

Low-Clinker Cements: Applying Carbon Management Practices to Increase Competitiveness

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Project Overview

- ❖ Commercial production “low-carbon” GUBL cement at the Brookfield, NS plant
 - 15% slag + 12% limestone substitution for clinker
- ❖ Anticipated market transformation from GU cement
- ❖ 699,000 tonnes CO₂ emission reductions between 2010-20
- ❖ Innovative project financing for 1.5 million project
 - Grant (\$670K) + offset revenue (~\$1M - \$5M+)
- ❖ Project partners
 - Lafarge, Carbon Sense Solutions, UNB, Province of NS



Project Objectives

- ❖ Industry adoption of GUBL cement
- ❖ Create new revenue streams through carbon offsets
- ❖ Integrate into corporate carbon strategy
- ❖ Transferability of technology and carbon offset strategy to other plants
- ❖ Innovative Financing of capital projects
- ❖ Increased competitiveness



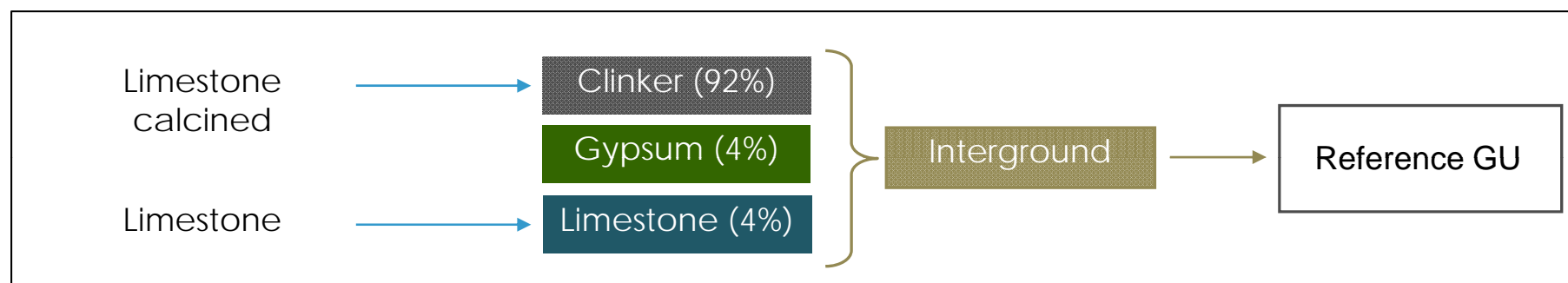
The Technology

- ❖ Innovative intergrinding technology
- ❖ Equivalent performance to GU cement
- ❖ GUBL intergrinding is not “just” dilution
- ❖ Slag and limestone addition
- ❖ CO₂ reductions achieved by less:
 - calcination
 - Kiln fuel combustion

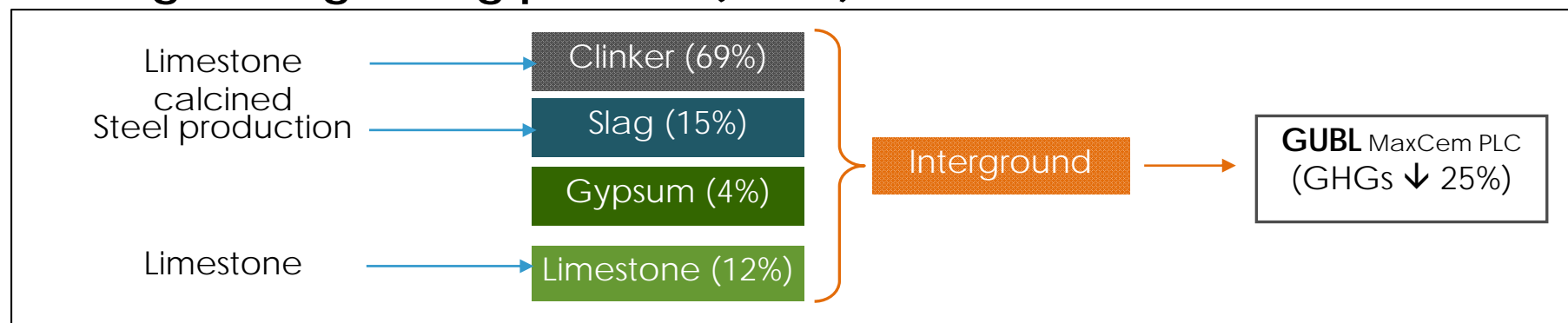


The Technology

Conventional cement (GU)



Lafarge intergrinding process (GUBL)



Carbon Management

❖ Why manage carbon?

- Minimize carbon exposure risks
 - Carbon Disclosure Project
- Operational cost savings
- Environmental stewardship
- Industry / supply chain pressure to reduce CO₂ emissions
- Prepare for future compliance period
- New financing sources / access to government incentives
- New “potential” revenue streams to offset capex costs



Carbon Management

Measure

- Requires robust accounting methodologies
- Provides accurate measure of energy consumption
- Informs carbon/energy management projects and capital strategy

Manage

- Process changes
- Energy efficiency
- Renewable energy purchases
- Carbon offsets

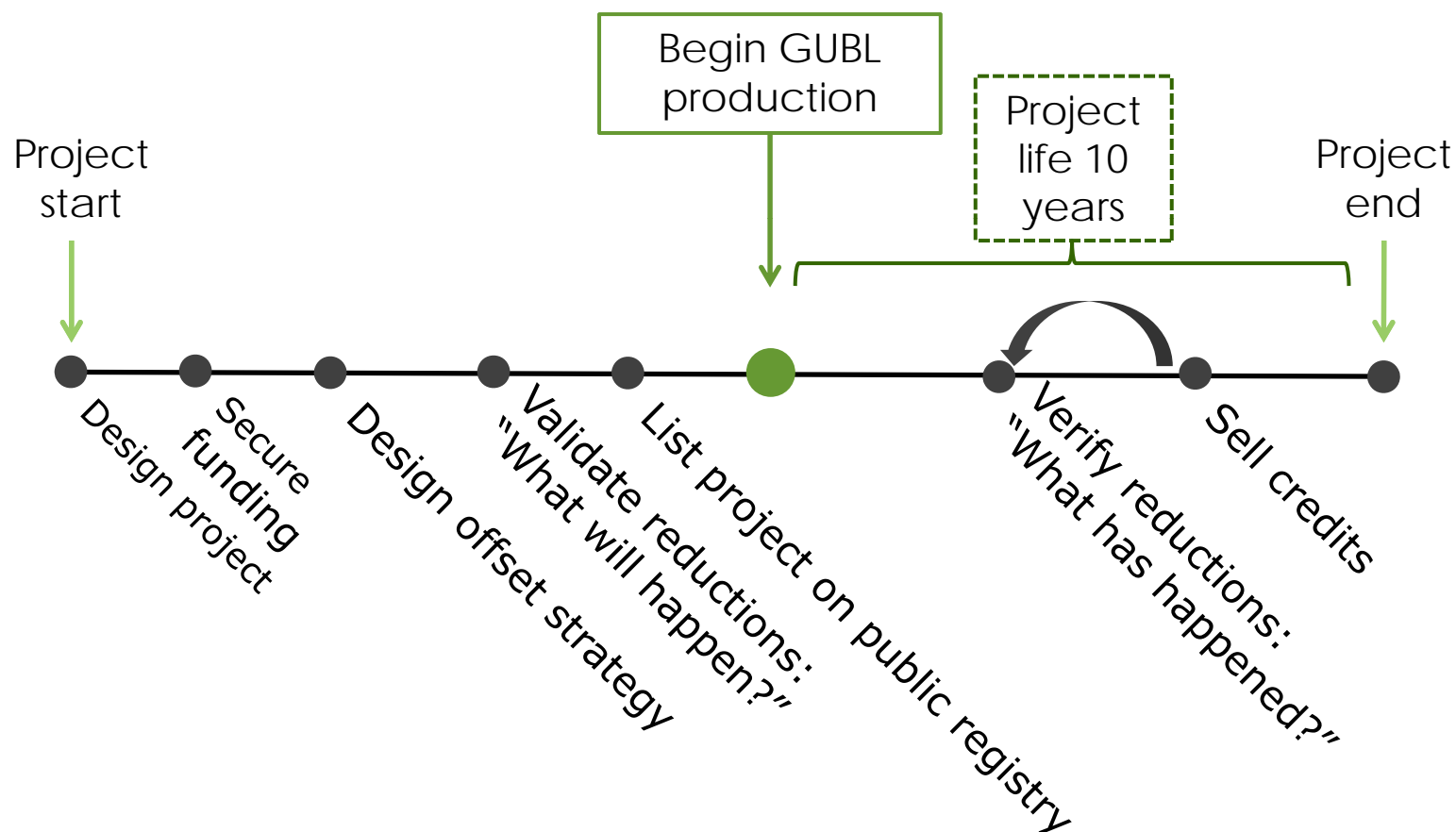
Monetize

- Operational savings
- Offset revenues
- Compliance cost avoidance
- Incentive programs
- Marketing
- Market access

Carbon Offsets

- ❖ Projects that reduce CO₂ levels can generate “carbon offsets”
- ❖ Project proponents sell the volume of CO₂ that their project reduces to a buyer who cannot reduce CO₂ themselves
- ❖ Traded on markets like stocks or sold directly to buyers
- ❖ Prices range from \$0.10 to \$20+
- ❖ Price depends on type and “quality” of the offsets

Carbon Offset Timeline



Project Outcome

- ❖ Production and industry acceptance of innovative GUBL blended cement
- ❖ Reduce GHGs by 699,000 tonnes of CO₂ by 2020
- ❖ Access to new financing sources
- ❖ Carbon offset revenue of ~\$1M – 5M+
- ❖ Access to new markets (green products)
- ❖ Transfer technology and carbon offset to other plants in NA

Lessons Learned

- ❖ Long time between cash inflows and outflows
- ❖ High quality offsets will fetch higher prices
- ❖ Documentation is key (requires effort, time, and money)
- ❖ Engage with validators and buyers early
- ❖ Project performance may be less than anticipated; be conservative with estimates

*Lafarge is using carbon management to turn
carbon emissions into profits*

QUESTIONS

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