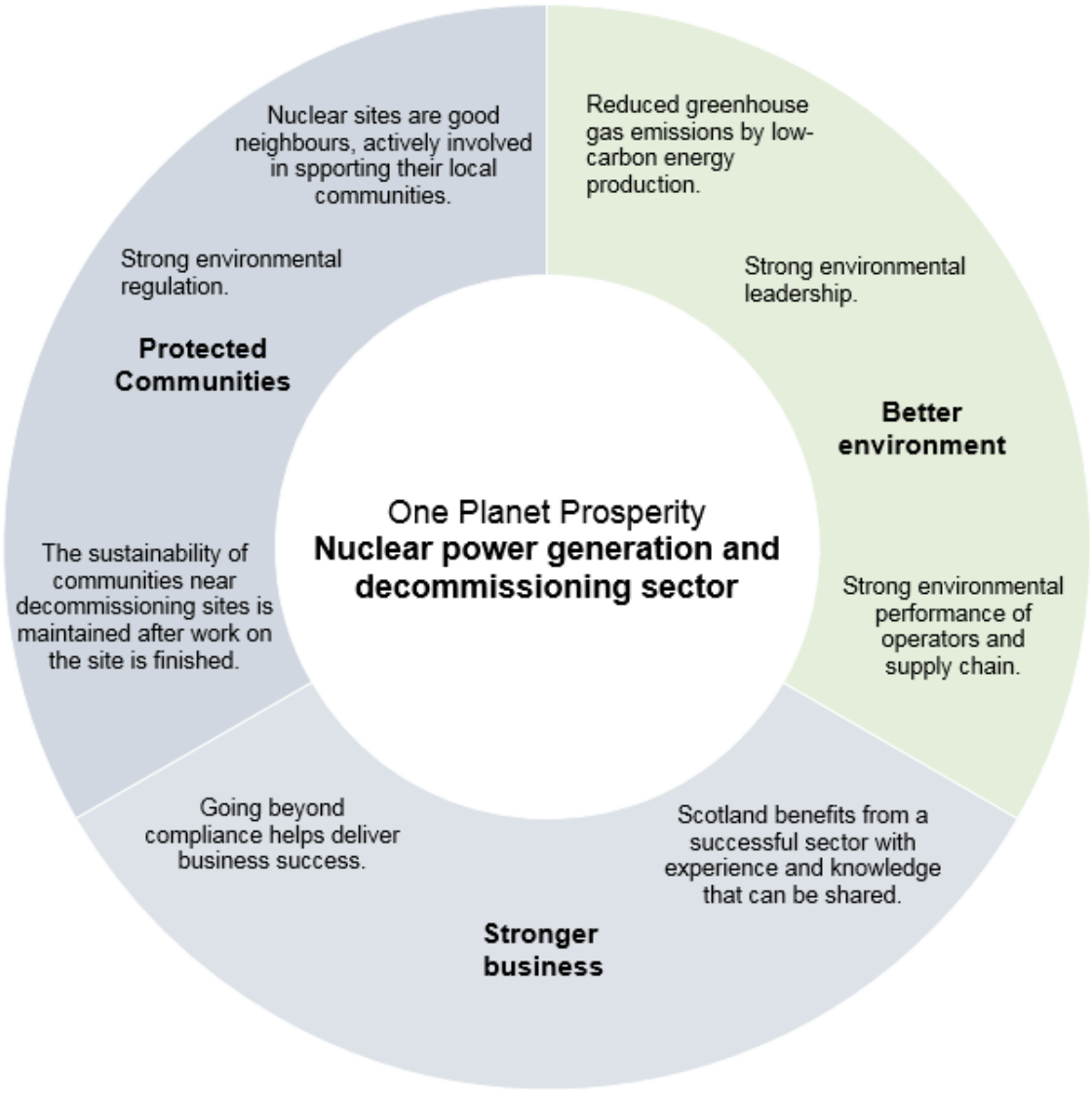
	Explore opportunities to support the sector in going beyond compliance.
	Explore opportunities for other sectors to learn from the nuclear power generation and decommissioning sector in achieving compliance and going beyond compliance.

Consultation question 11:

What actions would you like to see prioritised for 2019-2020?

6. Outcomes

If we achieve the vision we have set out in this plan, we anticipate that we will help to deliver positive outcomes that protect and improve the environment in ways that also protects communities and enable businesses to operate effectively and successfully in their markets.



Consultation question 12:

Please provide any other comments you may have on the nuclear power generation and decommissioning sector plan.

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www.sepa.org.uk
03000 99 66 99
The Castle Business Park, Strathallan House, Stirling FK9 4TZ

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