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

CHEMICALS MANUFACTURING **SECTOR PLAN**

DRAFT FOR CONSULTATION

Contents

Preface

1. Introduction

2. Our vision for the chemicals manufacturing sector

3. The chemicals manufacturing sector

4. Environmental impacts and how we manage them

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

6. Outcomes

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/chemicals-manufacturing

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, and

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 chemicals manufacturing sector.

Chemicals are used in a variety of products and activities in modern life. The manufacture of chemicals has taken place over many years in Scotland. During this time, much has been learned about how to reduce the environmental impact of these manufacturing processes. As new learning develops and as innovation continues apace, SEPA is determined to assist the Scottish chemicals manufacturing sector to be a world-leader in producing products that serve the needs of society in ways that further drive down environment impact.

That is why this draft sector plan is so important. It spells out how we hope to play our role as Scotland's environment protection regulator to support environmental excellence as a fundamental underpinning of everything the chemicals manufacturing sector does.

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

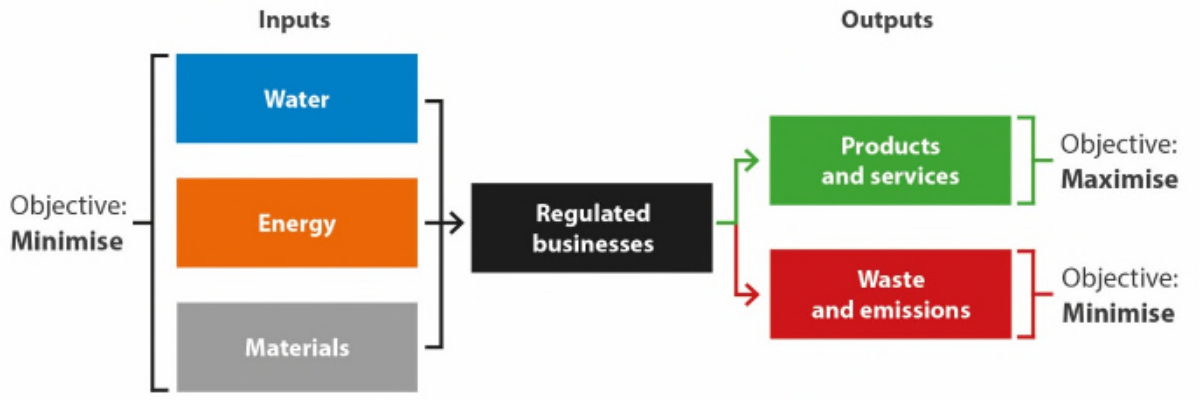
1. Introduction

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 chemicals manufacturing 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 chemical and biochemical manufacturing in Scotland, from base chemical manufacture to the formulation and packaging of final products. The plan also covers the storage, distribution and transport of chemicals, and resource efficiency, within this manufacturing chain. It explains how we will work directly with sites and also includes ways in which we will work with them to use our shared influence to improve environmental performance throughout the industry supply chain.

The sector already recognises the importance of resource efficiency and the opportunities that embracing the circular economy will bring[1]. This plan will support these ambitions by ensuring that the compliance expectations for sites within the sector are clear, while exploring potential opportunities for further innovation to take sites beyond compliance.

Our scope assumes that future SEPA sector plans will be developed for the quarrying/mining of raw materials and the extraction/processing of oil and gas. The outputs from these activities contribute to raw materials for multiple sectors. Additionally, the end use of manufactured chemicals is not included. The use of chemicals is prevalent across all aspects of society and the most effective way of addressing these impacts will be working through the other SEPA sector plans to facilitate collaborative working and innovative solutions.

Consultation question numbers align with those on the online hub, available from sectors.sepa.org.uk.

Consultation question 4:

This is the scope that we are proposing for our Chemicals Manufacturing Sector Plan, do you agree with this? Are there any activities that you think are missing from the scope?

[1] Waste and the Circular Economy Concept, CIA Position Statement: March 2018

2. Our vision for the chemicals manufacturing sector

The Scottish chemicals manufacturing sector produces valuable and innovative chemicals in a resource efficient manner, through environmental excellence and the protection of human health.

Operators and local communities work together to openly share information about risks, benefits, and impacts, and implement mutually beneficial opportunities.

Scotland is a world leader in developing successful solutions to supply chain challenges and environmental issues, while driving innovation through research and development, and embracing the circular economy. This leads to a thriving and robust chemicals manufacturing sector.

The chemicals manufacturing sector is resilient in the face of pressures such as increasing climatic changes, extreme weather events, regulatory changes and competition for investment.

Consultation question 5:

This is our vision, do you think that this sets the right level of ambition for the sector? Is there anything that you think could be included to improve this vision?

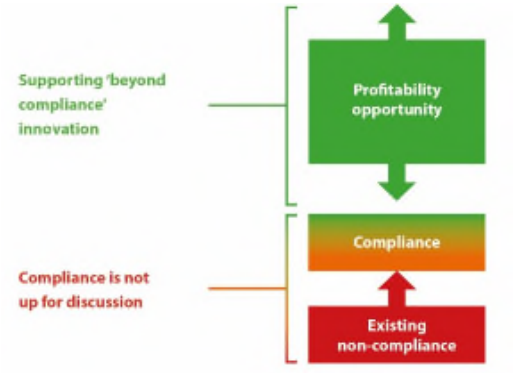
Our objectives

The objectives of the Chemicals Manufacturing Sector Plan are to:

- ensure all operators in the sector reach and maintain full compliance with Scotland's environment protection laws;
- help as many operators as possible in the sector to move 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 chemicals manufacturing sector. For our vision and objectives to be achieved our staff will work with partners and facilitate liaison between them and the chemicals manufacturing 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 chemicals manufacturing sector on a pathway to becoming a 'one planet' sector.

3. The chemicals manufacturing sector

Chemicals play an intrinsic part in modern living. The benefits of chemicals are significant but the unintended environmental consequences of chemical use in society are apparent. Some impacts are more visible than others, and general awareness on issues vary accordingly. The effects of plastic pollution, anti-microbial resistance and the harmful effects of hazardous chemicals (for example, endocrine disruption) on ecosystems will continue to pose significant challenges over the coming years.

Chemicals manufacturing within Scotland produces a diverse range of output, ranging from research and development (R&D), base chemical manufacture, speciality chemicals and subsequent formulation into products. The sector has substantial growth potential across businesses that span small-scale laboratories to large industrial complexes, from small to medium enterprises (SMEs) to global entities[2]. The operation and development of chemicals manufacturing sites within larger industrial complexes, close to communities, needs to be managed so as not to harm those communities.

Scottish manufacture of chemicals (including pharmaceuticals) reported a turnover of £3.65bn and contributed £1.94bn of Scotland's GVA (gross value added) in 2016[3]. The sector provides employment opportunities for highly qualified individuals with higher salaries than the manufacturing average[4]. This sector is reliant on global supply chains and is intrinsically linked with the EU[5]. In contrast to the overall Scottish export figure of 16%[6], approximately 60% of UK chemical exports and 75% of imports (including raw materials) are from the EU. The manufacture of refined petroleum and chemical products is the third largest industry in Scotland for international exports[7].

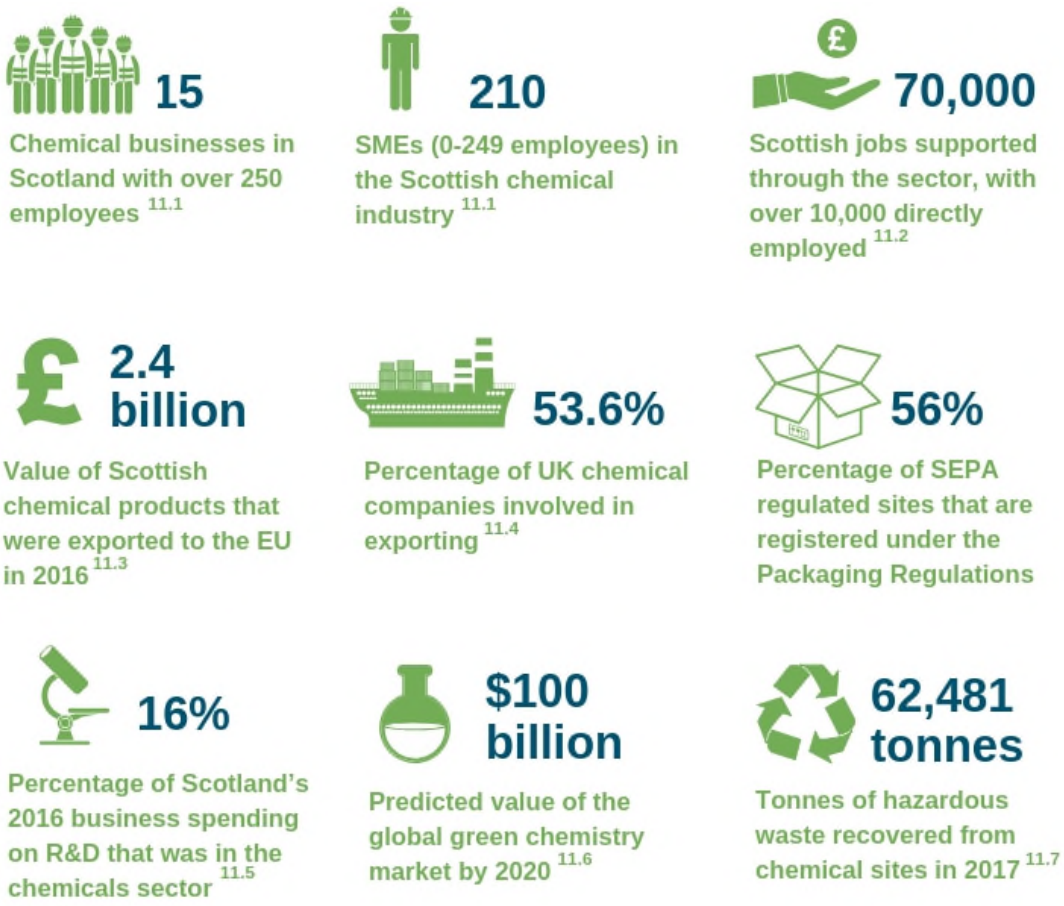
The Life and Chemical Sciences Manufacturing Strategy for Scotland details ambitious growth targets for an increase in turnover to £15.2bn by 2020[2]. This strategy is complemented by the wider manufacturing action plan for Scotland[8], which details the actions that the Scottish Government, enterprise agencies and other public agencies will undertake to support sustainable growth within the industry.

These strategies were considered when determining the scope of SEPA's chemicals manufacturing sector. Combining chemicals and biochemical manufacturing allows the potential to maximise cross-sector opportunities, with increased collaboration across industry. This sector plan aims to identify the opportunities to work collaboratively to tackle cross cutting issues.

The themes for growth across the vision documents for Chemical Sciences[9] and Life Sciences[10] in Scotland are closely aligned, focussing on innovation and commercial hubs, sustainable production and green chemistry, circular economy opportunities, research excellence and a skilled workforce and ensuring Scotland has an attractive environment for business.

[2] Life and Chemical Sciences Manufacturing Strategy for Scotland, Life Sciences in Scotland & Chemical Sciences Scotland, September 2015
[3] Businesses in Scotland 2018, Scottish Government, November 2018
[4] Sector Bulletin: Chemicals, EEF The manufacturers organisation in association with Santander, January 2018
[5] Making Brexit Work for the Chemical Industry, Chemical Industries Association and Squire Patton Boggs, February 2018
[6] FAI, Brexit and the sectors of the Scottish economy, November 2017
[7] Export Statistics Scotland 2016, A National Statistics publication for Scotland, Scottish Government, January 2018
[8] A Manufacturing Future for Scotland, Scottish Funding Council, Innovate UK, Skills Development Scotland, Zero Waste Scotland, Scottish Manufacturing Advisory Service, Highlands and Islands Enterprise, Scottish Government and Scottish Enterprise, 2016
[9] Strategic Plan 2025, Chemical Science Scotland, March 2018
[10] Life Sciences Strategy for Scotland 2025 Vision, Accelerating Growth, Driving Innovation, Life Sciences in Scotland, 2017

Facts and figures (Figure 3)[11]



The UK chemical industry was one of the first adopters of Responsible Care[12], a voluntary commitment by the global chemical industry to drive continuous improvement and achieve excellence in environmental, health and safety and security performance.

Raw resource inputs into the sector are from a variety of sources, but principally petrochemicals from the transformation of crude oil and natural gas, and inorganic compounds from mined or quarried ores and salts. Additional inputs may arise from plants, vegetable oils and animal fats. These can range from locally sourced inputs such as fish for the production of omega 3, to glucose from European cornfields for the production of vitamin C to ethane feedstock from North Sea gas for ethylene production.

Chemicals manufacturing is a resource intensive industry but there is an increasing move towards more efficient manufacturing techniques. The SEPA regulated sector in Scotland

[11] **Sources for facts and figures**

11.1 2016 Statistics - Businesses in Scotland 2018, Scottish Government, November 2018
11.2 www.sdi.co.uk/business-in-scotland/key-sectors/chemical-sciences
11.3 Export Statistics Scotland 2016, A National Statistics publication for Scotland, Scottish Government, January 2018 (includes coke, refined petroleum and chemical products, and basic pharmaceutical products and their products)
11.4 In 2016 - Sector Bulletin: Chemicals, EEF The manufacturers organisation in association with Santander, January 2018
11.5 Business Enterprise Research and Development Scotland 2016, The Scottish Government, December 2017
11.6 Strategic Plan 2025, Chemical Science Scotland, March 2018
11.7 PPC sites in sector, recovered covers all reported management methods excluding Incinerated, Landfilled or Transferred off-site

[12] www.icca-chem.org/responsible-care/

produces a varied range of outputs with a strong presence in pharmaceuticals, animal health, personal care, explosives, fertilisers, plastics and biodiesel. A significant volume of waste from chemicals sites is already being recovered rather than being disposed to landfill or incinerated.

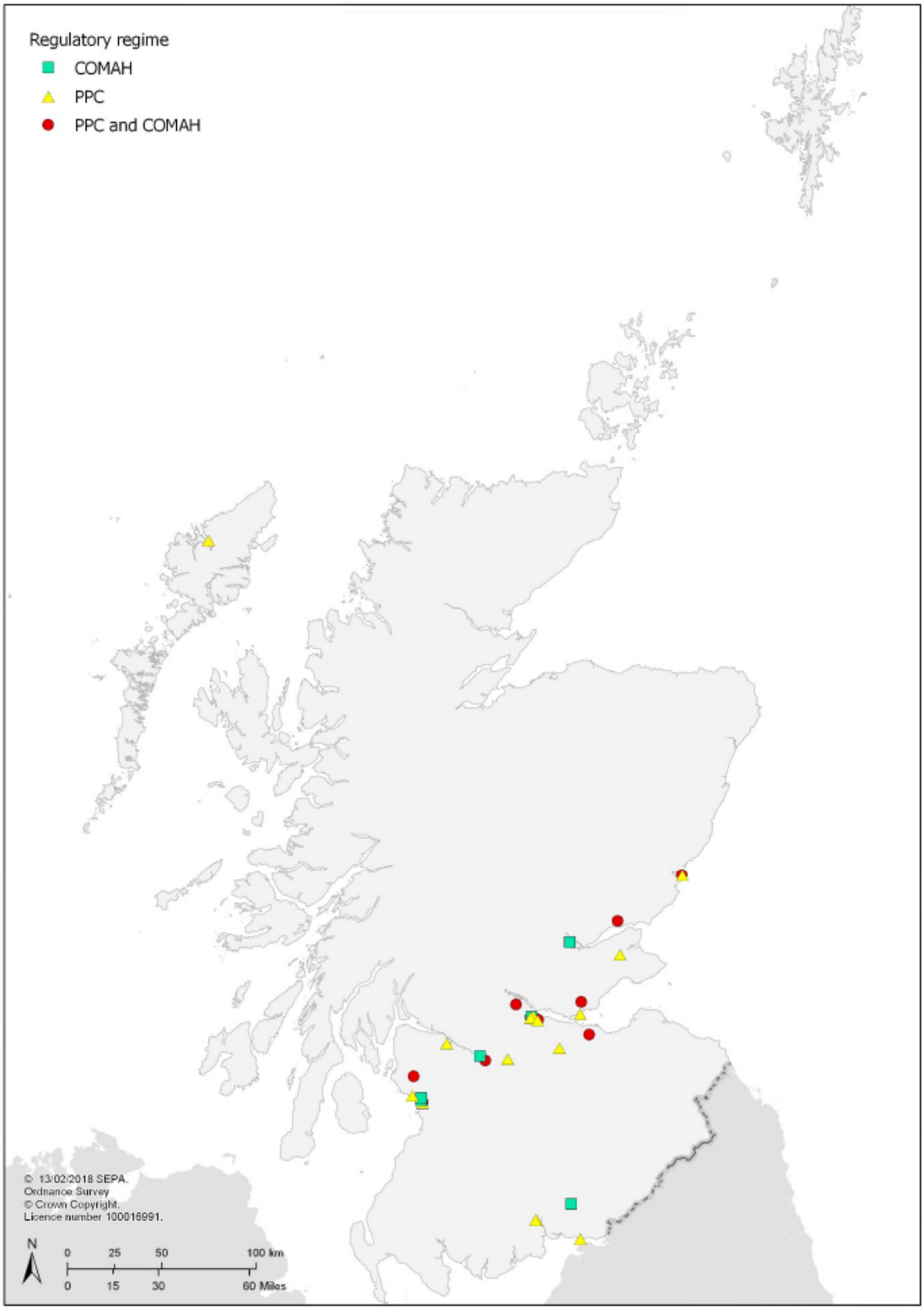
The majority of regulated chemicals manufacturing sites are located in the central belt and on the west and east coasts of Scotland. Chemicals Science Scotland has a strategic focus on developing cluster locations where collaborative R&D, skills and circular economy opportunities can be maximised[13]. Opportunities for the sector will arise from embracing innovation and sustainable methods, the link between industry and academia is a critical aspect in realising these. Academia in Scotland is well placed to support industry with significant specialisms around chemical and biological sciences research[14,15].

The movement of product across the chemicals manufacturing chain can be complex, with chemicals at different stages in the production process moving between parts of a site, to storage areas, to different sites, different operators, toll manufacturers and potentially back to the originating site. This chain can span significant distances and various countries before the final product reaches the point of sale. There is a movement towards more integrated supply chains, with operators completing more steps in the manufacturing chain on one site. No matter how simplified this process, there will still be a flow of resources through operations.

As with transportation, packaging is present throughout the production process and as part of the final product for sale.

[13] Strategic Plan 2025, Chemical Science Scotland, March 2018
[14] Life and Chemical Sciences Manufacturing Strategy for Scotland, Life Sciences in Scotland & Chemical Sciences Scotland, September 2015
[15] Life Sciences Strategy for Scotland 2025 Vision, Accelerating Growth, Driving Innovation, Life Sciences in Scotland, 2017

Regulated chemicals manufacturing sites in Scotland (Figure 4)



4. Environmental impacts and how we manage them

Environmental impacts throughout the supply chain

Environmental impacts (Figure 5)

Manufacturing operations

- Impacts on air, water quality and land from:
  - potentially complex emissions during, and after, manufacturing;
  - accidental pollutant release.
- Waste and by-product material.
- Greenhouse gas emissions from manufacturing operations.
- Greenhouse gas emissions from electricity and heat production.
- Impacts on local communities including odour, noise, vibration and light.
- Emissions, noise, light pollution and loss of resources from flaring.
- Impacts on water quantity and ecology from abstractions for operations, including cooling.
- Increased water temperature downstream of cooling water discharges.
- Land and groundwater contamination issues from legacy sites.

Storage and distribution of intermediates

- Impacts on air, water quality and land from:
  - emissions during transfer operations;
  - accidental pollutant release.
- Odour and noise.
- Greenhouse gas and other emissions during distribution.
- Single use packaging – quantity and leakage.

Formulation and packaging operations

- Impacts on air, water quality and land from:
  - potentially complex emissions during formulation and packaging operations;
  - accidental pollutant release.
- Greenhouse gas emissions.
- Single use packaging – quantity and leakage.

Storage and distribution of final product

- Impacts on air, water quality and land from:
  - emissions during transfer operations;
  - accidental pollutant release.
- Odour and noise.
- Greenhouse gas and other emissions during distribution.
- Single use packaging – quantity and leakage.

Consultation question 6:

Do you think we have identified the main environmental impacts across the supply chain? Are there any other impacts that concern you that are not included?

Environmental regulation of the chemicals manufacturing sector

Around 80% of environmental legislation in Scotland originates from the European Union. As the UK leaves the EU, 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.

Large sites that manufacture chemicals by chemical or biological means are regulated under the Pollution Prevention and Control (Scotland) Regulations 2012 (PPC Regulations). Under the PPC regulations, SEPA currently regulates some industrial activities that may impact the environment at thirty sites within this sector. Permits set strict conditions for the site to adhere to, to prevent or reduce the impact on the environment. Sites regulated under this regime are required to utilise 'best available techniques', for which mandatory emission levels are set in Best Available Technique Reference Documents, developed under the EU Industrial Emissions Directive (2010/75/EU), as well as to reduce resource consumption by continuing to improve their processes through innovation and efficiencies. SEPA undertakes regular inspections of permitted sites and reviews data returns to check compliance of a site. Submitted data relates to resource use, waste arising, emissions to air, noise and vibration assessments, any relevant monitoring results, and water discharge information and are received by SEPA at a specified frequency. Any incidents that occur should be reported to SEPA in a timely manner to allow appropriate action to be taken. Operators of PPC installations are also required to report mass releases of specific pollutants to air, water and land, and off-site transfers of waste to fulfil European reporting requirements.

Manufacturers of chemicals may be regulated under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) for the abstraction of water from, and the discharge of effluent to, the water environment.

Due to the hazardous nature of many chemicals, some sites (depending on quantities held on site) fall under the Control of Major Accident Hazards Regulations 2015 (COMAH), which transpose the EU Seveso III Directive (2012/18/EU). The operators of these sites must take all measures necessary to prevent major accidents and to limit their consequences for human health and the environment. There are twenty sites regulated under COMAH in the Chemicals Manufacturing Sector. COMAH Establishments within the sector located in Scotland are jointly regulated by the Health and Safety Executive (HSE) and SEPA. In addition to carrying out routine regular inspections under both PPC and COMAH, SEPA has a duty to carry out investigations into incidents under both regulatory regimes. SEPA focus on the environmental aspects of incidents although there is often an overlap with safety aspects considered under COMAH by the HSE.

Chemicals manufacturing sites may also be regulated under a number of other environmental regulations including the EU Emissions Trading Scheme, Energy Savings Opportunity Scheme (ESOS), the regulation of radioactive substances activities under the Environmental Authorisations (Scotland) Regulations 2018 and Regulations for Fluorinated greenhouse gases and ozone-depleting substances. SEPA undertakes regular audits at sites within the sector under these regulations to achieve outcomes in reducing climate impacts and protecting communities.

More generally, the marketing and use of chemicals is currently regulated by Regulation (EC) No 1907/2006 on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH). This legislation requires suppliers or importers of chemicals (the 'registrant') to ensure their safe use with respect to human health (workers and consumers) and the environment throughout the supply chain. The registrant must assess all potential risks in their chemicals' supply chains and disseminate safety information to downstream users in the supply chain. Some chemicals, identified as "substances of very high concern" under REACH, are subject to more stringent conditions on their marketing and use because of their higher level of hazard for humans and/or the environment. SEPA hold enforcement powers that may be exercised to check operators are using the correct measures to prevent the release of such chemicals.

The carriage of dangerous goods by road or rail is regulated by the HSE, and covered by the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2014 (CDG), which aim to protect anyone that might be directly (or inadvertently) involved with the movement of hazardous substances.

The majority of intermediates, along with some final packaging, is covered by the Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures (CLP Regulations). This seeks to ensure the safe use and supply of chemicals and covers aspects from labelling, through the safe packaging of chemicals and products. Waste packaging requires to be assessed to determine if there are any remaining hazardous components.

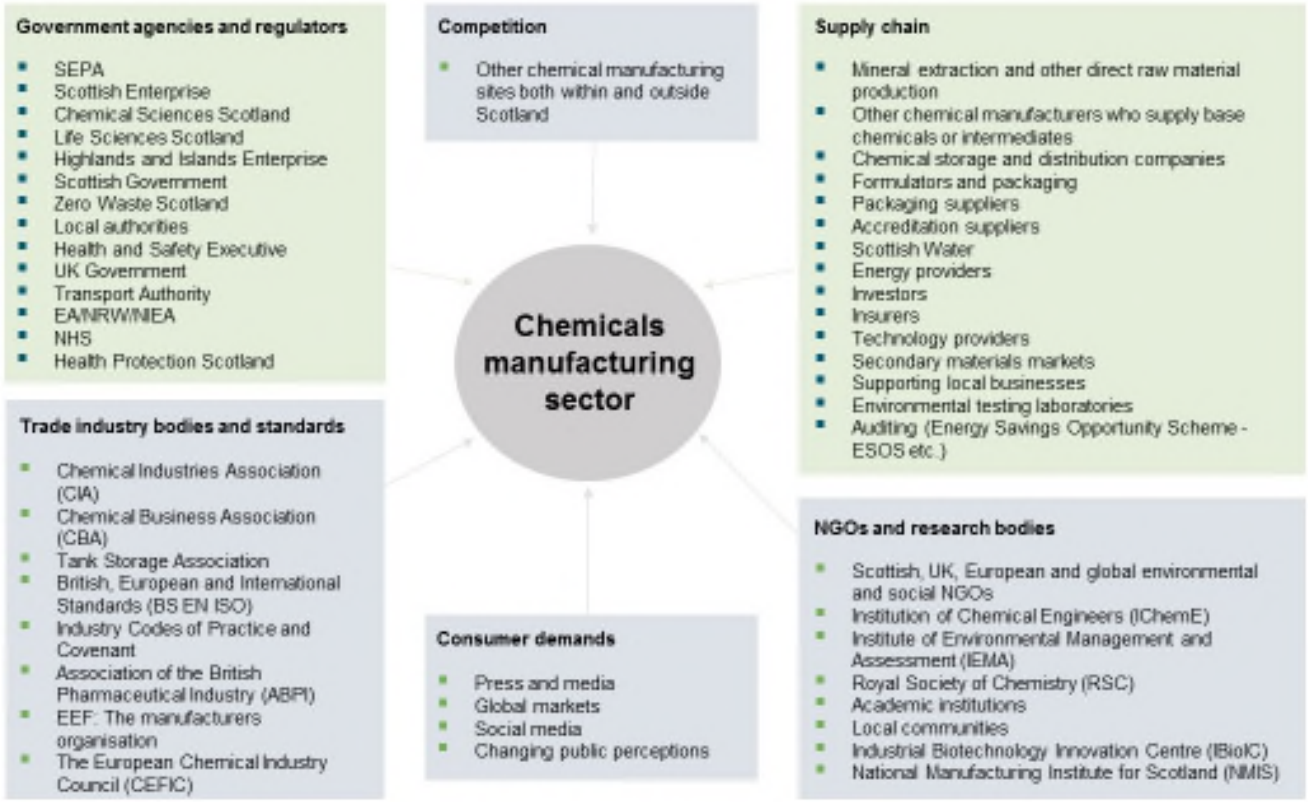
Under The Producer Responsibility Obligations (Packaging Waste) Regulations 2007, an obligated company is defined as a producer (i.e. companies who have a turnover of more than £2 million and have handled packaging materials weighing more than 50 tonnes in a year). They have an obligation to register with SEPA and to fulfil prescribed recovery and recycling targets. This is a market driven system to encourage minimisation of packaging waste as well as increased recycling where the producers take financial or physical responsibility.

Wider influences on environmental performance of the chemicals manufacturing sector

Full compliance with environmental regulations will not, by itself, deliver the transformational change required to secure our One Planet Prosperity objectives. The Chemicals Manufacturing Sector Plan needs to unlock the potential for businesses to gain 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 secure full compliance and to help as many businesses as possible to move beyond compliance.

Working with the sector, we will place this more sophisticated way of operating at the heart of our work. Figure 6 summarises the main organisations that influence and are influenced by operators in the chemicals manufacturing 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 chemicals manufacturing sector (Figure 6)



Consultation question 7:

These are the proposed key partners and influences that we have identified who may be able to help us achieve our outcomes, do you think we have missed anyone critical? Are there any other partners and influences that you think should be included?

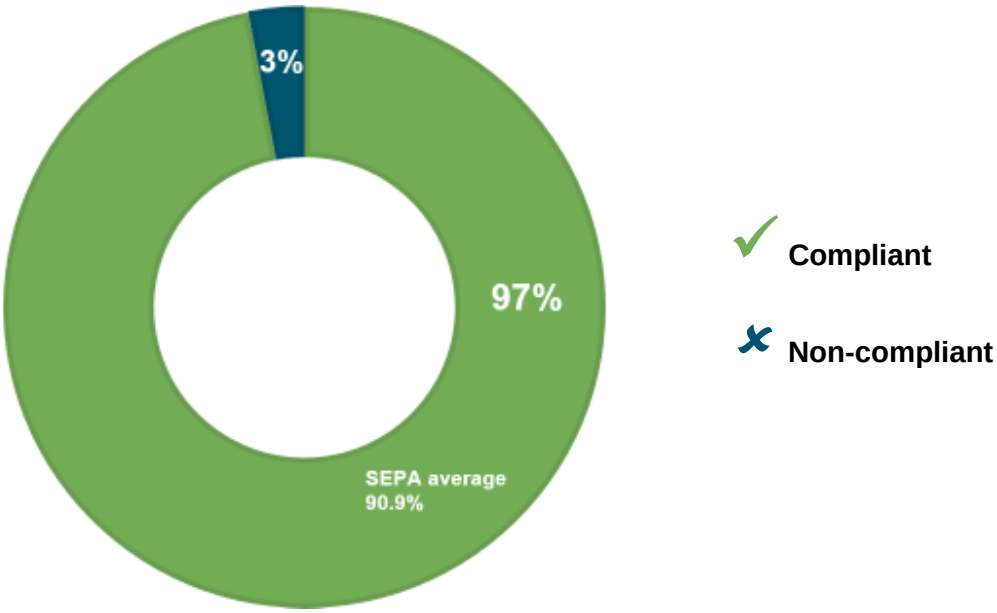
5. Tackling non-compliance and taking opportunities to go beyond

Compliance in the sector

Compliance[16] with environmental law is non-negotiable and regulated businesses in the sector need to comply.

Sites permitted under the PPC Regulations are assessed for compliance with the requirements of their permit. A site that is rated as compliant overall may still have some individual aspects that are not fully compliant and may not be compliant with other environmental legislation. The chemicals manufacturing sector has a generally excellent compliance record, 97% of sites permitted under the PPC regulations were assessed as compliant in 2017, with 59% of sites achieving an 'excellent' compliance rating. This is a reduction in compliance from 2016, when 100% of sites were assessed as compliant.

Sector compliance (Figure 7)



Key issues contributing to non-compliance

Non-compliance in 2017 was due to noise issues associated with unplanned flaring events, and associated operation and maintenance of plant due to noise and vibration issues.

Other non-compliance issues that prevent sites achieving an 'excellent' compliance rating include:

- impacts associated with operations including fugitive emissions, noise, vibration and odour;

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

- the accuracy and timeliness of reporting to SEPA, including environmental events, material use or emissions data;
- the identification of effective resource efficiency options.

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.

Although the sector is generally compliant, due to the nature of operations, potential impacts of any compliance issues are significant. To remedy ongoing compliance issues, SEPA will:

- where possible, clarify regulatory requirements where these are unclear to either industry or communities;
- review data return requirements in permits to ensure that they provide value and explore the option for the efficient return of data;
- continue to take action in partnership with operators to reduce emissions that may cause harm to the local community;
- increase scrutiny, prescription, fees and the use of enforcement and monetary penalties for those who fail to comply.

Consultation questions 8 and 9:

Have we identified all of the compliance issues? If not, what issues have we not identified?

Are these the right actions to tackle these issues? If not, what actions do you consider need to be taken?

Where 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.

Materials

The most successful organisations in the future will be resource efficient and minimise waste production. This will allow value extracted from materials to be maximised, while retaining a focus on minimising associated environmental harms. Chemicals manufacturing in Scotland is a diverse sector, incorporating a wide range of organic and inorganic raw materials. This allows significant potential for the sector to innovate to facilitate the successful use of secondary materials and realise the benefits of resource efficiency.

The sector is already embracing efficiencies from economic and environmental perspectives and recognises the potential benefits of a circular economy[17]. Increasing competition for materials of increasing scarcity will likely serve to embed further efficiency gains across the supply chain.

SEPA's aspirations are to:

- support transition towards sustainable (green) chemistry by encouraging innovation and sustainable technologies at early stages of product development;
- work with the sector to identify innovative opportunities to substitute virgin raw materials with secondary materials and pilot new technologies and techniques to help move towards circularity;
- continue to support the manufacture of chemicals from wastes and by-products and help emerging businesses develop in ways that ensure a high level of environmental protection;
- link in with partner organisations to ensure that there are clear and simple routes to gaining advice on resource efficiency and innovation;
- work collaboratively across SEPA and with partner organisations to tackle the environmental impacts around plastic manufacture, and use of plastic in the chemicals manufacturing supply chain;
- continue to identify opportunities to mitigate the risk from legacy land and groundwater contamination issues whilst ensuring a high level of protection for soil and groundwater.

[17] www.cia.org.uk/Portals/0/Documents/Policy%20Position%20Statements/Waste%20and%20the%20Circular%20Economy%20March%202018.pdf?ver=2018-04-10-112437-823

Energy, transport and air quality

Chemical manufacturing can be energy intensive; in 2015, the UK chemicals sector consumed 2.2% of total UK energy and 11.9% of total manufacturing energy[18]. However, energy consumption in the UK sector has reportedly dropped by 35% with a reduction of greenhouse gases of 70% over the past 20 years[19]. Scotland has an ambitious approach to energy policy that aims to deliver energy security, an integrated and localised approach to energy production, transport and use, and decarbonisation of the energy system by 2050. Ongoing increases in energy efficiency and divestment from carbon-based fuels will be required to achieve this target. SEPA, a delivery agency for the Scottish Energy Strategy, can work in partnership with, and support, Scottish businesses in maximising their sustainable economic opportunities.

Energy, transport and air quality are intrinsically linked; energy use and air quality in the sector is not limited to manufacturing activities alone. The transportation of materials throughout the supply chain is also considered within this sector plan.

We can use our regulatory tools, experience, knowledge and partnership approach to help to influence decision-making regarding electricity and heat production, transmission, storage and use at chemicals manufacturing sites. By setting out key areas for improvement within our sector plans we can help business move beyond compliance and assist in delivering the aims of the Scottish Energy Strategy.

SEPA's aspirations are to:

- work with partner organisations and the sector to identify and implement energy efficiency, low carbon energy solutions and associated opportunities to reduce carbon dioxide emissions. This could be through, for example, proactive regulation of Climate Change agreements, ESOS and PPC;
- support the research, development, and commercialisation of new clean technologies. To work with businesses that are piloting innovative and new approaches to help drive energy efficiency and greenhouse gas emission reductions;
- work in partnership with the sector and relevant organisations to help reduce impacts from transport across the sector. This may include working with other public agencies to target fuel consumption and emissions, for example through modified driver behaviour and promoting the use of vehicles with tighter emission standards and the use of biodiesel. Best practice can also be promoted, including maximising the efficiencies of journeys undertaken (for example, reducing empty truck miles, multiple transportation movements, effective vehicle routing).

[18] Sector Bulletin: Chemicals, EEF The manufacturers organisation in association with Santander, January 2018
[19] The chemical industry: delivering a low carbon future 24 hours a day, Chemical Industries Association, 2015

Water

All businesses that we regulate in this sector use water. One of SEPA's key roles is to protect the water environment and we want to help as many businesses as possible to manage their water use through resource efficiency measures. This will help us to achieve our objectives set in the Scotland River Basin Management Plan which states that "Working together to secure the sustainable use of the water environment will help maximise the benefits a healthy water environment can bring for people and businesses. It will also help identify, and make use of, opportunities to contribute to our wider goals, including those for improved resilience to climate change, biodiversity, forestry, flood risk management, fisheries and sustainable land use"[20].

The chemicals manufacturing sector is reliant on a consistent, quality water supply for use in industrial processes. The water use requirements across the sector vary depending on the scale and processes involved but the sector is generally considered water intensive. Water use within the sector relates to process water, cooling water, generation of steam for heating, cleaning, and staff welfare. The sector also produces significant quantities of effluent, which is required to be discharged in a way that protects the water environment from potential harm. Operators within the sector may undertake water treatment on site and should be responsive to the management of leaks and spills.

The cost of using large quantities of water can be significant, and operators that abstract water hold CAR abstraction licences that allow the sustainable management of water resources. The water requirements for the sector are generally met from public water supply, or through boreholes (groundwater). Although Scotland is a water rich country, recent years have seen an increasing pressure on water resources and there is an increasing focus on ensuring the efficient use of water.

SEPA's aspirations are to:

- work with the sector and partner organisations to realise water efficiency opportunities;
- work with the sector to explore the possible alternative options for disposing of or extracting value from discharge effluents;
- work with the sector to prioritise chemicals based on transparent risk assessments, identify interventions to reduce the presence and impact of hazardous chemicals in the environment and support research into less hazardous alternatives;
- work with the sector and partner organisations to ensure the sector is resilient to climatic changes, especially around flood risk and water scarcity issues. SEPA is developing a Flood Strategy that 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 be made, strengthening opportunities for co-outcome delivery.

[20] The river basin management plan for the Scotland river basin district: 2015-2027, Natural Scotland, Dec 2015

Social responsibility

There is a focus on the consolidation of activities in chemicals and life sciences 'hub' locations across Scotland. This can have a real impact on communities living around these areas. SEPA has a statutory purpose to protect and improve the environment in ways that, as far as possible, create health and well-being benefits and sustainable economic growth. SEPA is focussed on ensuring that environmental regulations are applied to provide protection to the environment and human health from regulated industrial activities.

The chemicals manufacturing sector provides significant benefits to the Scottish economy and, wider, to modern day living. Chemicals influence all aspects of people's lives in the modern world, from the food and water that we consume to the things we buy and use. Most chemicals we use end up in the environment in some shape or form, and in turn may impact ecosystems and the services they provide, upon which we rely.

SEPA's aspirations are to:

- work with communities, industry and other stakeholders to understand concerns around operations in the chemicals manufacturing sector in order to identify a way of providing information that allows operations and impacts to be explained. This should extend to those areas that SEPA has regulatory responsibility for, as well as any areas that partner organisations have responsibility for, and should include indirect effects if possible. Working with partner organisations to ensure that appropriate information is accessible in a timely fashion;

- input into industry discussions around helping people make informed decisions around chemical use, whether this is through increased consumer information, life cycle assessment of products, general advice on the sustainable use of chemicals, or informative labelling. This will be through internal conversations with other SEPA sectors, and externally as opportunities arise;

- continue partnership working with NHS Highland, Scottish Water, Centre for Research on Waters and Expertise (CREW), Highlands and Islands Enterprise (HIE) and others to deliver the 'WISE List' project, which aims to reduce the impact of pharmaceuticals on the water environment. Once a further understanding of associated environmental impacts (for example, endocrine disruption, anti-microbial resistance) is gained, work to identify if the development of associated environmental standards and discharge licence conditions are relevant for these and other chemicals of emerging concern;

- work with stakeholders to ensure that identified hub locations are expanded in an environmentally and socially responsible way.

Consultation question 10:

The proposed aspirations identified in the sections above are our initial thoughts for how we could help the sector to go further. Do you think we have identified the right aspirations? If not, what aspirations do you think we should have?

What actions are we going to take?

The following table summarises the actions that we have described above to fix compliance in the sector and, working in partnership, to 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 internal discussions between now and March 2019.

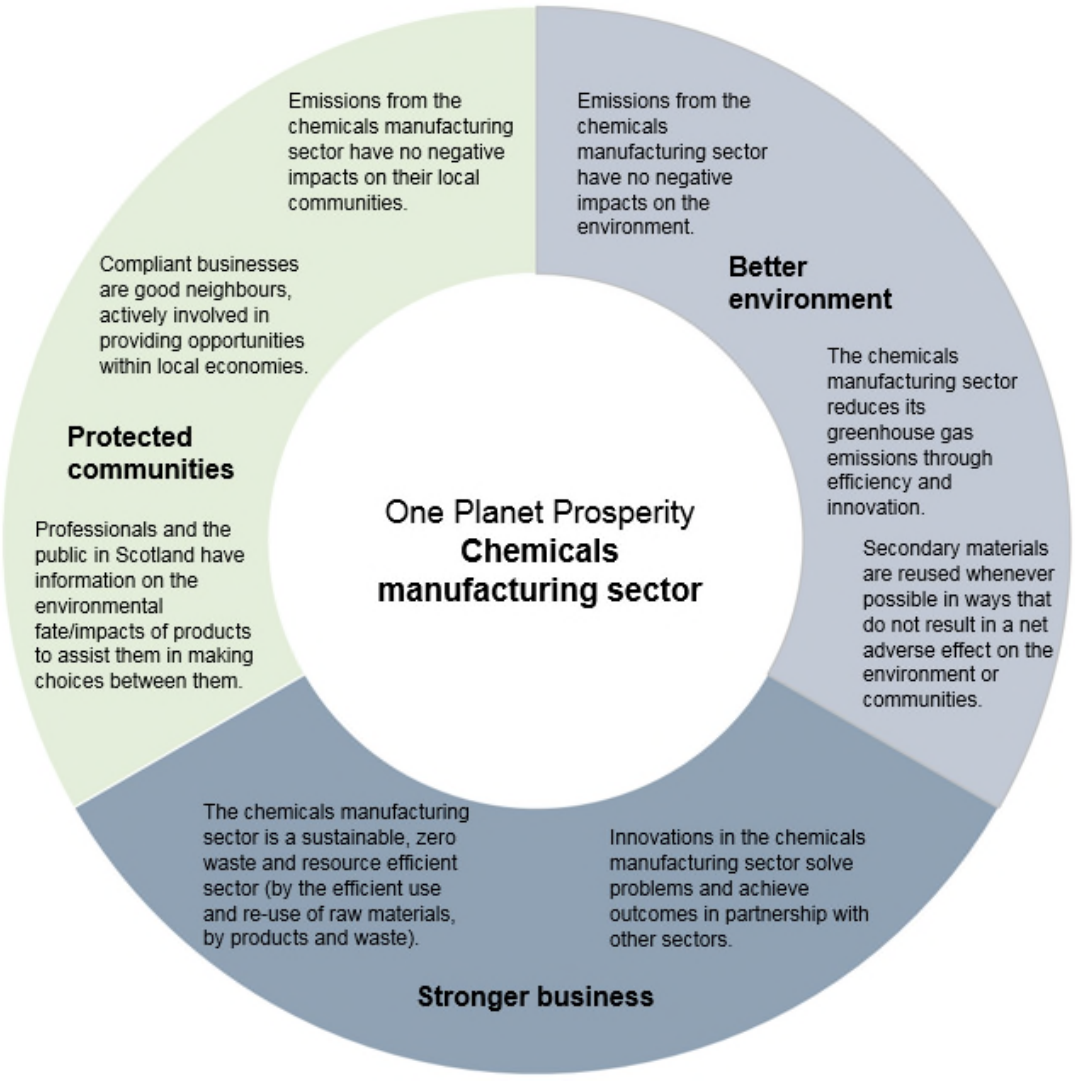
Outcome sought	Actions and aspirations
Better environment	
Emissions from the chemicals manufacturing sector have no negative impacts on the environment.	▪ To work collaboratively across SEPA and with partner organisations to tackle the environmental impacts around plastic manufacture and use of plastic in the chemicals manufacturing supply chain. ▪ Work with the sector to prioritise chemicals based on transparent risk assessments, identify interventions to reduce the presence and impact of hazardous chemicals in the environment and support research into less hazardous alternatives.
Secondary materials are reused whenever possible in ways that do not result in a net adverse effect on the environment or communities.	▪ Work with the sector to identify innovative opportunities to substitute virgin raw materials with secondary materials, find new uses for waste products, and pilot new technologies and techniques to help move towards circularity. ▪ Continue to support the manufacture of chemicals from wastes and by-products and help emerging businesses develop in ways that ensure a high level of environmental protection.
The chemicals manufacturing sector reduces their	▪ To work with partner organisations and the sector to identify and implement energy efficiency, low carbon energy

Outcome sought	Actions and aspirations
greenhouse gas emissions through efficiency and innovation.	solutions and associated opportunities to reduce carbon dioxide emissions. ▪ To support the research, development, and commercialisation of new clean technologies. To work with businesses that are piloting innovative and new approaches to help drive energy efficiency and greenhouse gas emission reductions. ▪ To work in partnership with the sector and relevant organisations to help reduce impacts from transport across the sector.
Protected communities	
Emissions from the chemicals manufacturing sector have no negative impacts on their local communities.	▪ Continue to identify opportunities to mitigate the risk from legacy land and groundwater contamination issues whilst ensuring a high level of protection for soil and groundwater. ▪ Work with stakeholders to ensure that identified hub locations are expanded in an environmentally and socially responsible way. ▪ Where possible, clarify regulatory requirements where these are unclear to either industry or communities. ▪ Review data return requirements in permits to ensure that they provide value and explore the option for the efficient return of data. ▪ Taking action in partnership with operators to reduce emissions that may cause harm to the local community. ▪ Increase scrutiny, prescription, fees and the use of enforcement and monetary penalties for those who fail to comply.
Compliant businesses are good neighbours, actively involved in providing opportunities within local economies.	▪ Work with communities, industry and other stakeholders to understand concerns around the chemicals manufacturing sector operations. Identify a way of providing timely information that allows operations and impacts to be explained.

Outcome sought	Actions and aspirations
Professionals and the public in Scotland have information on the environmental impacts of products to assist them in making choices between them.	▪ Input into discussions around helping people make informed decisions around chemical use, through internal conversations with other SEPA sectors, and externally with industry as opportunities arise. ▪ Continue partnership working to better understand environmental impacts, work to identify if the development of associated environmental standards and discharge licence conditions are relevant chemicals of emerging concern.
Stronger business	
The chemicals manufacturing sector is a sustainable, zero waste and resource efficient sector (by the efficient use and re-use of raw materials, by products and waste).	▪ Support transition towards sustainable (green) chemistry by encouraging innovation and sustainable technologies at early stages of product development. ▪ Linking in with partner organisations to ensure that there are clear and simple routes to gaining advice on resource efficiency and innovation. ▪ Work with the sector and partner organisations to realise water efficiency opportunities. ▪ Work with the sector to explore the possible alternative options for disposing of or extracting value from discharge effluents. ▪ Work with the sector and partner organisations to ensure the sector is resilient to climatic changes, especially around flood risk and water scarcity issues.
Innovations in the chemicals manufacturing sector solve problems and achieve outcomes in partnership with other sectors.	▪ Work with the chemicals manufacturing sector, other SEPA sectors and partner organisations to drive innovation.

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 questions 11 and 12:

These are our proposed outcomes for the sector plan, do you think there are any other outcomes we should consider?

Do you think the proposed actions and aspirations in the previous section will help us achieve these outcomes?

For information on accessing this document in an alternative format or language please either contact SEPA by telephone on 03000 99 66 99 or by email to **equalities@sepa.org.uk**

If you are a user of British Sign Language (BSL) the Contact Scotland BSL service gives you access to an online interpreter enabling you to communicate with us using sign language.

http://contactscotland-bsl.org/

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

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