

Authors:
John Ford (2115200),

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Circular Economy and Global Innovation

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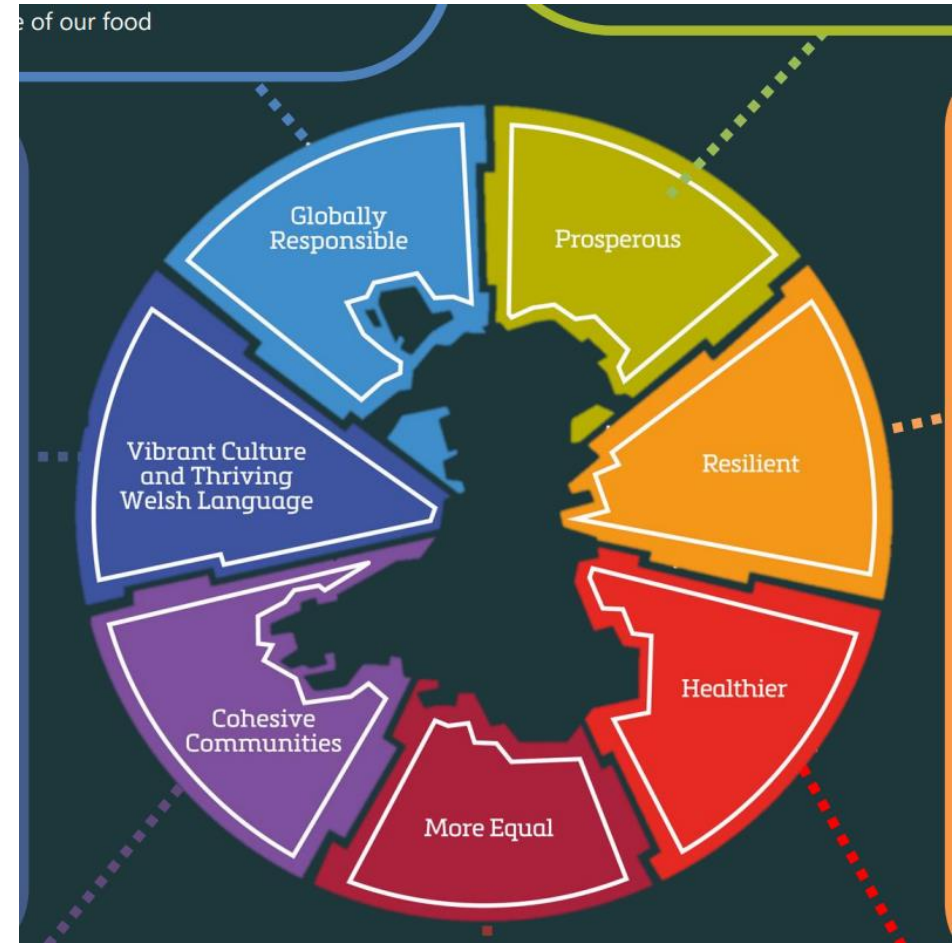


Image courtesy of Welsh Gov. (Welsh Circular Economy ¹)

Who We Are

Cymru Manufacturing Solutions Wales : Products for a global economy



What We Do

Cymru Manufacturing Solutions Wales : Products for a global economy

HQ



Supplying customers in the...



Aerospace



Automotive



Medical Devices

... sectors

What Are Our Aims

Cymru Manufacturing Solutions Wales : Products for a global economy

HQ



Strategic goals



Use a more 'circular economy' approach to manufacturing



Look to establish a more global footprint, both for in-country manufacturing as well as develop new customer base



Take advantage of Governmental innovation grants across the globe

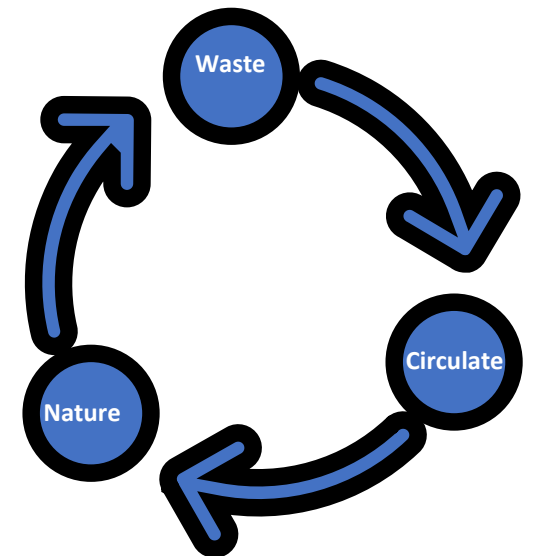
Build New Products in
New Places

The Circular Economy



“Current patterns of production and consumption drive the emerging environmental crises of resource scarcity and waste overload” – Velenturf et al 2018

UK economy is overly reliant on these linear practices



The Circular Economy



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UK economy is overly reliant on these linear practices

The Circular Economy – decouples economic activity from linear resource consumption; reduces and utilises waste (Ellen Macarthur Foundation¹)



“The Circular Economy is a systems solution framework that tackles global challenges like climate change, biodiversity loss, waste, and pollution” – Ellen Macarthur Foundation¹

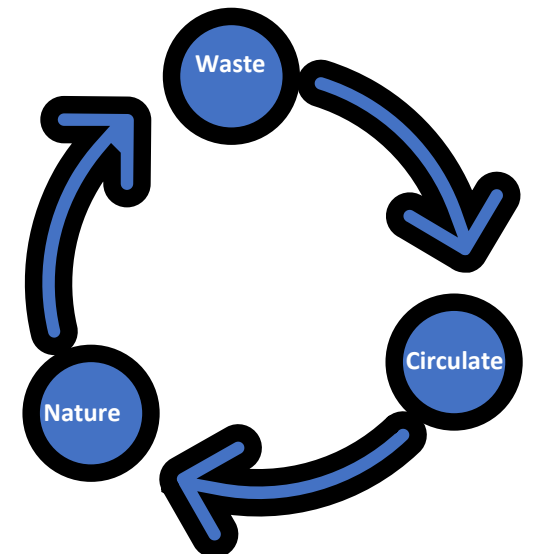
Eliminate waste and pollution



Circulate Products and materials



Regenerate Nature



The Circular Economy



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Circulate Products and materials



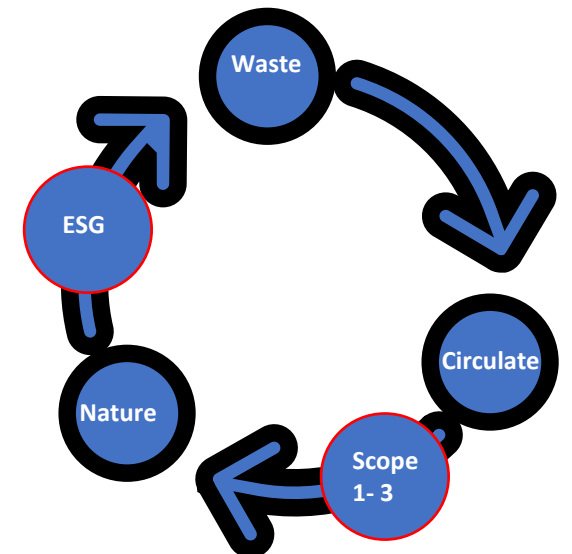
Regenerate Nature

Our additions

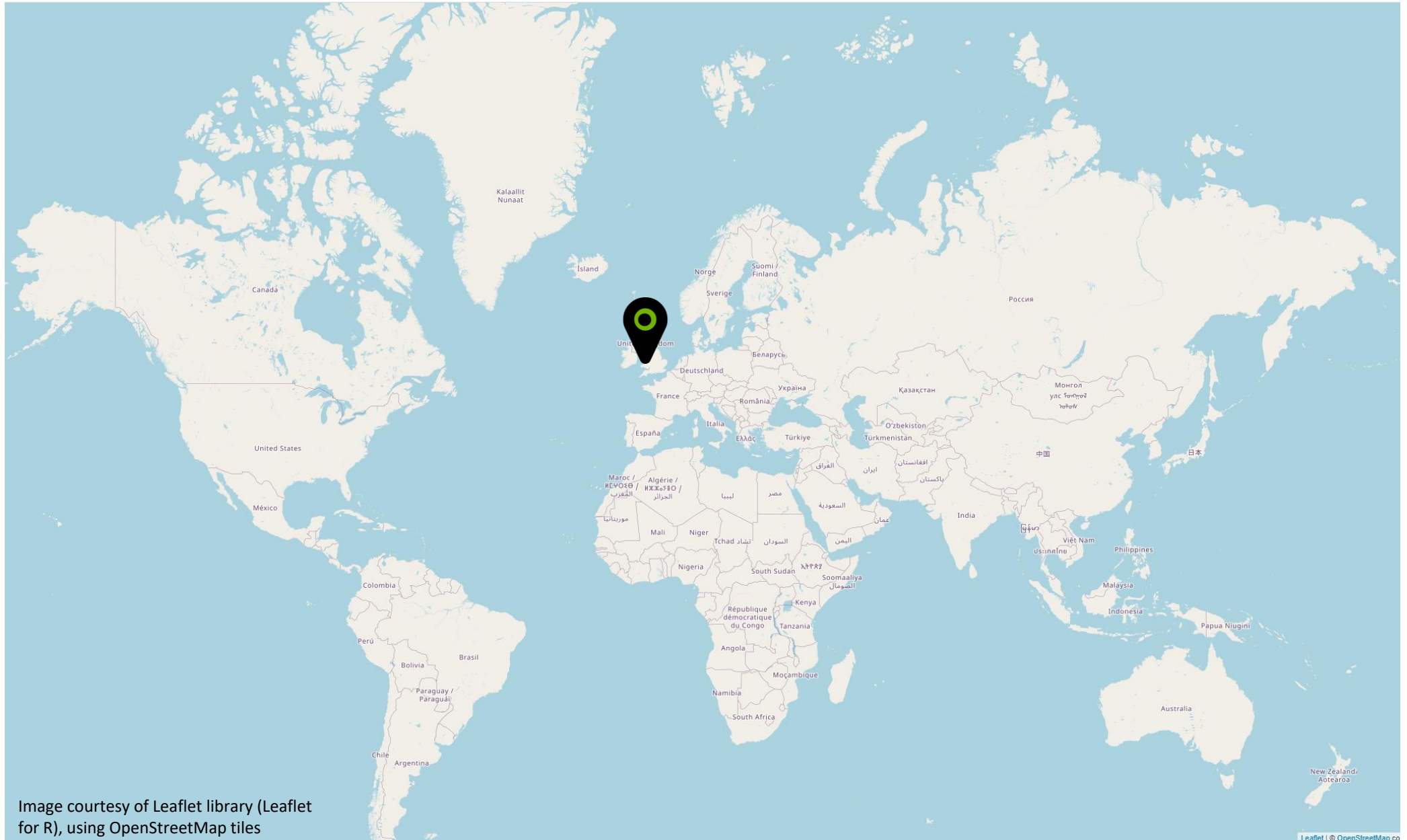
ESG policy compliant



Scope 1 – 3 emission recording



Circular Economy around the globe



Circular Economy: How Do We Fare?

Themes	Country			
	Wales	Northern Ireland	Scotland	England
INTEGRATING ECONOMIC WITH SOCIAL AND ENVIRONMENTAL VALUES				
<i>Radical change in economic theory and practice</i>	Yes	Partly	Partly	No
<i>Progress redefined to include social and environmental factors</i>	Yes	Yes	Partly	Partly
<i>Maximise environmental, social and economic value created from resources</i>	Yes	No	Partly	No
<i>Internalise or integrate environmental, social and economic metrics</i>	Partly	No	Partly	No
SUPPORTING SECONDARY RESOURCE MARKETS				
<i>Decoupling: consumption from economic growth; environmental, social and economic metrics</i>	Yes	Yes	Yes	No
<i>Keep materials in economy as long as possible</i>	Yes	Partly	Yes	Partly
<i>Incentivise/ regulate emerging secondary resource markets</i>	Yes	Yes	Yes	Yes
<i>From supplier-led to demand-led markets</i>	Yes	Partly	No	No
ENABLING INNOVATIONS				
<i><u>Business model innovation vs. business as usual with improved recycling technology</u></i>	Yes	Partly	Yes	Partly
<i><u>Material and product design including end-of-life options</u></i>	Yes	Yes	Yes	Yes
<i><u>Digitisation enabling recycling, but growing e-waste</u></i>	Partly	No	Yes	Partly
WHOLE SYSTEM APPROACH IDENTIFYING KEY INTERVENTION POINTS				
<i>Move away from end-of-pipe approaches and higher up the waste hierarchy</i>	Yes	Partly	Yes	Partly
<i>Decarbonisation+ has to include waste and resource management</i>	Yes	Partly	Yes	Partly
<i>Enable CE through (decentralised) waste infrastructure</i>	Yes	No	Yes	No
<i>Whole system approach but identify key intervention points for targeted action</i>	Yes	Yes	Yes	Partly
REALISE RADICAL CHANGE THROUGH ENGAGEMENT OF GOVERNMENT, INDUSTRY, ACADEMIA AND GENERAL PUBLIC				
	Yes	Partly	Partly	Partly

Table: Velenturf et al 2018



Promoted by national waste strategy “Towards Zero Waste”



Leading home nation – testament to Welsh Gov. push for innovation

Circular Economy: How Do We Fare?



Image courtesy of Welsh Gov. (Welsh Circular Economy ¹)

Current timeline



Timeline for delivery

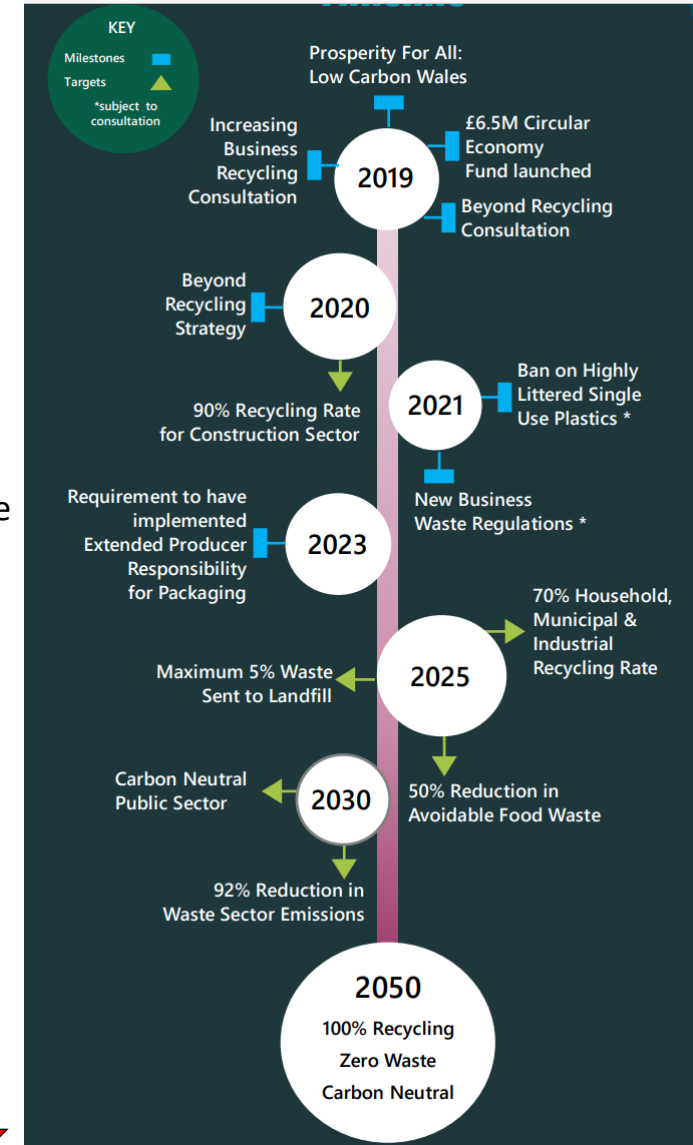


Image courtesy of Welsh Gov. (Welsh Circular Economy ²)

How Do We Drive Innovation?



Adoption of the Circular Economy itself necessitates innovation in terms of material use, design and business model. Application of the Circular Economy can be considered a 'disruptive Innovation'.



The Circular Economy as a domain is now well defined



New start-ups in this domain will be disruptive as many of the problems that exist within the circular economy are yet to be solved

Greg Satel's innovation matrix

How well is the problem defined?	Well	BREAKTHROUGH INNOVATION Mavericks Open innovation/prizes	SUSTAINING INNOVATION Roadmapping R&D labs
	Not well	BASIC RESEARCH Research division Academic partnerships	DISRUPTIVE INNOVATION ● Innovation labs Lean launchpads
		Not well	Well
		How well is the domain defined?	

How Do We Drive Innovation?



Adoption of the Circular Economy itself necessitates innovation in terms of material use, design and business model. Application of the Circular Economy can be considered a 'disruptive Innovation'.



Innovation requires Finance:



Innovate UK



Part of UK Research and Innovation

- Multi billion £ fund, annually accessible
- Provided by central UK government
- Part of the KTP (Knowledge Transfer Partnership) programme – connecting industry with academia.

How Do We Drive Innovation?



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Innovation requires Finance:



SMARTCymru, 2019



Regional grants for R&D in innovation

- Welsh Gov. support for SME's (~£10M annual turnover)
- Provide funding for R&D studies; e.g., equipment cost etc.
- Originally EU Grant funded, but now from Cardiff (via Westminster...)

What Does It Work In Wales?

Table derived from Worldwide Governance Indicators



Table from World bank GDP rankings

Gross domestic product 2021

Ranking	Economy	(millions of US dollars)
1	United States	23,315,081
2	China	17,734,063
3	Japan	4,940,878
4	Germany	4,259,935
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https://databankfiles.worldbank.org/public/ddpext_download/GDP.pdf

We are a Knowledge-Based economy, with a stable government

We have a high GDP and 1st world living status

What Does It Work In Wales?

Table derived from Worldwide Governance Indicators



Indicator

- ☒ (All)
- ☒ Voice and Accountability
- ☒ Political Stability and Absence of Viol...
- ☒ Government Effectiveness
- ☒ Regulatory Quality
- ☒ Rule of Law
- ☒ Control of Corruption

Year

(Multiple values) ▼

Color by:

Indicator ▼

Country

- ☐ ' High income: nonOECD
- ☒ ' High income: OECD
- ☐ ' Low income
- ☐ ' Lower middle income
- ☐ ' Upper middle income
- ☐ * East Asia & Pacific
- ☐ * Europe & Central Asia
- ☐ * Latin America & Caribbean
- ☐ * Middle East & North Africa
- ☐ * North America
- ☐ * South Asia
- ☐ * Sub-Saharan Africa
- ☐ Afghanistan
- ☐ Albania
- ☐ Algeria
- ☐ American Samoa



Culture is a significant controlling factor in driving innovation



In general, the UK is welcoming and promotes collaboration (KTP's are a great example of collaboration)



We are a 'rich', stable and multi-cultural society as well, which typically leads to better innovative solutions

We have the culture that drives and revels in innovation



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Circular Economy + Innovation around the globe

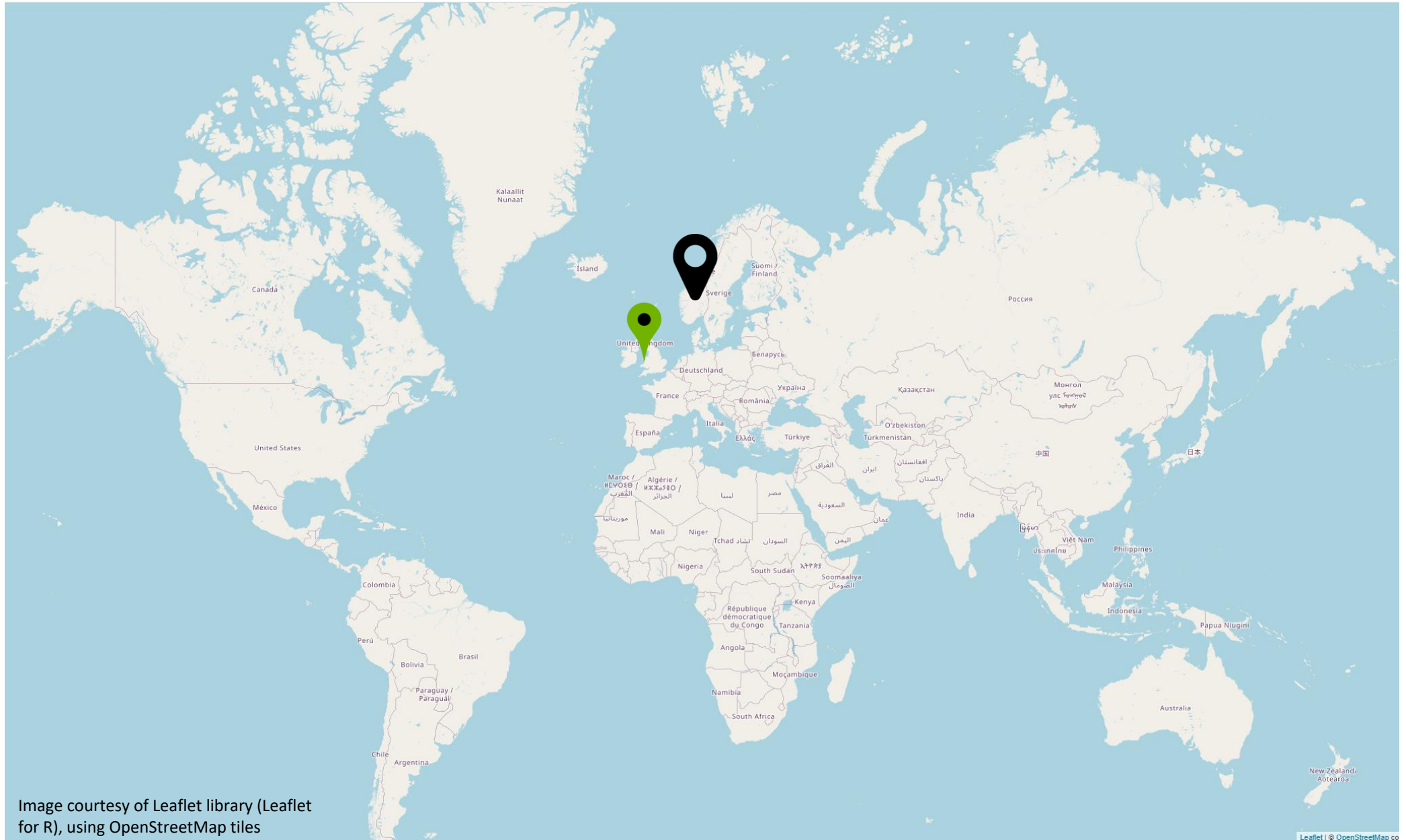


Image courtesy of Leaflet library (Leaflet for R), using OpenStreetMap tiles

What Does It Work In France?

Table derived from Worldwide Governance Indicators



Indicator

- ☒ (All)
- ☒ Voice and Accountability
- ☒ Political Stability and Absence of Violence/Terrorism
- ☒ Government Effectiveness
- ☒ Regulatory Quality
- ☒ Rule of Law
- ☒ Control of Corruption

Year

(Multiple values)

Color by:

Indicator

Country

- ☐ eSwatini
- ☐ Ethiopia
- ☐ Fiji
- ☐ Finland
- ☒ France
- ☐ French Guiana
- ☐ Gabon
- ☐ Gambia, The
- ☐ Georgia
- ☐ Germany
- ☐ Ghana
- ☐ Greece
- ☐ Greenland
- ☐ Grenada
- ☐ Guam
- ☐ Guatemala

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What Does It Work In France?

Policy measures that are a world first

The law has introduced a large number of measures, some of which are a world first, to shape the transition to a circular economy ⓘ. France is the first country to ban the destruction of unsold non-food products. Rather than landfill or incinerate unsold goods, companies will now have to reuse, donate or recycle ⓘ their unsold products.

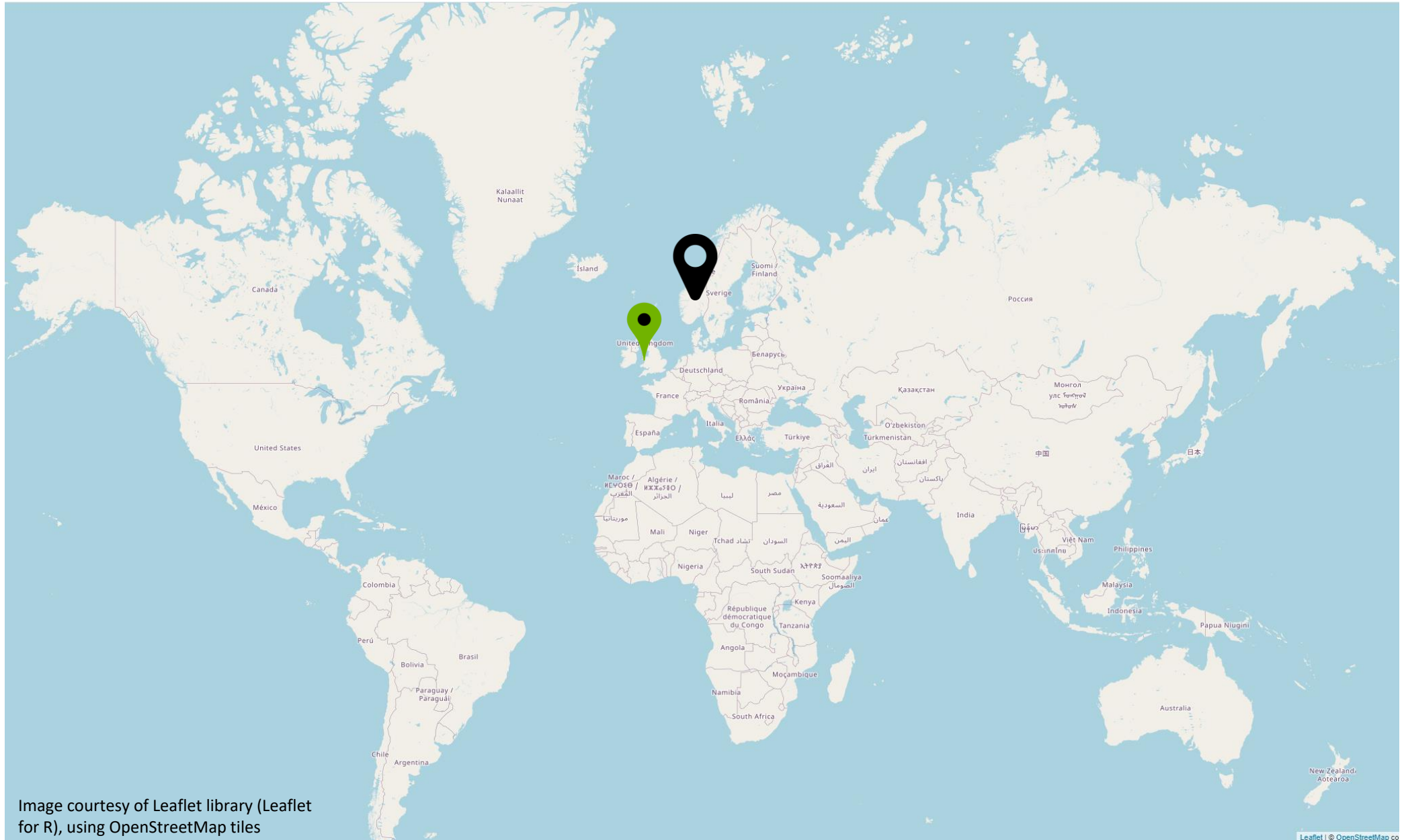
It is also the first country to introduce a mandatory repairability ⓘ index on electronic and electric products, such as smartphones, laptops, washing machines, and televisions. This measure aims to increase the proportion of products that get repaired, by making manufacturers consider repairability at the design stage and consumers aware of repair options when purchasing a device.

The law also aims to stimulate societal transformation, by creating new jobs and supporting the solidarity economy. By creating funds to foster the creation of 70,000 jobs in reuse networks and encouraging the donation of unsold goods to charitable organisations, France is also promoting circular solutions to support people living in precarious conditions.



Policy-first approach

Circular Economy + Innovation around the globe



What Does It Work In Norway?

Table derived from Worldwide Governance Indicators



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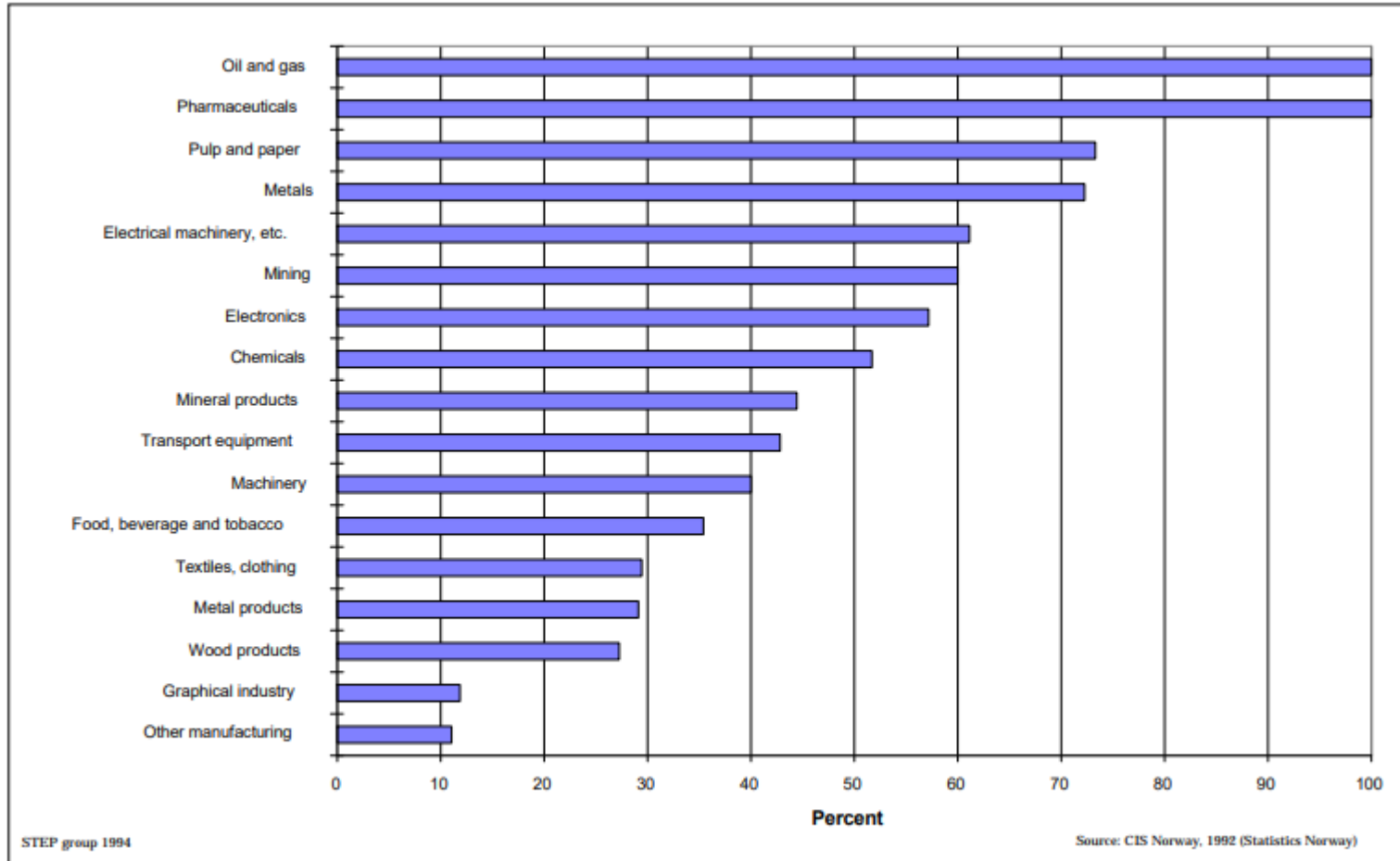
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What Does It Work In Norway?

Distribution of R&D spend In Norway (Smith *et al*, 1994)



Focussing on R&D in particular sectors –
Norway leaning on its Energy reserves

Typically collaborative – Industry and academia
working together

Circular Economy + Innovation around the globe

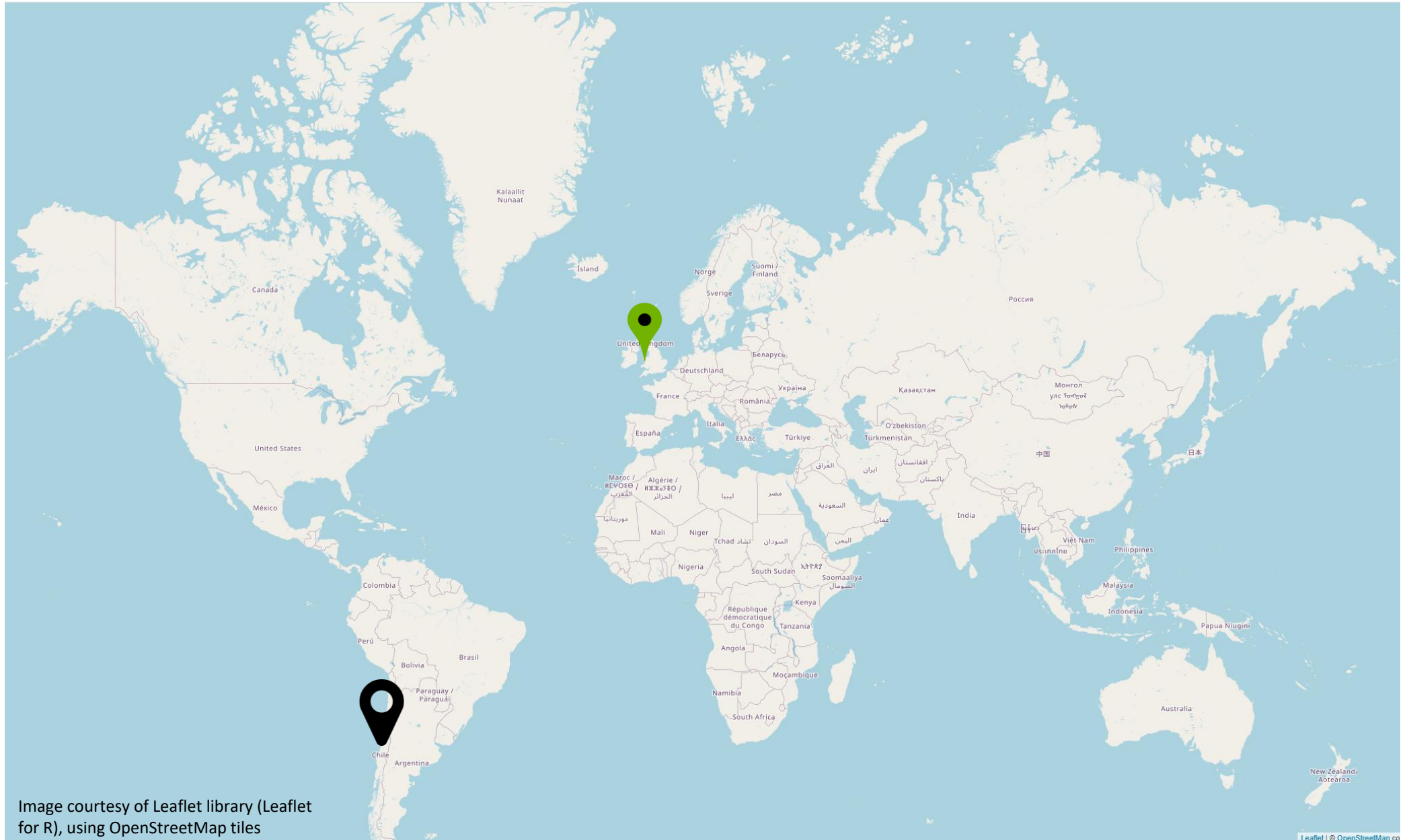


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What Does It Work In Chile?

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- ☒ Control of Corruption

Year

(Multiple values) ▼

Color by:

Indicator ▼

Country

- ☐ Cape Verde
- ☐ Cayman Islands
- ☐ Central African Republic
- ☐ Chad
- ☒ Chile
- ☐ China
- ☐ Colombia
- ☐ Comoros
- ☐ Congo, Dem. Rep.
- ☐ Congo, Rep.
- ☐ Cook Islands
- ☐ Costa Rica
- ☐ Côte d'Ivoire
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- ☐ Cuba
- ☐ Cyprus
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What Does It Work In Chile?

27 initiatives were crafted to achieve these goals, with actions and timescales for completion. These are grouped into four pillars:

- **Circular innovation** includes actions to create a robust national innovation system for a circular economy in Chile, by embedding circular design principles in the creation of products, services, and processes.
- **Circular culture** includes actions to make circular habits and practices the norm, through education and skills development, communications campaigns, and actions to strengthen transparency and monitoring.
- **Circular regulation** includes actions to adjust Chile's regulatory framework to support circular practices, by expanding the range of products subject to the extended producer responsibility scheme, promoting reuse and recovery of waste, and incentivising and facilitating waste separation at source.
- **Circular territories** includes actions to adapt to the different contexts and priorities of Chile's 16 regions, and distribute resources across the country, by providing waste management infrastructure, developing regenerative rural production, and growing secondary markets for local materials.

Ellen Macarthur Foundation³

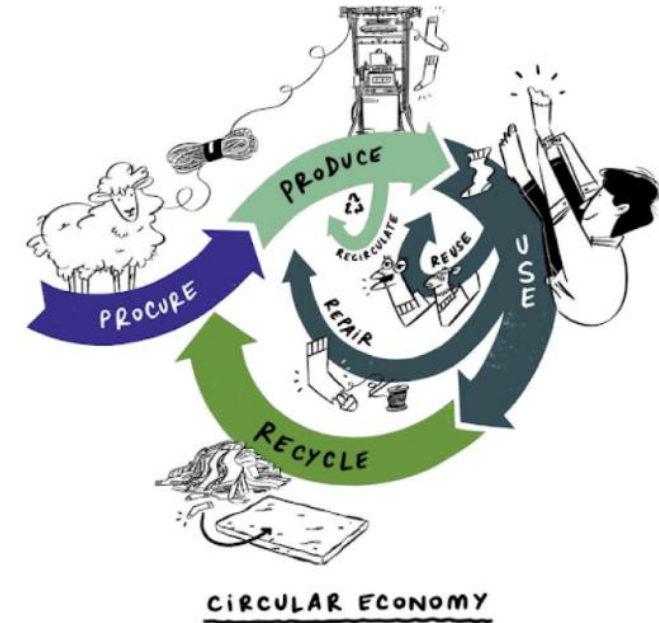


Illustration credit: Dilo con Monos | Source: Roadmap for a Circular Chile by 2040 Ellen Macarthur Foundation³



Chile looking more towards a regulatory framework to drive innovation and develop a circular economy by 2040 – Is this likely given their limited government stability?

Conclusions



Circular economy brings innovation and associated challenges



Wales is outperforming the rest of the UK for delivering on Circular economy pledges and driving innovation



Globally, innovation is being controlled through either industrial R&D or, in cases such as Chile and France, more from a Policy control



Ultimately, 1st world economies which benefit from stable government and a knowledge-based workforce provide the best grounding for innovation development. These societies also, commonly, foster a culture of innovation, where boundaries can be tested and new solutions developed.

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