



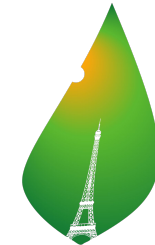
SUSTAINABLE DIGITAL
INFRASTRUCTURE ALLIANCE

The European platform for the creation of a sustainable digital economy

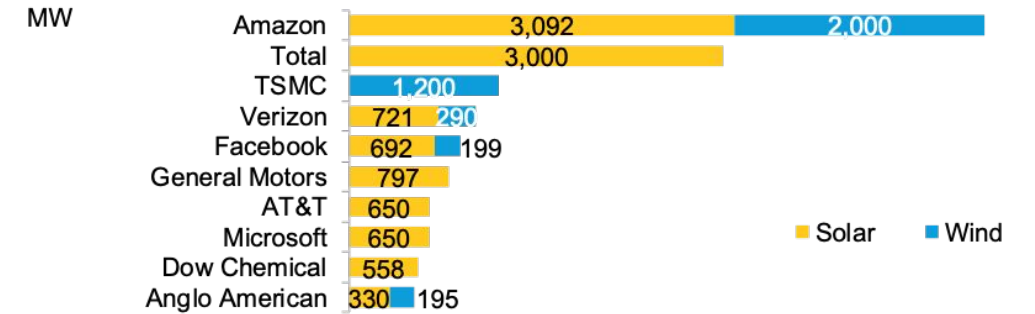
An independent alliance of all stakeholders working across the digital sector. We are committed to executing the Roadmap to Sustainable Digital Infrastructure by 2030

Sustainability in the digital economy and IT is happening now

Governments around the world are prioritizing sustainability.



UN CLIMATE CHANGE CONFERENCE
COP21·CMP11



Big Tech already largest buyers of green power in the world.

SAP Accelerates Climate Protection to Achieve Carbon-Neutrality by 2023



Microsoft will be carbon negative by 2030

“By 2050, we committed that we’ll remove from the environment all the carbon that Microsoft has emitted directly or through electricity use since the company was founded in 1975.”



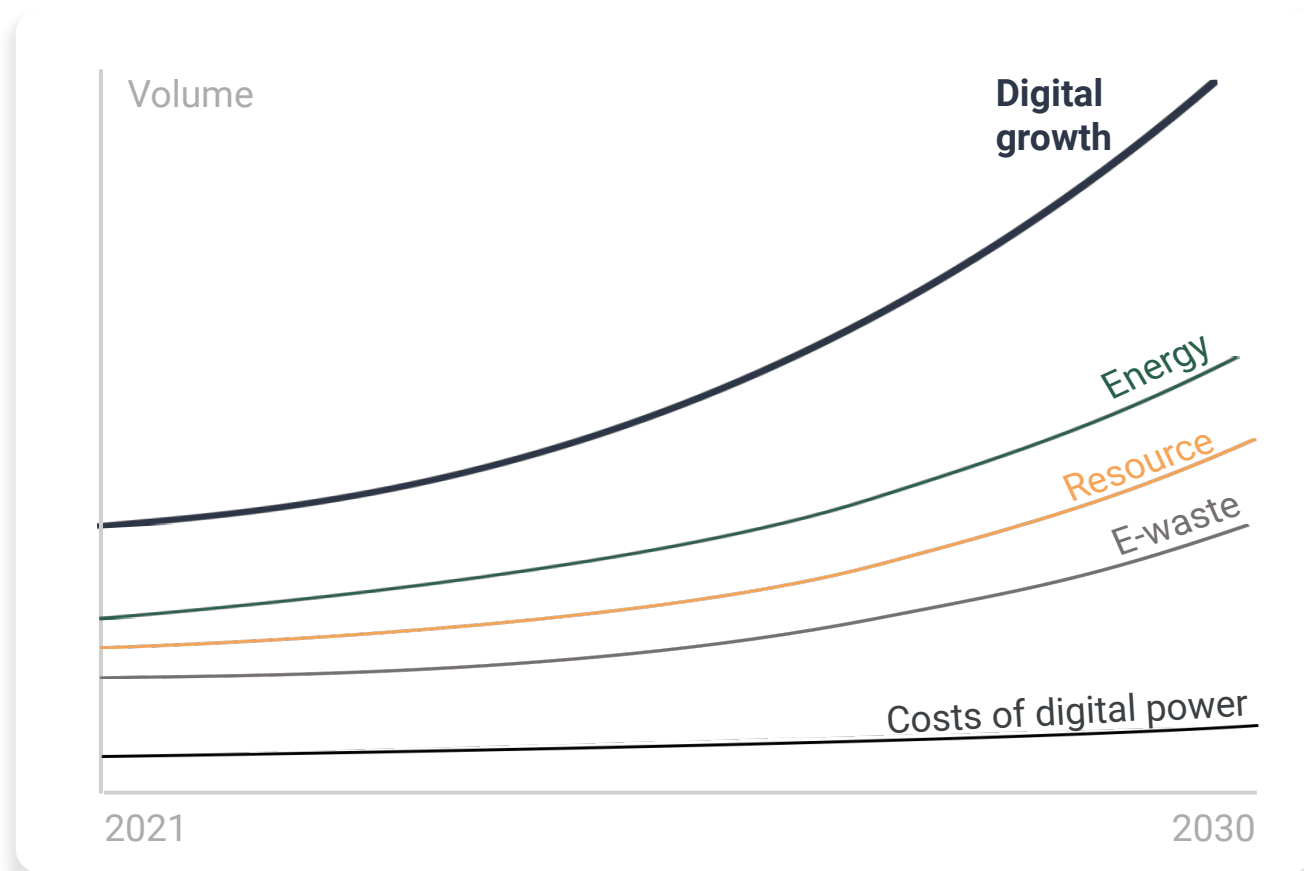
Google Pledges 24/7 Carbon-Free Energy by 2030

“We are the first major company that’s set out to do this, and we aim to be the first to achieve it,” says Google CEO Sundar Pichai.

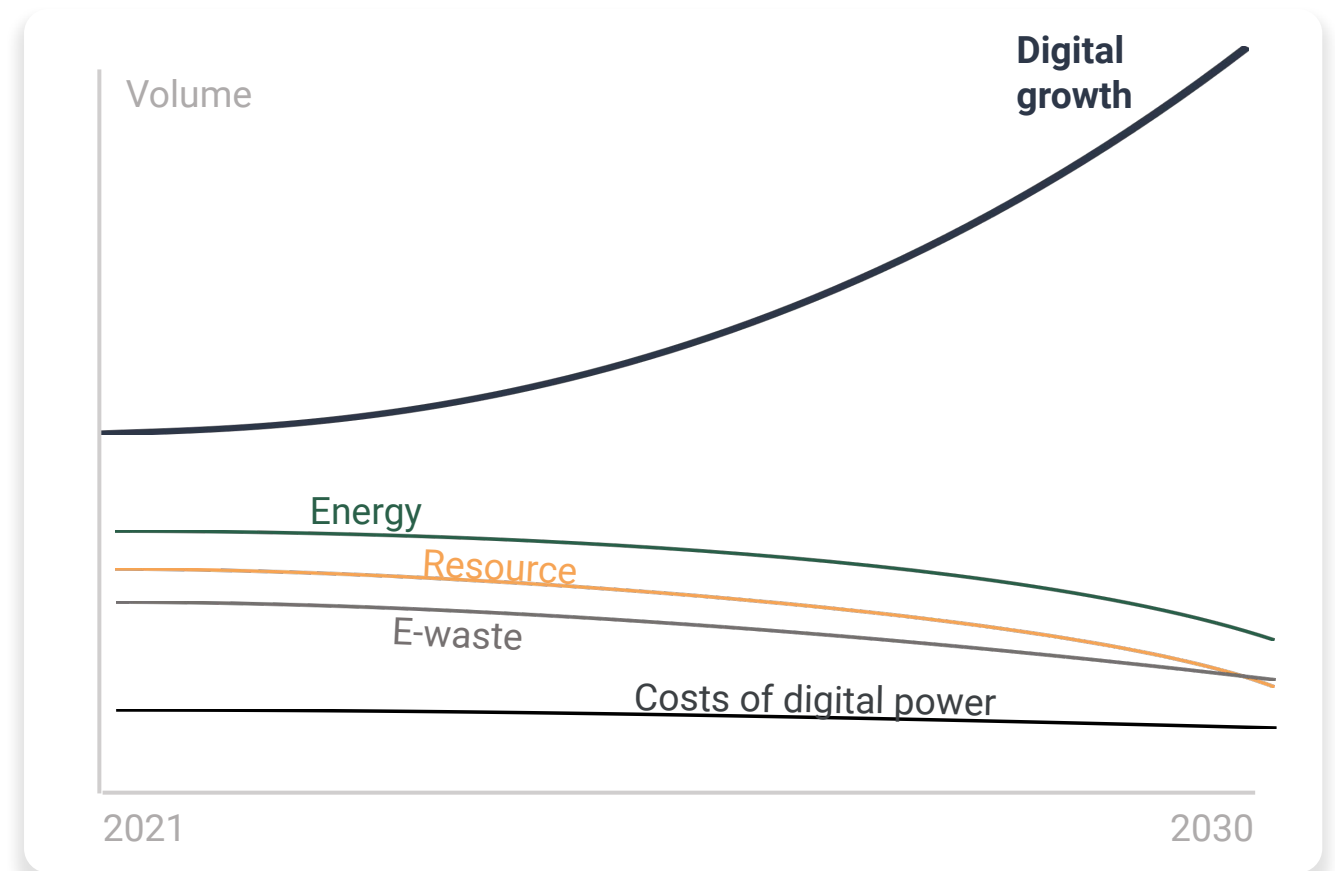


Enabling the growth of the digital economy requires the decoupling of its resource consumption

Current Trajectory

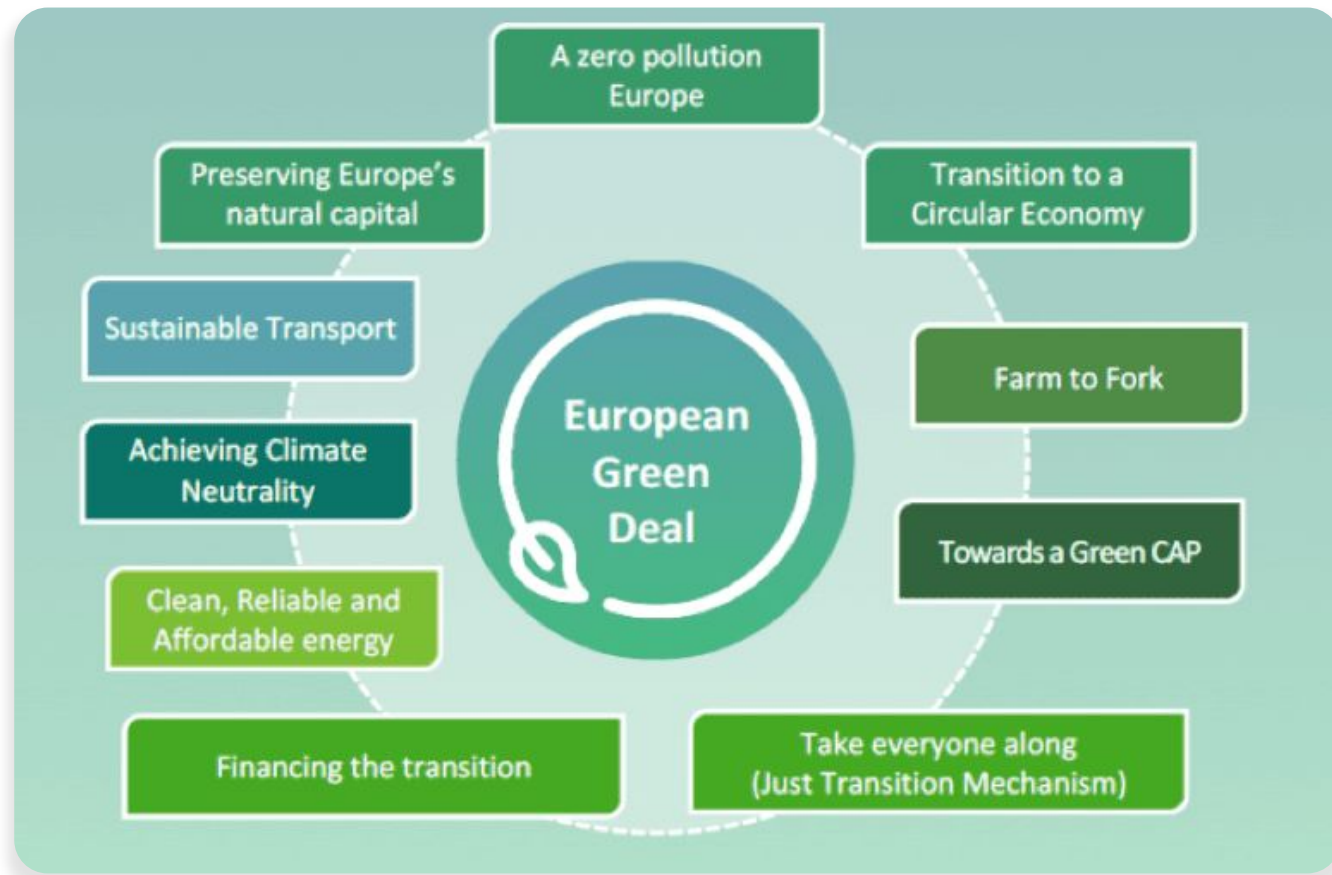


Sustainable Digital Economy



The transition to a sustainable economy is happening, but we need to ensure it is open and inclusive

The transition is now:



An inclusive digital economy:



Stable macroeconomic policies



Public investment in education & infrastructure



Equal opportunities available to the majority of citizens and businesses



Free markets

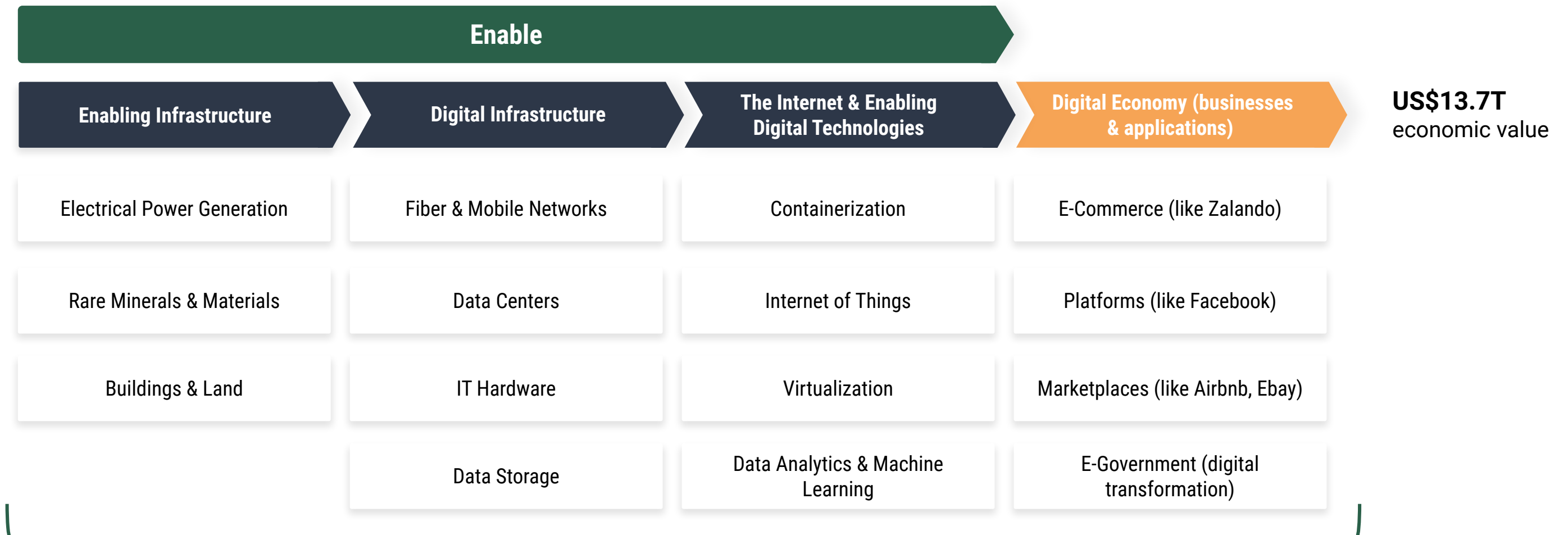


Business friendly



Creative destruction (encouraging innovation)

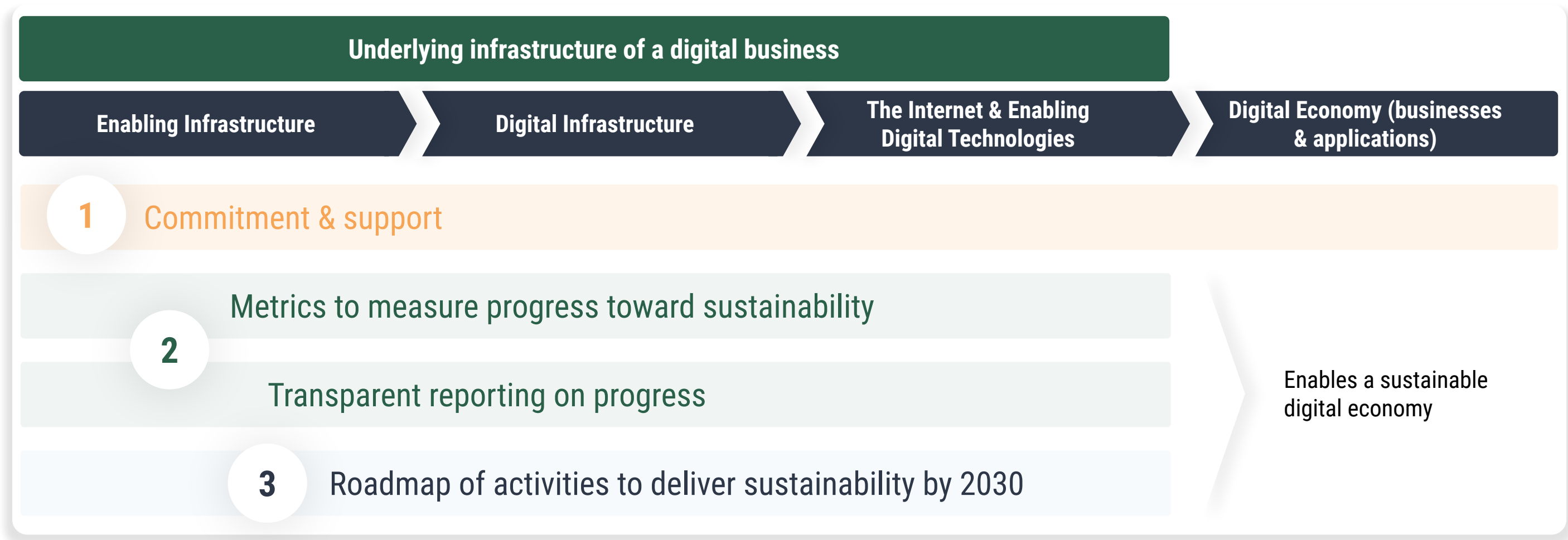
The digital economy is a complex ecosystem of infrastructure & software – the Alliance drives collaboration across all layers



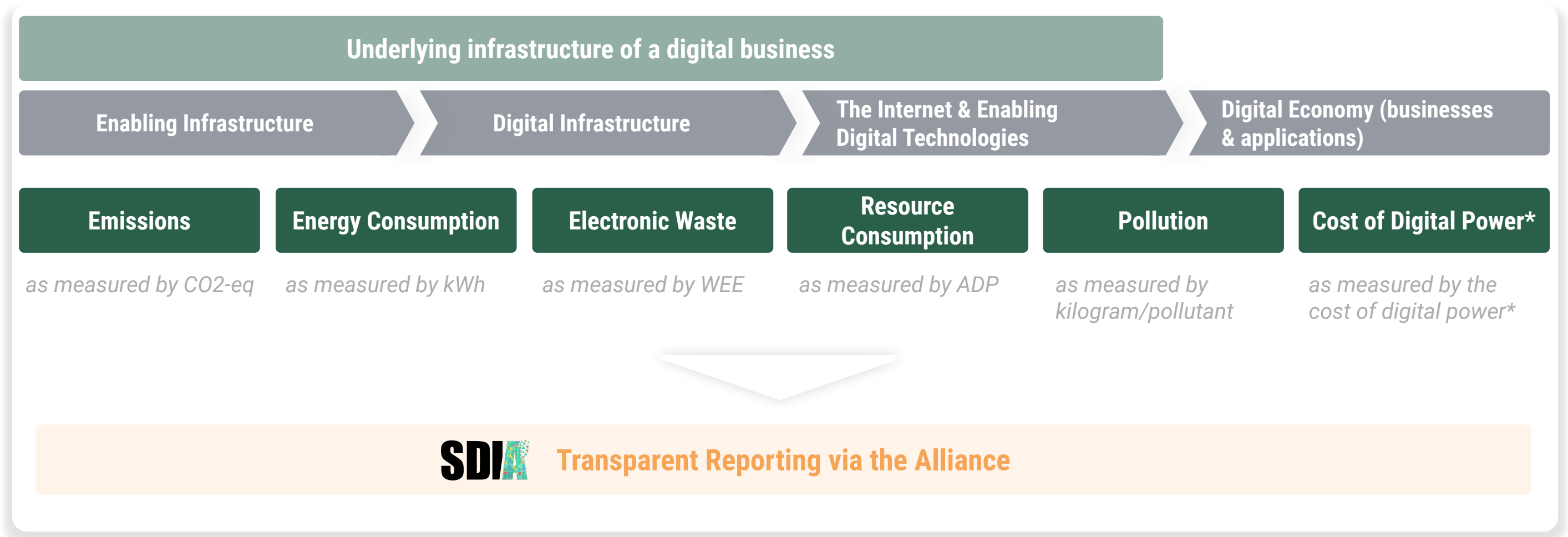
Members & partners of the Alliance from across the digital ecosystem are committed to create a sustainable digital economy



Making the digital economy sustainable requires systemic collaboration across boundaries



Our Roadmap defines a set of Metrics that measures progress toward sustainability across the entire digital ecosystem

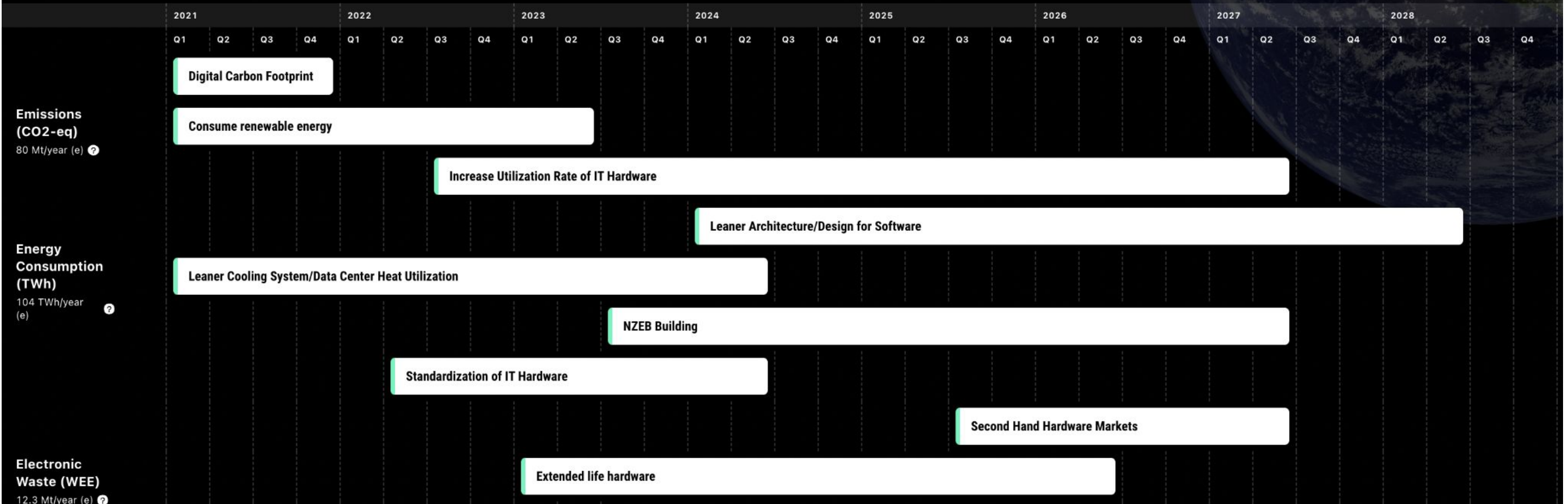


The Roadmap to Sustainable Digital Infrastructure by 2030

To reach our Sustainability Goals by 2030 we need to systematically embed sustainability across the sector. This roadmap enables every industrial actor to connect, benchmark and deliver sustainability within their segment of Digital Infrastructure value chain. Through the universal reporting regimen, and the industry led action plan, the roadmap is simultaneously the reporting vehicle, and the collaboration vehicle that will ensure we hit sustainable digital infrastructure by 2030.

[Join the Roadmap](#)

[Learn more](#)



Electronic Waste (WEE)
12.3 Mt/year (e) ?

Extended life hardware

Recycling of Parts

Circular Design

Digital Resource Footprint

Resource Consumption (ADP)
Not Available ?

Zero-(Fresh) Water Cooling System

Zero Rare Materials Consumption

Zero-Pollution Backup Power and Cooling Systems

Pollution
Not Available ?

Digital Pollutant Footprint

Zero-Pollution Manufacturing

Defining a standardized framework for quantifying Digital Power

Socioeconomic (Cost of Digital Power)
Not Available ?

Unbundling IT Hardware & Software

Efficient Future Digital Infrastructure Architectures Edge Regional Hubs Exascale

For each Metric, we created Activities that enable progress and transcend industry boundaries

| Emissions | Energy Consumption | Electronic Waste | Resource Consumption | Pollution | Cost of Digital Power |
|---|--|--------------------------------|-----------------------------------|---|---|
| Digital Carbon Footprint | Leaner Cooling System/ Data Center Heat Utilization | Standardization of IT Hardware | Digital Resource Footprint | Zero-Pollution Backup Power and Cooling Systems | Standardized Framework for Quantifying Digital Power |
| Renewable Power Consumption & Integration | Energy-efficient Chip & Hardware Design | Secondhand Hardware Markets | Zero-(Fresh) Water Cooling System | Digital Pollutant Footprint | Efficient Future Digital Infrastructure Architectures |
| IT Hardware Utilization Efficiency | NZEB Building | Extended Life Hardware | Zero Rare Materials Consumption | Zero-Pollution Manufacturing | Unbundling IT Hardware & Software |
| | Leaner Architecture/Design for Software | Recycling of Parts | | | |
| | | Circular Design | | | |

Consume Renewable Energy

Power Flexibility in Data Centers

Grid-friendly behavior becoming a standard for large energy consumers like data centers to enable the integration of more renewable energy into the grid.

Active

On-Site Renewable Power Generation for Data Centers

Integrating data centers with renewable power plants to take advantage of decentralized energy infrastructure, support their own-consumption, and a more grid-friendly design.

Active

Leaner Cooling / Heat Utilization

Excess Heat Utilization from Data Centers

Facilitating the mainstream integration of residual heat from data centers for energy reuse, provision of GHG emission-free heat, and reduction of energy costs for data centers.

Active

Zero-Pollution Backup Power and Cooling System

Opportunities of Hydrogen Based Backup

Replacing conventional backup power systems with low-emission, hydrogen-based solutions, while exploring additional services like energy flexibility with them.

Active

Digital Carbon Footprint

Assessing the Digital Carbon Footprint

Supporting better data availability and reporting of carbon emissions within the digital value chain to provide the basis for better decision-making.

Active

Developing the SDIA Open Data Hub

Creating a transparency reporting framework for the digital economy to facilitate researchers, governments and decision makers with reliable and comprehensive data

Active

Unbundling of IT Hardware & Software

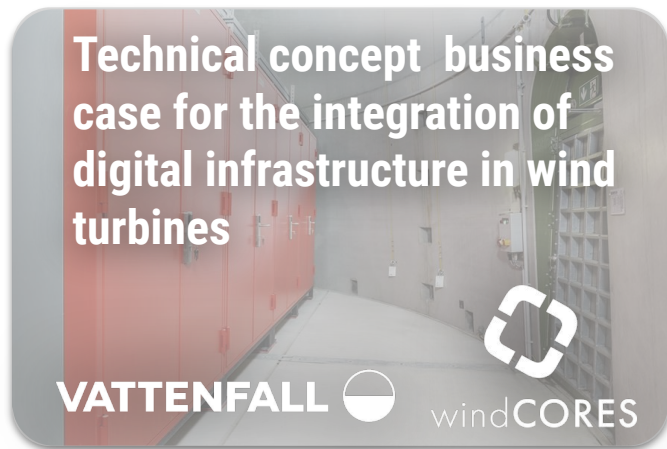
Building a Sustainable European Cloud



Using our strength of distributed and diverse ICT infrastructure to enable a European-wide connected cloud platform


Active

In each Activity, members collaborate to design sustainable solutions, for which the Alliance finds the business case

Technical concept business case for the integration of digital infrastructure in wind turbines



VATTENFALL  windCORES 

VATTENFALL 
A business case for heat recovery

Disassembled the public cloud business model

heli  ScaleUp Technologies 



Report: Collaboration opportunities between grid, power generation, and digital infrastructure

A business case & architecture for hydrogen-powered data centers


 Rolls-Royce

A bidding marketplace for data centers & local utilities for heat and power



 ecoqube **More efficiency for legacy data centers**

Showcasing the business case of refurbished & recycled hardware



Combined Heat & Compute:
An integration architecture for digital infrastructure within cities

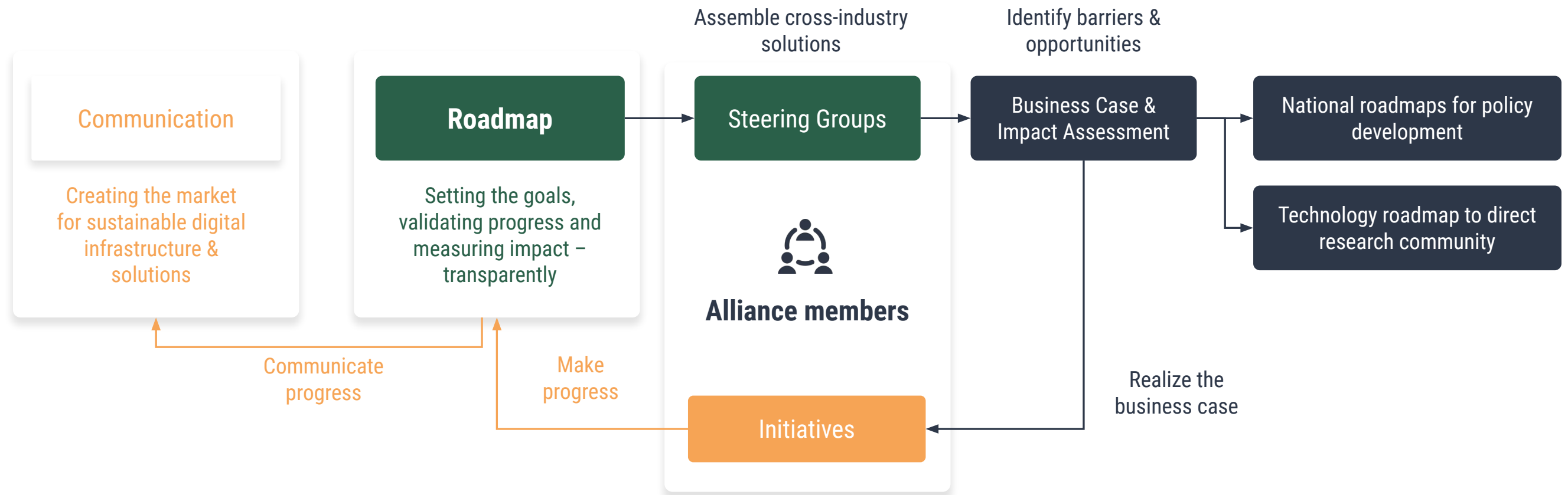


VATTENFALL 

A carbon footprint for software – creating transparency across the stack

 south pole

Our strategy: Advancing the Roadmap through collaboration & finding the business case in sustainability






Realizing the business case in sustainability

Our work on scaling sustainability by making it commercially viable

Creating the business case in power flexibility from lithium-based UPS backup power systems

Roadmap Activity:
Renewable Power Consumption
& Integration

 **Data Center Power Flexibility**



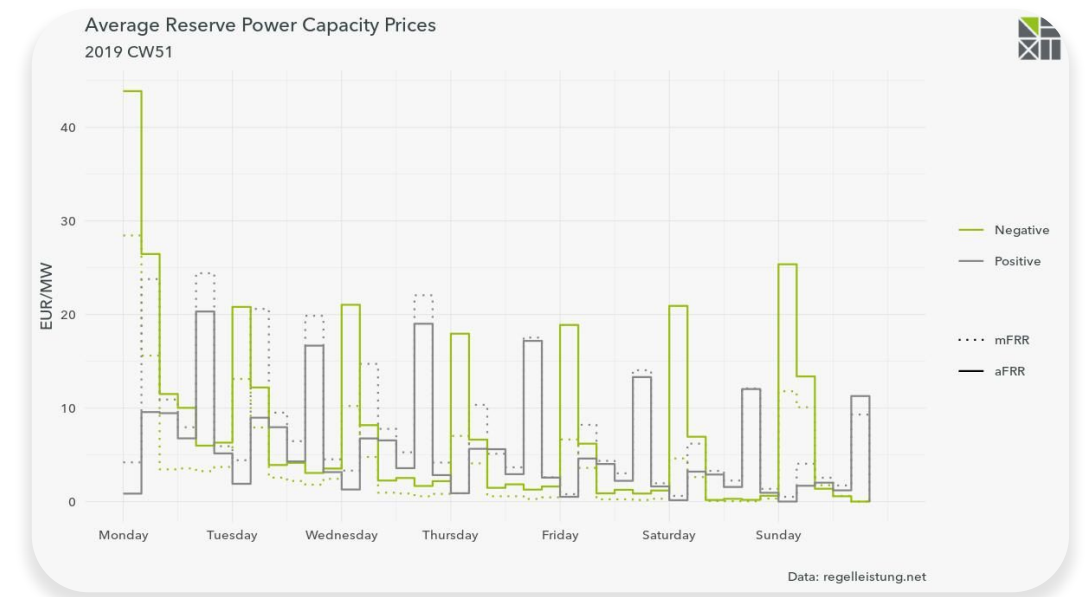
A business case for flexibility from UPS systems

Most modern UPS systems within digital infrastructure have the capability to supply ancillary services to the grid. Pressure is mounting to unlock this potential flexibility. The business case for the additional costs for lithium-based battery systems, however, is still limiting market adoption. We have developed scenarios in which it is viable.

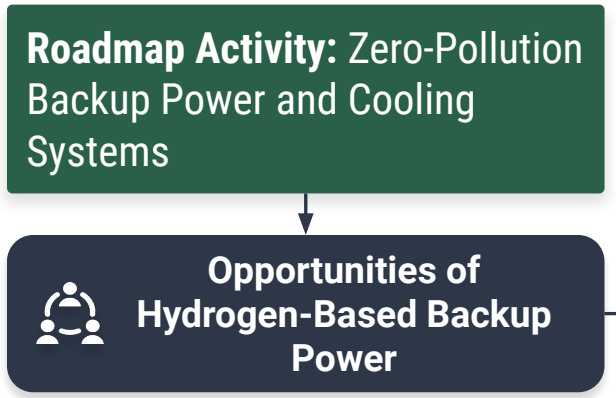


Implementation: Lobbying for an improved business case

Together with EPEX, we are advocating for the creation of regional grid supports markets, in which data centers can participate.



Designing a viable alternative for diesel-based backup generators using hydrogen



System design & business case for hydrogen-based solutions

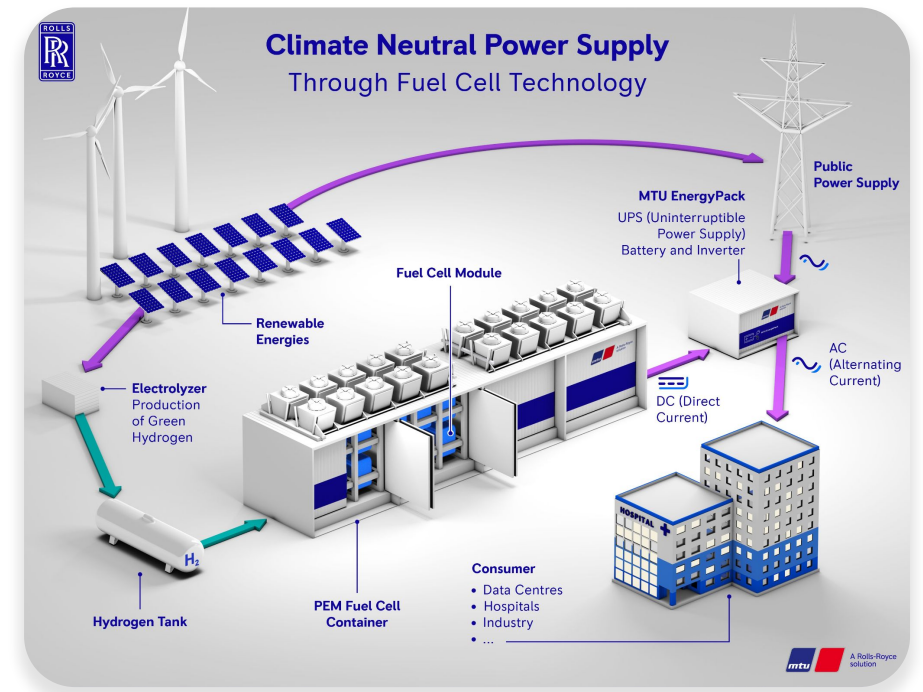
The financials of hydrogen remain a challenge for broader market adoption. By combining various technologies – fuel cells, electrolyzers, gas storage, renewable power generation, and energy markets – we designed sustainable and financially viable solutions.



Implementation: Norway

In progress

The Nordics' CO2 levels have been negatively affected by the deployment of diesel gensets in data centers. Our designs provide a viable and sustainable alternative.



From a Steering Group to a commercial implementation of a sustainable solution: Vattenfall & Cloud&Heat case study

Roadmap Activity:
Leaner Cooling System / Data Center Heat Utilization

Excess Heat Utilization from Data Centers



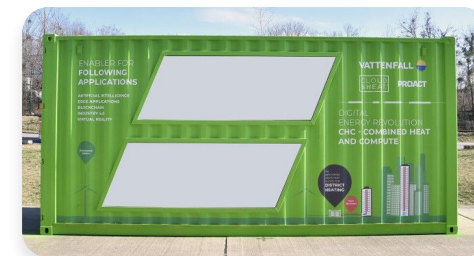
A business case for heat recovery

Based on the solution design of our members for heat recovery, we assessed the markets in which and with what heat integration (district heating, industrial use, etc.) it is financially feasible to do so, taking into account capital investment, operational costs, and value of the heat.



Implementation: Stockholm – Vattenfall

Based on our business case and together with Cloud&Heat, Vattenfall invested in a heat recovery system for a 1MW data center.



ADVANCE ANALYTICS BUSINESS DATA SCIENCE

Cloud&Heat and Vattenfall to provide environmentally friendly cloud computing resources

Vattenfall partners with Cloud&Heat for prototype data center

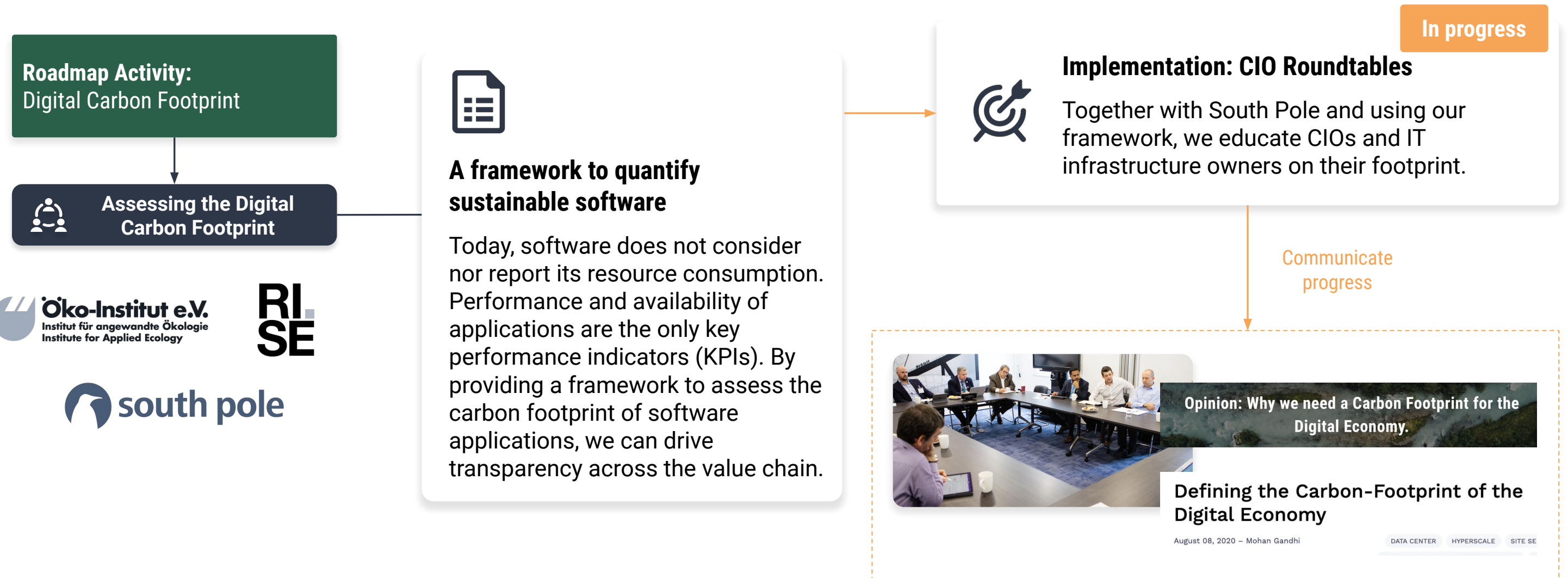
Two liquid-cooled Cloud&Heat containers make a 500kW data center near Stockholm



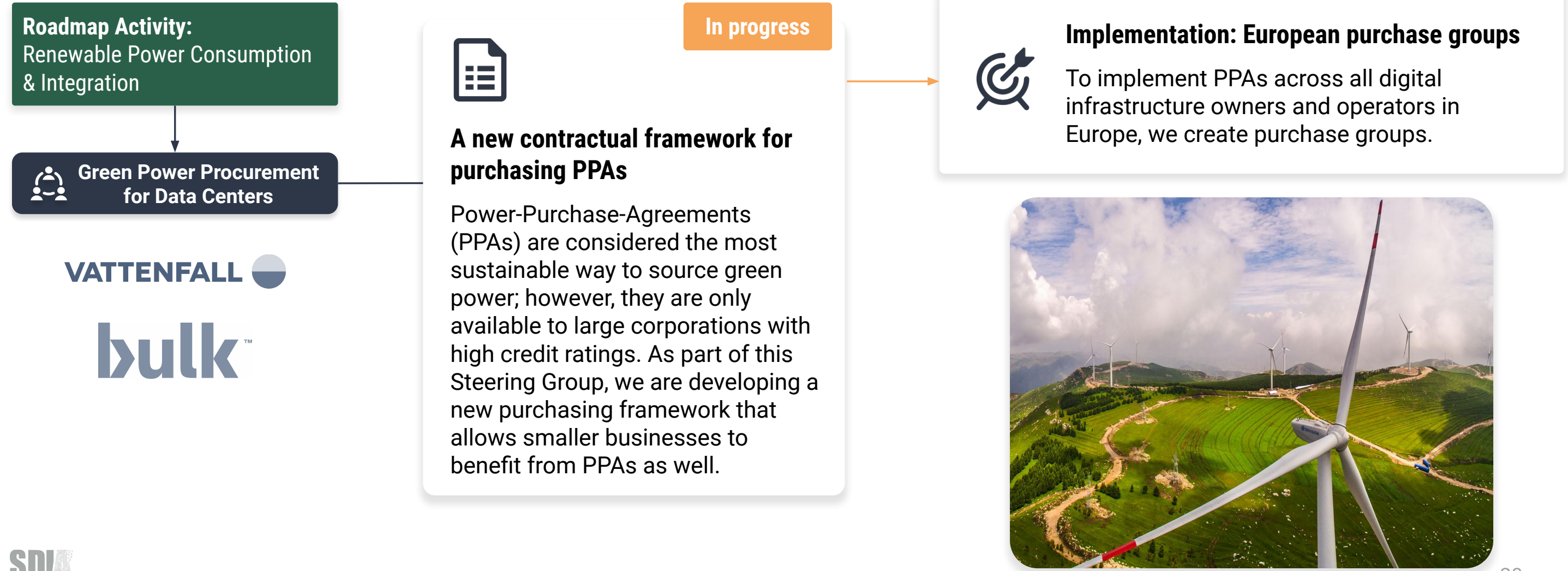
Association of District Heating Operators & Internet companies

Joint White-Paper on adapting the German law for industrial waste-heat, emphasizing an incentive scheme for data centers.

A carbon footprint for software: creating transparency across the stack – framework and market implementation



Making renewable energy available to every operator within digital infrastructure – from small to large



Making a European cloud infrastructure fair, open, and inclusive, with a sustainable business model & society involved

Roadmap Activity:
Unbundling IT Hardware
& Software

 The Making of a European
Cloud Infrastructure



In progress



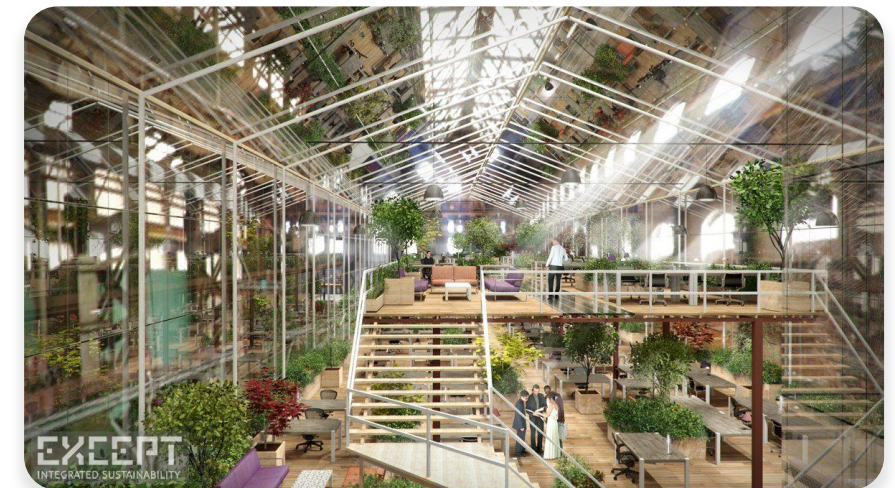
A business & ownership model for European cloud infrastructure

Across Europe many initiatives are underway to create European cloud infrastructure. Rather than waiting, we went ahead and modeled the business. We began by implementing pilot installations of a federated, sustainable, open, and fair cloud platform aimed at startups, SMEs, and governments.



Implementation: Regional hubs that demonstrate and educate

Making European infrastructure should be inclusive, and society must be part of the creation process. Therefore, we bring data centers and cloud software closer to people by embedding them into the urban environment as experience & innovation hubs.





Sustainability is happening now: Will you lead or will you follow?

The Alliance is the leading platform for the realization of a sustainable digital economy

The SDIA is the leading platform for driving sustainability in the digital sector – will you lead with us?



Founded on 17 July 2019 in Hamburg, Germany, with offices in Amsterdam, London, and Brussels



15 full-time employees, 9 board members, 11 advisory board members



65+ members & partners across Europe and beyond

Our Mission:

To assemble all actors of the digital sector to jointly create and execute a plan toward a sustainable digital economy

The SDIA is the leading platform for driving sustainability in the digital sector – will you lead with us?



Are you **committed to creating sustainable growth** of digital technologies & infrastructure?

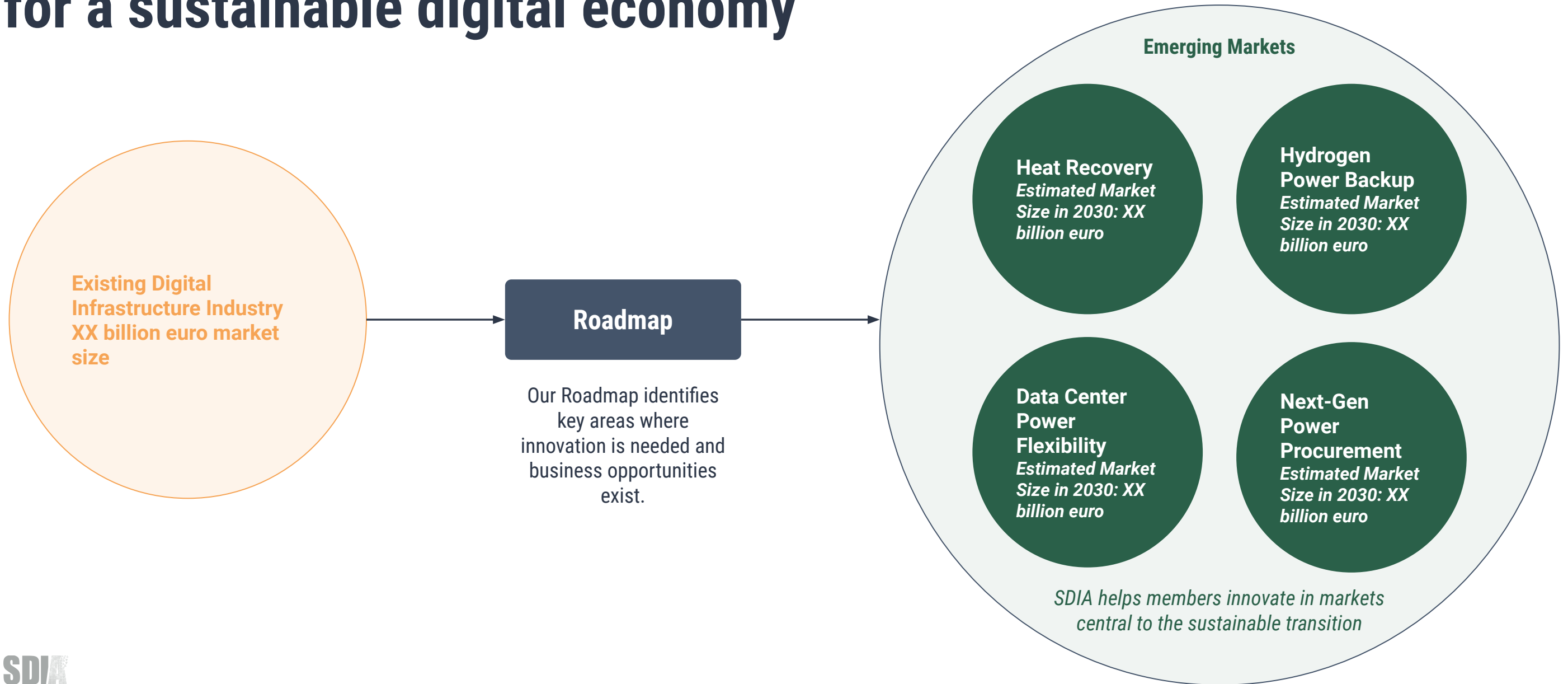


Does your organization deliver products or services that **can contribute to solutions which lead to a meaningful impact** on our Roadmap Activities?



Are you **willing to contribute resources** – either financial or in-kind – to make this happen?

Together with our members, we incubate business models for a sustainable digital economy



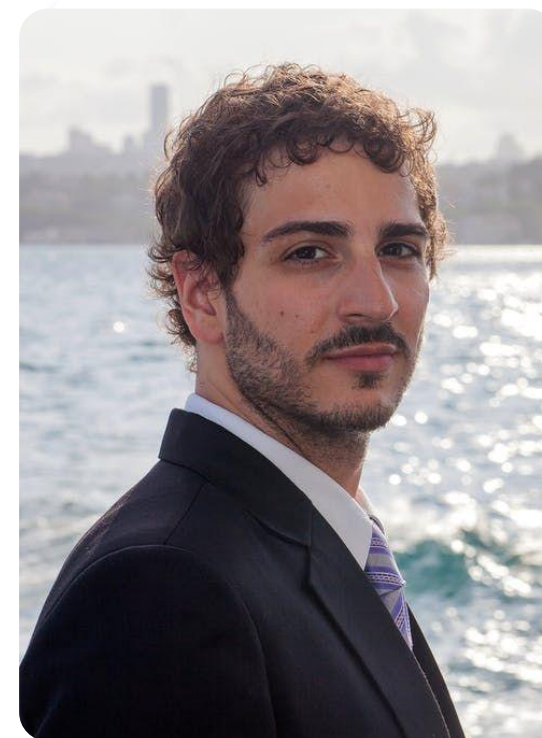
Still have questions? Let's talk



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