

OPTIMISTIC  
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@COP28



**BUREAU  
VERITAS**

# CIRCULAR ECONOMY - CHEMICAL

DEC 2023

SOFIEN MASMOUDI



# SUMMARY

**01**

CIRCULAR  
DEFINITION &  
CHALLENGES

**02**

MARKET  
OUTLOOK &  
DRIVERS

**03**

OUR OFFERING  
IN CIRCULAR  
ECONOMY

**04**

SOME  
BEST  
PRACTICES





01

CHEMICAL CIRCULAR ECONOMY  
**DEFINITION**

## CHEMICAL CIRCULAR ECONOMY

# CHEMICAL SITS AT HEART OF THE MANUFACTURING VALUE CHAIN!

AROUND 100,000  
CHEMICALS ARE USED  
IN THE WORLD TODAY



### ENERGY SUPPLY



- ✓ Wind Turbines
- ✓ Solar Panels
- ✓ Fertilizers



### FOOD & DRINKS



- ✓ Packaging



### HOME & OFFICE



- ✓ Plastic Pipes
- ✓ Insulation
- ✓ Electronics
- ✓ Toiletries
- ✓ Textiles



### NEW - ON THE MOVE



- ✓ Batteries
- ✓ Tires
- ✓ Pharma
- ✓ Luggage

95%

OF ALL MANUFACTURED  
GOODS RELY ON SOME  
FROM OF INDUSTRIAL  
CHEMICAL PROCESS

# CHEMICAL CIRCULAR ECONOMY CRITICAL FOR ADDRESSING GLOBAL SUSTAINABILITY AGENDA

## CHEMICAL PRODUCTS

## ADDRESSED UN SDG GOALS

Fertilizers & Pesticides  
Plastics food packaging



Pharma intermediates & API's



Light weight composites



Recycled Plastics



Building materials (e.g. foam, insulation/window frames)



Water treatment chemicals  
Pipe Solutions



Energy savings enabled by Chemical products are **DOUBLE** those required to manufacture them

Solutions provided by Chemical industry could reduce emissions by **2.5 GtCO<sub>2</sub>e per year** by 2030

# CHEMICAL CIRCULAR ECONOMY

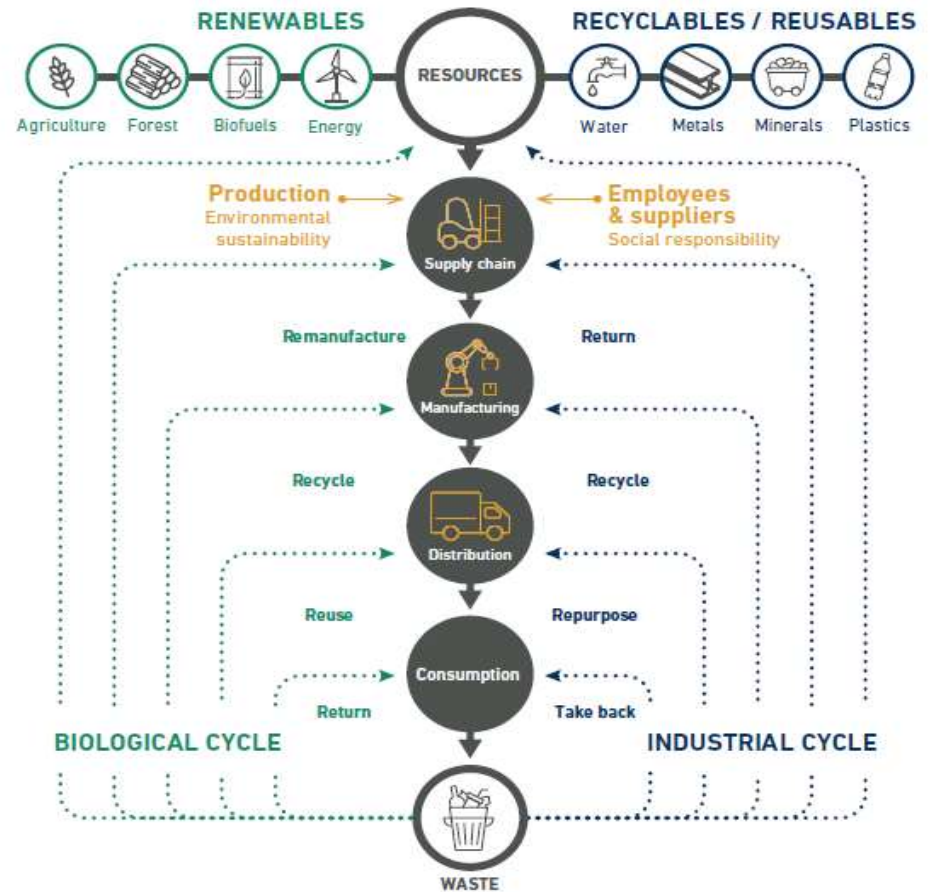
## DEFINITION & MEANING

**01** Is about **material cycles** – how we use, re-use and dispose of materials, how we minimize waste and how we make the most of **resources** in that process.

**02** This restorative & regenerative approach aims to create a **closed-loop supply chain** that “designs out” waste.

**03** The risks to humans or the environment should be avoided, so the use of **hazardous chemicals in products** should be reduced throughout their entire life cycle

**04** **BS 8001** – “Systemic approach to design of processes, products, services and business models enabling **sustainable economic growth** by managing resources more effectively as a result of making the flow of materials more circular and reducing and ultimately **eliminating waste**”





# CHEMICAL CIRCULAR ECONOMY

# GROWING PROBLEM – A GROWING AWARENESS

## CHALLENGES = OPPORTUNITIES

**20x**

The use of plastics has increased twentyfold in the past half-century

**1M+**

Every day more than 1 million tonnes of plastics are produced worldwide

**8M+**

Every year more than 8 million tonnes of plastic waste leaks into the ocean

**14%**

Only around 14% of plastic packaging is recycled worldwide, 14% incinerated, 40% landfilled

The global market for **plastic recycling** should grow from **\$26.5 billion in 2020 to \$64 billion by 2025** for the forecast period of 2020-2025.

### Changing consumer preferences

According to Accenture research, consumer attitudes and buying preferences related to sustainability are shifting. These trends are seen across all downstream industries.

**81%**

**of consumers plan to buy more eco-friendly products over the next five years.<sup>5</sup>**

**62%**

**want companies to take a public and passionate stance on social, cultural, environmental and political issues.<sup>6</sup>**

**77%**

**perceive plastics to be the least environmentally friendly packaging material.<sup>7</sup>**

The background of the slide is a photograph of a grassy field with solar panels. The panels are visible in the top-left and bottom-right corners, extending diagonally across the frame. The grass is green and appears to be in a field. A white rectangular box is centered on the page, containing the text and the number '02'.

02

**CIRCULAR ECONOMY  
OUTLOOK & DRIVERS**



# PRODUCT STEWARDSHIP - ESSENTIAL (ESG) DATA

88%

Material resources in EU are lost after just one use

Source: Circularity Gap Report 2023.

7,2%

Of materials globally that are extracted & used circulate back into the economy

Source: Circularity Gap Report 2023.



## REGULATORY FRAMEWORK / COMPLIANCE

- Chemicals Strategy For Sustainability (CSS) - Boost investment & innovative capacity production & use of Chemicals
- Ecodesign for Sustainable Products Regulation (ESPR)
- Registration, Evaluation, Authorization, & restriction of Chemicals (REACH) addresses production (including recycling) & use of chemical Substances Very High Concern > (SVHC) 0.1% w/w,
- Classification, Labelling and Packaging (CLP)



## HSE ASPECTS OF PRODUCT LIFECYCLE, SOME ELEMENTS TO CONSIDER:

- Product Environmental Footprint (PEF) - environmental performance - ISO 14040 & 14044
- ESG & sustainability digital transformation
- Digital Product Passports (DPPs) - simply exchange of (ESG) information between organizations
- Environmental Product Declaration (EPD) - ISO 14025
- Safety Data Sheets (SDSs) + Labelling
- Guidelines & Principles for implementing and measuring circularity, for circular business models and value chains - ISO 59004, 59010, 59020

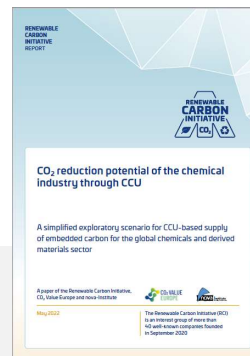


# Chemicals Strategy For Sustainability (CSS)

## Update Regulations & Guidelines

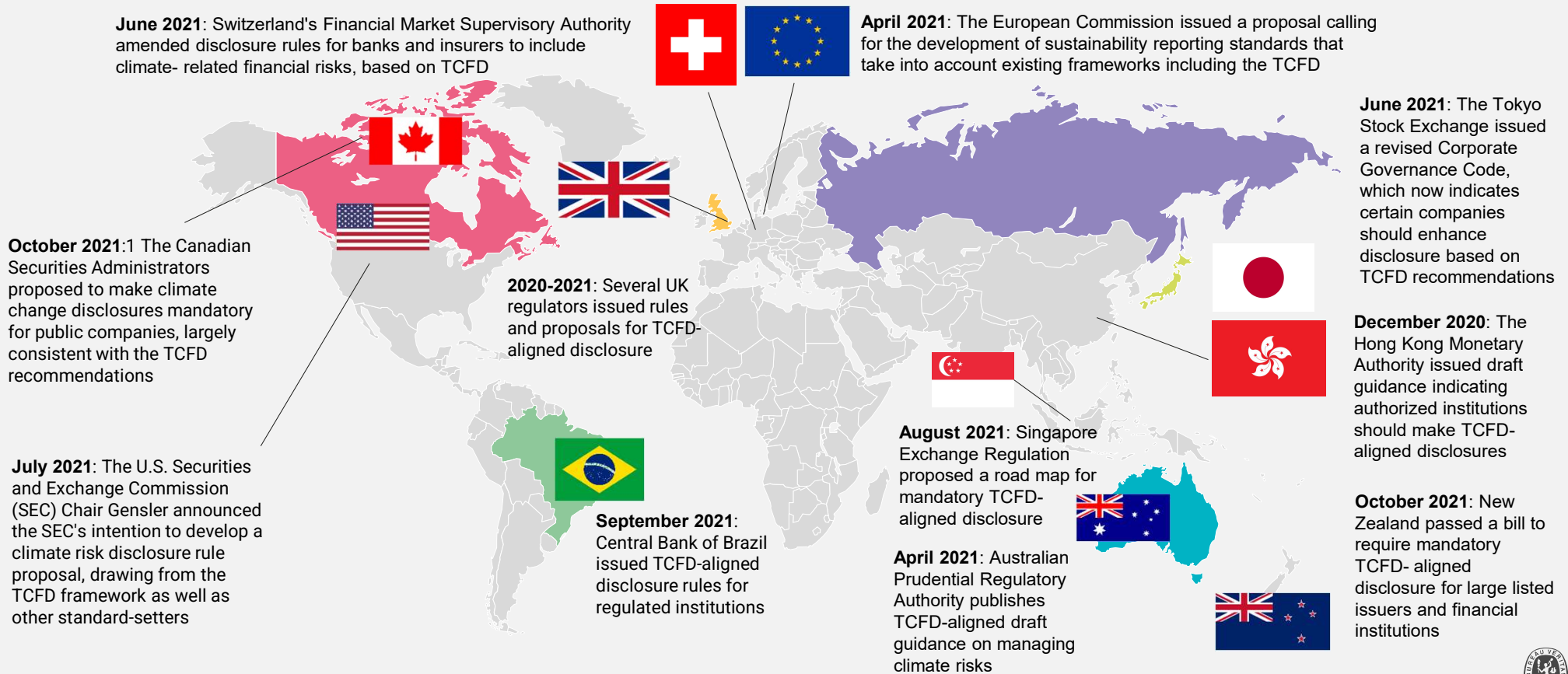
### EUROPEAN COMMISSION

- | **Ban** the most **harmful chemicals** in consumer products – allowing those chemicals only where their **use is essential**.
- | Pay attention to the **cocktail effect** of chemicals when **assessing chemical risks**.
- | Phase out **per- and polyfluoroalkyl** substances (PFAS) in the EU, unless their use is essential.
- | **Boost investment & innovative capacity** for the production & use of chemicals that are **safe and sustainable** by design throughout their **lifecycle**.
- | Promote the EU's **supply & sustainability** of critical chemicals.
- | Establish a simpler “**one substance, one assessment**” process for assessing the risks and hazards of chemicals.
- | Play a **leading role globally** by championing and promoting high **chemical safety standards** and **not exporting** chemicals banned in the EU.

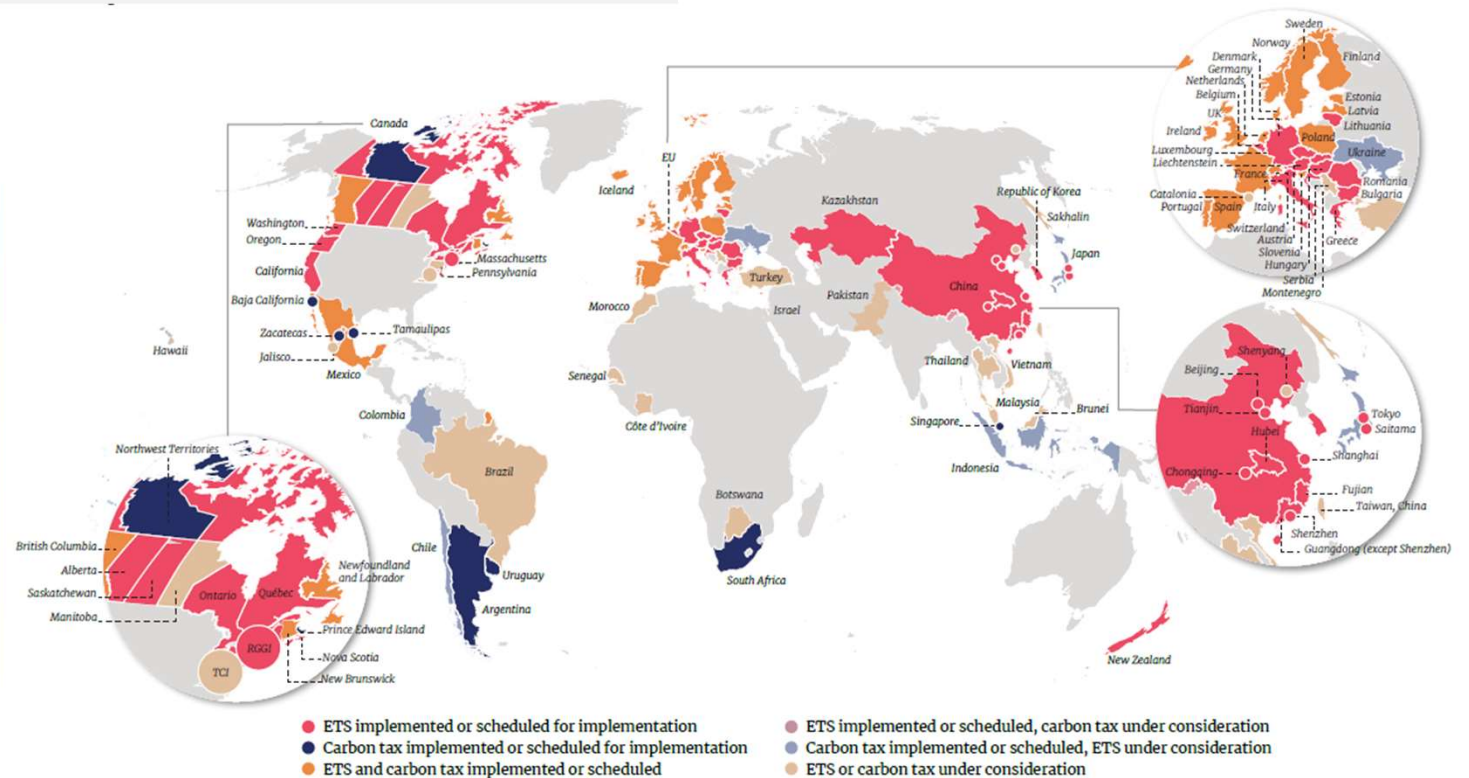




## IN ADDITION, VARIOUS JURISDICTIONS ARE TAKING STEPS TO ENCOURAGE OR MANDATE TCFD - ALIGNED DISCLOSURE



# MAP OF CARBON TAXES & ETS



Carbon pricing initiatives are considered "scheduled for implementation" once they have been formally adopted through legislation and have an official start date. Carbon pricing initiatives are considered "under consideration" if the government has announced its intention to work towards the implementation of a carbon pricing initiative and this has been formally confirmed by official government sources. TCI refers to Transportation and Climate Initiative. RGGI refers to the Regional Greenhouse Gas Initiative.



# INTERNATIONAL REGULATION

## AMERICAS

- | Brazil
  - | Brazilian Securities and Exchange Commission Resolution (RCVM 59)
- | Canada
  - | Climate Related Financial Disclosures (TCFD)
- | United States
  - | SEC Climate Risk Disclosure Requirements
  - | Prudence and Loyalty in Selecting Plan Investments and Exercising Shareholder Rights
  - | NASDAQ board diversity listing rules
  - | State Laws:
    - | Illinois Business Corporation Act
    - | California Unfair Competition Act

## ASIA PACIFIC

- | ASEAN
  - | Taxonomy for Sustainable Finance
- | Australia
  - | Climate Change Act 2022
  - | Corporate Governance Council Recommendations
- | India
  - | Companies act 2013
  - | SEBI Business Responsibility & Sustainability Report
- | Japan
  - | Guidelines on Respecting Human Rights in Responsible Supply Chains
- | Singapore
  - | SGX Exchange Rules on Sustainability Reporting (TCFD)
  - | Disclosure & Reporting Guidelines for Retail ESG Funds
- | S.Korea
  - | Corporate Governance Reporting
  - | KOSPI Listed companies disclosure of ESG

## EUROPE

- | European Union
  - | EU Taxonomy
  - | Renewable Energy Directive (3)
  - | Energy Efficiency Directive
  - | Carbon Border Adjustment Mechanism
  - | Carbon Removal Certification Scheme
  - | Corporate Sustainability Reporting Directive
  - | Green Bond Standard
  - | Corporate Sustainability Due Diligence Directive
    - | German Supply Chain act / French Commercial Code & Duty of Vigilance Law
  - | Green Claims Directive
    - | Ecolabels / Digital Product Passports
- | UK
  - | Modern Slavery Act
  - | Corporate Governance Code & Stewardship Code
  - | Climate Related Financial Disclosures (TCFD)



# NEW “SUSTAINABLE” CHALLENGES

## CHEMICAL INDUSTRY (2020 – 2025) NEW REQUIRED INVESTMENTS

### New challenge

### New Investment



Alternative feedstock

Bio-based, Renewable (Hydrogen, solar / wind)



Carbon reduction

New process technology & CCS storage



Wastewater Management

New desalination & separation technology



Reducing energy consumption

Electrification (e-cracker, electrolyzer)



Chemical recycling

Pyrolyze technology – new feedstock (Waste Plastic)



Digitalization

Use of robotic technology & Data driven services



New regulations

Asset & Product (New technology & tractability & testing)



Key end markets

New capacity (e.g. batteries, medicines, energy, housing materials)



**FOR PRODUCTS**  
Product Stewardship



**FOR ASSETS**  
CAPEX & OPEX 2022 - 2025



**FOR PEOPLE & PROCESSES**  
Training & Certification



## CHEMICAL

# CARBON BORDER ADJUSTMENT MECHANISM (CBAM)



### PURPOSE

Level the playing field to protect domestic market EU production subject European trading



### MECHANISM

Ensure everyone pays the same price for carbon (global & local)



### CHEMICAL PRODUCTS IN SCOPE

- Fertilizers
- Polymers
- Chemical (Organic, hydrogen, anhydrous/aqueous ammonia)



EUROPEAN CBAM scheme is aimed at creating a level playing field .....

EU-28 imports from OGC for Chemicals Products included in CBAM Scope

Will affect chemical exports of ~ \$6-8 Bn from GCC to EU

# CLIMATE RELATED OPPORTUNITIES

## EXAMPLES (NON-EXHAUSTIVE)

Resource Efficiency	<ul style="list-style-type: none"><li>  Use of more efficient modes of transport and production and distribution processes</li><li>  Use of recycling</li><li>  More to more efficient buildings</li><li>  Reduced water usage and consumption</li></ul>
Energy Source	<ul style="list-style-type: none"><li>  Use of lower-emission sources of energy</li><li>  Use of supportive policy incentives</li><li>  Use of new technologies</li><li>  Participation in carbon market</li></ul>
Products & Services	<ul style="list-style-type: none"><li>  Development and / or expansion of low emission goods and services</li><li>  Development of climate adaption and insurance risk solutions</li><li>  Development of new products or services through R&amp;D and innovation</li></ul>
Markets	<ul style="list-style-type: none"><li>  Access to new markets</li><li>  Use of public-sector incentives</li><li>  Access to new assets and locations needing insurance coverage</li></ul>
Resilience	<ul style="list-style-type: none"><li>  Participation in renewable energy programs and adoption of energy-efficiency measures</li><li>  Resource substitutes / diversification</li></ul>

Source: TCFD, Recommendations of the Taskforce on Climate related Financial Disclosures, 2017



03

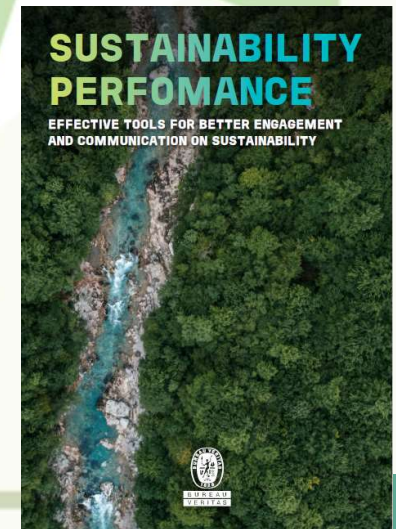
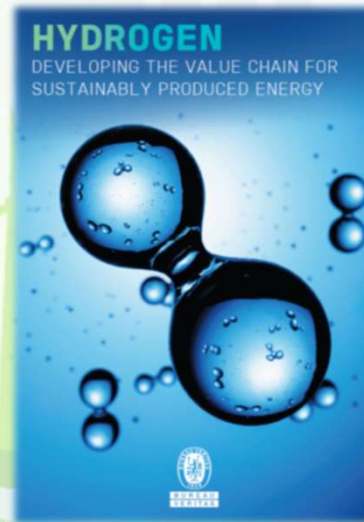
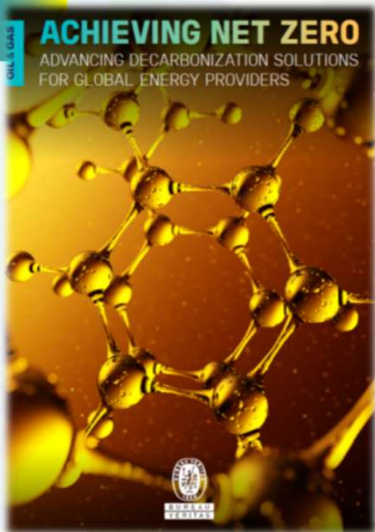
OUR OFFERING  
IN **CIRCULAR ECONOMY**

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# OUR WHITE PAPERS

## POSTIONING SUSTAINABILITY



# Bureau Veritas Integrate solutions

## Meeting your challenges throughout the asset & products lifetime

Conformity verified

Delivered on time and on budget

Supply chain resilience

HSSE prioritized

Risks mitigated and personnel trained

Minimize operation risk and increase performance



### CERTIFICATION

**Demonstrate compliance & secure viability**

- Approvals in Principle
- Component certification
- Product certification (e.g., REACH, CLP, CBAM, etc.)
- Project certification



### DESIGN & PERMITTING

**Reduce development risk**

- Site assessment
- Energy yield calculations
- Design review
- Environmental impact assessment
- Permitting support
- Risk assessment
- Due diligence
- Investor / lender services



### PROCUREMENT

**Access a global, reliable supply chain**

- Supply chain technical assessment (Supply-R)
- Technical procurement support
- Shop inspections (QA/QC)
- Expediting
- Factory acceptance tests
- Transport, loading & unloading supervision



### CONSTRUCTION

**Run projects safely & to schedule**

- Project & site management support
- Construction supervision
- On site QA/QC
- On site HSE
- Commissioning and test run supervision
- Take over and end-of-warranty inspections



### ASSET OPERATION

**Ensure availability and reduce down-time**

- Regulatory compliance
- Statutory inspections
- Non-destructive testing
- Load measurements
- Vibration monitoring
- Thermographic inspections
- Oil analysis & Outsourced quality laboratories
- Endoscopic inspections
- Net-zero & ESG data maturity
- Training
- Failure & damage analysis
- Drone inspections



### ASSET MANAGEMENT

**Extend operating life & increase performance**

- Maintenance strategies
- Condition monitoring & assessment
- Asset integrity management
- Reliability engineering (e.g., RBI, FFS, RAM, RCM, FMECA etc.)
- Performance optimization
- Remaining life assessment & lifetime extension



BUREAU  
VERITAS



# BUREAU VERITAS:

MEETING YOUR CHALLENGES THROUGHOUT THE CHEMICALS VALUE CHAIN

R&D  
Labs

Ethane  
cracker  
facility

Polyethylene  
plant

Storage  
tanks

Distribution  
center

Pipelines

## QUALITY, SUSTAINABLE FEEDSTOCK

- Sample control
- Loading & unloading inspections

## ASSET INTEGRITY & AVAILABILITY

- NDT & LDAR
- Condition Monitoring
- RBI, FFS, RCM, FMECA etc.
- Maintenance & Inspection engineering plans

## DIGITALLY-DRIVEN PERFORMANCE

- Drone inspections
- AI-based analytics and predictive models
- Digital twin
- Real time inspection & control reports
- Cyber Security

## SAFE, COMPLIANT OPERATIONS

- Process Safety Management
- Risk Assessments
- Safety Culture
- Certification of personnel & processes
- Industrial Hygiene

## NEW, QUALITY PRODUCTS

- Product quality testing
- Product quality oversight
- Outsourced quality laboratories

## PRODUCT COMPLIANCE

- REACH
- Classification, Labeling & packaging (CLP)
- ADR Compliance
- CE-marking
- Trade compliance





04

SOME  
BEST PRACTICES

# BV REFERENCES

## CIRCULAR ECONOMY



### LE HARVE PROJECT

France: 2019 - ongoing

- 25,000 t/y Chemical Recycling Plant

#### BV ROLE:

- Assistant Building & Environmental permit
- Intermediary local authorities
- Compliance work
- HAZOP study
- Safety & site QA/QC



### GRANDPUITS PROJECT

France: 2020 - ongoing

- 15,000 t/y Chemical Recycling Plant

#### BV ROLE:

- Assistant Building & Environmental permit
- Intermediary local authorities
- Compliance work
- HAZOP study
- Risk assessments
- Sample control



### SPEARS

Netherlands: 2021 - Ongoing

- 20,000 t/y Chemical Recycling Plant

#### BV ROLE:

- Compliance Plan
- CE-Marking Pressure assemblies & ATEX
- Firefighting compliance
- Technical expert support



### LAB OUTSOURCING

USA: 2021 - 2024

- Chemical Recycling Plant

#### BV ROLE:

- The design & equipment selection for the on-site laboratory
- Laboratory Outsourcing (operations Lab)



### PRODUCT COMPLIANCE

Germany: 2020

Recycling plant

#### BV ROLE:

- OR representative REACH
- REACH compliance product
- Set-up MSDS