

ReShaping Plastics

RUTAS HACIA UNA ECONOMIA
EUROPEA DE LOS PLASTICOS CIRCULAR
Y CLIMATICAMENTE NEUTRA

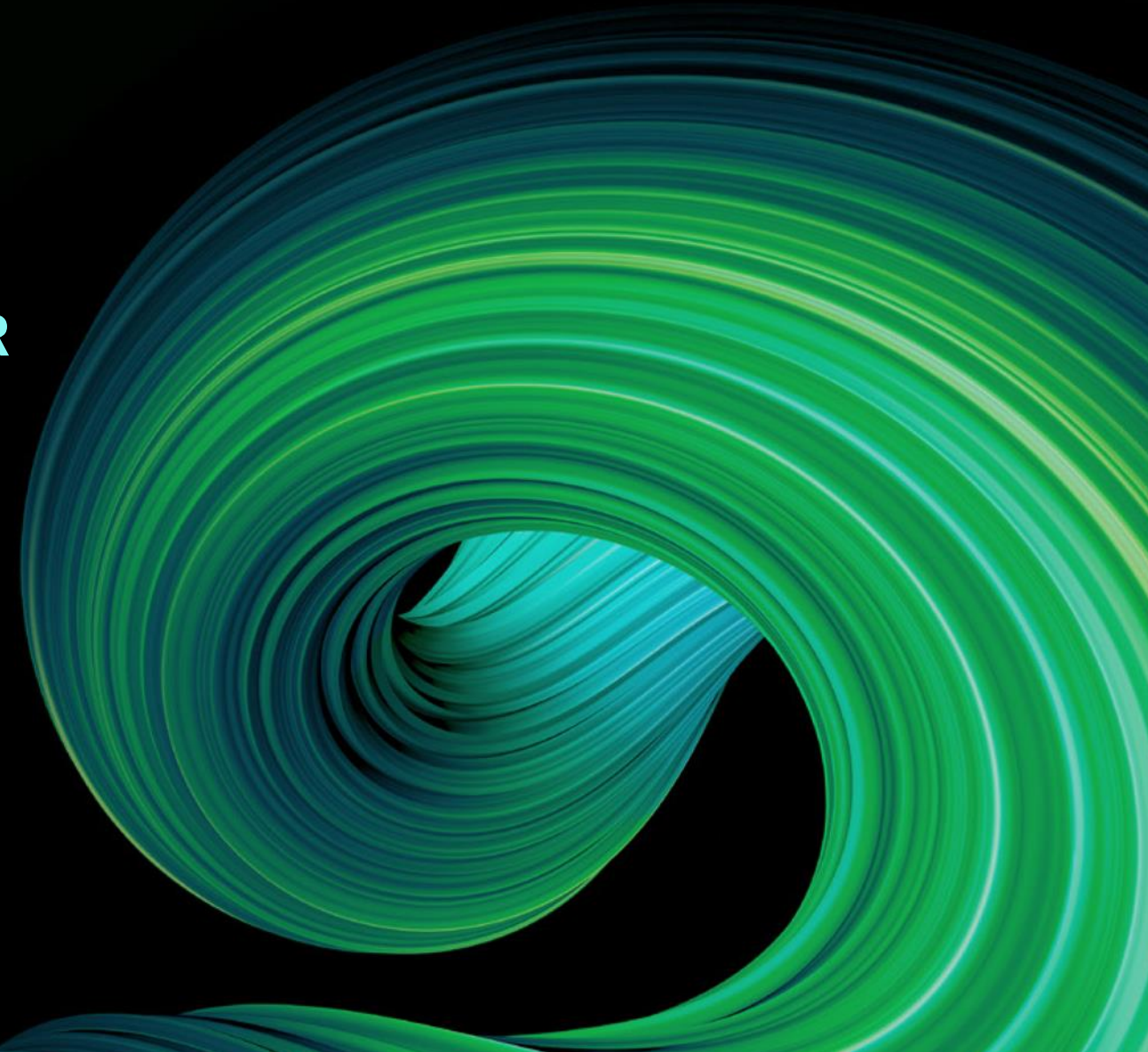
OCTOBER 7, 2022
PRESENTATION TO INNOVA PLASTICOS

S Y S T E M I Q

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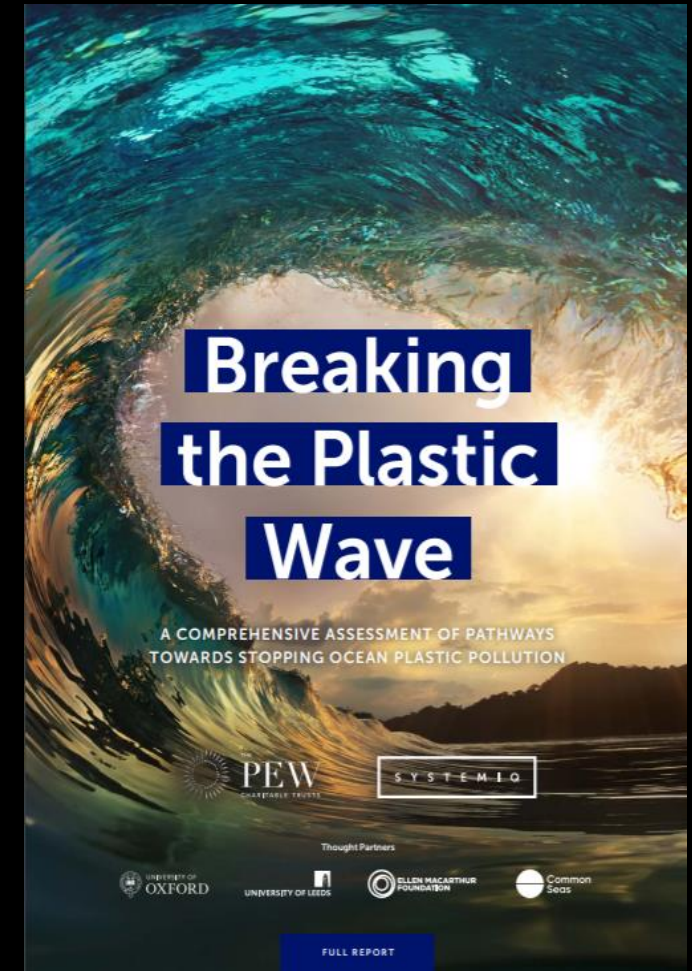
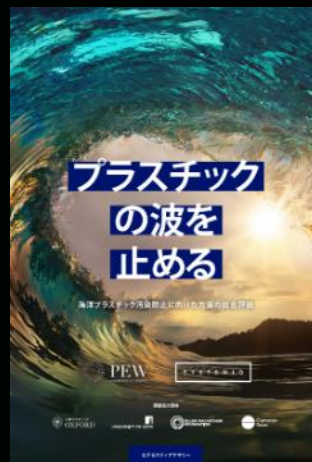
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BREAKING THE PLASTIC WAVE LAUNCHED IN RESPONSE TO A GLOBAL PLASTICS CHALLENGE



FOUR **UNRECONCILED** PROPOSITIONS (IN EUROPE)

1

**BANS &
REDUCTIONS**

2

**MATERIAL
SUBSTITUTION**

3

**CHEMICAL
RECYCLING**

4

**ALTERNATE
FEEDSTOCKS**

- HOW DO STRATEGIES PERFORM ON **ENVIRONMENTAL, ECONOMIC AND SOCIAL INDICATORS?**
- WHAT **COSTS AND INVESTMENTS** ARE ASSOCIATED?
- DO THEY ALIGN WITH **CLIMATE GOALS?**
- HOW **QUICKLY** CAN THEY BE IMPLEMENTED?

HOW “RESHAPING PLASTICS” IS DIFFERENT

- 1 Focus on Solutions
- 2 Circularity & Climate
- 3 System-wide Model
- 4 Data Driven & Impartial

OUR INDEPENDENT STEERING COMMITTEE AND EXPERT PANEL

The Steering Committee members are:



Jyrki Katainen

President of the Finnish Innovation Fund Sitra, Former European Commission Vice-President, Former Prime Minister of Finland, Steering Committee Chair



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Chair of Circular Plastics at Maastricht University
Steering Committee Deputy Chair



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European Environmental Bureau (EEB)



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Turntoo



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Research Manager Sustainable Materials
VITO

S Y S T E M I Q

FOUR CRITICAL QUESTIONS

- 1 What is expected from the plastic industry?
- 2 What's the starting point in 2022?
- 3 How to go circular?
- 4 How to go from circular to net-zero?

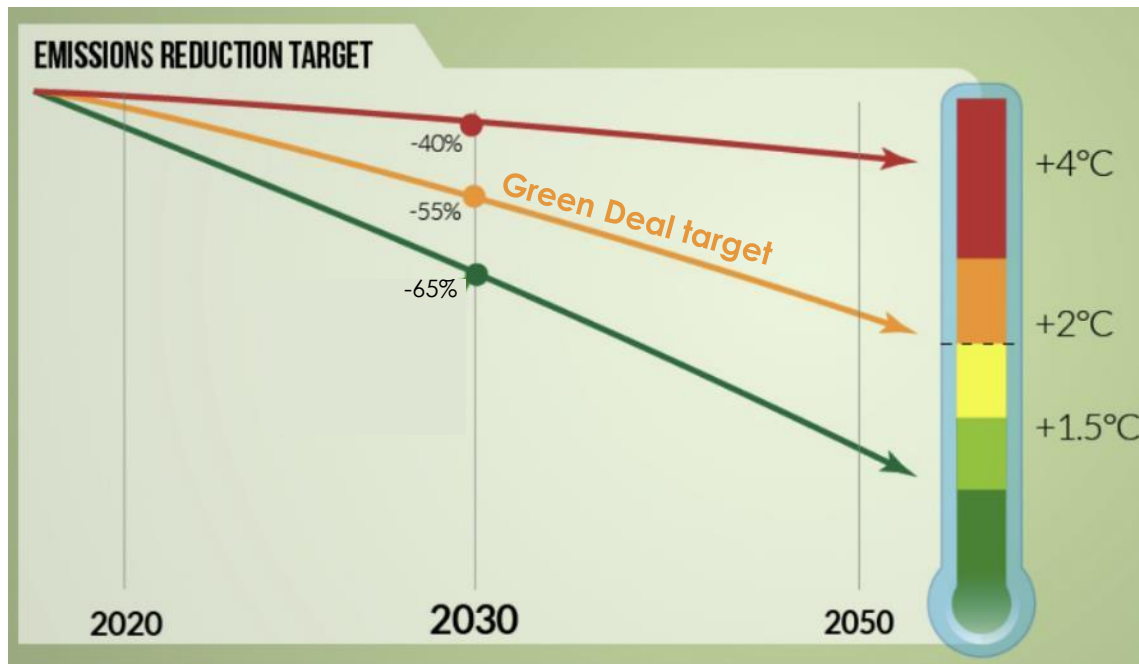
**What is expected
from the plastic
industry?**



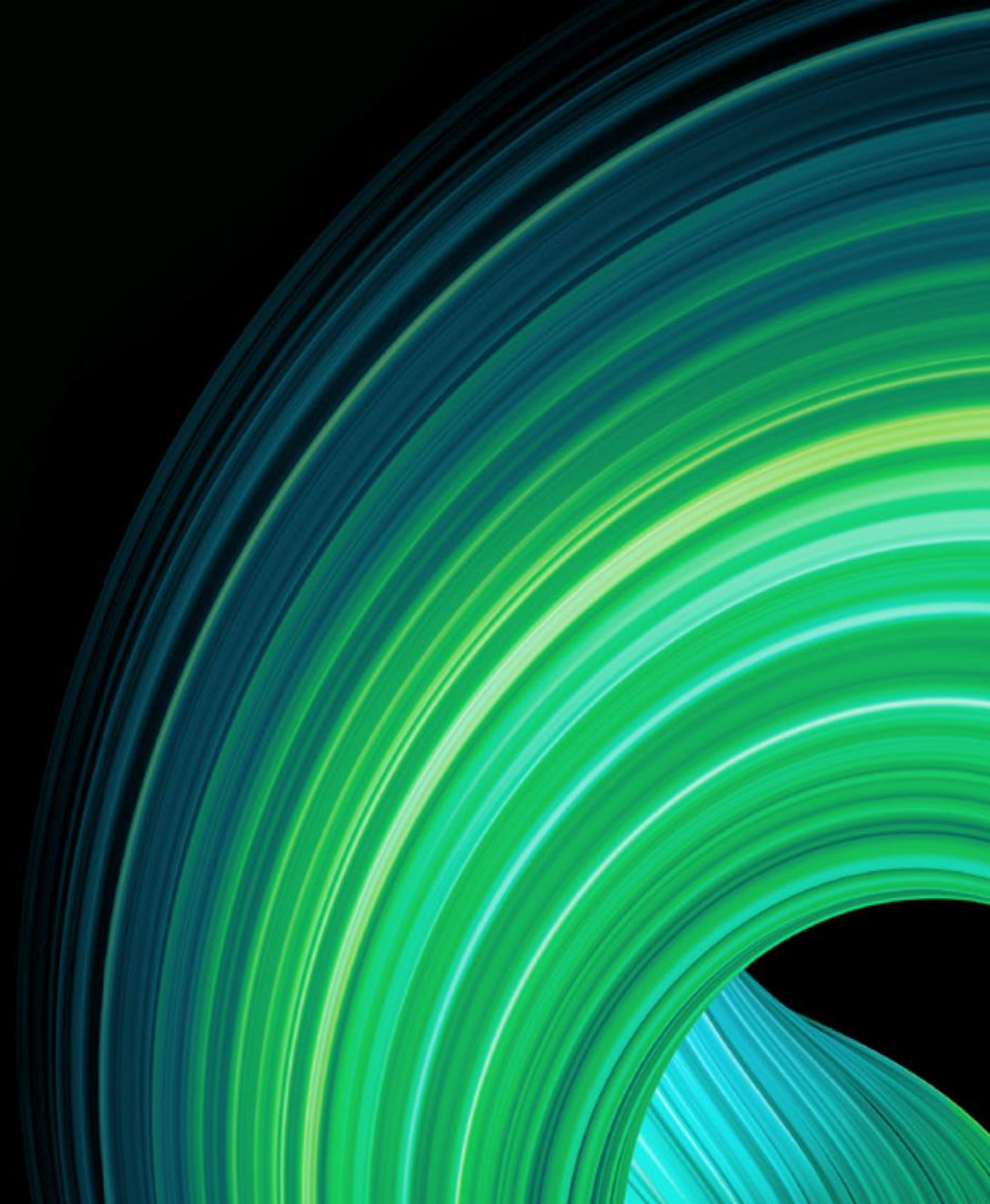
FOR THE FIRST TIME, INDUSTRY IS CONFRONTED WITH TWO LEGALLY BINDING REQUIREMENTS

INDUSTRIAL DECARBONIZATION ACROSS ALL SCOPES,
ANCHORED IN THE EUROPEAN CLIMATE LAW

CIRCULARITY, ANCHORED IN THE CIRCULAR ECONOMY
ACTION PLAN AND WASTE DIRECTIVES

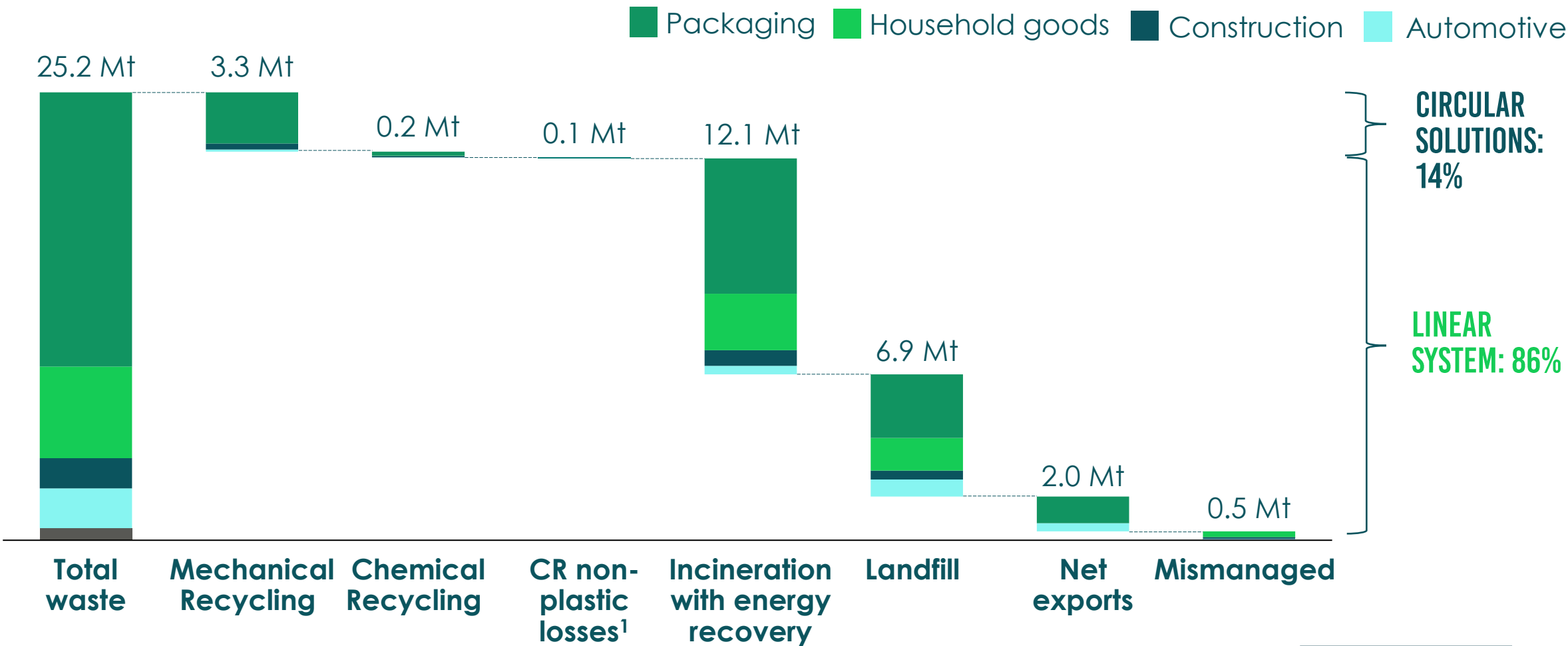


**What's the
starting point
in 2022?**



86% OF PLASTIC WASTE IN TODAY'S EUROPEAN SYSTEM IS LINEAR

PHYSICAL FATE OF PLASTIC WASTE IN EUROPE 2020



1) Chemical recycling non-plastic losses describes gaseous and process losses in chemical recycling (gasification and pyrolysis)

DOZENS OF CURRENT ACTIONS HAVE BEEN LAUNCHED



PUBLIC SECTOR

- European Green Deal
- Single Use Plastics Directive
- Packaging & Packaging Waste Directive
- Circular Plastics Alliance
- Circular Economy Action Plan 2.0
- Basel convention
- Landfill Directive
- EU Plastic Packaging Levy
- Plastic Waste Shipment rules

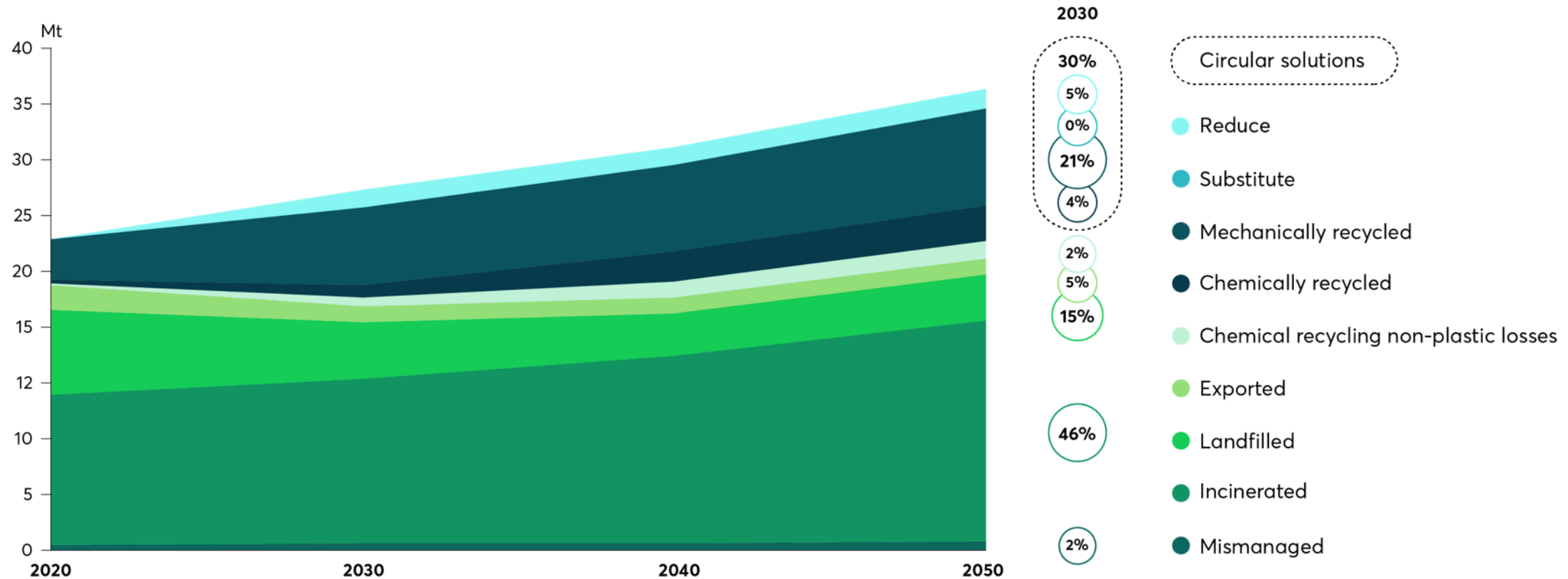


PRIVATE SECTOR

- Ellen MacArthur Foundation's Global Commitment
- EU Plastic Pact
- Chemical recycling pledges
- ...

CURRENT ACTIONS INCREASE CIRCULARITY FROM 14% TO 30% BY 2030

PHYSICAL FATE OF PLASTIC WASTE IN EUROPE 2020¹, MT

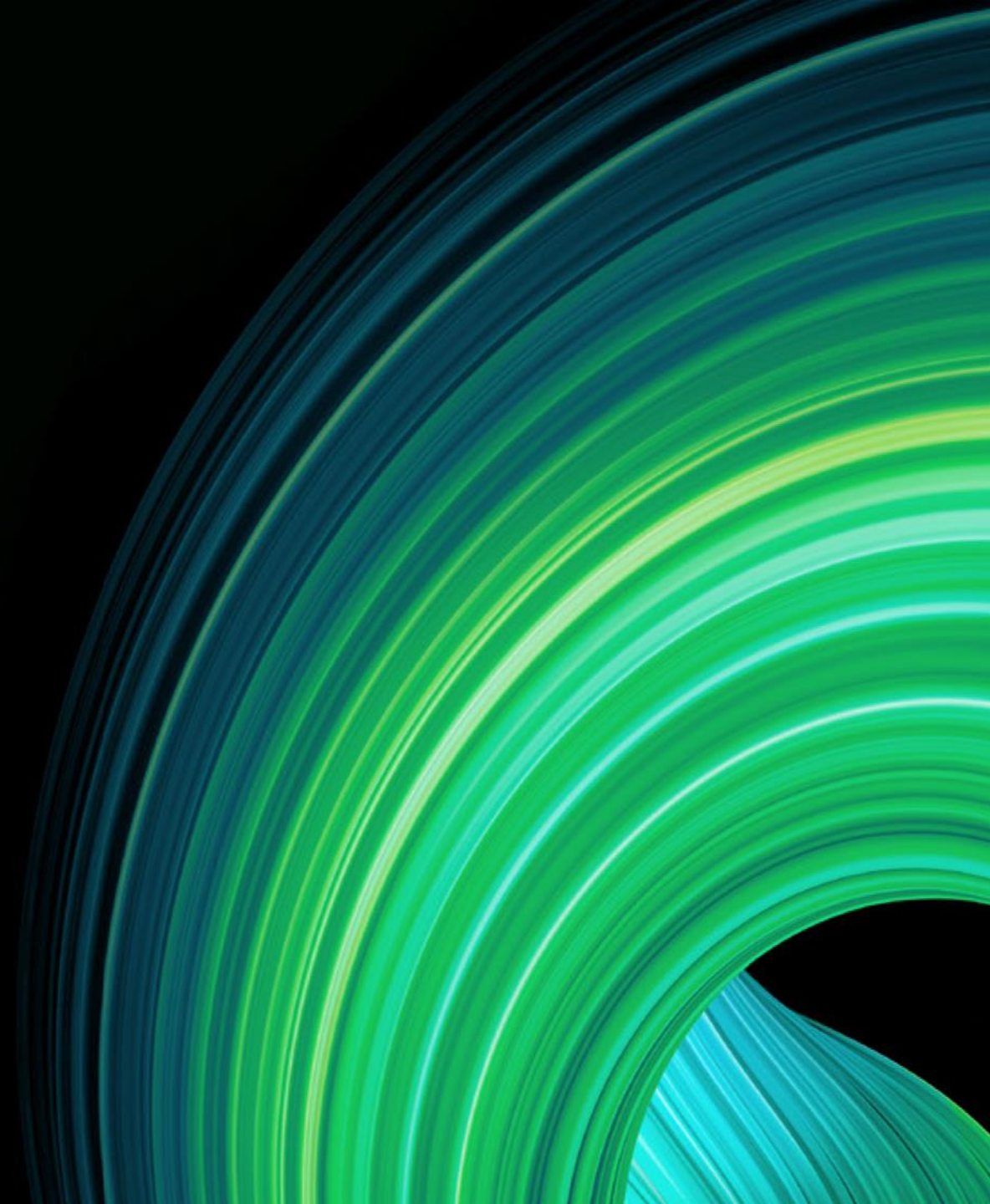


This scenario also **decreases CO₂ emissions by 10% by 2030**

The European plastics system is adapting, **but not yet fast enough** to align with the goals of the Circular Plastics Alliance, European Green Deal, or the Paris and Glasgow climate agreements.

1) Includes plastic waste from packaging, household goods, automotive, and construction

**How to go
circular?**



WE CREATED A **SCIENCE-BASED** METHOD TO DESCRIBE A CIRCULAR SYSTEM CHANGE SCENARIO

4 MATERIAL STREAMS

1 Packaging

2 Household goods

3 Automotive

d Construction

13 SYSTEM SOLUTIONS

a Eliminate

b Reuse

c New Delivery Model

d Paper Substitution

e Biogenic Substitution

f Closed loop MR

g Open loop MR

h Pyrolysis

i Gasification

j Depolymerization

k Dissolution

l Incineration

m Landfill

5 CRITERIA

a Affordability test

b Performance test

c Acceptance test

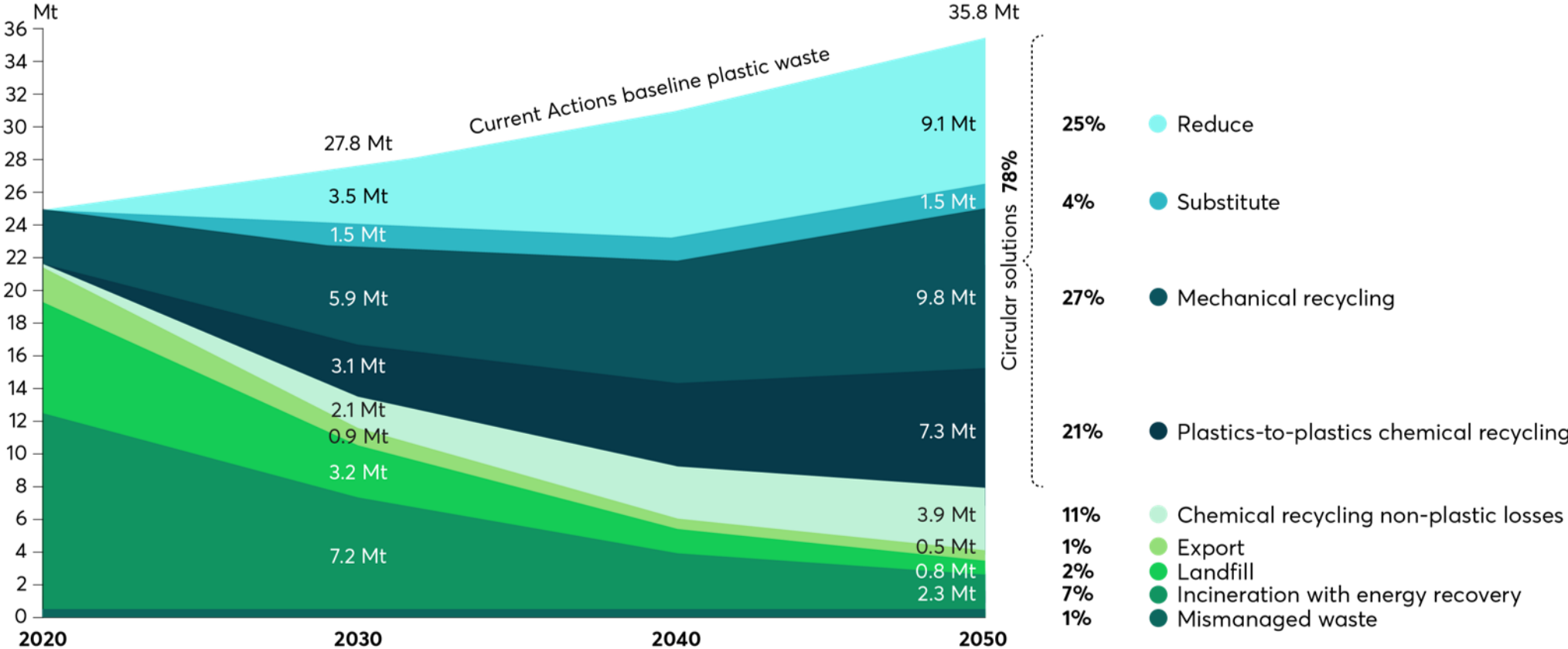
d Sustainability test

e Technology readiness

THE EUROPEAN PLASTICS SYSTEM COULD BE 78% CIRCULAR BY 2050...

PHYSICAL FATE OF PLASTIC WASTE IN EUROPE 2020¹, MT

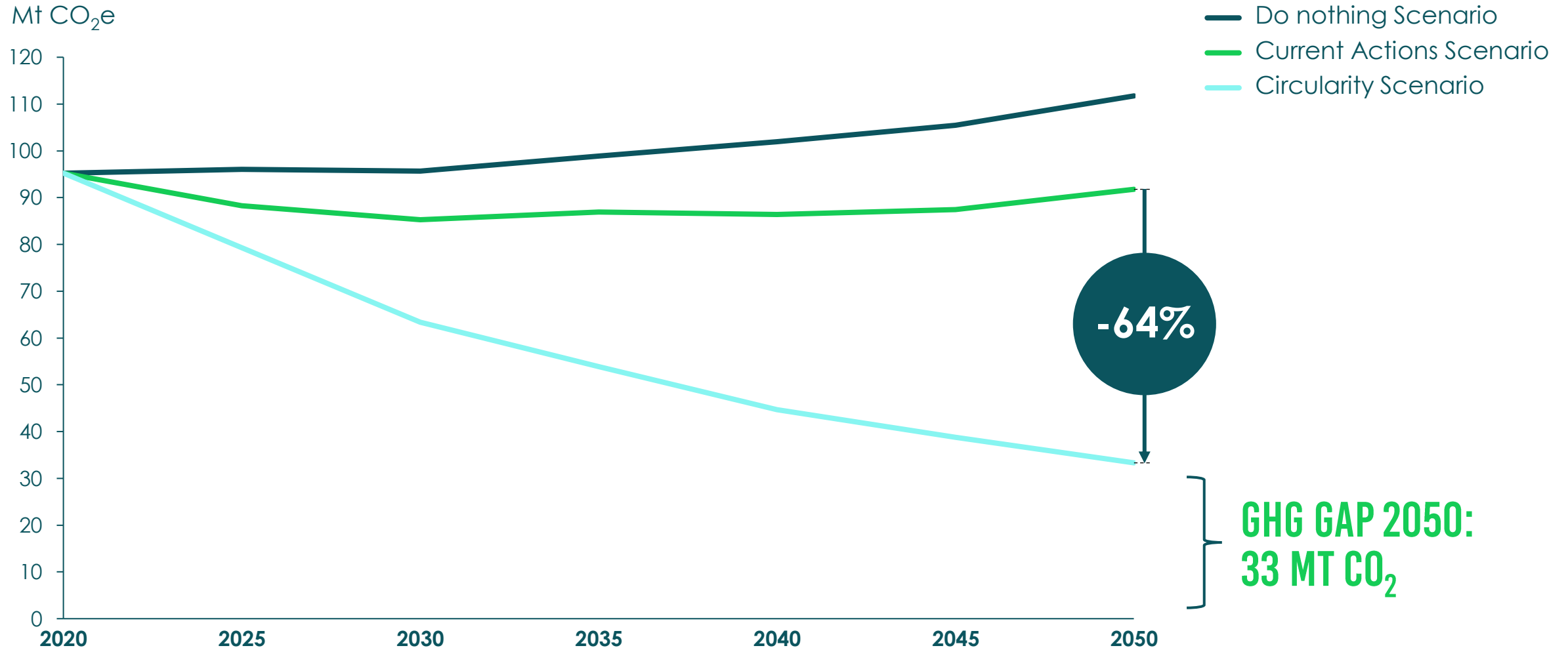
Physical fate of plastic waste from packaging, household goods, automotive and construction 2020-2050 (Mt)



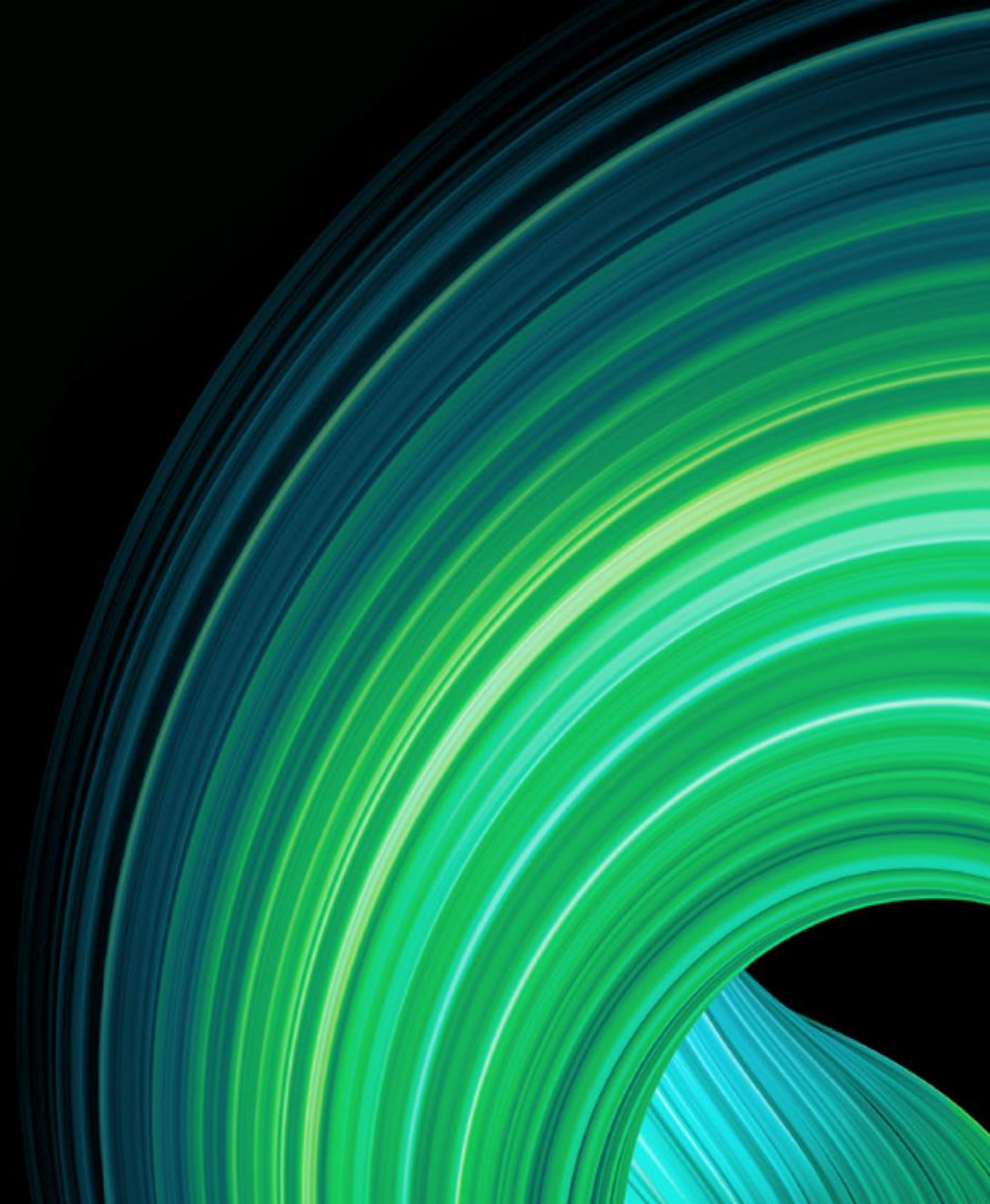
Source: "Reshaping Plastics" model

...BUT THIS IS NOT ENOUGH TO ACHIEVE EUROPE'S CLIMATE TARGETS

GHG EMISSIONS UNDER DIFFERENT SCENARIOS, MTCO2E



**How to go
from circular
to net-zero?**



TWO SYSTEM CHANGE SCENARIOS TO REDUCE GHG FURTHER: RETROFIT AND NET ZERO

RETROFIT SYSTEM CHANGE SCENARIO

- 1 Retrofit steam crackers with carbon capture
- 2 Use green H₂ as a fuel for steam cracker production
- 3 Apply carbon capture to incinerators

(In addition to Circularity Scenario)

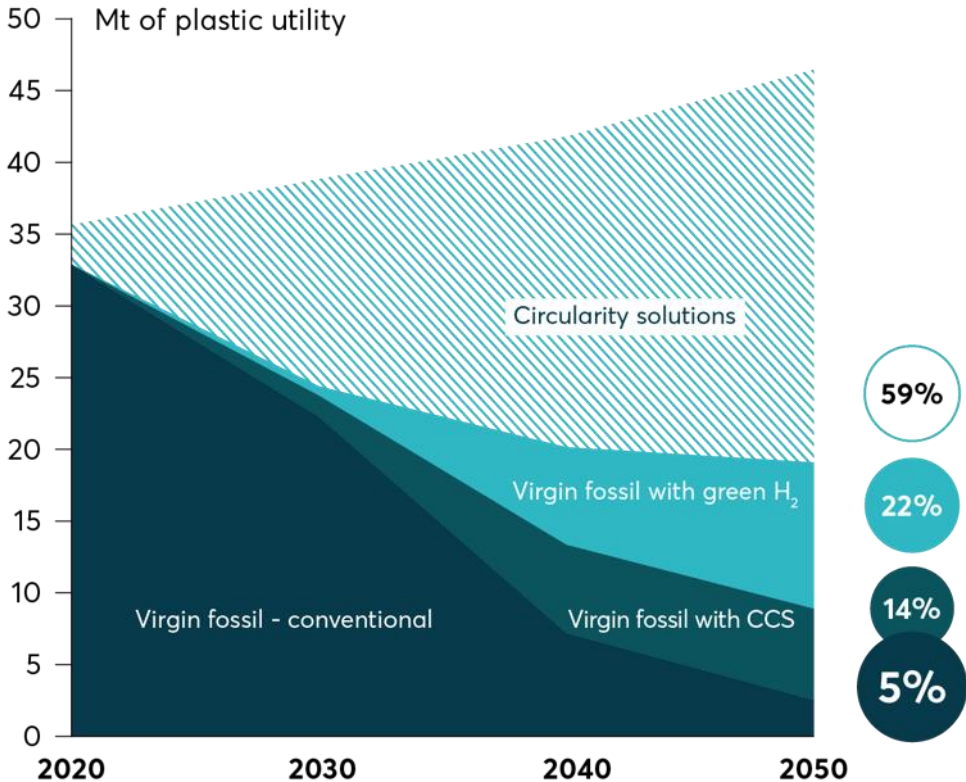
NET-ZERO SYSTEM CHANGE SCENARIO

- 4 Use electricity as a heat source for steam crackers
- 5 Displace fossil fuel feedstocks with captured CO₂ + green H₂
- 6 Displace fossil fuel feedstocks with biomass

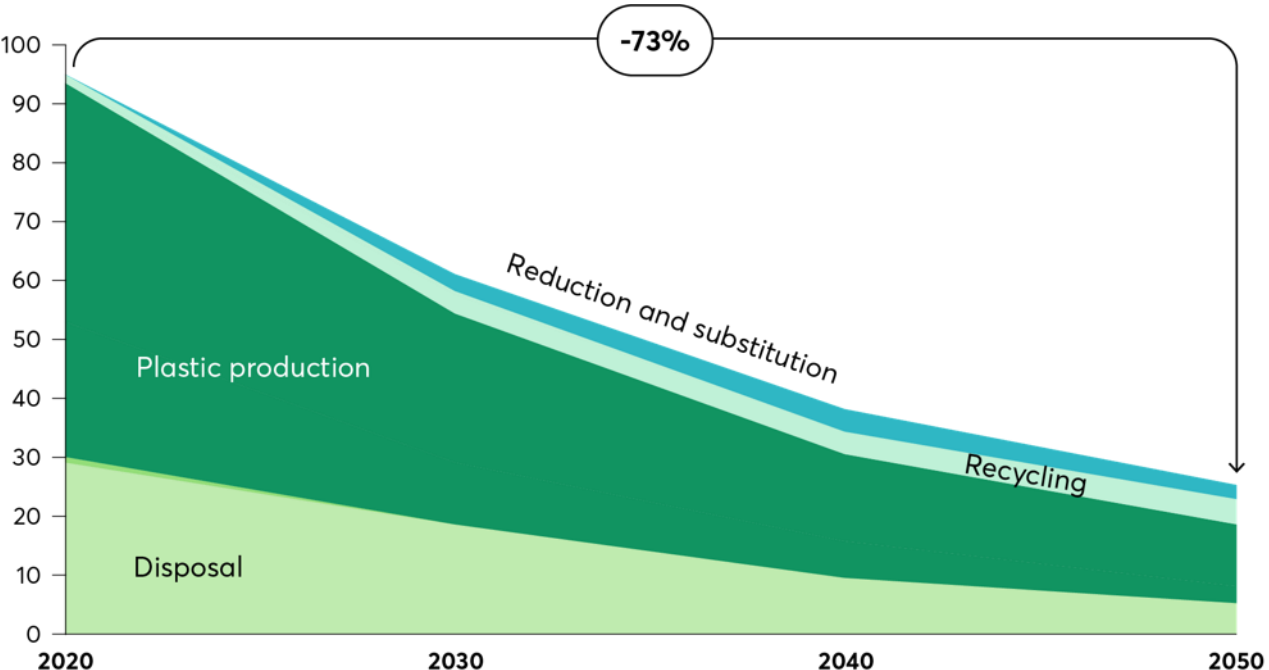
(In addition to Retrofit System Change Scenario)

THE RETROFIT SYSTEM CHANGE SCENARIO REDUCES UNABATED VIRGIN FEEDSTOCK TO 5%, AND REDUCES GHG EMISSIONS BY 73% BY 2050

HOW DEMAND FOR VIRGIN PLASTIC IS MET IN THE RETROFIT SYSTEM CHANGE SCENARIO (MT)



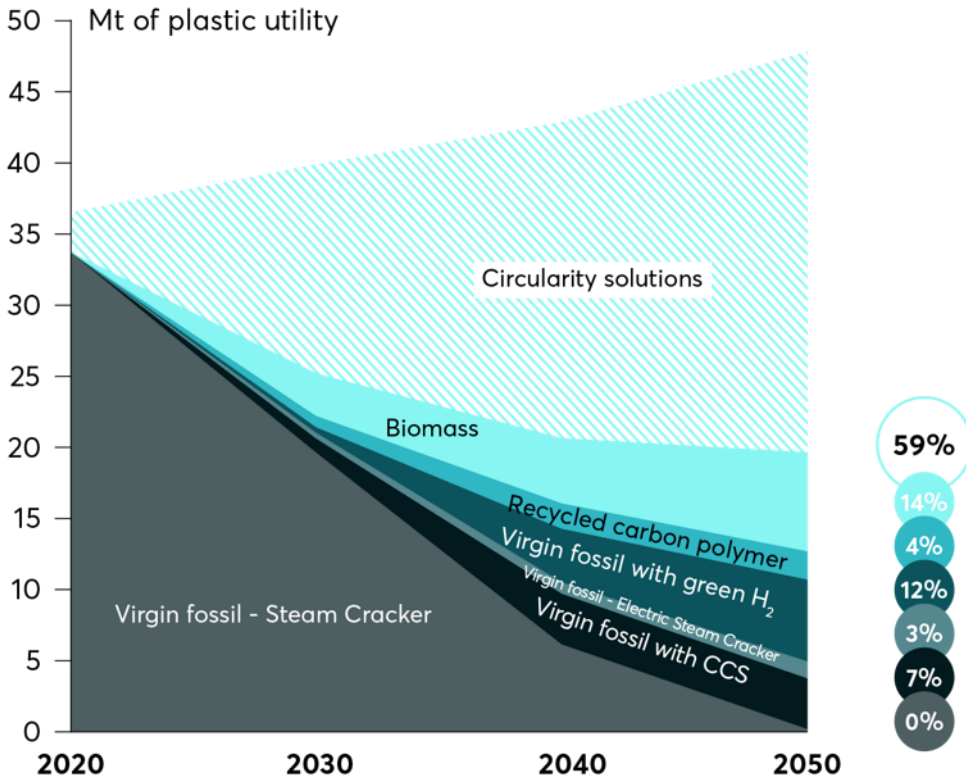
RETROFIT SCENARIO ANNUAL GHG EMISSIONS (MT CO2E/ YEAR)



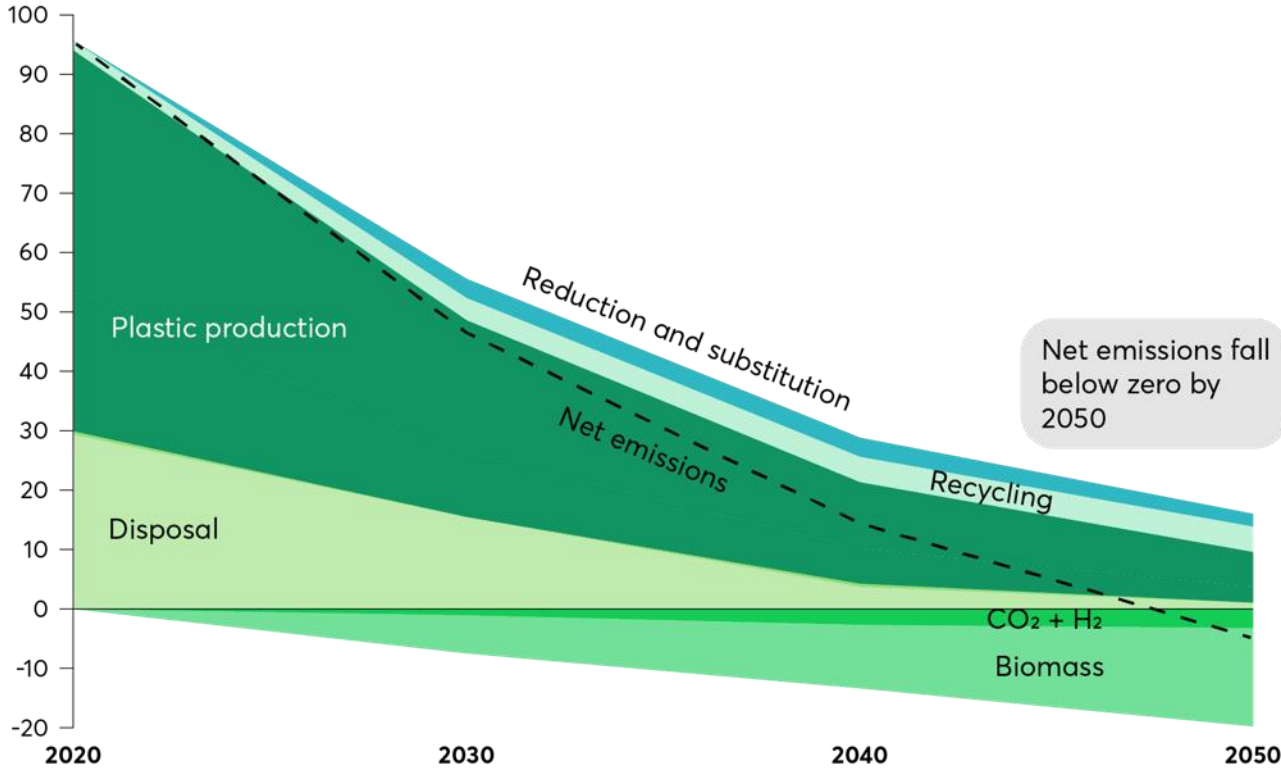
Note: All Circularity Scenario levers (Reduction and Substitution, and Recycling) are included, as well as application of Carbon capture and Storage to Steam Crackers and Waste Incinerators and the application of Hydrogen Steam Crackers
 Source: "ReShaping Plastics" model

THE NET ZERO SYSTEM CHANGE SCENARIO HAS NO UNABATED VIRGIN FEEDSTOCK AND ACHIEVES NET-ZERO CARBON EMISSIONS BY 2050

HOW DEMAND FOR VIRGIN PLASTIC IS MET IN THE NET ZERO SYSTEM CHANGE SCENARIO (MT)



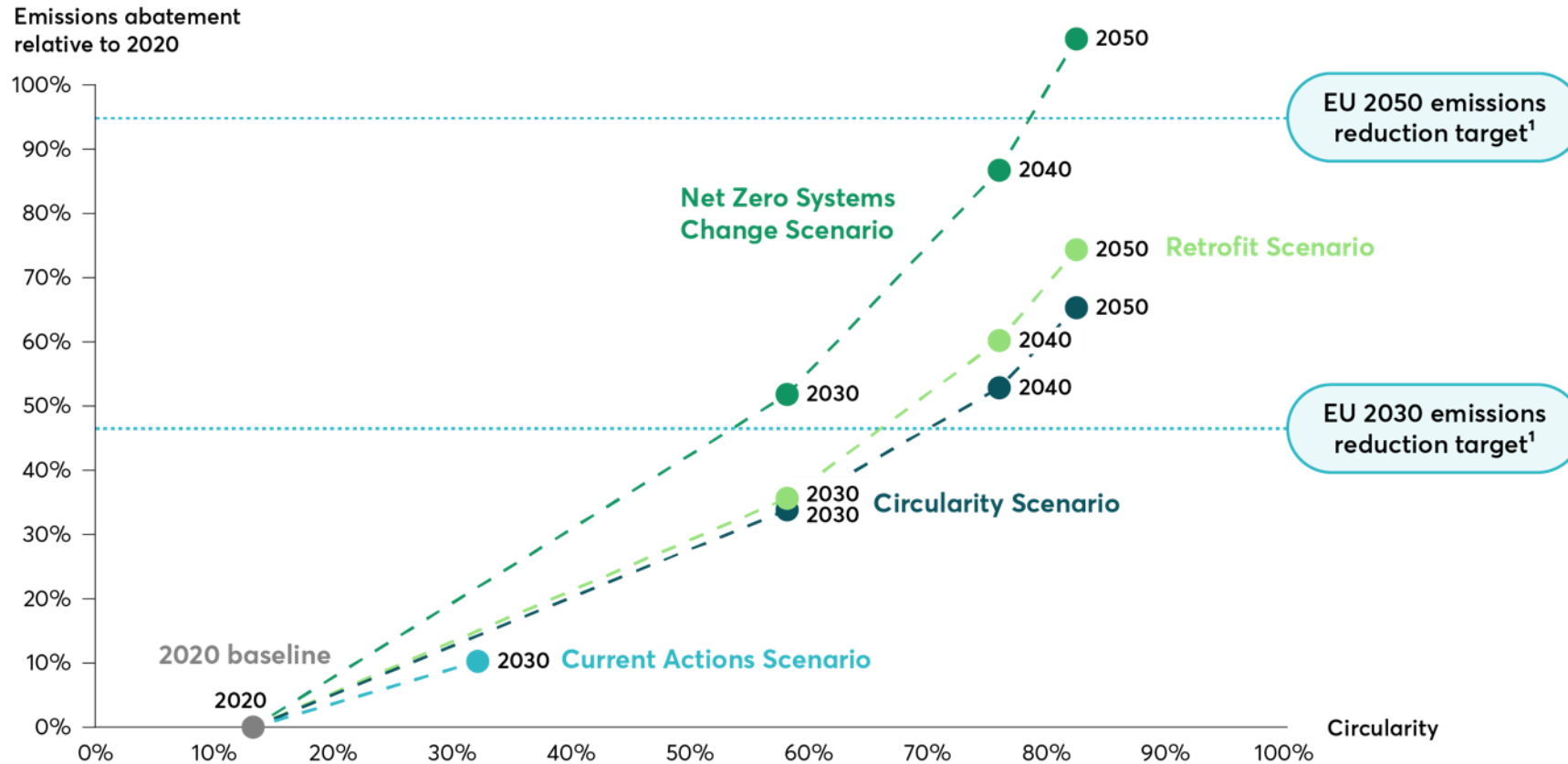
NET ZERO SYSTEM CHANGE SCENARIO ANNUAL GHG EMISSIONS (MT CO2E/ YEAR)



Note: Includes all levers from Retrofit Systems Change Scenario plus alternative feedstocks to displace virgin fossil, incineration + carbon capture and utilization and electric steam crackers.
 Source: "ReShaping Plastics" model

THE NET ZERO SYSTEM CHANGE SCENARIO IS THE ONLY ONE TO MEET THE EU'S EMISSIONS REDUCTION TARGETS IN 2030 AND 2050

A COMPARISON OF EMISSIONS ABATEMENT VS. CIRCULARITY² ACHIEVED IN EACH SCENARIO PER DECADE



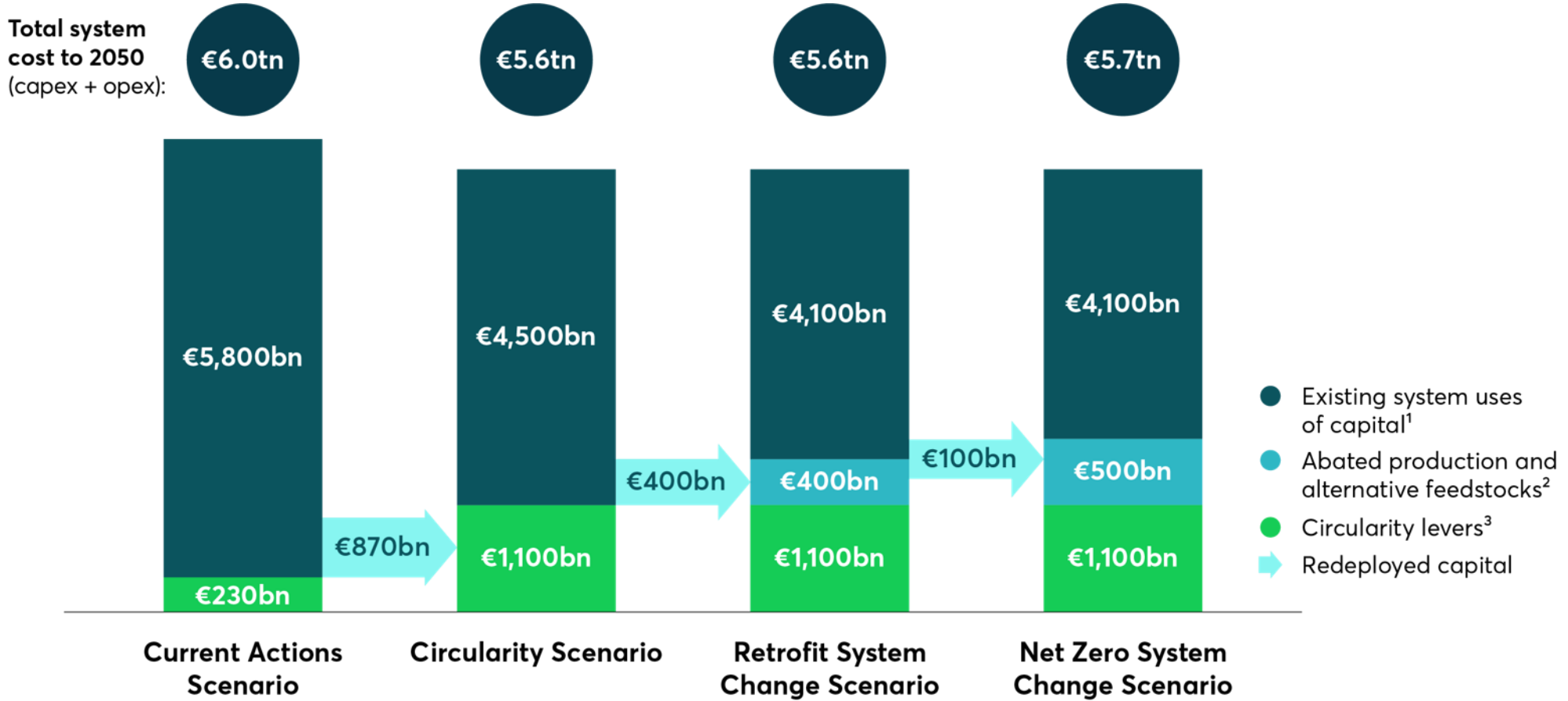
1) The EU climate law (55% emissions reduction by 2030 compared to 1990 levels; climate neutral (95% reduction) by 2050) has been calculated to match the required reductions compared to 2020 levels (2030: ~48%; 2050: ~94%) using data by the EEA (2020): Total greenhouse gas emission trends and projections in Europe.

2) Circularity is a measure of resource efficiency, i.e. the degree to which (re)used materials replace new virgin materials. In this study, the circularity metric is defined as the share of plastic utility that is either reduced, substituted by circular materials, or recycled mechanically or chemically excluding plastic entering stock.

Source: "Reshaping Plastics" model and EEA (2020)

ACHIEVING THIS WILL REQUIRE SIGNIFICANT CAPITAL INVESTMENT

CUMULATIVE SYSTEM COST AND REDEPLOYMENT OF CAPITAL PER SCENARIO IN 2050 (EUR BN)



DRIVING CIRCULARITY AND GHG REDUCTION HAS A MAJOR IMPACT ON THE SYSTEM BY 2050

78%

Circularity of plastics in the system

1.6 Gt

CO₂e emissions avoided 2020-2050

160,000

Additional jobs created

70%

Reduction in the system demand for virgin fossil

ReShaping
Plastics

THANK YOU!

Questions?

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