USTV – GLASS RECYCLING 09/22/2021

TECHNICAL CHALLENGES OF RECYCLING IN GLASSWOOL PRODUCTION

GUILLAUME BARBA ROSSA – SAINT-GOBAIN ISOVER

A FEW WORDS ABOUT OUR PRODUCTS

ADEME promotion for housing insulation (France Relance)

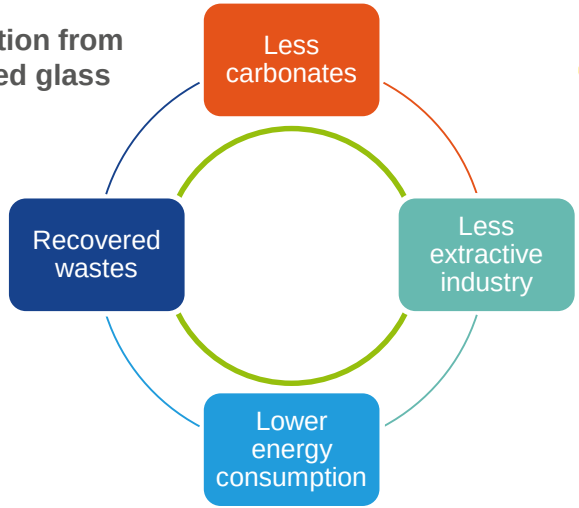
A typical ISOVER glass wool product has amortized the CO_2 emitted in its production, transport & disposal just **3 months** after installation

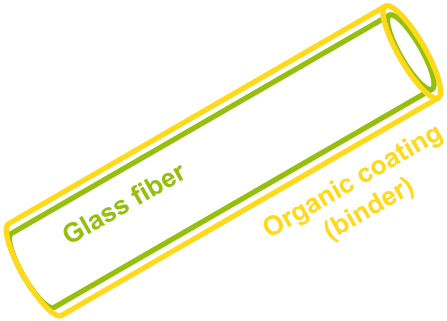
RESPONSIBLE PRODUCTION

Some ways of our net zero carbon roadmap

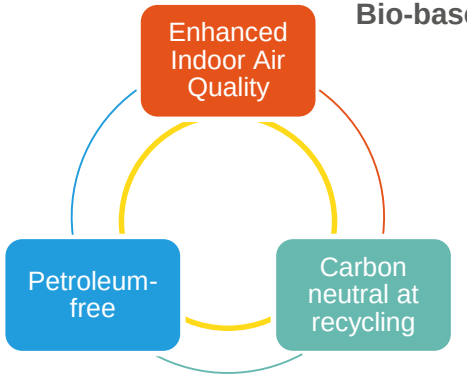
2050 NET ZERO CARBON

Production from recycled glass





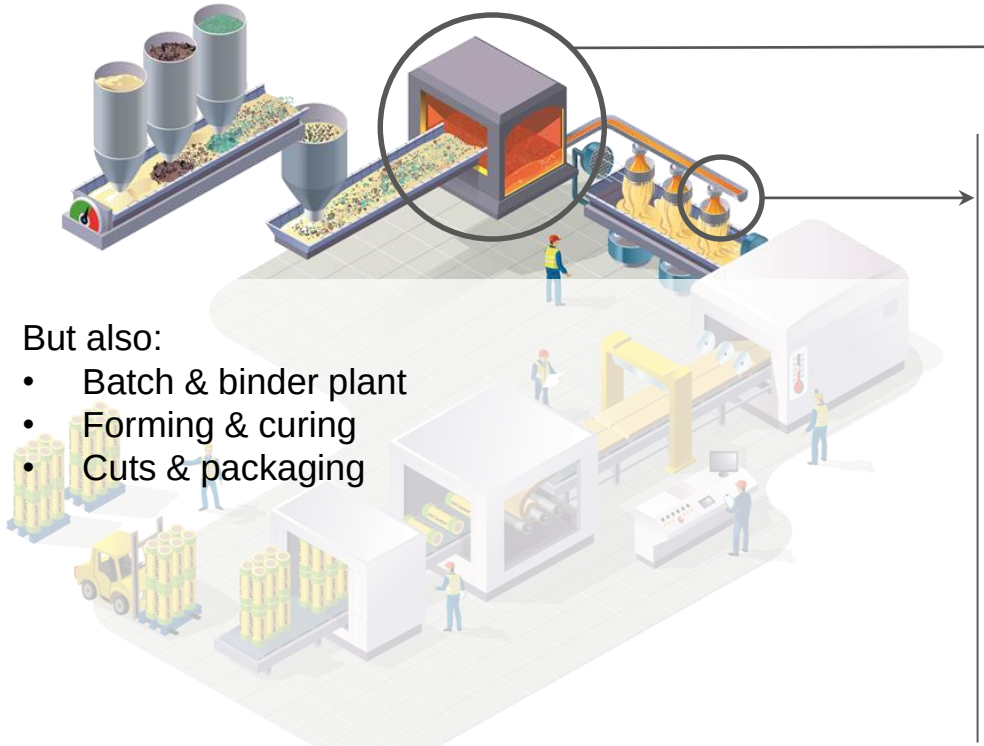
Bio-based binder



isover SAINT-GOBAIN

(VERY) SHORT PROCESS OVERVIEW

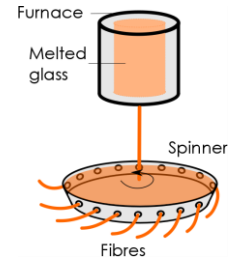
Glass wool production plant



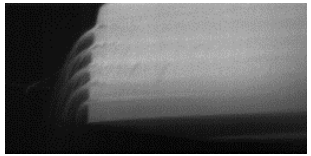
But also:

- Batch & binder plant
- Forming & curing
- Cuts & packaging

Electric melting



Fiberizing



Binder addition

RECYCLING GLASS

RECYCLED GLASSES

Cullets (glass granulates)

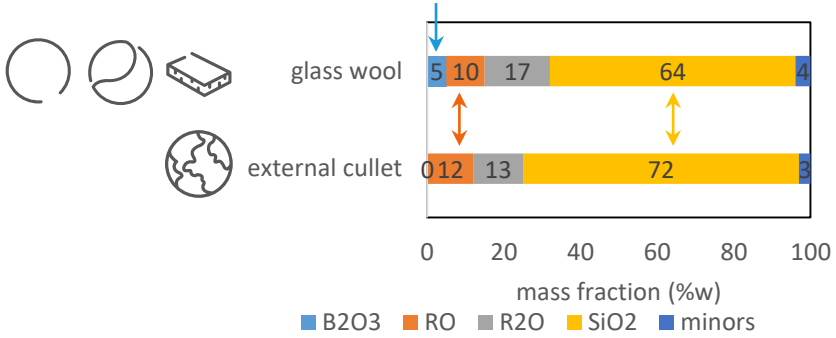
External cullets
Container (household) & float (glazing, windshield)

Internal cullet
Non-fiberized granulated plant glass

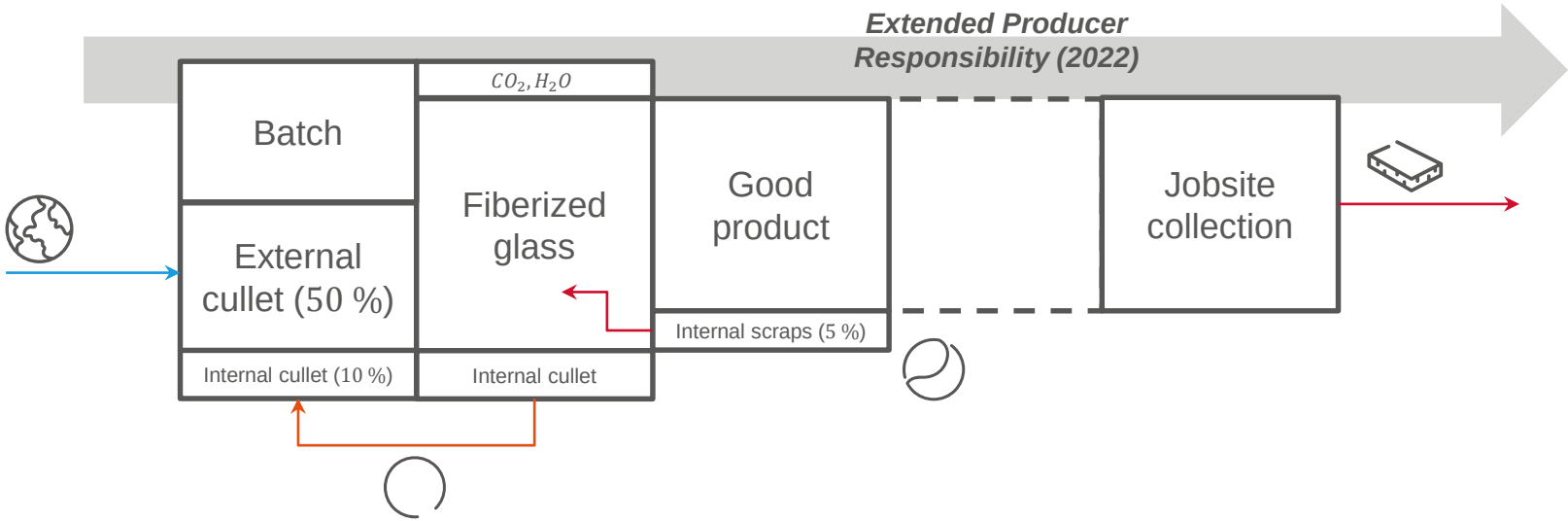
Glasswool

Collection from jobsites
Construction & Deconstruction

Internal scraps
Unsold plant fibers

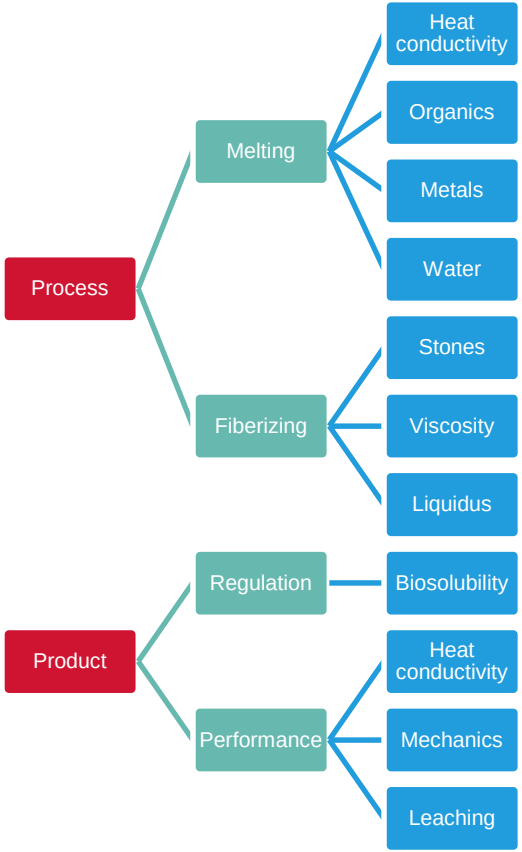


LIFE-CYCLE OVERVIEW



RECYCLING CHALLENGES

IMPACTS



Iron pollutions (stone wool)

Food residue, PVB, glass wool binder

Metallic pollutions (aluminum, enamels)

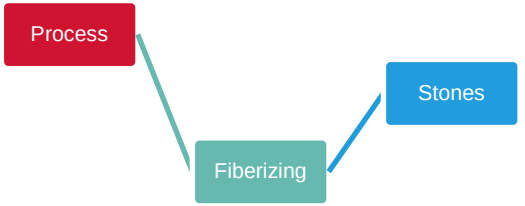
Moisture

Refractory pollutions (ceramics, stones, porcelain)

Glassy phase oxides content

REFRACTORY POLLUTIONS

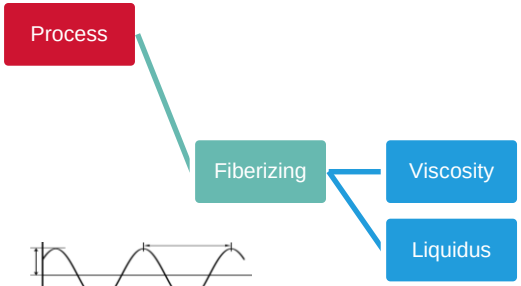
Ceramics, stones, porcelain



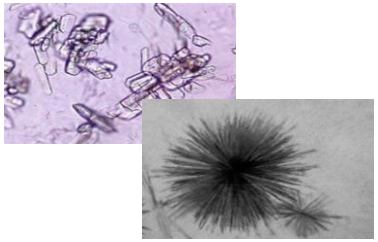
CSP in fiberizing spinner

- Visual check before truck unloading
- Adjust cullet content if necessary
- Audit suppliers to ensure procedures and controls are met
- Be careful with pullrate changes

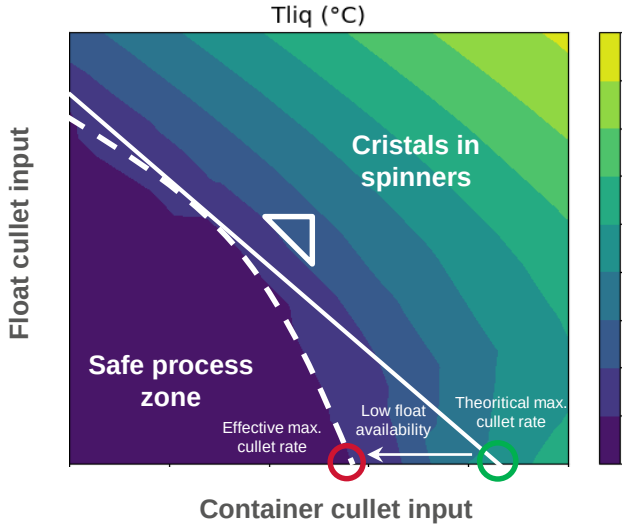
GLASSY PHASE OXIDES CONTENT



Limiting oxides



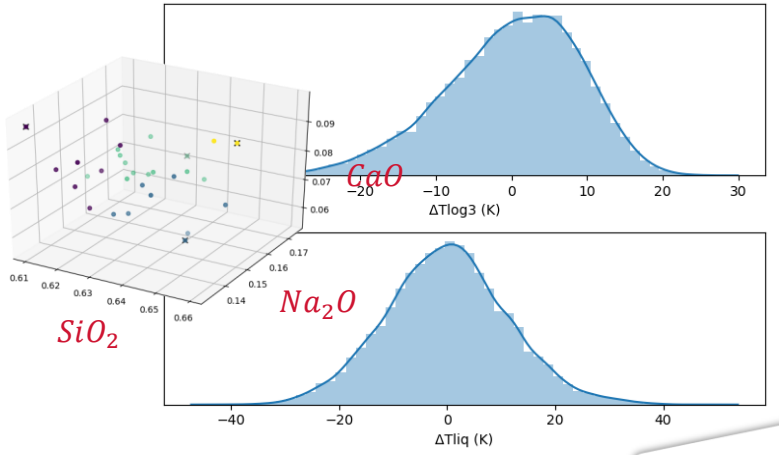
- The liquidus limit (RO)



Variability

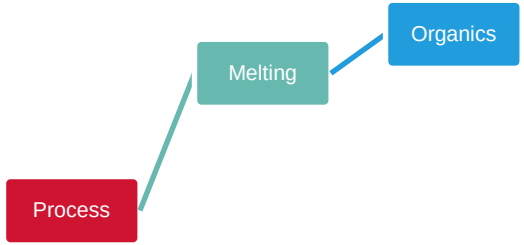
- High frequency variability that cannot be corrected with complementary batch recipe

Glasswool collected from jobsites

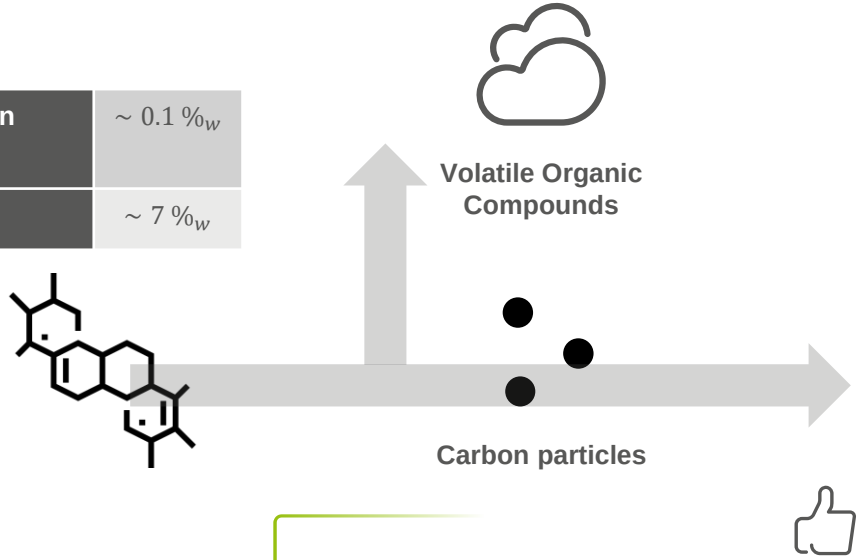


ORGANICS

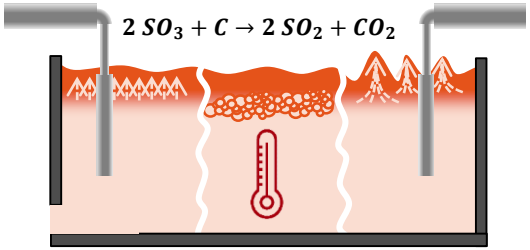
Furnace lifetime, energy consumption, VOC



Food residue & PVB in external cullets	~ 0.1 $\%_w$
Binder in glass wool	~ 7 $\%_w$



Foaming-induced temperature rise

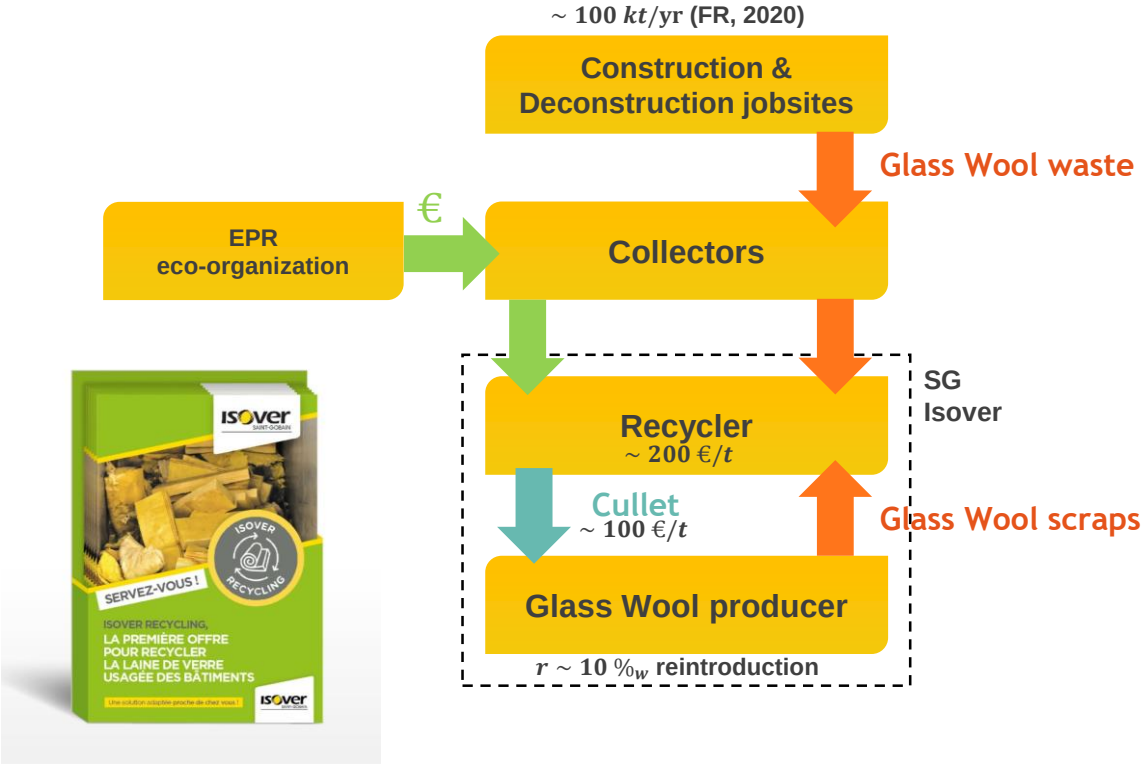


- **Oxidizing atmosphere**
- **Control cullet organics**
- **Limit SO_3 input**
- **Enhance competing reactions with solid oxidizers**

GLASS WOOL RECYCLING

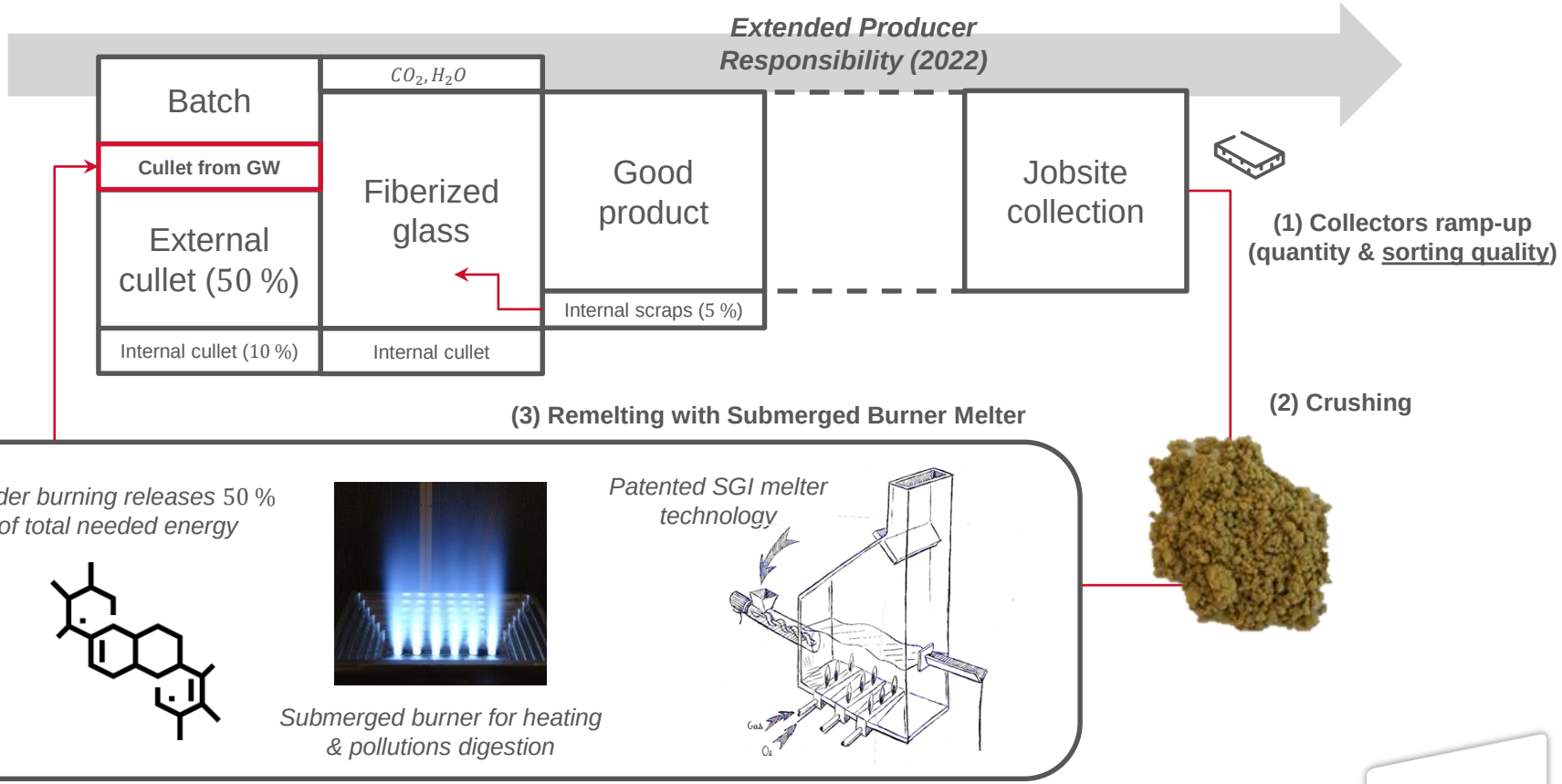
ISOVER RECYCLING

Value chain overview



Sorting tests by collectors

FROM WASTES TO CULLET



LIFE GRANT

I-LOOP LIFE on LIFE Public Database

ADMINISTRATIVE DATA

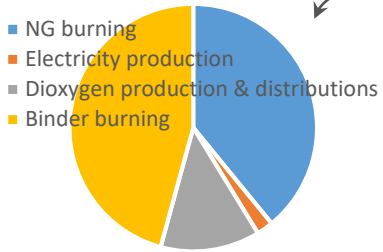
- Reference: LIFE18 ENV/FR/000046
- Acronym: I-LOOP LIFE
- Start Date: 01/10/2019
- End Date: 01/07/2026
- € Total Budget: 12,772,419 €
- EU Contribution: 4,156,408 €
- Project Location:

Insulation Glass wooL circular ecOnOmy aPproach

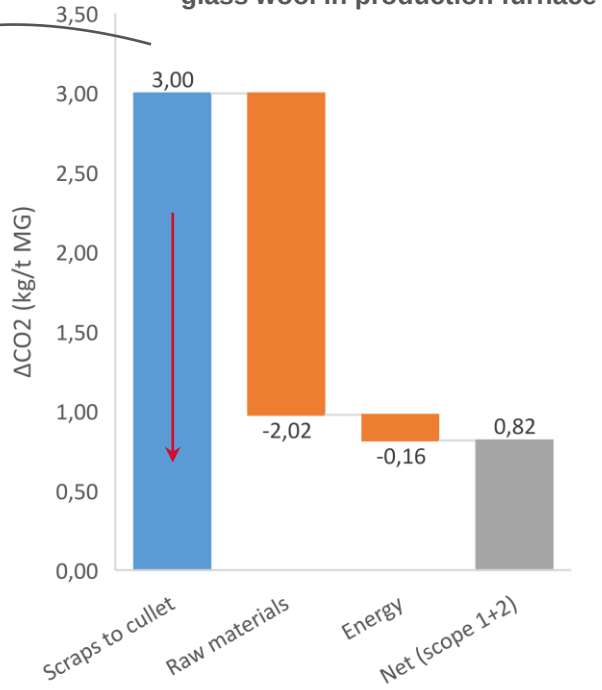
Reference: LIFE18 ENV/FR/000046 | Acronym: I-LOOP LIFE

THE STRUGGLE TOWARDS 0 CO_2

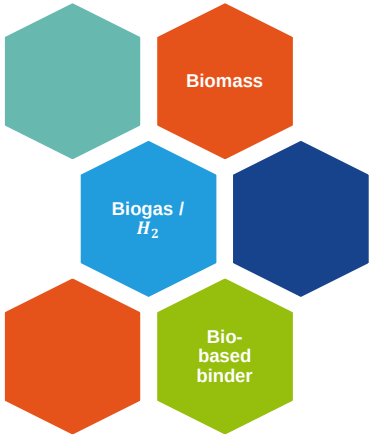
Scope 1+2 budget



CO_2 balance for 1 $\%_w$ recycled glass wool in production furnace



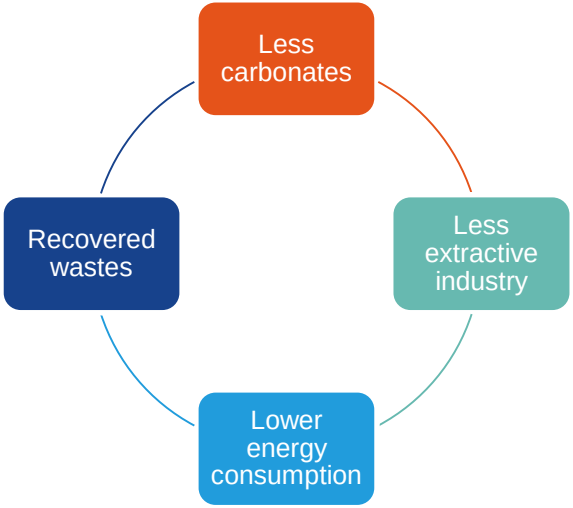
The 3 "bio"



CONCLUSIONS

Glass recycling in glass wool production

- A major technical challenge influencing the way we produce
- Well established for container and float glass sources
- On track for post-consumer glass wool
- Strong technical efforts needed for decarbonization



THANK YOU FOR YOUR ATTENTION