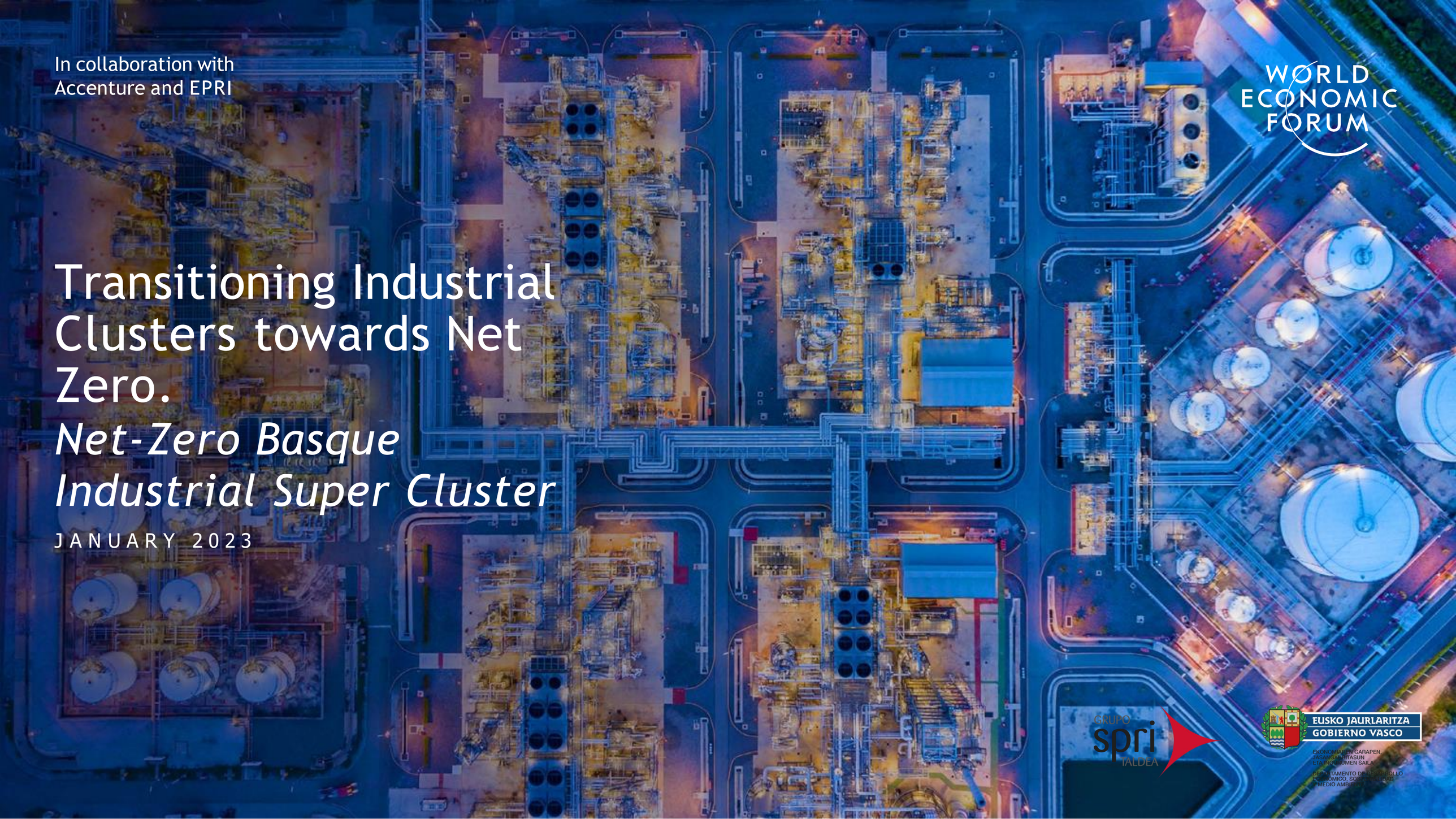
In collaboration with
Accenture and EPRI

WORLD ECONOMIC FORUM

Transitioning Industrial Clusters towards Net Zero.

Net-Zero Basque Industrial Super Cluster

JANUARY 2023



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Disclaimer
This document resumes the "Transitioning Industrial Clusters towards Net Zero" published by the World Economic Forum adding some specific information about the "Net-Zero Basque Industrial Super Cluster".

1 Introduction: from global Industrial Clusters initiative to Net-Zero Basque Industrial Super Cluster

Transitioning Industrial Clusters towards Net Zero initiative

The World Economic Forum and EPRI have launched a global initiative to support industrial clusters in their paths to net zero though a holistic approach, involving cross-industry stakeholders with a technology-neutral focus. With industry responsible for 30% of global CO2 emissions, industrial cluster will be a critical player in accelerating the path towards net zero.

Strategic technologies

No single technology or decarbonization lever will abate all industrial emissions – it is necessary that a spectrum of technology levers, applied within a holistic value approach, work in tandem to optimize emissions reduction measure an the resulting economic, social and environmental value.

Systemic efficiency and circularity	Direct electrification and renewable heat	Carbon capture, utilization and storage (CCUS)	Hydrogen
Increase circularity within a cluster through cross-entity waste use	Electrify low-to-medium temperature and pressure processes	Capture carbon from energy and hydrogen production as well as directly from industrial processes	Leverage electricity and heat from nearby zero-carbon sources (wind, solar, nuclear, biomass)
Integrate processes within a cluster to share energy and material streams	Generate low-cost, renewable electricity and heat onsite (e.g. rooftop solar, biomass, concentrated solar power)	Use captured carbon for industrial and manufacturing processes	Produce low-to-zero carbon hydrogen from the most economical source (e.g. blue, green)
Provide cost-effective system benefits outside the cluster	Pursue shared infrastructure (e.g. microgrid, storage, flexibility)	Store carbon underground where feasible	Use produced hydrogen as an alternative fuel for hard-to-electrify industrial processes, building heating and transport

System value framework

The Transitioning Industrial Clusters initiative leans on the World Economic Forum's (in collaboration with Accenture) system and framework. This methodology creates the means to holistically consider quantitative impact targets and outcomes, where priorities will vary by sociopolitical and geographic context.

Initiative signatory clusters

Under the "Transitioning Industrial Clusters" initiative, there are 13 signatory industrial clusters which joined before 15 November 2022 and they represent eight nations across North America, Europe and Asia Pacific.

Industrial Clusters Approach

The following pages describe Net-Zero Basque Industrial SuperCluster, one of the Transitioning Industrial Clusters.
The Net-Zero Basque Industrial SuperCluster has been developed in line with the Transitioning Industrial Cluster's initiative approach: balancing system value (primarily economic, social and environmental benefit) in a technology-neutral, collaborative format.

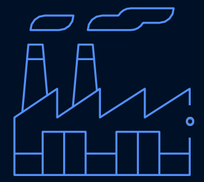
Aligned to the strategic development priorities of the initiative, the cluster is represented through its partnership, policy, financing and technology positioning.

Partnership profiles have been standardized through the lens of the *Fostering Effective Energy Transition: 2022 Edition* insight report's model for assessing net zero collaboration between customers and suppliers.

The federal policy enablement foundation has been used from the initiative's October 2022 *National Policy Enablement for Industrial Decarbonization* white paper.

The technology consideration model from Accenture in collaboration with the World Economic Forum's March 2021 *Achieving net-zero future with industrial clusters* report, which has been adopted as core to the initiative.

The Net-Zero Basque Industrial SuperClusters profile has been developed in close coordination with signatory clusters based on the current stage of their decarbonization journey and thus, available information.



417 Mt CO_2
abated emissions represented

2.59 million
direct/indirect jobs represented

$188 billion
GDP contribution represented

Initiative signatory clusters

Maturity status

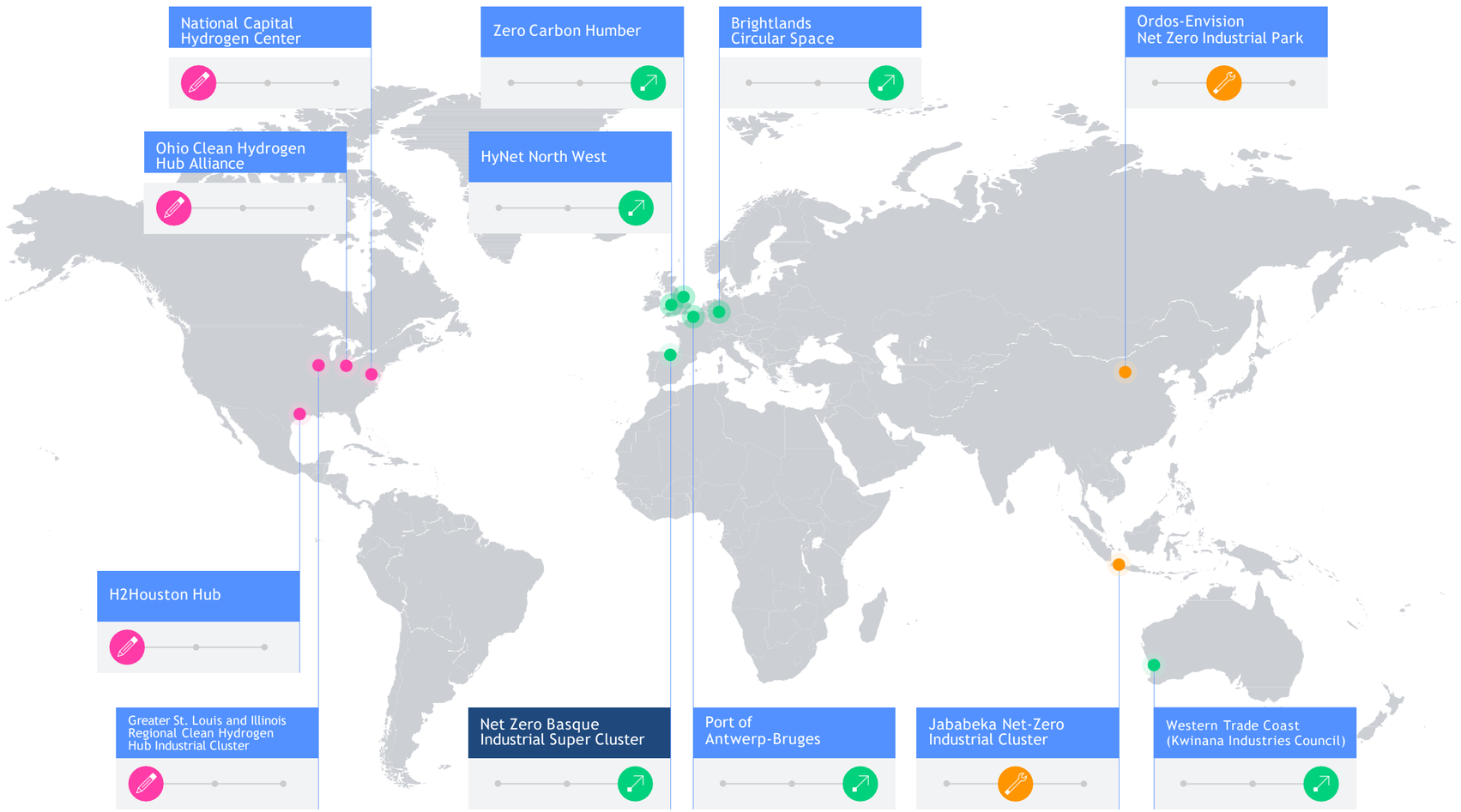
The development of the diverse clusters is different. Therefore, these industrial clusters have been categorized into three general maturity groups

Planning: Public announcement has been issued, but no collaborative physical asset improvements or construction has begun.

Developing: Collaborative physical asset improvements or construction has begun but is not yet facilitating decreased- or avoided-emissions operations.

Scaling: Decreased- or avoided-emissions operations are occurring as a result of clean technology integration through collaborative measures.

Maturity status



Net Zero Basque Industrial Super Cluster

Key highlights

Basque Country, Spain

The Net Zero Basque Industrial Super Cluster (NZBIS) initiative, launched in late 2021 at COP26, aims to accelerate the path to net zero emissions in Spain's Basque Country, fostering energy supply decarbonization and energy efficiency in the industrial sectors and creating market opportunities based on the scale-up of the new technologies and innovative services. This initiative has been launched by Basque Government (SPRI), with the two primary energy companies in the Basque Country, Iberdrola and Petronor-Repsol, and with the collaboration of the industrial cluster associations (representing stakeholders by industry: energy cluster, foundry cluster, iron and steel cluster, pulp and paper cluster and concrete cluster).

Status

Industries represented

- Cement
- Energy (hydrogen)
- Energy (oil and gas)
- Metals
- Power generation
- Pulp and paper

7.2 Mt CO_2

annual emissions (2019)

20,000-30,000

jobs created by 2030 (2-3% of jobs in 2021)

€2-3 billion

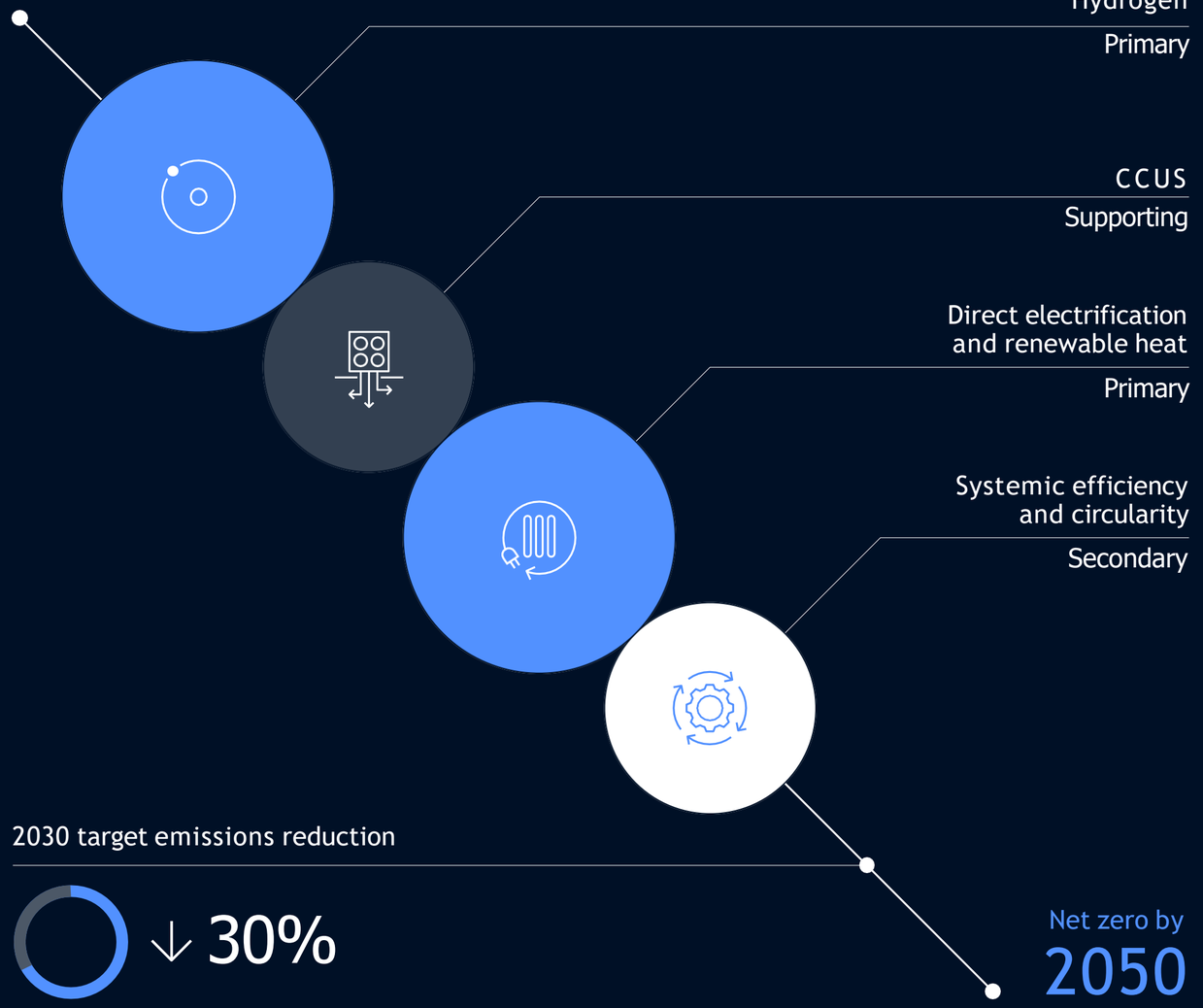
economic impact in 2030 (3%-5% of GDP in 2021)

Decarbonization roadmap

Current annual emissions (2019)

7.2 Mt CO_2

Impact on roadmap towards decarbonization



2 WEF Industrial Cluster approach

Industrial Clusters initiative mission and ambition

The Transitioning Industrial Clusters towards Net Zero initiative aims to build a community of one hundred industrial clusters, which balance economic, social and environmental impact through strong and expeditious support of developing clean energy markets and maturing decarbonization technologies.

Those 100 industrial clusters will represent 1.6 billion tonnes of CO_2 emissions per year or 15% of global CO_2 emissions. Through their decarbonization journey, these 100 clusters are expected to generate approximately 17 million jobs and contribute $2.5 trillion to the global GDP.

How the initiative teams with signatory and prospective industrial clusters

- Best practices exchange between clusters located in various regions
- Global recognition through initiative partners' and signatories' media outlets and initiative publications
- Opportunities to showcase progress and liaise with signatories through in-person community meetings
- Environmental justice support to build and execute strategies to holistically benefit region

Partnerships

- Partnership development models, resources and assets
- Facilitated workshops to develop global partnerships
- Connections to initiative's global network to develop balanced economic, environmental and social outcomes

Policy

- In-depth, country-specific policy and public funding analyses
- Roundtables with policy-makers and financial sector leaders
- Exchange of best practices and tools to build public-private engagement

Financing

- Country-specific financial analyses to catalyse funding opportunities and investment structure
- Experts' guidance on financing nascent technologies

Technology

- Technology expertise and provisioned support to develop an integrated technology strategy and roadmap
- Technology supply and demand matchmaking

Net Zero Basque Industrial Super Cluster Partnership

> The Net-Zero Basque Industrial Super Cluster aims to accelerate the path to Net-Zero Emissions in the Basque Country, fostering energy supply decarbonization and energy supply in the industrial sectors and creating market opportunities based in the scale up of new technologies and innovative services.
>
> Arantxa Tapia, Minister of Economic Development, Sustainability and Environment, Basque Government

> Basque energy companies are committed to the decarbonization of the economy, as well as of its own processes, through further electrification and the use of renewables and decarbonized fuels such as green hydrogen, based on technological neutrality and competitiveness
>
> Petronor-Repsol and Iberdrola, Basque Energy Companies

- The Basque region has a longstanding history of public-private collaboration and NZBIS's launch with the objective to support Basque economies in the long-term is a natural extension of this culture
- The name "Super Cluster" represents the participation of cross-sectoral industrials, government and community stakeholders and industrial cluster associations in NZBIS; the current composition of the governance model which brings this region together leans on three types of active industrial engagement to facilitate discussions and decision-making, represented as the strategic, executive and operating levels.
- This governance model's clear delineation of responsibilities allow different stakeholders to confidently own the dialogues between industrials, industry alliances and public entities in priority areas across levels. From the establishment of the cluster, these dialogues have anchored in international perspectives to consciously define and strengthen the strategic positioning of the cluster.

Energy transition index collaboration model

Collaboration type existing in cluster	Partner types	Partners
Shared infrastructure development		
Industrial cluster infrastructure planning	– Public authorities – Cross-industry peers	SPRI, Iberdrola, Petronor-Repsol, Basque industry associations
Shared commercial projects		
Cross-industry funding	– Public authorities – Financiers (public and private)	SPRI, Iberdrola, Petronor-Repsol
Knowledge sharing	– Public authorities – Cross-industry peers – Researchers	SPRI, Iberdrola, Petronor-Repsol, energy cluster, foundry cluster, iron and steel cluster, pulp and paper cluster and concrete cluster, EPRI
Reskilling the workforce		

Net Zero Basque Industrial Super Cluster Policy

- From its inception, NZBIS has worked to accelerate the cluster's collaboration-driven decarbonization strategy. In addition to regional, national and EU-level policies described here, the SPRI (Basque Government) continues to team with the partners to develop policies that creatively enable the cluster and other regional decarbonization initiatives.
- Regionally, the 2021 Basque Climate & Energy Transition Law (LTCCE) was passed to enforce and support public and private initiatives – like NZBIS – to achieve the region's target of climate neutrality by 2050.
- To leverage maximum public support, the cluster benefits from the support of several funding programmes at European, Spanish and Basque level, for Industrial strategic R&D projects and for knowledge acquisition by RTOs.
- SPRI and the Basque Government, through its Science, Technology, and Innovation Plan 2030 (PCTI 2030) and the Intelligent Industry Strategy, is committed to the implementation of digital technologies and considers the use of data analytics and digital technologies as one of the keys to decarbonizing energy consumption.
- These policies have laid the foundation, and seeded the funding, for the Basque Country and NZBIS to remain on track towards its net zero commitments and align with the European Green Deal and the Agenda of Objectives for Sustainable Development.

Systemic efficiency and circularity | Direct electrification and renewable heat | CCUS | Hydrogen

Enabling policies available

- The EU's Circular Economy Action Plan (CEAP)
- Develop a consumption system based on dynamic pricing.
- Energy Strategy of Euskadi 2030
- Develop a consumption system based on dynamic pricing; implementing a legal framework and eliminating bureaucratic barriers.
- €1.36 billion public investment towards the digitalization of the energy grid to meet future distribution requirements.
- €929 million public investment for agricultural machinery efficiency improvement.
- €3.9 billion public investment for industrial heat efficiency improvement.

How these policies are being leveraged

- €1.36 billion public investment towards the digitalization of the energy grid to meet future distribution requirements.
- €3.9 billion public investment for industrial heat efficiency improvement.
- Support programmes of the Basque Energy Agency for energy efficiency projects and investments in industrial plants.
- Exploring public funding opportunities to digitalize the grid, improve industrial heat efficiency, and support broader efficiency projects in the cluster's industrial plants.

Sources: EU Commission; Ministry for the Ecological Transition, Spanish government; Basque government

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Systemic efficiency and circularity

Direct electrification and renewable heat

CCUS

Hydrogen

Enabling policies available

- Estimated investments associated with electricity infrastructures foreseen for the decade are €4,554 million, with an average annyak investment volumen of €759million.
- Developing legal framework to encourage use of energy storage.
- National strategy oversees and rewards individual´s and corporation´s energy consumption and introduction of renewable self-consumption systems in public buildings.
- Promote high-efficiency cogeneration of electricity that aims for a total a 1,200 MW.

How these policies are being leveraged

- Exploring EU and National funding opportunities promoting high-Efficiency cogeneration of electricity and infrastructure.

Sources: EU Commission; Ministry for the Ecological Transition, Spanish government; Basque government

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Systemic efficiency and circularity

Direct electrification and renewable heat

CCUS

Hydrogen

Enabling policies available

- EU Hydrogen Strategy.
- Regulatory framework, aid and tax Benefit programmes focused on supporting alternative fuel implementation that will enable the following goals.
- "Hydrogen Roadmap" released by the Spanish Government.
- Basque Hydrogen Strategy.

How these policies are being leveraged

- Exploring opportunities to support the production of 100% renewable hydrogen and infrastructure for its use and storage, as well as R&D funding for hydrogen initiatives.

Sources: EU Commission; Ministry for the Ecological Transition, Spanish government; Basque government

Net Zero Basque Industrial Super Cluster Financing

- Financing and policy for NZBIS have stayed closely tied since seed funding was provided as a public initiative led by SPRI (Basque Government). SPRI has taken a driving role in facilitating the transition to private funding through the definition of new technology and collaborative pilots.
- With regional government positioned as an anchor within the industrial cluster, the larger regional landscape benefits greatly from initiatives of SPRI aimed directly to empower the cluster. The programmes with wide-reaching impact most notably include funding packages to support R&D and infrastructure deployment as well as operational technology and digital development.
- The technological focus of the cluster enables secure financing, both short-term and long-term. R&D funds from different European, national and regional sources are available for this purpose.
- Especially relevant R&D funds are the European programmes for the Recovery and Transformation of the Economy (PERTE), that were launched by the Spanish government to mobilize European funds to improve the Spanish position in the areas of energy transition, such as: renewable energies, power electronics, storage and renewable hydrogen.

Planned funding deployment by technology readiness level

Development stage	Technology readiness level	Funding allocation		
		Now	By 2025	By 2030
Research and development	Exploratory research transitioning basic science into laboratory applications	✓	✓	✓
	Technology concepts and/or application formulated	✓	✓	✓
	Proof-of-concept validation	✓	✓	✓
Pilot projects and early development	Subsystem or component validation in a laboratory environment to simulate service conditions	✓	✓	✓
	Early system validation demonstrated in a laboratory or limited field application	✓	✓	✓
	Early field demonstration and system refinements completed	✓	✓	✓
	Complete system demonstration in an operational environment	✓	✓	✓
At scale commercial deployment	Early commercial deployment	○	✓	✓
	Wide-scale commercial deployment	○	✓	✓

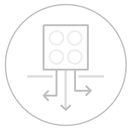
Net Zero Basque Industrial Super Cluster Technology

The NZBIS initiative aims at developing a robust, innovative industrial landscape where technology innovations serve as key driver of the energy transition and decarbonization. To do so, NZBIS will act as enabling mechanism by prioritizing those technologies with potential to transform the Basque industries not only by looking at the decarbonization profile, but especially focusing on their capacity to activate the entire value chain within the region.

Selected technology initiative matrix

Systemic efficiency and circularity

Direct electrification and renewable heat



Carbon capture, utilization and storage (CCUS)

Hydrogen

- For the circularity of pulp and paper subsector, the recycling of side products will be promoted to valorize their use as materials or energy carriers.
- In the case of the steel subsector, the recycling of steel that can be processed directly through electric arc furnaces should be promoted, which implies further electrification of the industry.
- Replacement of fossil fuels by net zero emission fuels, such as, synthetic fuels, biogas and biofuels, with no investment for the user (use of efficient technologies in furnaces) in foundry, steel and cement subsectors.
- Energy efficiency and decarbonization of refining process will be carried out applying best available technologies and optimizing industrial processes, products and services, and work tools to increase global efficiency of the company.

Digital foundations of the cluster

In addition to the investment of corporations across the industry associations, the Net Zero Basque Industrial Super Cluster is investing in digital technologies that accelerate collaborative initiative prioritization and actions. Most notably, the BIDERATU project is developing a tool for modelling regional energy systems, especially focused on characterizing measures and solutions to decarbonize energy consumptions. This tool focuses in industrial sectors and processes, assessing the suitability of a selection of decarbonization strategies, their action plans, investments needs and business models.

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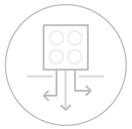

Carbon capture, utilization and storage (CCUS)

Hydrogen

- Electrifying the cement production processes through the replacement, where possible, of fossil fueled furnaces to energy efficient electric furnaces that will help to partially reduce CO2 emissions. A renewable PPA can be included to supply the energy required to this furnace.
- Direct electrification of pulp and paper sector due to the integration of efficient high temperature heat pumps to replace gas in the drying process. A renewable PPA can be included to supply the energy required by the heat pump.
- Installation of renewables onsite and/or renewable PPAs to help reduce the carbon footprint and further electrify processes of the pulp and paper, oil refining and cement industry.
- Direct electrification through the direct electrolysis of steel for making steel by converting this steel into liquid metal and oxygen in steel subsector.

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Selected technology initiative matrix

Systemic efficiency and circularity

Direct electrification and renewable heat

Carbon capture, utilization and storage (CCUS)

Hydrogen

- Installation of 2,5 MW alkaline electrolyzer to integrate, at an appropriate initial scale, different uses of hydrogen, as a test bed to help leverage regulation and as a basis for future larger-scale projects: refinery and hydrogen distribution by pipeline.
- Installation of a 10 MW electrolyser for the production and supply of renewable hydrogen to the synthetic fuels production plant.
- Installation of 100 MW large scale electrolyser project to accelerate the development of the European Hydrogen Backbone by installing large-scale electrolyzer capacities in or near industrial hubs in line with third party accessibility, TEN-E criteria and with the prospect of further integration into the emerging European Hydrogen Backbone.

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3 Net-Zero Basque Industrial Super Cluster journey

Cluster journey through WEF approach: from initiation to scale

	Partnership	Policy	Financing	Technology
1 Cluster initiation	Convince local stakeholder with shared decarbonization ambitions			Build the regional vision for joint technology and infrastructure development: use as basis for workforce, environmental and social impact targets.
2 Cluster formalization	Align on cluster-wide, time-bound decarbonization goals for public release; execution of multi-lateral memorandums of understanding (MoUs) between cluster stakeholders in industry , research/academia, government, community organizations, etc.	Engage relevant legislators and regulators to outlay and together use policy enablers and mitigate barriers, exploring business model support structures for early market development.		
3 Net-zero strategy development	Establish scalable governance structure to integrate, develop and manage cross-organizational action plans for technology, workforce and community engagement initiatives.	Organize roundtables with local and global cluster communities' industrials and policy-makers to explore local applications of globally successful public support mechanisms.	Host roundtables with cluster partners and funding players to discuss engagement opportunities and proactively identify and develop funding instruments.	Convince expanding stakeholder groups across technology interest areas to develop and prioritize asset and infrastructure development pipeline, writing partnership agreements to de-risk proposed investment.
4 Net-zero strategy implementation: anchor projects	Develop external workforce transformation and community education programs as well as internally shaper agreements and IT infrastructure for necessary key performance indicator (KPIs) reporting, Project management and internet of things-based collaboration.	Develop regular cadence with all levels of regulators and policy-makers to maximize use of existing policy enablers and, where possible, collaborate to shape new mechanisms that support renewable and clean resource growth.	Stack available federal, regional and local grants financial benefits of enabling policy to balance corporate commitment philanthropic funds and public seeing; through this, ensure environmental justice (EJ) and equity benefits of deployed capital are documented.	Prioritize growth of joint infrastructure use MoUs and offtake agreements to address supply-demand gaps; engage stakeholders in ongoing planning and project management activities.
5 Net-zero strategy implementation: full scale	Implement cultural transition tools so that cluster members can draw messaging from a consolidated reporting resource to shape a public, quantify impact story (environmental, social economic).	Continue ongoing multilateral roundtables with regulators and policy-makers, seeking opportunities to expand policy-enabled technology focus and connect neighboring, developing industrial clusters into existing efforts.	Engage existing public and private financing players in ongoing roundtables to educate funders on technology development, new financing mechanisms introduced from other markets, and dialogue on opportunities for investment growth.	

Cluster initiation

1. Cluster initiation
2. Cluster formalization
3. Net-zero strategy development
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

Basque Government joins WEF Net-zero Industrial Clusters initiative with the creation of the Net-Zero Basque Industrial Super Cluster to reinforce its commitment to reduce industrial emissions and achieve net-zero targets.

- The main goal of the project is the decarbonization of the different industrial sectors, focusing on the different industrial processes, its consumptions and other related activities. And is committed with the development of decarbonization projects in the most relevant industries by GHG Emissions such as, pulp and paper, cement, oil refining, steel and foundry sectors.

- The objective is to make the Basque Country a reference territory for the development of new industrial and technological initiatives around industry decarbonization, contributing to the generation of wealth, employment, and quality of life.

24,2% industry contribution to GVA in 2021

2,2M population in the Basque Country

204.000 Jobs in industry in the Basque Region

46,15% of GHG Emissions are emitted by industries

68,87% of GHG Emissions are emitted by 5 sectors (pulp & paper, cement, oil refining, steel and foundry)

The expected impact:

- GDP impact : 2B€ to 3B€ (>2030).
  3-5% of GDP 2021.

- Jobs impact: 20k to 30k (>2030).
  2-3% of Jobs 2021.

- Emission reduction: 100% reduction of Emissions generated by energy consumption in the industry by 2050.

Cluster formalization

1. Cluster initiation
2. Cluster formalization
3. Net-zero strategy development
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

The Net-Zero Basque Industrial Super Cluster relies on a multi-stakeholder collaboration approach where the Basque authorities boost the collaboration between the different actors

- The Net-Zero Basque Industrial Supercluster initiative was presented in the Basque Country (on October 28, 2021, at BEC, Baracaldo) and in the framework of the 2021-COP 26 (October 3-4 in Glasgow).
- The partners of set-up & launch are the Basque Government and the Energy companies Iberdrola and Petronor with the collaboration of the Industrial Cluster Associations.
- Their objective is to articulate initiatives in the key Sectors to decarbonize their industry, accompanied by the main Basque approach: technical innovation and digitalization.

Accelerating industrial cluster playbook
Net-zero strategy development

1. Cluster initiation
2. Cluster formalization
3. Net-zero strategy development
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

The initiative establishes scalable governance structure driving the development of decarbonization projects

- The Basque Net Zero Industrial Super Cluster aims to accelerate the path to net-zero emissions in the Basque Country, fostering energy supply decarbonization and energy efficiency in the industrial sectors and creating market opportunities based on the scale-up of the new technologies and innovative services.
- The Basque Industrial Clusters Associations play a key role in driving the development of decarbonization projects, ensuring coordination and maximizing synergies among their partners.
- The Super Cluster initiative is also aiming to create market opportunities based on these new technologies and services in the Basque Energy value chain, and therefore works very closely with the Basque Energy Cluster Association to deliver change.

Accelerating industrial cluster playbook

Net-zero strategy development

1. Cluster initiation
2. Cluster formalization
3. Net-zero strategy Development: current status
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

We are creating the decarbonization roadmaps collaboratively with clusters and integrating the input of sectors characterization. Afterwards we will identify the potential of Basque companies to participate in pilot projects to start the journey

Launch

Design & Develop

0 Project launch

Initiative presented in the Basque Country and in the COP- 26.

1 Characterization of the industry

Focusing on energy consumption from process perspective and describing the evolution of the sector in the Basque Country.

2 Technologies identification

Roadmap for each sector that identify the best technologies and measures to reduce CO2 emissions associated with energy consumption.

3 Value Chain

Evaluation of the current or potential value chain in the Basque Country for the development and supply of the identified measures and technologies.

4 Pilot projects

Identification/ prioritization of pilot projects and demonstrators for the application of technological solutions.

Accelerating industrial cluster playbook
Net-zero strategy development

1. Cluster initiation
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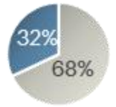
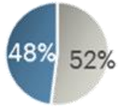
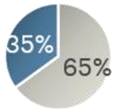
3. Net-zero strategy Development: current status
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

In phase 1 we have focused sector characterization on energy consumption and in the processes concentrating most of emissions derived from it

	Phase 1			
	Production plants	**Energy consumption**	**GHG Emissions** *[kt CO2 eq./year]*	**Emission factor** *[Kt CO2/Kt product]*
Pulp and paper	10		462	0,34*
Oil refining	1		2.144	0,22
Cement	3		1.002	0,44
Steel	8		1.137	0,26
Foundry	49		212	0,50

Thermal energy

Electrical energy

*Aggregated value for pulp and paper production

Accelerating industrial cluster playbook

Net-zero strategy development

1. Cluster initiation
2. Cluster formalization
3. Net-zero strategy Development: current status
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

We have identified more than 50 technology solutions to be integrated in the roadmap (work in progress)

	Pulp and paper	Cement	Oil refining	Steel	Foundry
Sistemic Efficiency and Circularity	9	4	7	6	7
Electrification and Renewable Heat	6	2	2	3	3
Hydrogen		2	1	1	1
Carbon Capture, Utilization and Storage		1			

Net-zero strategy implementation: anchor projects: BH_2C

1. Cluster initiation
2. Cluster formalization
3. Net-zero strategy development
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

The Basque Hydrogen Corridor is one of the anchor projects for decarbonizing Basque industry

- The Basque Hydrogen Corridor (BH2C) consists of the creation of a hydrogen ecosystem in the Basque Country, with broad public-private collaboration to develop projects all along the hydrogen value-chain and to advance in the decarbonization of the energy, mobility and other industrial sectors.
- The aim of the corridor is that the transition to a decarbonized economy will contribute to improving the competitiveness of Basque Industry.

Main characteristics

- 1.383 M€ investment.
- Creation of 7.753 direct and indirect jobs.
- 39.679 tonnes green Hydrogen production per year.
- 1,28 MT reduction of CO2 per year.

Net-zero strategy implementation: full scale

1. Cluster initiation
2. Cluster formalization
3. Net-zero strategy development
4. Net-zero strategy implementation: anchor projects
5. Net-zero strategy implementation: full scale

The project aims to create opportunities for the decarbonization of the industry, identifying pilot projects and identifying possible funding support from which the sector can benefit.

- Industry decarbonization solutions will focus on four strategic pillars:
    1. Systemic Efficiency and Circularity.
    2. Direct Electrification and Renewable heat.
    3. Green Hydrogen.
    4. Carbon Capture, Utilization and Storage (CCUS).

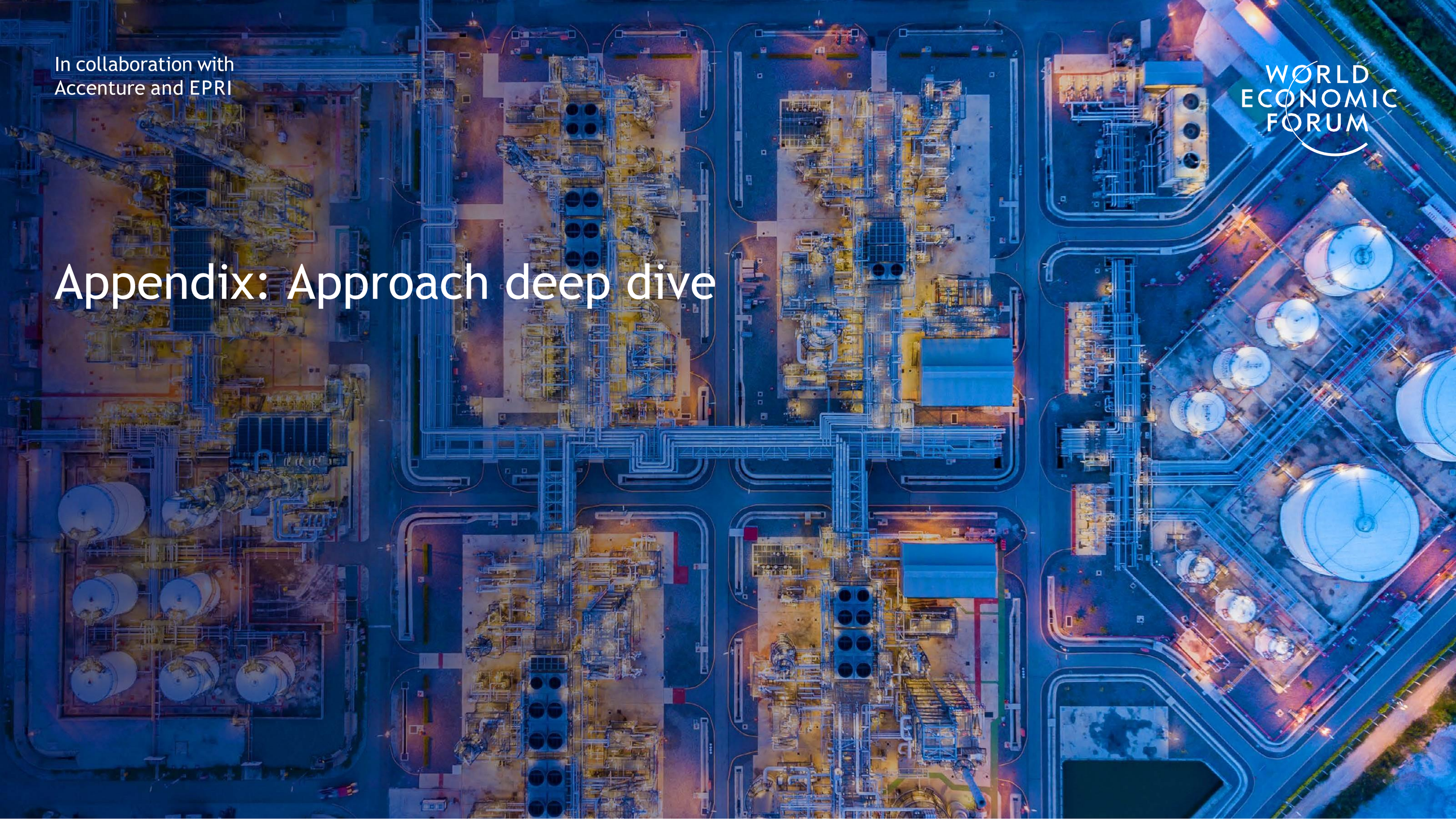
- Several projects are being identified during the project, which include a wide range of topics and synergies between different clusters. In addition, strong links to programmes and investment funds on a national and European scale will be explored.

- With the aim to attract, retain and justify investment, tools will be developed to report on environmental, social and environmental impacts generated by the initiative.

In collaboration with
Accenture and EPRI

WORLD ECONOMIC FORUM

Appendix: Approach deep dive



Empowering and accelerating

As a neutral body with a technology-impartial approach, the Transitioning Industrial Clusters initiative sits as an aggregator and connector between global industrial clusters, media outlets, environmental justice programmes and cross-value chain stakeholders. A four-pronged strategic approach ensures balance between sustainable environmental, economic and social value creation.

Partnership

Policy

Financing

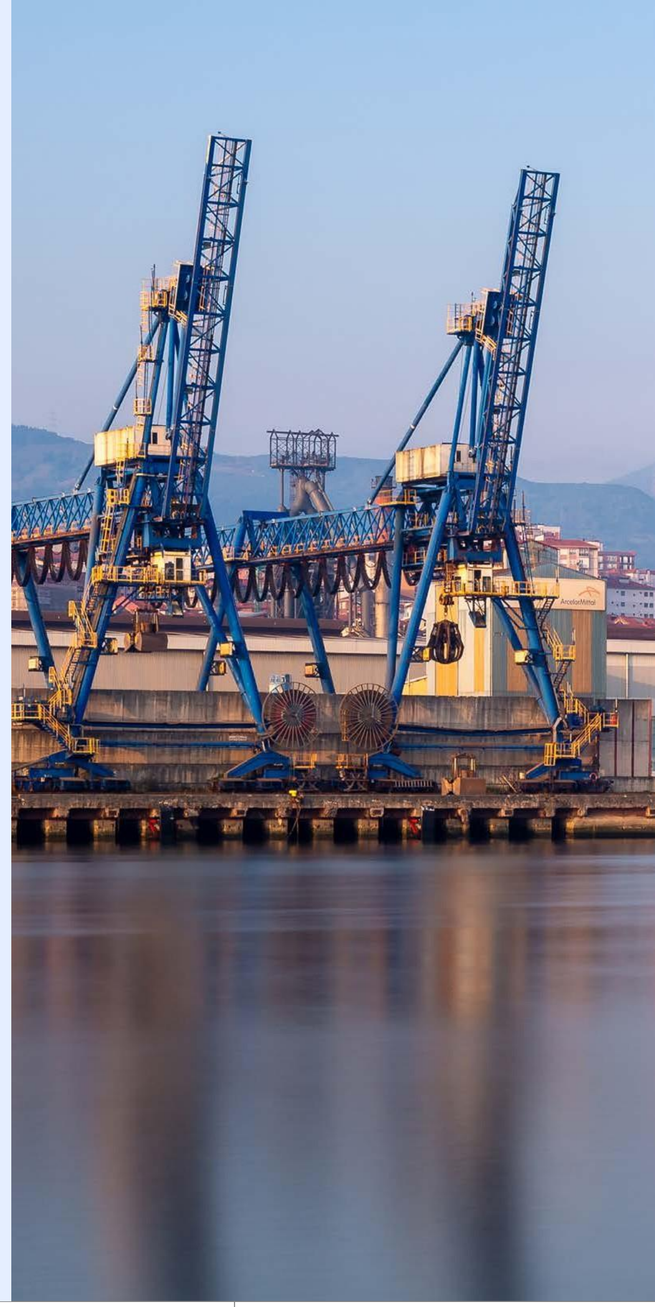
Technology

How the initiative supports

In support of formalizing partnerships across the value chain to facilitate financial and operational risk sharing, the initiative has developed tested partnership structures and collaboration models, facilitates workshops series to build a unified vision and cluster structure, and brokers global connections to build balanced economic, environmental and social outcomes.

Work in practice

Transitioning Industrial Cluster's April 2022 Community Meeting on Developing Partnerships in Bilbao, Spain, dove into the key components of sustainable, scalable partnership through the experiences of global market developers.



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Partnership

Policy

Financing

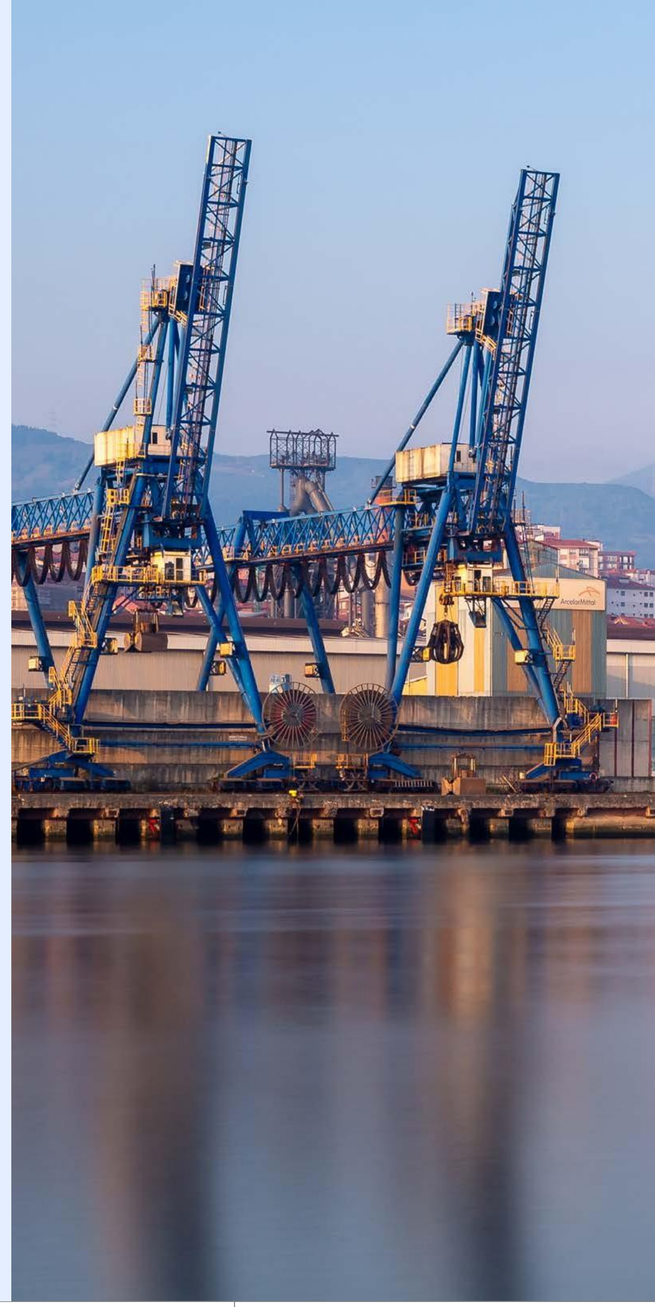
Technology

Support description

To advocate for an enable close working relationships between industrial clusters and all levels of the public sector, the initiative continues to develop in-depth, country-specific policy and financial analyses and brokers global discussions forums on the same. These create a level entry point across stakeholders in conversations on how to best use available local enablers as well as to understand global best practices, which may be localized for additional support. Signatory industrial clusters further engage with multilaterals to receive coaching from successful ecosystems on thei practices and tolos used to build public-private engagement.

Work in practice

The initiative conducts enabling policy analyses of across North america, Europe and Asia Pacific based on priorization of the signatory industrial cluster community (ten of these can be found in the National Policy Enablement for Industrial Decarbonization White paper) along with multilateral policy-maker roundtables in selected markets.



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Partnership

Policy

Financing

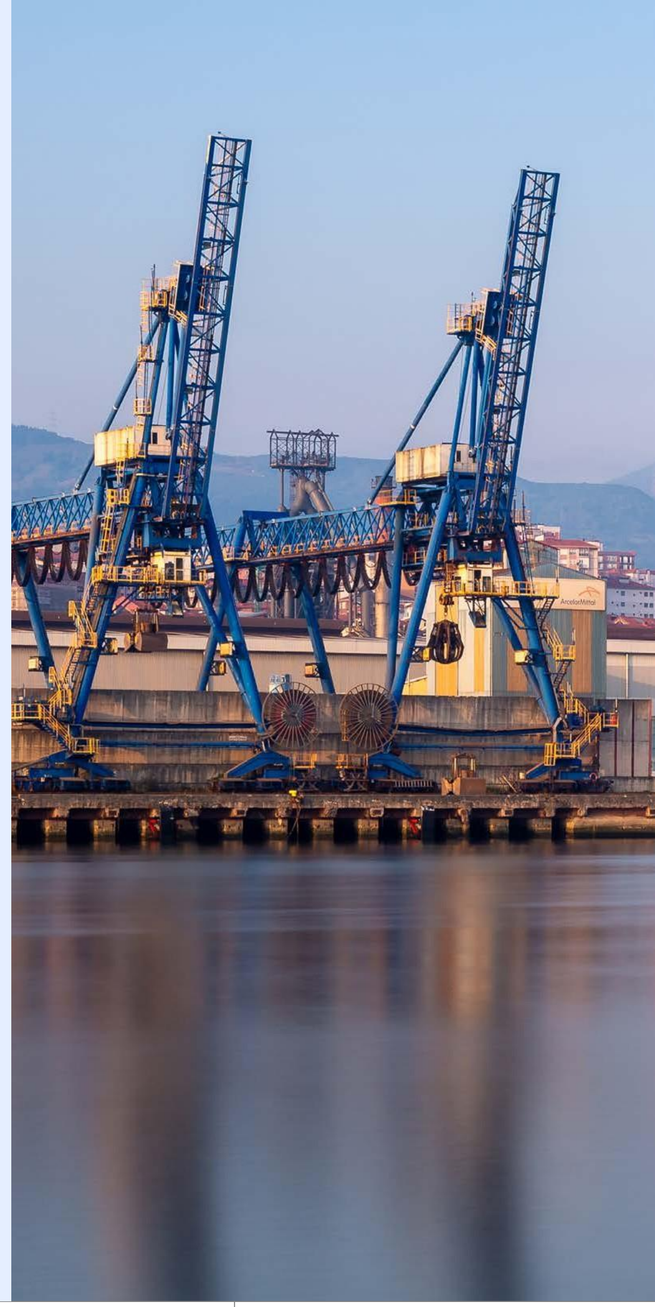
Technology

Support description

Beginning with the careful evaluation of public financial levers encapsulated in the "Policy" section of this publication, the initiative Works closely with public and private financiers to build perspectives on transition and financing maturation strategies based on the successful market development of signatory industrial clusters. The initiative facilitates bilateral workshops among clusters, policy-markers and the financial community to identify risks, barriers and creative mechanisms to overcome these.

Work in practice

Throughout 2022, the initiative has hosted a series of conversations of the public finance enablers that remove barriers to scaled private capital deployment. This platform brigs public and private stakeholders together to discuss financing enablers and strategies for industrial clusters; one example of this is the "Maximizing Infrastructure Investment and Jobs Act (IIJA) Impact" workshops series in the US.



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Partnership

Policy

Financing

Technology

How the initiative supports

Frequent forums on the technolog use cases, lessons learned and workshops series to develop early technology priorization and roadmaps are hosted by the initiative and its community members to draw out collaboration and further coaching opportunities. Further, one of the core priorities of the initiaitve is demonstrated in its technology supply and demand matchmaker capacity within and across geographies.

Work in practice

In October 2022, the initiative´s global community gathered in Houston, Texas, to explore members`use cases for the four technologies identified as key to industrial decabonization alongside ecosystem enablers like workforce, digital and public finance support.