



Transitioning to a Circular Economy

10-Sep-21



Agenda



Enel Group global context

Circular economy basics and North America

Enel's model for circularity

Examples from our business

Q&A



Enel: a growing green energy giant

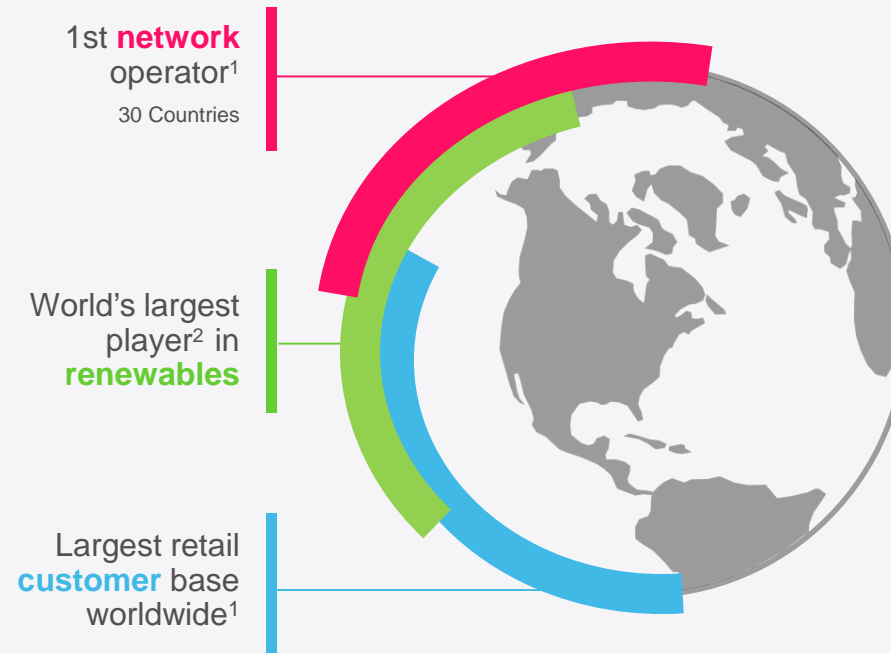
Accelerating the Energy Transition: the focus on decarbonization and electrification



Enel is a multinational power company and a leading integrated player in the global power, gas and renewables markets. We are changing the face of energy as a shaper, leader and enabler of the energy transition.

Enel began as an energy utility over 50 years ago, but today we are not the company we once were.

With a dedicated focus accelerating the energy transition through decarbonization and electrification, we have been listed on the *Dow Jones Sustainability Index* for 16 years and have been included on *Fortune Magazine's* "Companies Changing the World" list (2015, 2017, 2018).



1. By number of customers. Publicly owned operators not included
2. By installed capacity. Includes managed capacity for 4.2 GW
3. Includes customers of free and regulated power and gas markets

70 M

UTILITY
CUSTOMERS³

32

COUNTRIES

66,700+

EMPLOYEES

49 GW

RENEWABLE
CAPACITY

5.9 GW

DEMAND
RESPONSE
CAPACITY

2050

THE YEAR BY WHICH
ENEL PLEDGES TO BE
CARBON NEUTRAL

Enel business lines

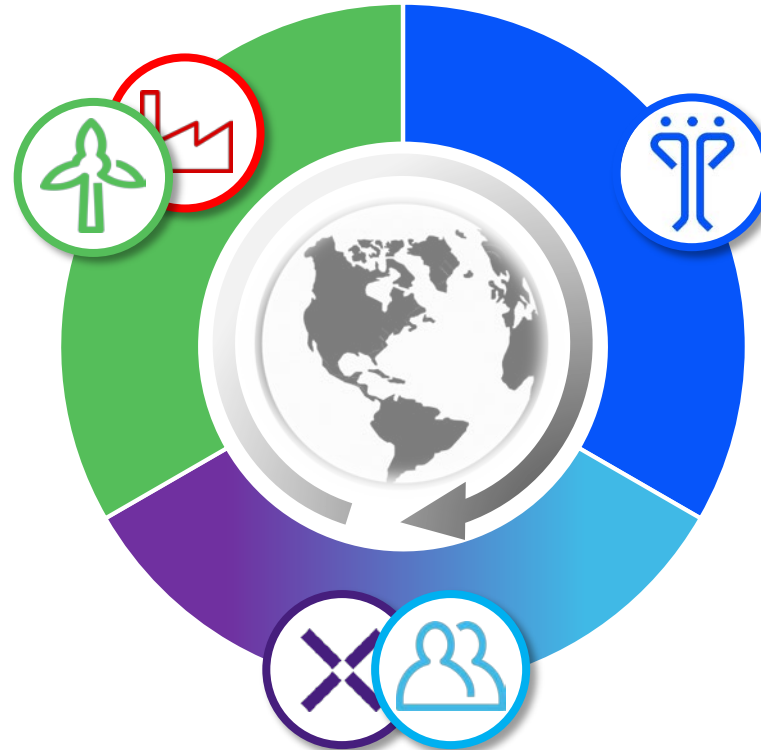


Global Power Generation

Accelerates a sustainable energy transition, increasing **renewables** capacity growth and **decarbonizing** our fleet

Enel X

Enables the energy transition boosting electrification and decarbonization of customers, by providing **innovative services** and **system flexibility**



Global Infrastructure & Networks

Guarantees reliability and quality of service in the energy supply, through **efficient**, **resilient** and **digital** networks

Global Energy & Commodity Management

Optimizes the Group margin as a single portfolio, finding its **best balance**

Retail

Increases customer value through commodities and “beyond commodities” services also thanks to **customer satisfaction and experience** improvement



OUR PURPOSE

A photograph of several wind turbines silhouetted against a vibrant sunset sky with orange and red clouds. The turbines are positioned across a dark horizon line.

Open Power

CASTLE ROCK RIDGE II, ALBERTA, CA

for a Brighter Future:

We empower sustainable progress

Sustainability

=

Value

10-Sep-21

Planning

Actions

Metrics

Fundamental
Parameters

Storytelling

Sustainability is at the core of Enel strategy

Drive sustainability through growth acceleration



Enel's commitment to the UN Sustainable Development Goals



Quality Education



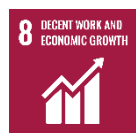
Affordable and Clean Energy



Affordable and Clean Energy



Climate Action



Decent Work and Economic Growth



Peace, Justice and Strong Institutions



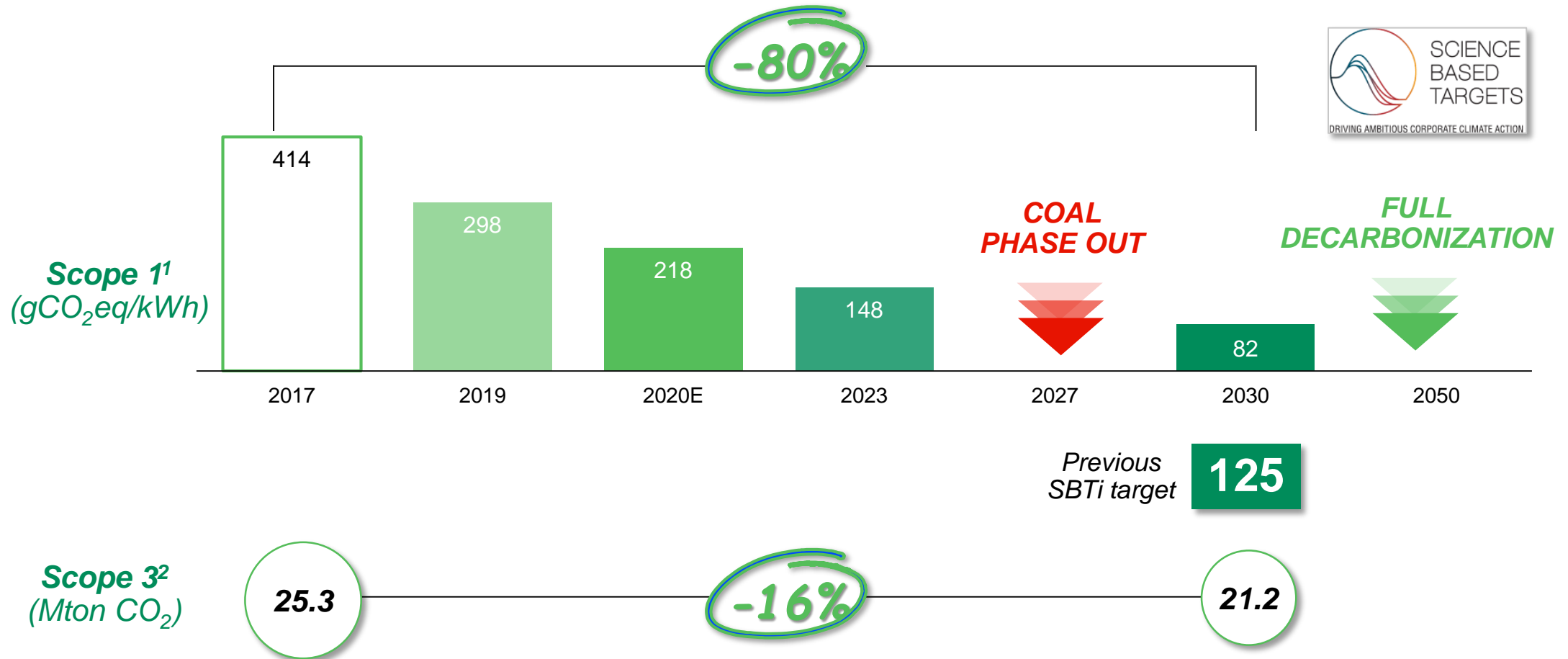
Industry, Innovation and Infrastructure

Enel Sustainability Plan 2021-2023



Growth accelerators include innovation, digital supports, circular economy and sustainable finance.

GHG emissions reduction, in line with 1.5° scenario



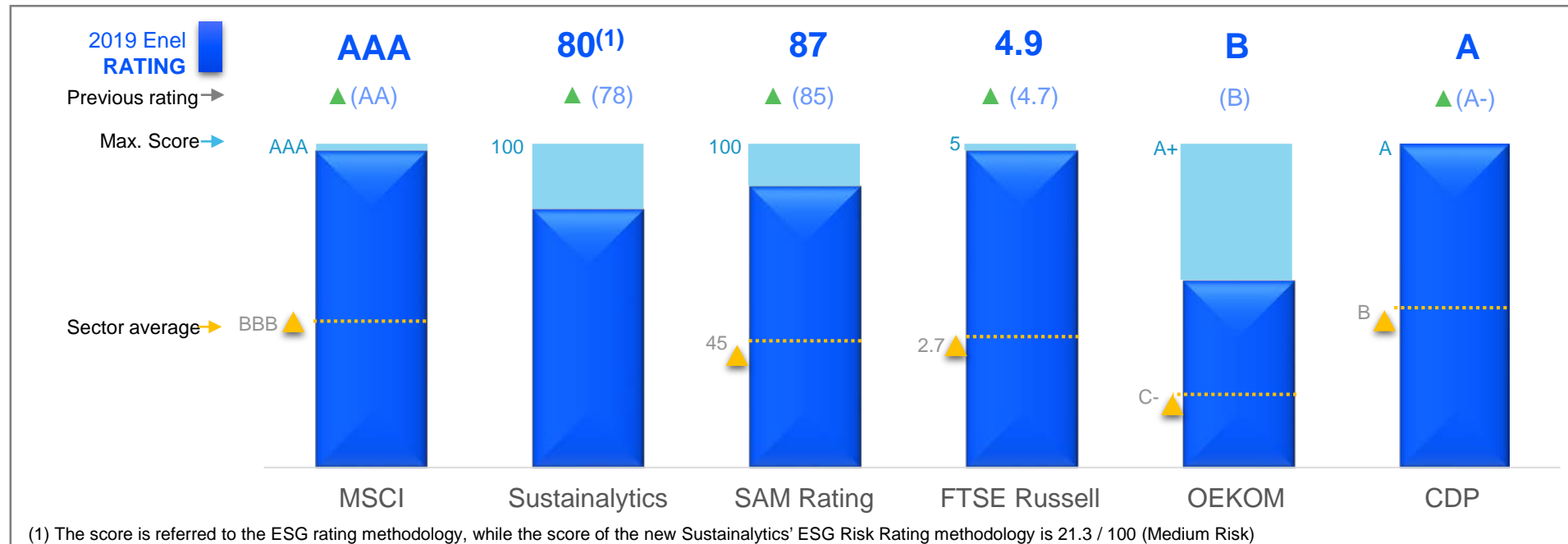
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1. Scope 1 by 2030, consistent with the 1.5 pathway of the Science Based Target Initiative and the IEA 1.5 scenario
2. Scope 3 related to gas retail activities by 2030, consistent with the 2C pathway of the Science Based Target Initiative

Outstanding position in main ESG Ratings in 2019



Main ESG Ratings



Main ESG indices & Rankings

MSCI ESG
Universal Indexes
MSCI ESG
Focus Indexes



MEMBER OF
Dow Jones
Sustainability Indices
In Collaboration with RobecoSAM



Global 100
(Corporate
Knights)

Enel in the United States & Canada

Changing the face of energy



AURORA SOLAR FARM, MN



GILLETTE STADIUM, MA



RIVERVIEW WIND FARM, CANADA

10-Sep-21

enel

Enel in the U.S. & Canada



For 20 years Enel has been a renewable energy leader and innovator in the United States and Canada. Our goal is to help companies and consumers find value in sustainability.

We are empowering sustainable progress.

Producing clean energy from renewable sources is only the first step towards the energy transition. We are complementing the growth of renewables with increasingly flexible energy solutions, helping to accelerate the electrification and decarbonization of the grid. Thanks to the energy, expertise and common vision of Enel's people, we can manage the constantly evolving complexities of the energy industry to deliver greater value for our partners.

Together with our customers, people and partners we are creating lasting, shared success from the energy transition.

50

US STATES

2

CANADIAN
PROVINCES

1,350

EMPLOYEES

2

INNOVATION HUBS
IN BOSTON AND
SAN FRANCISCO

Main offices:

ANDOVER, MA

BOSTON, MA

LENEXA, KS

LIBERTY LAKE, WA

NEW YORK, NY

OKLAHOMA CITY, OK

RENO, NV.

SAN CARLOS, CA

WASHINGTON, DC

CALGARY, AB



Enel North America

A top 5 owner and operator of renewable energy power plants



Global Power Generation

A leading owner and operator of renewable energy power plants with 100% renewable capacity in North America (80 plants, >6 GW)

Enel X

Market leader in demand-response services and a provider of technology-enabled energy solutions

Global Energy & Commodity Management

Manages and maximizes the integrated gross energy margin, dispatching local generation fleet



Guiding our customers through the energy transition



The energy sector is experiencing a radical transition. Digitalization and customer centricity will change how energy is produced and consumed. Through our business offering in the US and Canada we are helping our customers navigate complexity and generate long-term value from their sustainability investments.

DECARBONIZATION



77% of new global generating capacity by 2050 will be renewables.

ELECTRIFICATION



Global electricity demand will increase by 60% by 2040.

DIGITALIZATION



Digital electricity infrastructure investments increased 45% between 2014 and 2016.

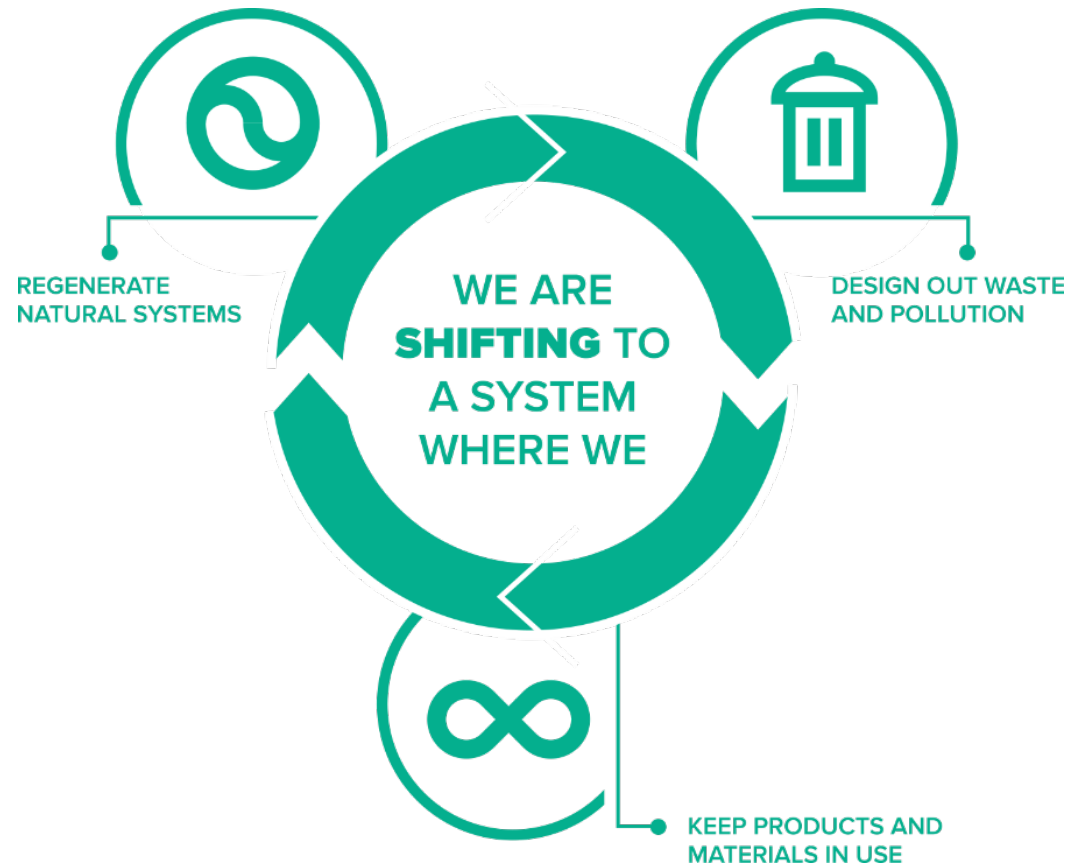
NEW CUSTOMER NEEDS



New customer needs lead to the development of customized services with a sustainable approach.

Circular Economy (CE)

From linear to circular



Principles of the Circular Economy

1. **Design out waste and pollution**
 - GHGs and hazardous materials, pollution, traffic congestion
2. **Keep products and materials in use**
 - Optimize resource yields by circulating products, bio-based materials
3. **Regenerate natural systems**
 - Avoids non-renewable resources, using renewable energy, returning nutrients to soil

Drilling down from the macro view to execution

Aspects of management and business planning drive more circular outcomes

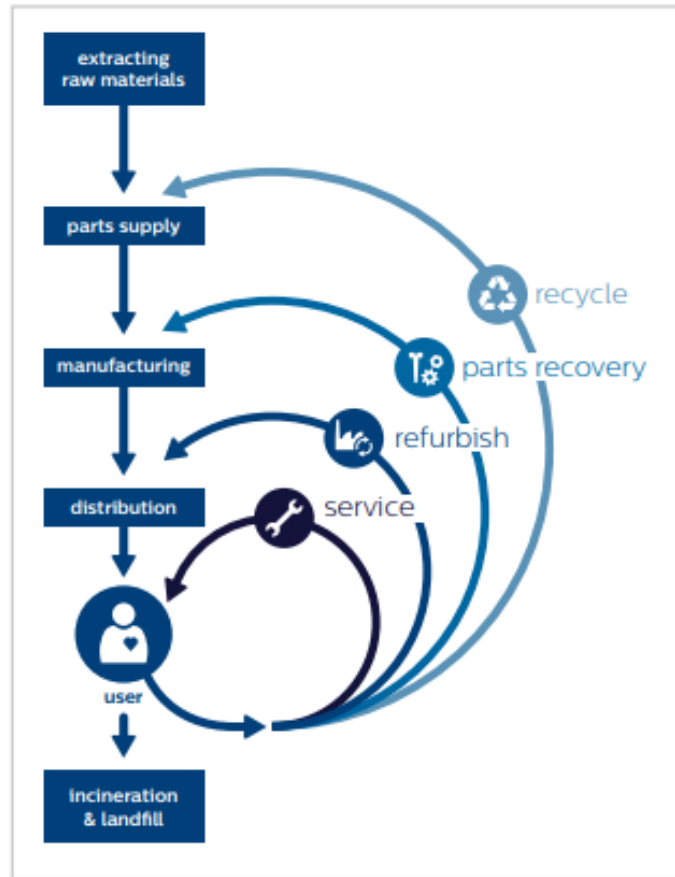


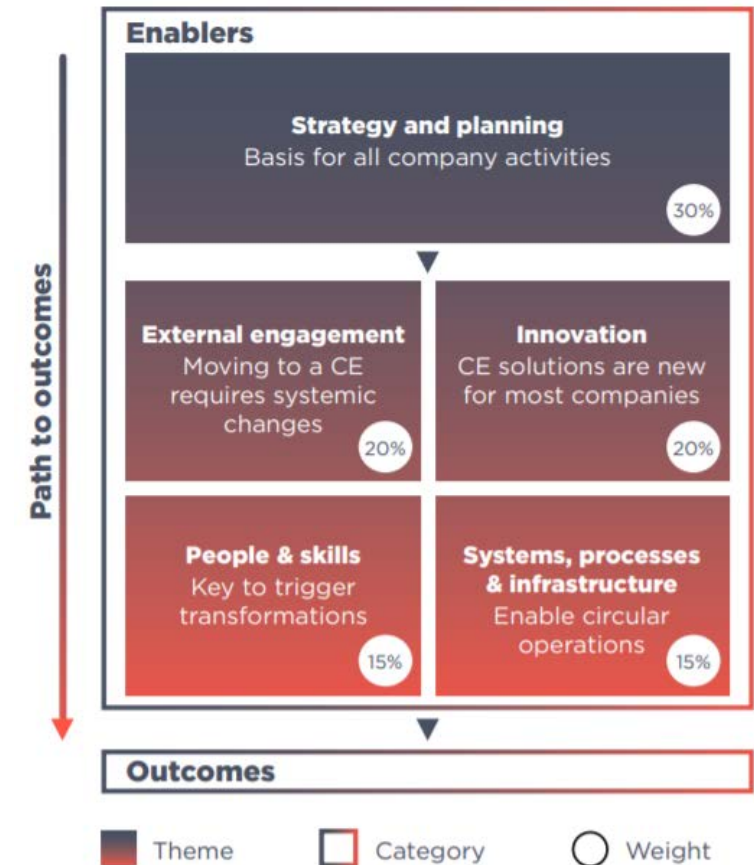
Image: PACE | CEC | Philips

“Up to \$500 billion of value is at stake by 2030 in waste-to-wealth opportunities in the electricity industry — an industry worth \$2.7 trillion today.”

- Jean Marc Ollagnier, Forbes

“The U.S. has fallen behind its peers by failing to announce a national circular economy strategy. Many countries...are on their second or third policy iteration on this issue.”

- BNEF



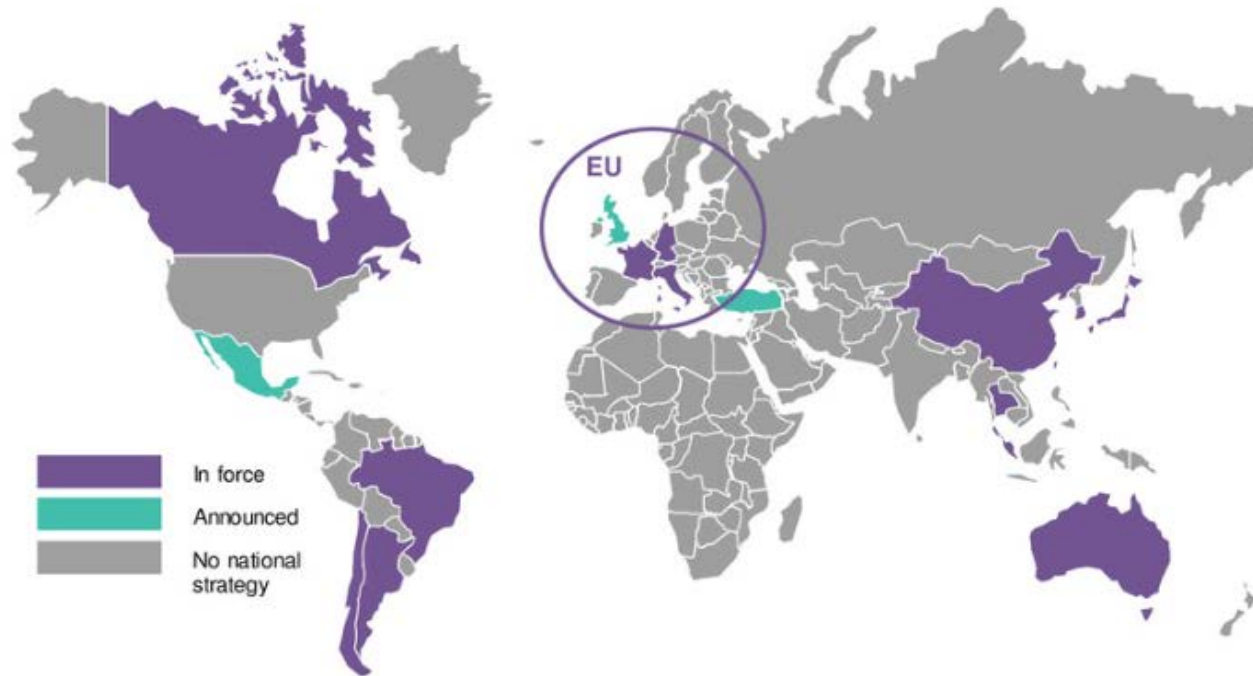
Source: Ellen McArthur Foundation

Circularity policies are spreading globally

US is perceived to be a laggard internationally, but legislation has been introduced



Figure 2: National circular economy policies announced or in force



Source: BloombergNEF Circular Economy Policy Database ([web](#) | [terminal](#)). Note: The EU has introduced overarching circular economy goals, but individual countries are free to implement their own plans to meet these targets. So far France, Germany, Italy, and the UK have done so.

Examples include:

- Environmental Product Declarations (EPDs)
- Minimum required contents
- Elimination of problematic substances in products
- Bans on industrial processes or single use materials
- Product take back programs
- Recycling mandates

Regional action is driven by consortiums

Given CE is in nascent stages in North America, opportunity exist to influence and engage



USA



Mostly driven by states and municipalities, policies are opportunity driven

- ANSI and RIC jointly developed national **standards on remanufacturing**
- **CE incubation center** launched in 2017 by Arizona State University in partnership with City of Phoenix, funded by US Economic Development Administration
- In 2018, the US Dept. of Energy provided funding to the **REMADE Institute**, focusing on driving down the cost of **reuse, recycling and remanufacturing technologies**
- **NYC Zero Waste initiative** to reduce commercial waste by 90% by 2030 and **Orlando's goal to become a zero-waste** community by 2040



Leading companies are focusing on circularity

Enel is a collaborative partner open to discussions across several sectors



GLOBAL PARTNERS OF THE ELLEN MACARTHUR FOUNDATION



wbcsw Circular Metrics Project work group



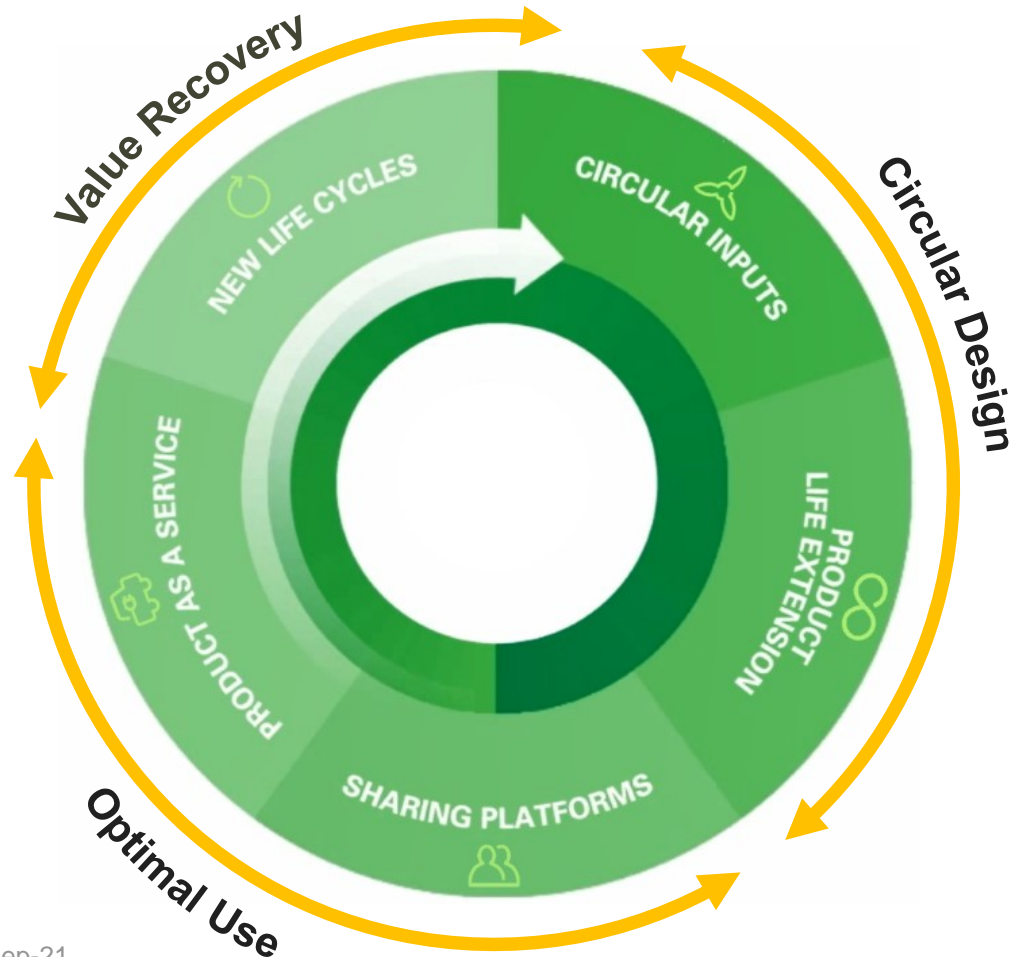
Quantis Plastics Leak Project



Circular pillars: Enel Group model



The Enel's five pillars of Circular Economy



Circular inputs: from renewable, reuse, recycle



Product Life extension: Extending life through design, maintenance and repair



Sharing platforms: increase utilization rate through shared use/access/ownership



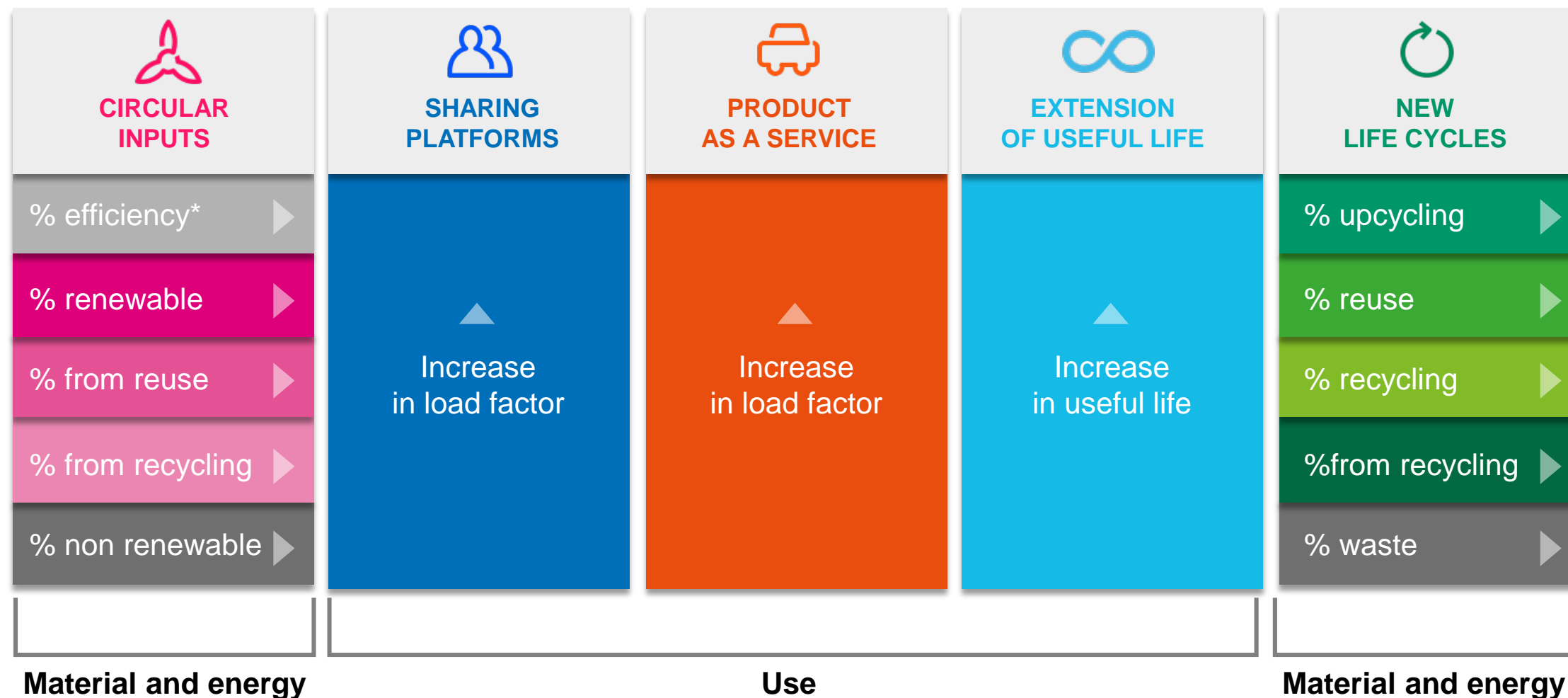
Product as a service: sell to clients a service instead of a product



New life cycles: maintain value through upcycling, reuse and recycling

Circulability model

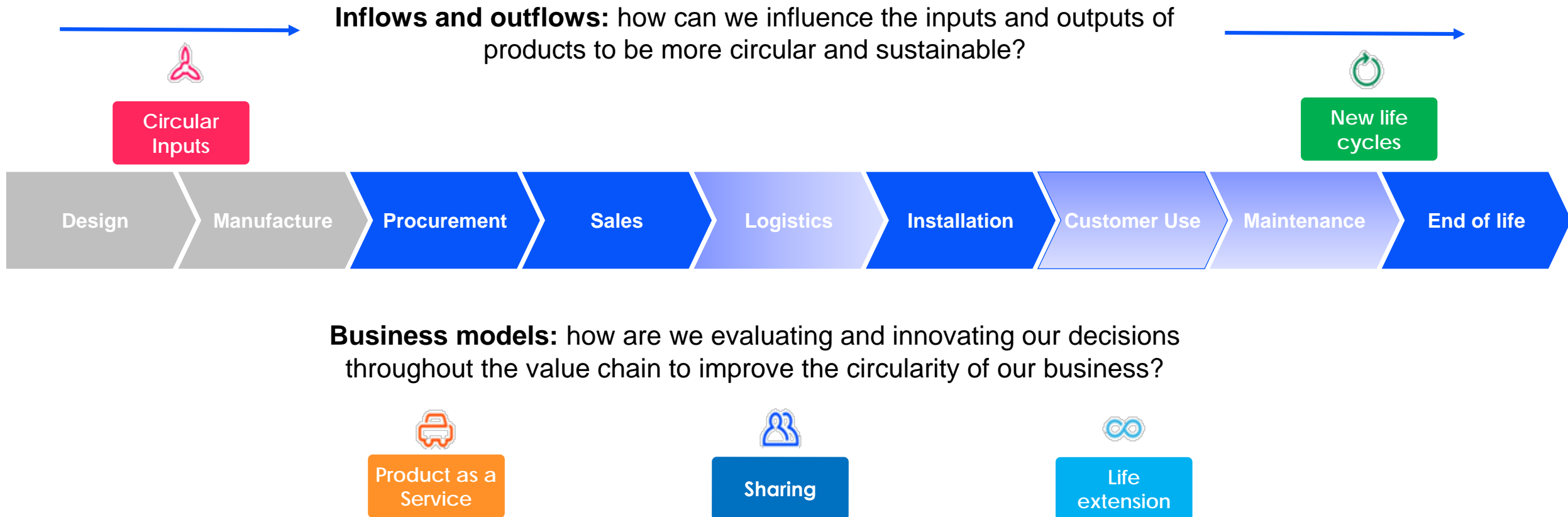
Five pillars defined through specific metrics



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Product or asset value chain

Assessing total product life cycle and evaluating how and where we can improve



Illustrative example

Managed by Enel

Not managed by Enel

Sustainability – USA & Canada | Enel North America, Inc.

Product or asset value chain

We need to re-evaluate the levers we control to improve circularity



- Are we currently involved in product design?
- **Can we increase the amount of circular or sustainable inputs?**
- Can the product be designed to be more modular, promoting life extension?

- **What are market-specific drivers or requirements?**
- Can we offer new commercial models – i.e. bundle with RE, PaaS, or sharing?

- **Are we able to influence customer use?**
- Are we communicating the benefits of applying the CE lens to customers?

Design

Manufacture

Procurement

Sales

Logistics

Installation

Customer Use

Maintenance

End of life

- **What is our supplier selection process?**
- How can we ensure EPDs and codes of conduct are adhered to?

- Subcontracted; how can we influence the process?

- **What is the O&M model, and can we influence it?**

- **How do we ensure responsible product take back?**
- Are there upcycling, reuse or recycling opportunities?

Illustrative example

Managed by
Enel

Not managed
by Enel

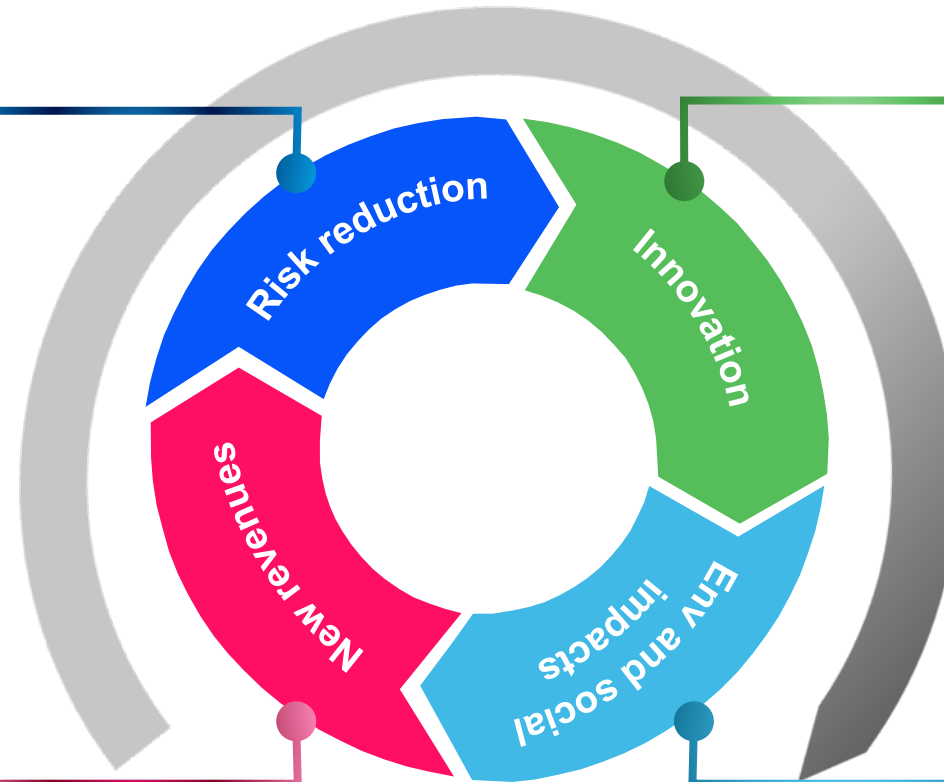
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Circular Economy opportunities



- **Lower** exposure to **commodity prices**
- Lower exposure to environmental risks

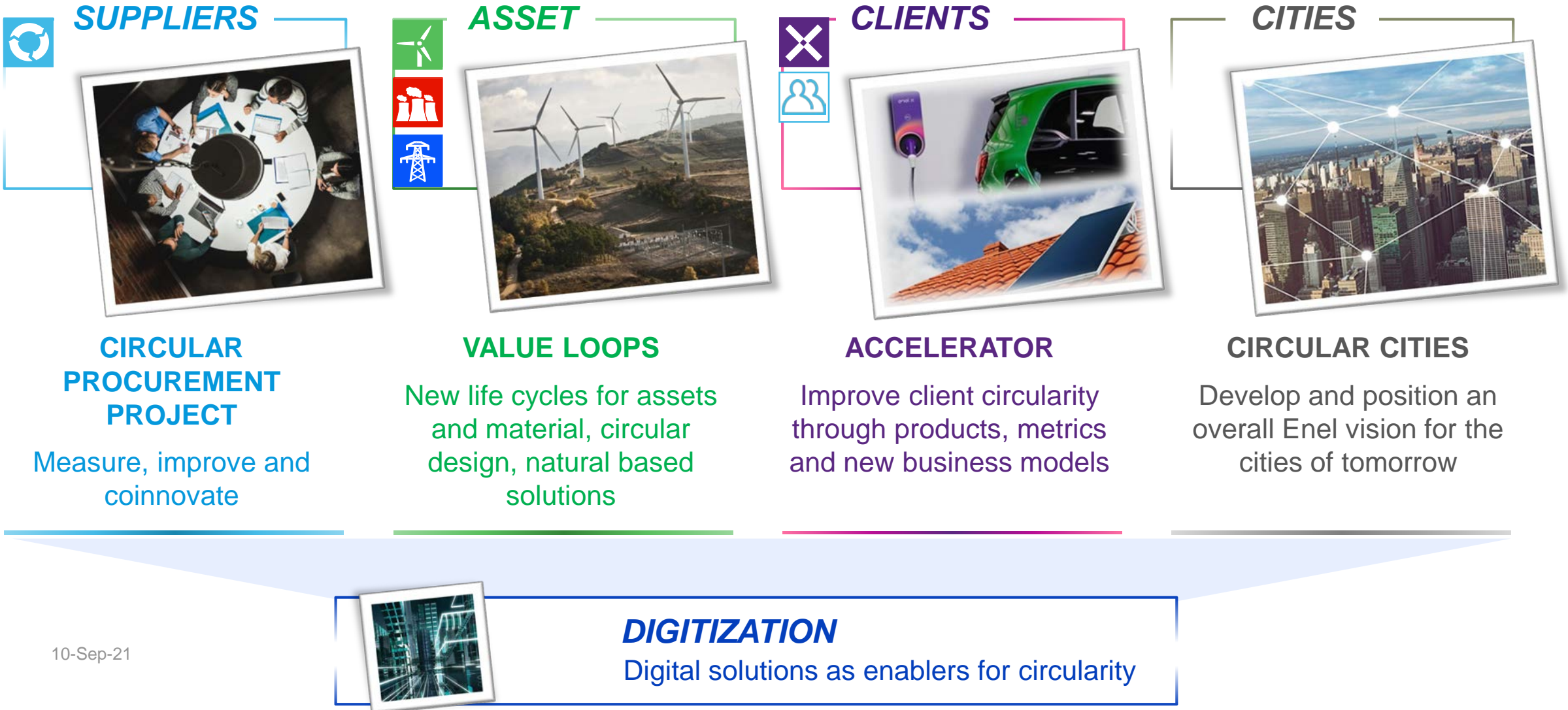
- **Keeping material value**
- **Value** not from sales but **from services**



- **New technologies** as enablers of circular solutions
- **New business model** to create value from use vs. sale

- Minimize **environmental impact**
- **Maintenance + services** instead of resources extraction + automation

Main focus of the business lines



Circular Procurement Strategy



Purchase works, goods and services with the aim of **reducing environmental impacts** and **waste creation** during their life-cycle



ENVIRONMENTAL KPIs

GLOBAL WARMING POTENTIAL (GWP)

ACIDIFICATION POTENTIAL (AP)

OZONE-CREATING POTENTIAL (POCP)

EUTROPHICATION POTENTIAL (EP)

1

Suppliers engagement

TENDER PHASE (K)

Rewarding **suppliers** for their commitment in transition toward the Circular Economy.

2

Definition of metrics and impacts

EPD PROGRAM

Quantify, assess and validate environmental **impacts** deriving from the manufacturing cycle.

3

Co-innovation

CIRCULAR BY DESIGN PACKAGING

Re-examine design, production **processes** and packaging



LESS IMPACTS
COST SAVING

RISK REDUCTION
LOCAL SUPPLY CHAIN

Circular Procurement Strategy: roadmap



Definition of metrics and KPIs

Circular Economy Initiative for supplier engagement

Project launched

2018

Internal protocol and webtool

2019



From Protocol
to PCR to EPD®

2020

TARGET

2021

First wave

Solar PV, Wind Turbines,
Insulators, Smart Meters, Switches

Second wave

Storage, Cables, EV charger stations, Transformers,
Home appliances, Public lightning, Electrical panels

> 60 % of total supply

Circular Supplier Webtool: aggregates and analyses the environmental impacts of the products in order to define the areas of potential co-innovation with suppliers

PROTOCOL: rules, requirements, and guidelines for developing an EPD for a specific product category. It becomes PCR in case of certification.

EPD: declaration validated by third party, according to international standards ISO 14040 and ISO 14025, with the purpose of quantifying and objectifying data of the entire lifecycle of a supply.

PCR (Product Category Rules): recognized standard providing rules, requirements, and guidelines for developing a certified EPD for a specific product category.

1.2 Information about this PCR

Proponent	ENEL S.p.A. - Viale Regina Margherita 125 - 00198 Rome, Italy
PCR Title	ELECTRICITY PRODUCED BY WIND TURBINES
Type of PCR	Core PCR

10-Sep-21



EPD PROGRESS 12/2020



■ insulator ■ meter ■ pv panel ■ switches ■ wind turbine



Other PCRs under development: Cables, Transformers, EV Charging stations, Public Lighting, Switchboards, Storage, Home Appliances

10-Sep-21

SUPPLIERS ENGAGED WITH EPD PROCESS, CONVERGING TOWARD TARGETS

From renewable energy to sustainable energy

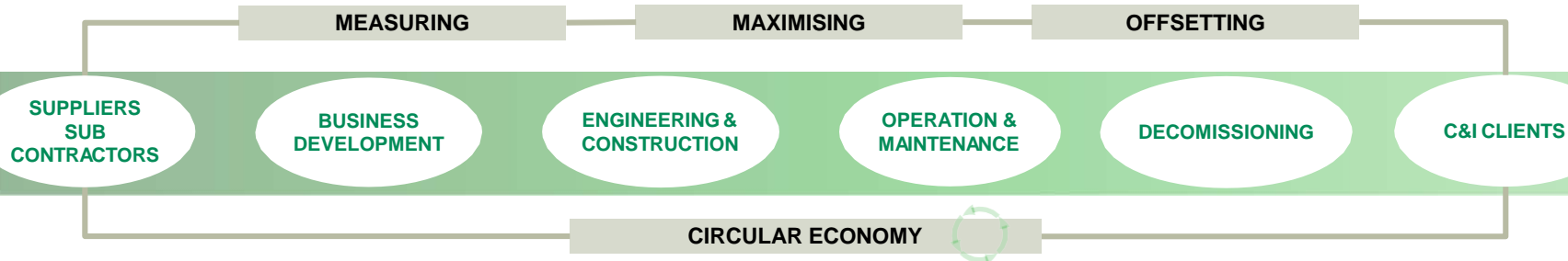
Where do we want to go?



GREEN ENERGY

*From Coal to renewables, a Fair Energy Transition, bringing **socio-economic** and **environmental** benefits ...*

*... thanks to the **Creating Shared Value** approach integrated strategy extended to **suppliers and clients**, and leveraging on **Circular Economy***



SUSTAINABLE ENERGY

A differentiation lever with Customers and Investors

SUSTAINABLE PILLARS

Sustainable Procurement | Sustainable Design | Sustainable Construction Site | Sustainable Plant | Sustainable Decommissioning

10-Sep-21



The future of solar

Successfully applying Circular Economy principles for dual land use models



20

- External & internal stakeholders interviewed

37

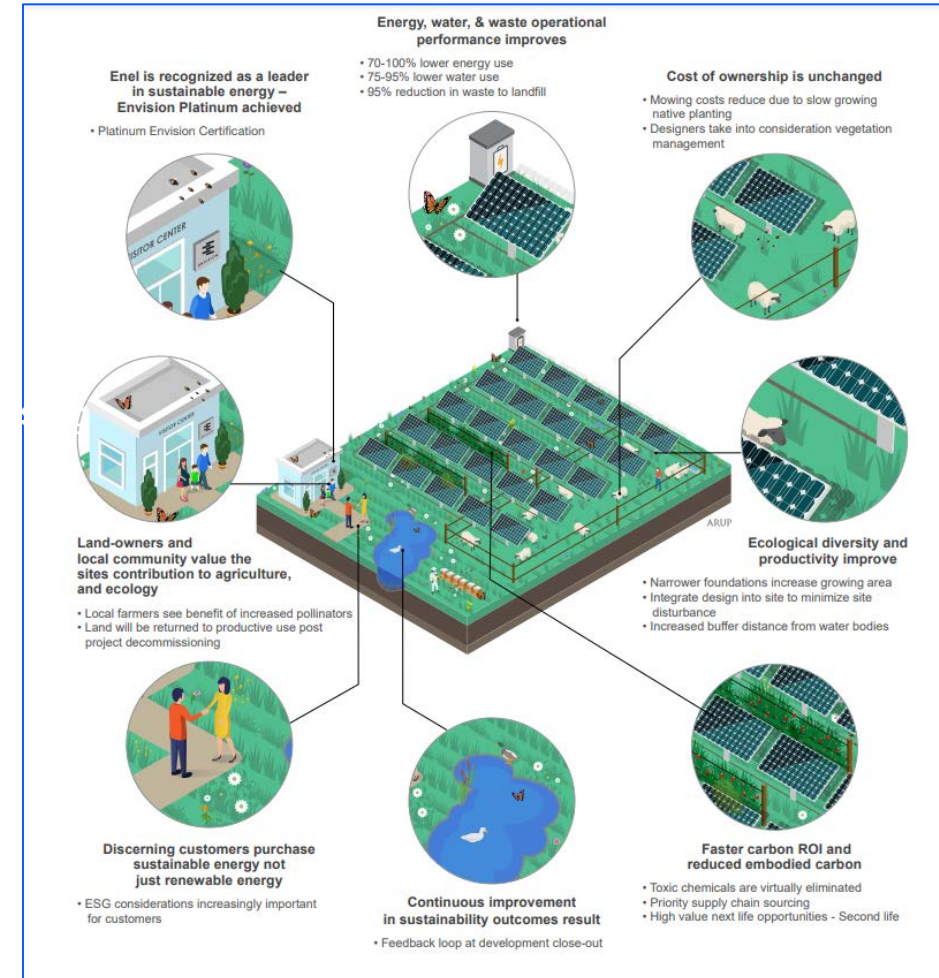
- Programmatic changes for more circular solar



- Tool to facilitate improved dual use solar outcomes



- Pathway to Envision Platinum, the highest accreditation



ARUP

EPRI | ELECTRIC POWER
RESEARCH INSTITUTE

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

The Bee & Butterfly
Habitat Fund
A Unique Conservation Solution.

Minnesota
Native
Landscapes

Re-Wind BladePole reuse project

Partnering with Innovation to progress towards full scale demonstration



Existing end of life solutions for blades include:

- Mechanical grinding
- Fuel/feedstock for cement production
- Landfill

...which have not met the commercial scale and environmental needs of Enel.

Re-Wind has **over 6 years of research** on recycling and reuse opportunities for wind blades and concluded the economic and environmental limitations of the **existing solutions are not sufficient.**

- The group proposes **reuse of the blade** in applications that **preserve the structural integrity** of the blade and as a result, **its economic value.**
- The group has developed the **BladePole application** in which parts of the blade are reused as **a electric transmission pole.**
- Civil structural analyses completed to evaluate feasibility, now must evaluate **half and full-scale demonstrations of the BladePole.**



Circular Chicago Coalition

Enel North America: Official Knowledge Partner



OBJECTIVE

- Position the City of Chicago to become the North American leader in circular economy design, inclusivity & practice, spurring job creation & SME development in marginalized communities

WHY THE CONCEPT IS UNIQUE

- Chicago would create a circular economy roadmap to affect circular legislation on a city, state and federal level
- Inclusively designed to address structural racism, targeting the marginalized black community in the South and West side of Chicago
- Over 20 confirmed corporate verbal references of support including Pepsi, McDonalds, and Dow
- All industries are represented with Enel North America representing the Energy sector as supporter

CONVENING PARTNERS



Reimagining economic growth for New York City

Employee-based challenge to develop a circular city



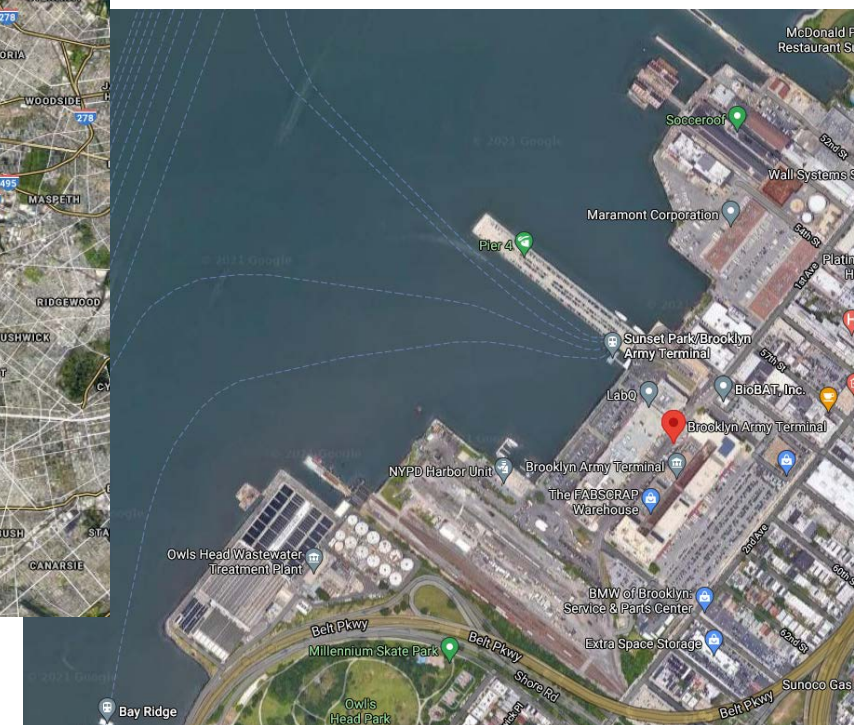
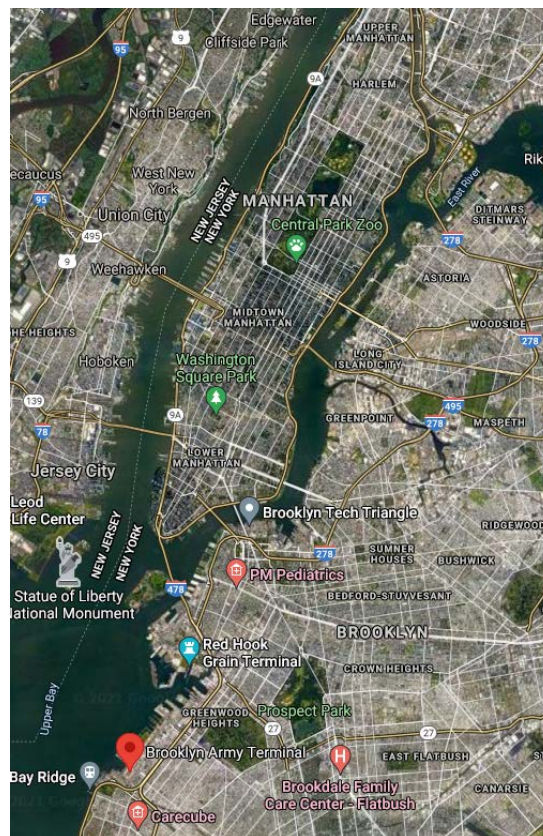
NYC/EDC



PYXERA Global



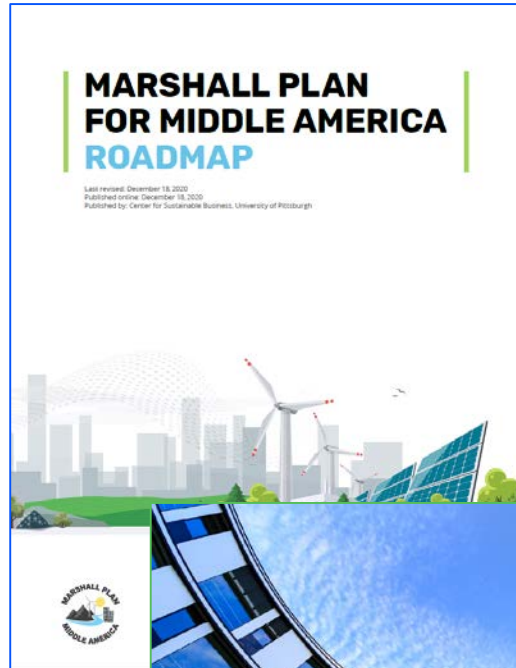
- >95 acres
- Mixed use facilities
- Multiple modes of transport



“Energy is at the forefront of circular economy and will play a critical role in making our urban energy ecosystems more resilient, equitable and climate-ready. This Challenge demonstrates a significant step forward in uniting collaborators from around the world to stimulate new economic opportunity and accelerate the transition towards a more sustainable and prosperous future for all.”

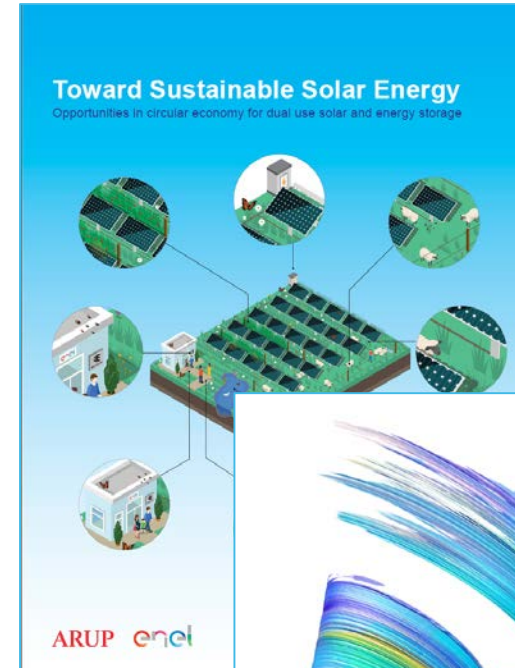
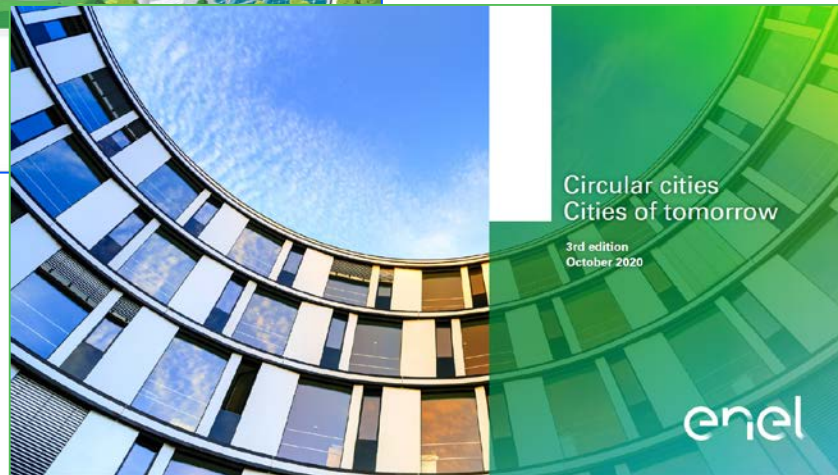
– SURYA PANDITI, President and CEO, Enel X North America

Learn more about circularity opportunities in the United States and Canada



2020: Enel Foundation and University of Pittsburgh

2020: 3rd edition



2021: Co-authored paper on dual use solar with Arup



2021: First North America position paper



Thank you

A large, solid grey rectangular block is positioned below the "Thank you" text, likely serving as a placeholder for a signature or a large graphic.

Peter Perrault, ENV SP, SMCP
Head of Circular Economy and
Sustainable Solutions – USA & Canada

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