

# DIFFICULTIES AND OPPORTUNITIES IN CCUS FOR SAINT-GOBAIN

PIERRE MILLEREAU, 17/05/2023



# SAINT-GOBAIN'S VISION



**Be the worldwide leader in light and sustainable construction**



**Improving daily life through high-performance solutions**



# MAIN ACTIVITIES

## 4 REGIONS

- Northern Europe
- Southern Europe, Middle-East, Africa
- Americas
- Asia-Pacific

A UNIQUE PORTFOLIO OF SOLUTIONS  
FOR LOCAL CONSTRUCTION TRADES

### Renovation

- ▶ Reduction of the environmental impact of buildings
- ▶ Energy efficiency of buildings
- ▶ Quality and comfort of living spaces
- ▶ Performance and ease of application

### Light construction

*(new-build residential and non-residential)*

## 1 GLOBAL ENTITY

### High Performance Solutions

ADVANCED APPLICATIONS  
FOR GLOBAL MARKETS

### Sustainable Construction

- ▶ Cutting-edge expertise in materials science, formulation and design
- ▶ Co-development of solutions with customers
- ▶ Materials with exceptional properties (resistance to high temperatures, abrasion, chemical stability, surface properties...)

### Sustainable Mobility

### Sustainable Industry

**Saint-Gobain** relies on **global expertise platforms** to be **at the forefront of innovation and industrial performance**, particularly in the context of the **digital transformation of our activities**.

# A STRONG GLOBAL GROUP CLOSE TO ITS CUSTOMERS



Commitment to achieve  
**carbon neutrality in 2050**



**World or European leader**  
in most of our businesses

Founded over

**350** years ago

Locations in

**75** countries

Saint-Gobain Research

**8**  
cross-business R&D centers

Around

**168,000**  
employees <sup>(1)</sup>

Around

**900**  
manufacturing facilities  
around the world

Around

**2,700**  
sales outlets

1) As of 2022/12/31

# THANKS TO OUR SOLUTIONS, WE ARE CONTRIBUTING TO 3 LONG TERM AMBITIONS

2050  
NET ZERO CARBON



A decarbonated home



More performance with less



A better living for all



## Recognized commitments



# EMISSIONS OF SAINT-GOBAIN WORLDWIDE

**SCOPE 1**

Direct emissions

**SCOPE 2**

Indirect emissions generated by consumed electricity

**SCOPE 3**

Indirect emissions generated by the activity

## 2030 Saint-Gobain objectives

-33% on Scope 1&2 vs 2017 (absolute value)

-16% vs 2017 (absolute value)

## SG activities worldwide (2022) ~ 31 MtCO<sub>2</sub>/year

**SCOPE 1**

8.4 MtCO<sub>2</sub>/year

**SCOPE 2**

1.4 MtCO<sub>2</sub>/year

**SCOPE 3**

Pending

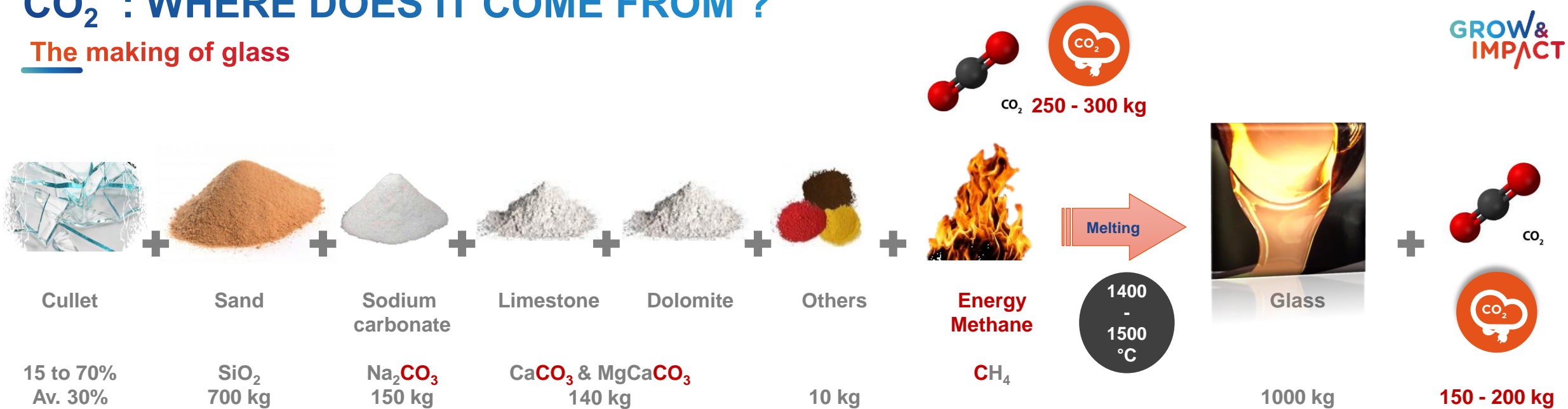
-27% in 2022

**Saint-Gobain glass making businesses account for approximately half of scope 1&2 emissions from the group**



# CO<sub>2</sub> : WHERE DOES IT COME FROM ?

## The making of glass



CO<sub>2</sub> from batch @ 20% cullet  
 ≈ **160 kg CO<sub>2</sub>/t MG**  
 1/3

CO<sub>2</sub> from Combustion  
 ≈ **290 kg CO<sub>2</sub>/t MG**  
 2/3



Glass  
 ≈ **450 kg CO<sub>2</sub>/t MG**

**For the flat glass business: a plant emits ~ 100kt of CO<sub>2</sub> per year**

**→ Saint-Gobain plants are “relatively small emitters”**



# FOCUS ON SAINT-GOBAIN GLASS



# STRATEGIES TOWARDS NET ZERO FOR SAINT GOBAIN GLASS

## Energy efficiency first

Not much room left for improvement?  
Few % could be gained

## Current focus on fuel switching

## Electrical boosting



6 février 2023



## AGC et Saint-Gobain s'associent pour accélérer la décarbonation de la fabrication du verre plat

AGC et Saint-Gobain, fabricants mondiaux de verre plat et leaders en matière de développement durable, annoncent leur collaboration en vue de la conception d'une **ligne pilote de verre plat, une innovation de rupture** qui devrait réduire de manière très significative les émissions directes de CO<sub>2</sub>.

Dans le cadre de ce projet de Recherche et Développement, la ligne de production de verre imprimé d'AGC à Brevka, en République tchèque, sera entièrement rénovée et transformée en ligne de production hautement performante et ultramoderne, qui sera alimentée à 50 % avec de l'électricité et à 50 % avec une combinaison d'oxygène et de gaz. C'est une véritable avancée par rapport à la technologie actuelle utilisée dans les fours à verre plat alimentés au gaz naturel. Cette conception de lignes de production de verre plat **sera la plus faiblement émettrice de carbone au monde** et contribuera à la trajectoire vers la neutralité carbone des deux entreprises et à l'accélération nécessaire de la décarbonation de l'industrie du verre plat.

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## Current focus on fuel switching

### Alternative fuels

- H2 combustion
- Biogas and biomethane

## PRESS RELEASE

March 30, 2023



## SAINT-GOBAIN ACHIEVES THE FIRST FLAT GLASS PRODUCTION USING MORE THAN 30% HYDROGEN

Saint-Gobain is the first manufacturer in the world to carry out a test production of flat glass using more than 30% hydrogen during Research & Development (R&D) trials at the Herzogenrath site in Germany.

With this world first, Saint-Gobain has proven the technical feasibility of manufacturing flat glass with a significant proportion of hydrogen, which will complement other decarbonized energy sources and will reduce the site's direct CO<sub>2</sub> emissions (scope 1) by up to 70%.

# MAIN OPTIONS TOWARDS NET ZERO FOR SAINT GOBAIN GLASS

## Energy efficiency first

Not much room left for improvement?  
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Electrical boosting

## Current focus on fuel switching

### Alternative fuels

- H2 combustion
- Biogas and biomethane

## CCUS?

Will highly depend on the location

In the past the furnace best design  
was rolled out in the world

In the future depending on the local  
environment the furnaces might be  
different incorporating different  
technology bricks

# CCUS FOR GLASS? IT CAN BE DONE

## Carbueros Metálicos captura CO2 en Canarias para darle aplicaciones sostenibles

Los beneficios del CO2 sostenible se muestran en la campaña 'Cuidamos Canarias', una iniciativa que refuerza el compromiso de Carbueros Metálicos con el territorio isleño



[https://diariodeavisos-espanol-com.translate.goog/2021/07/carbueros-metalicos-captura-co2-en-canarias-para-darle-aplicaciones-sostenibles/?\\_x\\_tr\\_sl=es&\\_x\\_tr\\_tl=fr&\\_x\\_tr\\_hl=fr&\\_x\\_tr\\_pto=sc](https://diariodeavisos-espanol-com.translate.goog/2021/07/carbueros-metalicos-captura-co2-en-canarias-para-darle-aplicaciones-sostenibles/?_x_tr_sl=es&_x_tr_tl=fr&_x_tr_hl=fr&_x_tr_pto=sc)

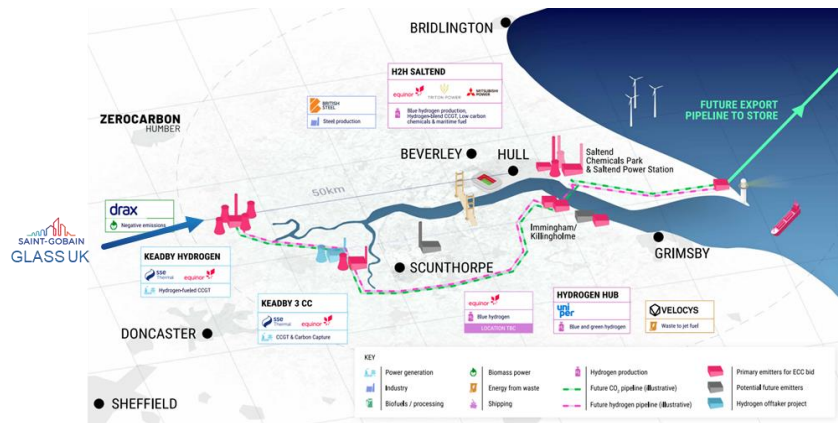
**Since 2014, CO2 is captured from a glass factory for the food and beverage market in Canary Islands**

- CO2 can be captured from a glass plant despite fume specificity
- Cost is accepted thanks to the insular situation
- No decrease of emissions for the glass business

# CCUS FOR GLASS? EXAMPLE OF THE PROJECT IN EGGBOROUGH, UK



- Project location: Eggborough, UK, only flat glass plant of SG in UK
- Fumes specificity:
  - ~ 100ktCO<sub>2</sub>/y
  - ~ 9%CO<sub>2</sub> in fumes
  - ~ 400ppm of NO<sub>x</sub> and SO<sub>x</sub>
- Objective of the project: be selected by the BEIS department to join the Humber cluster project



# CCUS FOR GLASS? EXAMPLE OF THE PROJECT IN EGGBOROUGH, UK



- **Result of feasibility study**
  - It can be done
  - But it is expensive ~ **200€/tCO<sub>2</sub> captured**
  - Not negligible space needed → that could be an issue on other sites
  - Application to BEIS cluster sequencing program in January 2022
- Negative answer on application in August 2022, 2 of the main issues were pinpointing the transportation to the pipeline and cost
  - Selected projects appeared to have bigger emissions → decreased costs per ton?
- Current status → improve project to get selected in next application window
- Next step: enhanced feasibility study on capture and transportation evaluating more options

# OTHER CCUS PROJECTS FOR SAINT-GOBAIN?



## What SG is looking for

- **Storage**
  - Hub or local opportunities around our plants
- **Utilization**
  - Possibilities to use our CO<sub>2</sub> with a decrease of our emissions (mineralization, chemicals...)
- **Partnership with companies aiming for CCUS solutions for low emissions**
  - 20-120ktCO<sub>2</sub>/year
  - 5-12%CO<sub>2</sub> concentration
- **Evaluation of pros and cons regarding switching to oxy-combustion furnaces**



## What can SG offer

- Waste heat available to **decrease OPEX costs**
- Possibilities for **co-development** especially on the utilization side
- Replication opportunities across lot of sites worldwide ~ **100 furnaces across the world** (flat glass, glass wool, glass fibers...)



**THANK YOU FOR YOUR  
ATTENTION**



**SAINT-GOBAIN**