



CPS

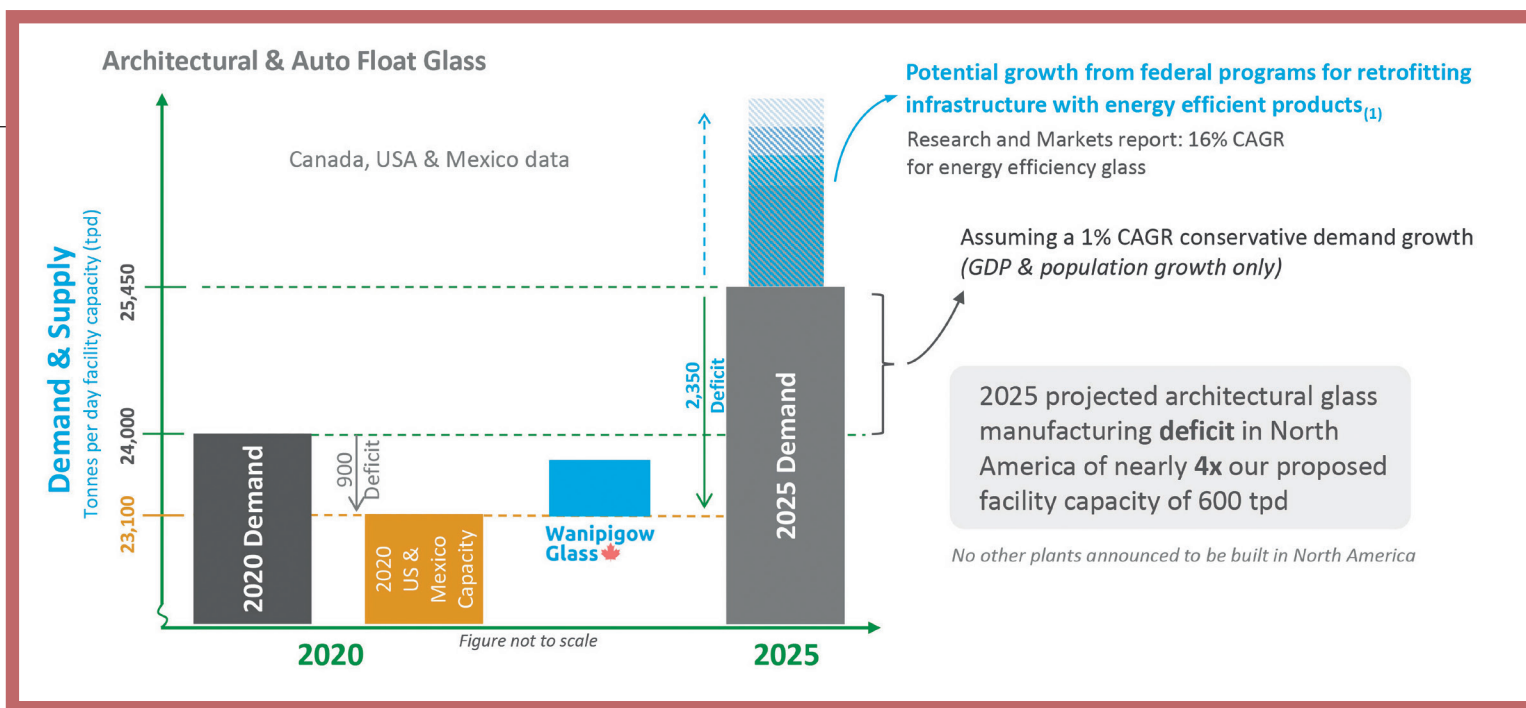
LOW-CARBON MANUFACTURING OF ARCHITECTURAL & SOLAR GLASS

This article introduces the project actually underway in Canada for the low carbon manufacture of architectural and solar glass which, its founders say, will set a new standard for profitable low-carbon manufacturing of architectural and solar glass designed to reduce emissions — quite an important goal.

When setting up any business, there are a series of essential aspects that need to be considered, ranging from technology to emissions, while monitoring sustainability and — last but certainly not least — profitability for the businesses taking part. CPS has carried out in-

depth studies, also with regards to the fact that in the country we are speaking about — Canada — there is no float glass manufacturing capacity, and had come to the conclusion that now is the time to set up float production of special solar glass, also bearing in mind that the organization has its own sand deposit is located





in Manitoba which enjoys long-term manufacturing cost advantages. The new company will therefore benefit of utilizing best available technology and renewable electricity to set a new low-carbon standard for float glass manufacturing.

GROWTH AND DEMAND

Demand for solar glass products manufactured by CPS will be accelerated by:

- EU's and Canada's Net-Zero by 2050 plan
- China's Net-Zero by 2060 plan
- USA's carbon-free electricity grid by 2035 plan
- New generation bi-facial dual-glass modules that provide increased conversion efficiency require 2x solar glass

Demand for coated energy efficient glass will be accelerated by:

- 'Canada's Buildings Strategy' federal program for retrofitting old

infrastructure to reduce emissions(1, 2, 3)

- Canada's revised plan for achieving Paris 2030 emission targets(4)
- Future buildings design will require an assessment of embodied carbon of products utilized, making low-carbon manufacturing critical in meeting new LEED and Canada Green Building Council standards(5)
- Solar glass used in solar panels and coated architectural glass used in energy efficient products save more energy upon installation than used in manufacturing, creating a unique carbon negative product(6)

INCREASING FOCUS ON LOW-CARBON MANUFACTURING

For architectural products, the new company's focus will be on the following guidelines and programs which accelerate demand for energy efficient archi-

tectural products. These guidelines also focus on embodied carbon from manufacturing of building products.

- Canada Building Code 2020 (energy efficiency)
- LEED building rating system (life-cycle analysis)
- Energy Star 5.0 certification program
- Build Smart – Canada's Building Strategy (retrofitting infrastructure to reduce emissions)

The following considerations will likely be incorporated into design parameters and building codes by architects and developers across the world, increasing the focus on low-carbon manufacturing:

- Canada Green Building Council – Case for Building to Zero Carbon (2019)
- European Standard EN 15978 specifies calculation method for building environmental performance (2017)
- Finland's Ministry of Environment publication: Roadmap for low-carbon construction (2019)

- International Green Construction Code (2018) – design and construction of sustainable, resilient, high performance buildings
- Comprehensive approach on Carbon Assessment and applying it through the building design cycles (2017)

'SPEAKING' TO CPS

CPS is a company that owns quarry rights to a very large reserve of low iron silica sand in Manitoba. Our plan is to build an industry-leading sustainable float glass manufacturing and coating facility in the greater Winnipeg and supply that operation from our sand reserves.

Our facility will contribute to global efforts to reduce emissions through sustainable manufacturing of carbon negative glass products. We aim to set a new standard for low-carbon manufacturing of glass utilizing renewable energy from the provincial power grid for the facility's electricity supply. We will also incorporate the latest technology



and sustainable operating practices including waste heat recovery and recycled municipal water for cooling.

What will we produce?

Our high-quality sand will facilitate the manufacture of solar glass for use in solar panels, or ultra-clear energy efficient architectural float glass for use in energy efficient buildings and homes.

A process is underway to determine what the Company's long-term production plan will focus on – either fully dedicated to solar glass, fully dedicated to architectural glass, or a strategic combination of the two. This will be influenced by direct feedback from potential customers and detailed analysis of our customers' supply chain.

How did we land on this strategy to build a sustainable float glass facility?

We investigated potential industrial uses for the high-quality silica sand

and associated value-add manufacturing opportunities. We quickly realized that the iron content before processing of our sand is low and fairly unique in North America. We also determined that with basic processing the iron content could be reduced even further making it ideal feedstock in the production of high end glass products.

Combining the potential of the resource and the significant logistics, sustainability and cost benefits of locating a facility in Manitoba led to our vision of building a low-carbon float glass facility in the province.

We believe the project timing is ideal for Manitoba. It is aligned with provincial climate action priorities, sustainable development mandates, new employment targets, and the project will contribute to economic recovery following the COVID-19 pandemic as the float glass operation will produce over 300 full-time

PROJECT SUMMARY

- Wholly owned silica sand deposit suitable for high quality glass manufacturing
- Cost-competitive low-carbon manufacturing process
- High growth markets aligning with global climate action plans
- Shareholder alignment with notable board and management ownership positions
- A green investment to produce carbon negative products for a rapidly growing need

permanent jobs in Manitoba. Moreover, there is substantial economic spin-off opportunity for the community and the province including: secondary business creation for suppliers and services and manufacturing and fabrication of further value-added glass products.

What is the importance of sand as a raw material for glass manufacturing?

Silica sand is the primary raw material used to manufacture float glass. There are very few silica sand mines in North America with sufficiently low iron levels to produce high quality glass. Low iron content in the source silica sand is essential for production of premium glass because it improves clarity and transmissivity of light through the glass.

The more light that is able to pass through the glass, the more efficient a solar panel can become and the more specialized coatings can be applied to architectural glass.

What is your view on the future of this market?

Global demand for float glass is high and projected to increase substantially with demand outpacing North American supply for years to come.

Both Canada and the USA have climate action mandates. Policies supporting these mandates focus on reducing energy consumption by buildings. Retrofitting older buildings with low-E coated glass and ensuring new building codes mandate low-E coated glass form a key component of climate action policies and incentives.

Further, the new US Administration's goal to de-carbonize the electricity grid by 2035 will drive growth in renewable energy infrastructure. Solar power will contribute to this and that contribution will drive strong growth in the manufacture of high efficiency solar panels. CPS will be capable of producing the glass coverings for these solar panels and potentially facilitate an increase in North American

LEADERSHIP

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solar panel manufacturing capability.

Building design and city development standards will soon start incorporating life-cycle carbon assessment, placing a greater emphasis on low-carbon manufacturing and responsibly sourced material for future development. We are building a low-carbon facility in North America with a focus on future development needs.

What are the next steps?

CPS is a small group of entrepreneurs that have been working on developing this business plan. We recognize the need to strengthen our management team with float glass industry expertise and will be recruiting the talent to do so. Our enhanced team

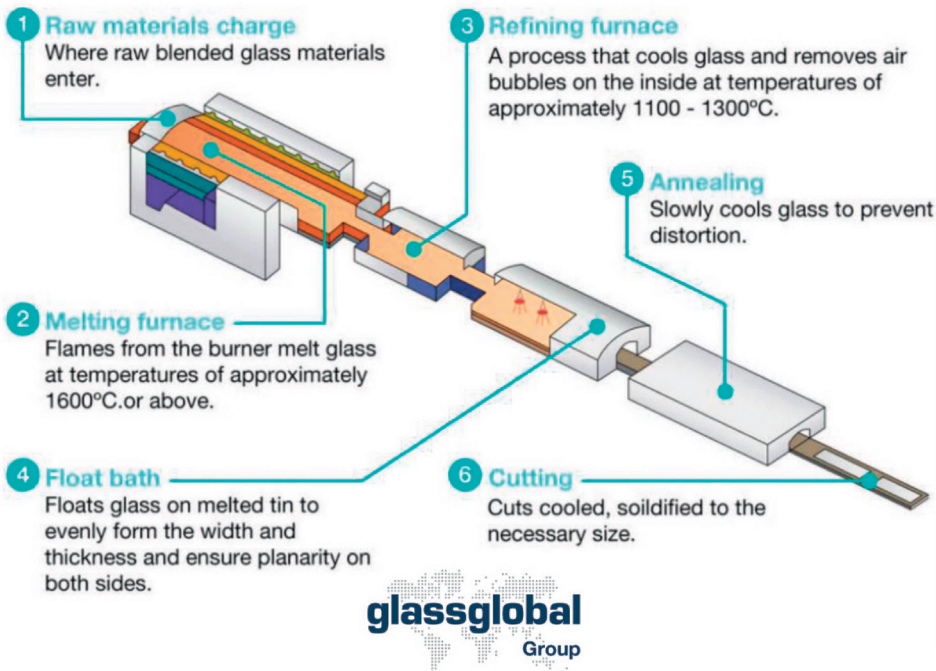
will then guide the detailed design of our float glass facility, contract the services and suppliers to build the facility then start construction. The team will also work to establish supply contracts with our float glass customer base.

We are going to make decisions on our production portfolio in the coming months. That determination will coincide with starting the front-end engineering and design (FEED), permitting and regulatory applications needed to enter construction contracts.

What is your end goal/vision?

We see a float glass manufacturing facility as a starting point for a larger vision. With over 96 per cent renewable electricity from





solar glass product or fabrication and glazing businesses utilizing our architectural glass product. Because of the magnitude of our silica sand resource, we see significant potential for a long-term, silica industry based growth strategy for the province of Manitoba.

REFERENCES

1. 13% of all emissions in Canada is from energy consumption in buildings (Natural Resources Canada)
2. Build Smart - Canada's Buildings Strategy (2017)
3. IRENA - REmap Transition Pathway 2019 to 2050
4. Government of Canada's proposal to UN Climate Change panel
5. MANTLE Low-Embodied Carbon Report (and additional sources)
6. White Paper: Industrial Decarbonization & Energy Efficiency Roadmaps to 2050 – Glass; Report for United Kingdom

KEYS TO SUCCESS

Expanding our core team with glass industry veterans
Market focused products
Building strategic technical and operational partnerships
Operational excellence

the provincial power grid at very competitive rates, we hope to build out a centre of excellence in the province focused on silica based value-added manufacturing. This could include a solar panel manufacturing facility adjacent to our facility utilizing our



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