

Case Studies on Minimizing Clinker Factor in Cement by Fosroc's New Age Grinding Aid

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Advantages of Clinker Substitution

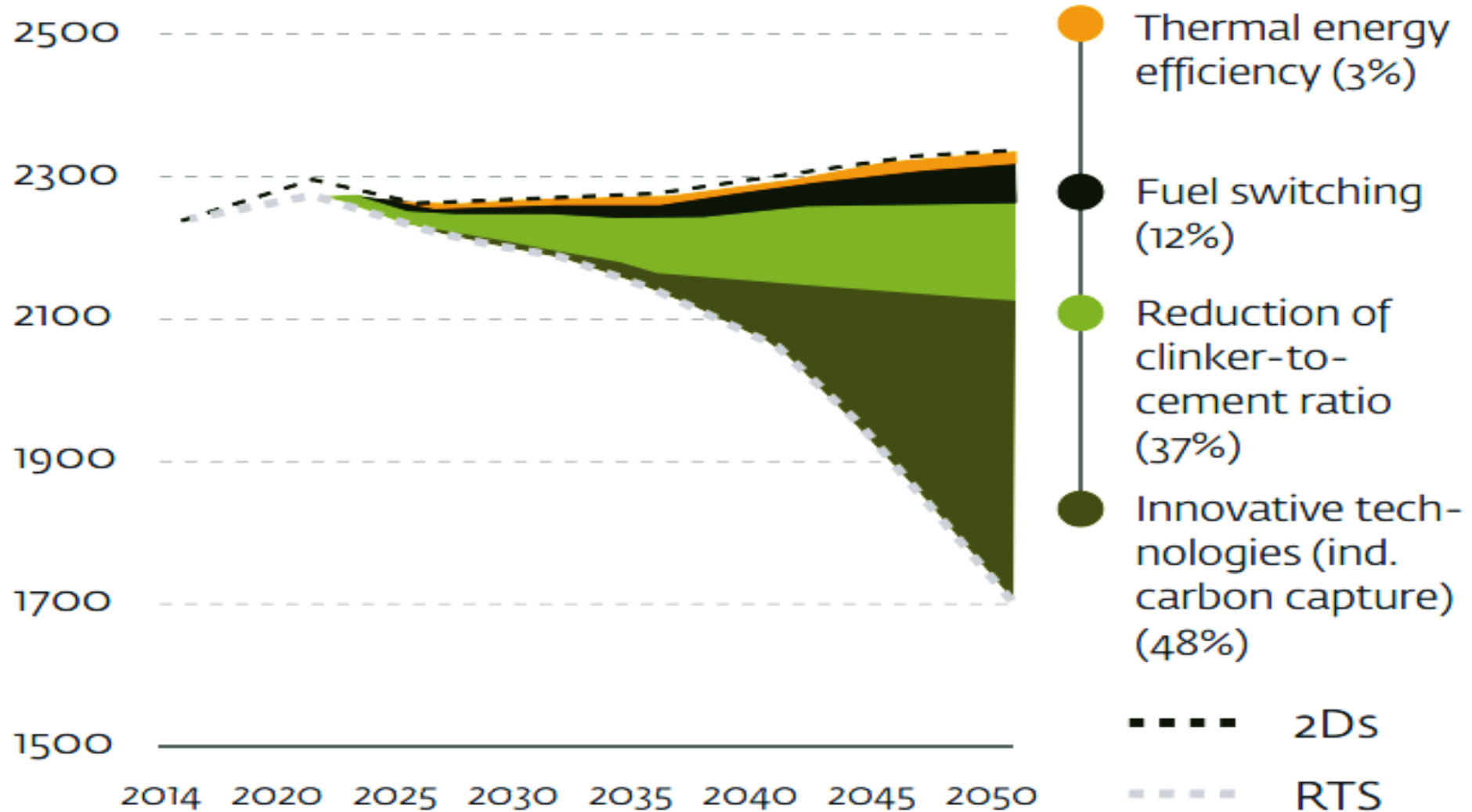
- Reducing environmental impact
- Conserving resources
- Cost saving in overall cement production



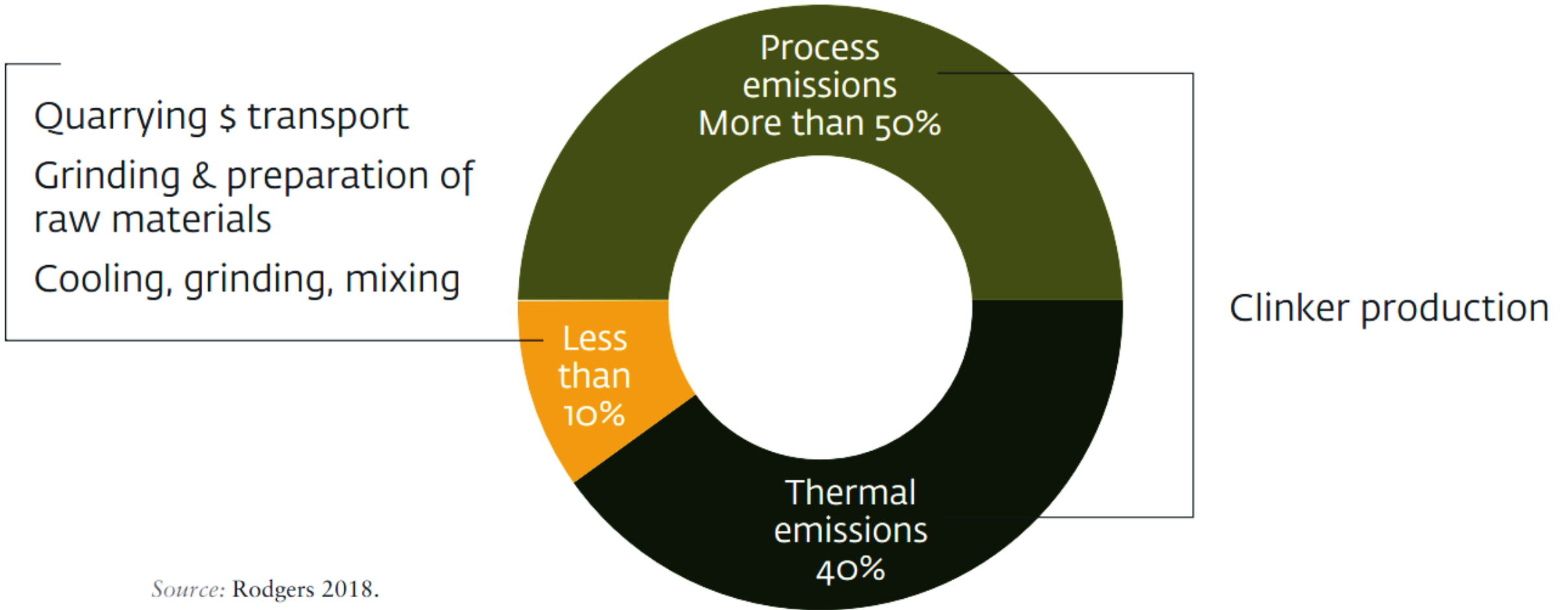
Clinker Reduction and “net zero”



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CO2 Emission in Cement Production



Source: Rodgers 2018.

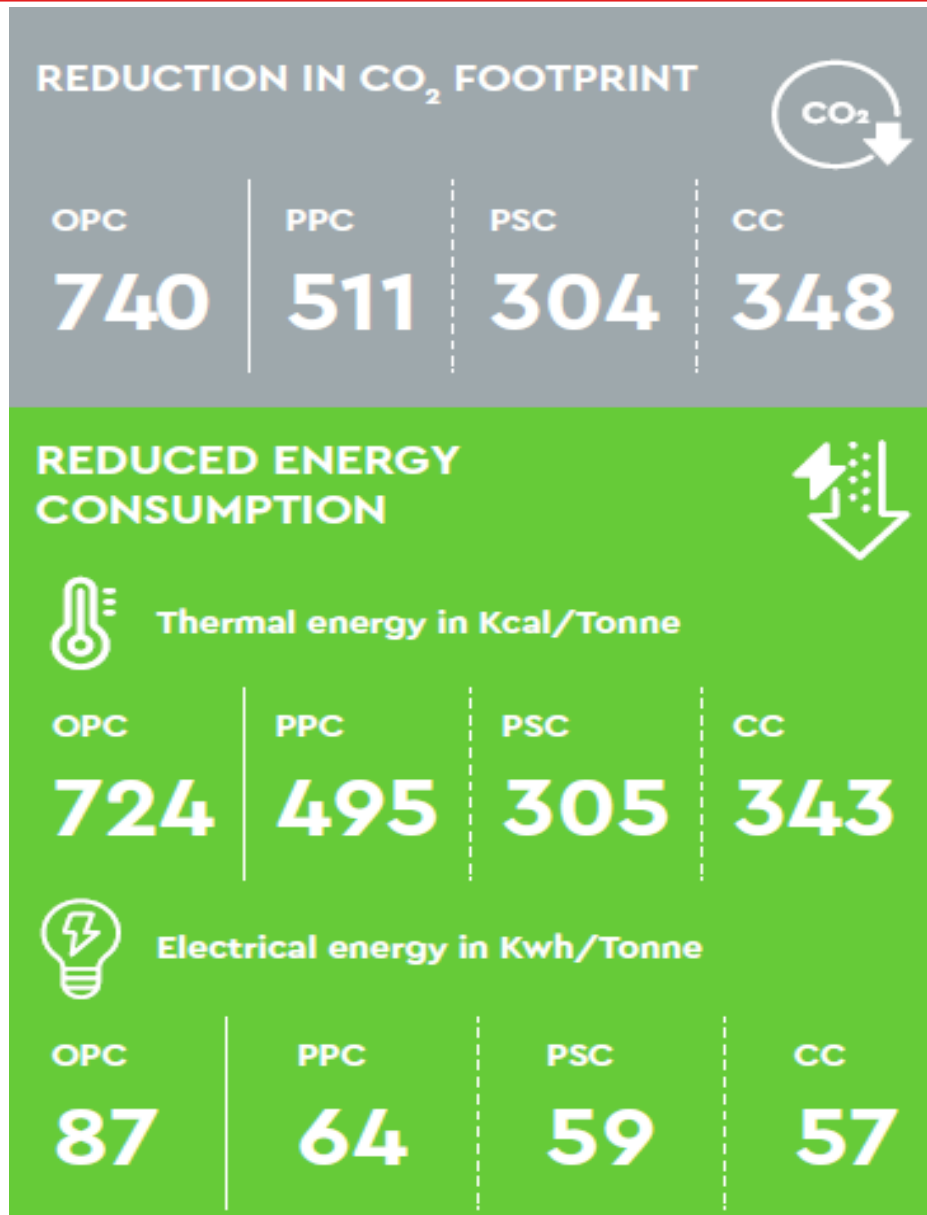
Key Constraints in Reducing the Clinker Factor



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- Strength requirement in market
- Quality and availability of SCM (Fly ash, Slag, etc)
- The **premium war** among brands

Opportunities with Low Clinker Cement



- Reduced carbon emissions
- Reduced Energy Consumption
- Increase in Cost savings
- Increased Durability
- Increased Productivity
- Increased mines life

Overcoming the Limitations

- **Finer cement grinding for Achieving Optimal Strength**
 - ▶ reduced grinding efficiency
 - ▶ increased product / production cost

- **Using Grinding Aids / cement performance enhancers**



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Current Offerings of Cement Additives

- Productivity improvement : 6-8 %
- Strength increment : 1.5 to 2.0 MPa (early strength)
- Clinker replacement : 2%

The Need of the Hour

Addressing Challenges and Embracing Opportunities

The Need



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- Maximizing Clinker replacement (more than 2%)
- Cater Strength demand of market

The Gap





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Addressing the Limitations

With Fosroc's New Age Cement Additives: The Cemax Effect

Fosroc's Cemax: The Future of Grinding Aids

- **Trusted Innovation Leader** in grinding aids & performance enhancers
- **Relentless R&D Investment** for evolving industry needs
- **Cutting-Edge Cemax Additives** for enhanced cement performance
- **Sustainability at Core:** Achieved up to **5% clinker replacement**



Maximize with Nano



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Fosroc's additives revolutionize clinker replacement with nano molecules. Experience:

■ Increased Reactivity

- ▶ Unleash potential with high surface area nano molecules.

■ Improved Pozzolanic Activity

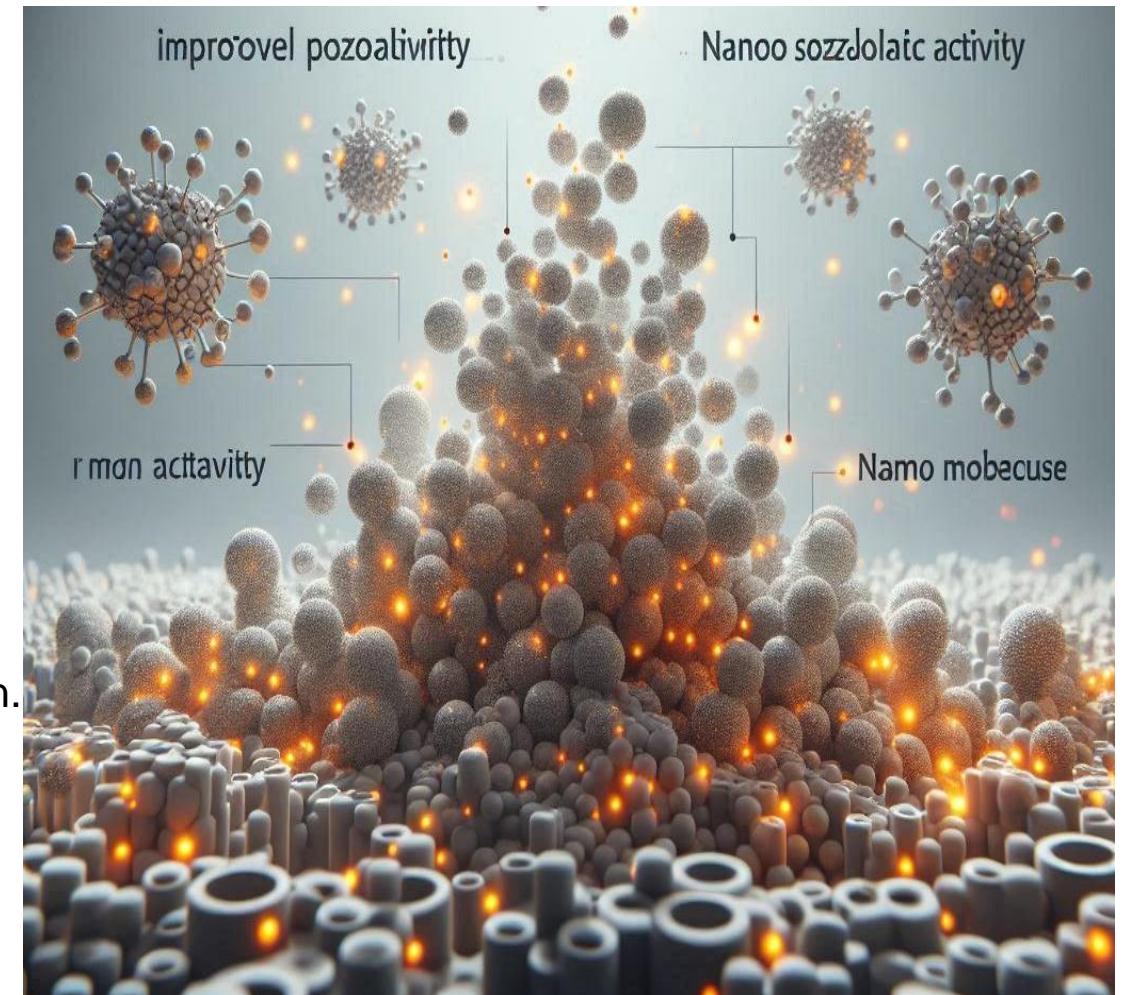
- ▶ Amplify SCM efficiency with nano particle precision.

■ Nano Scale Dispersion

- ▶ Achieve uniform SCM distribution at the nano level.

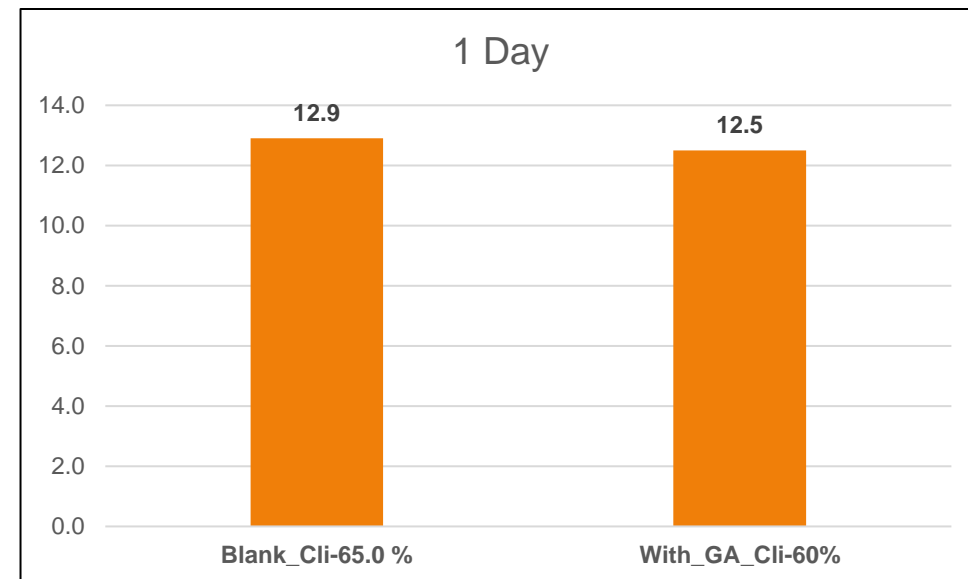
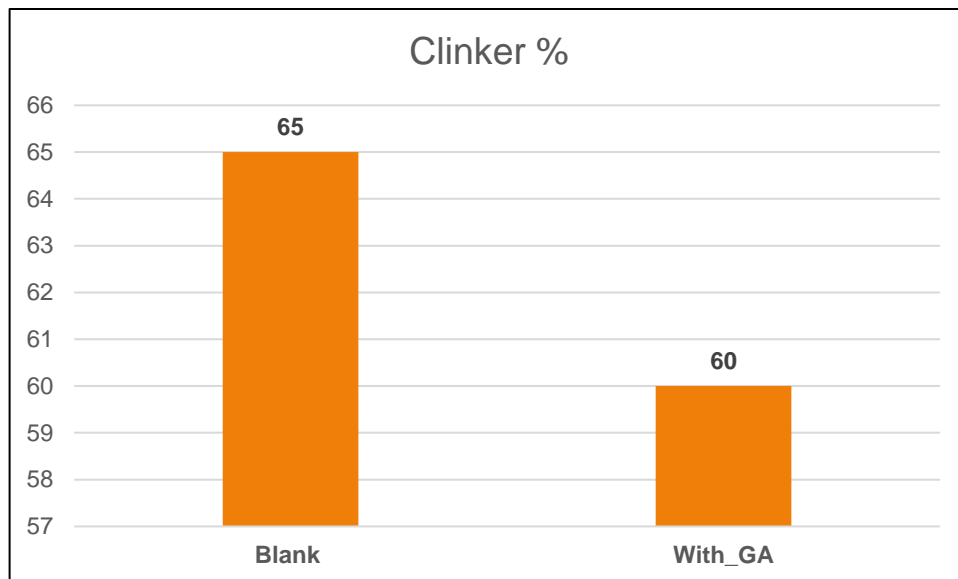
■ Particle Packing Perfection

- ▶ Optimize density and minimize porosity with nano precision.



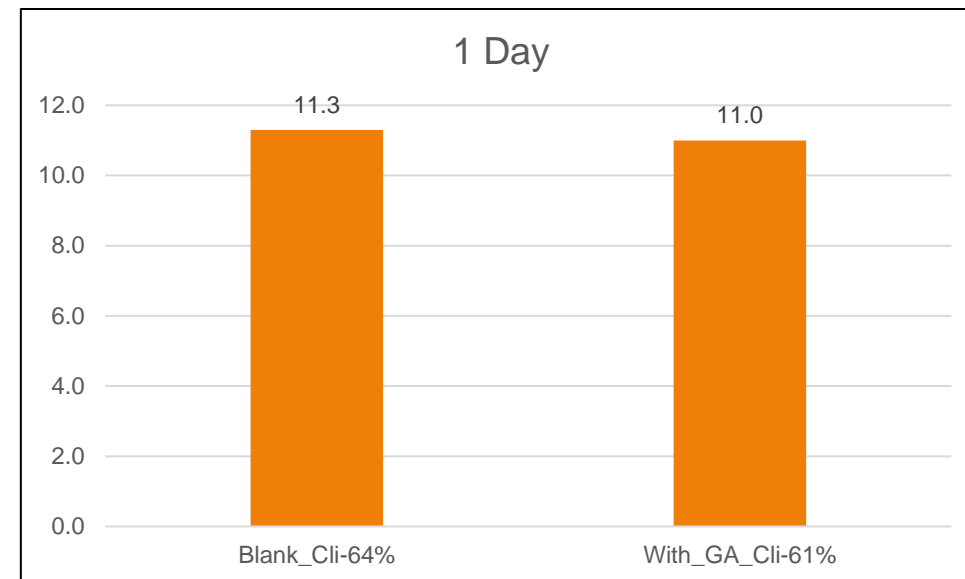
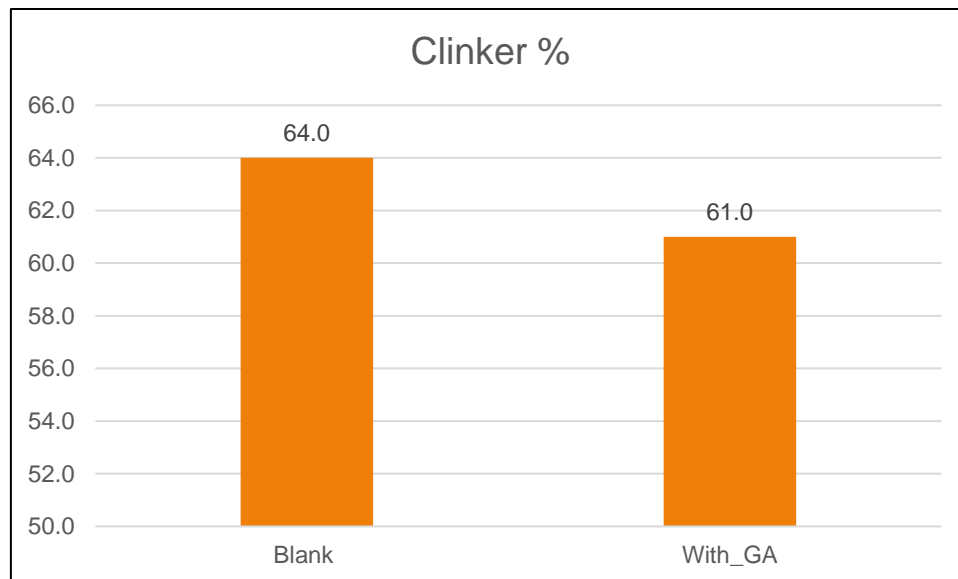
Case Study 1: Plant A

- Location and size of the plant : Southern Region / 4.0 MTPA (approx.)
- Initial clinker factor: 65.0%
- Reduction in clinker factor: **5%**



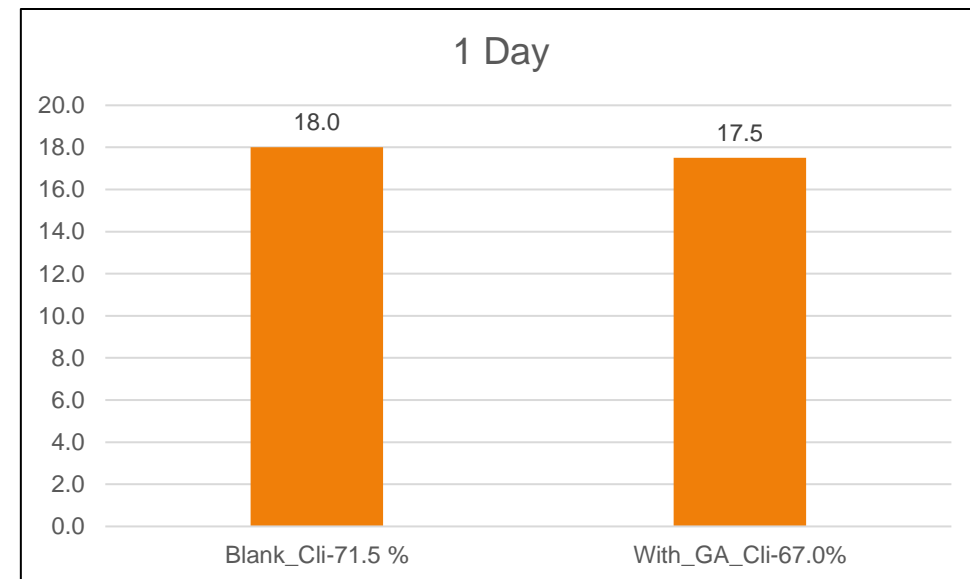
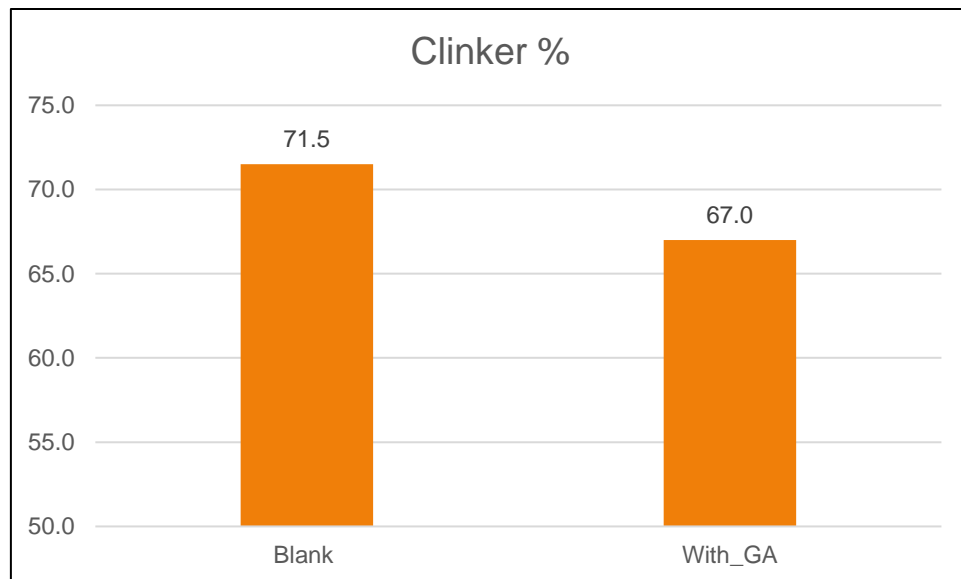
Case Study 2: Plant B

- Location and size of the plant : Southern Region / 1.7 MTPA (approx.)
- Initial clinker factor: 64.0%
- Reduction in clinker factor: **3%**



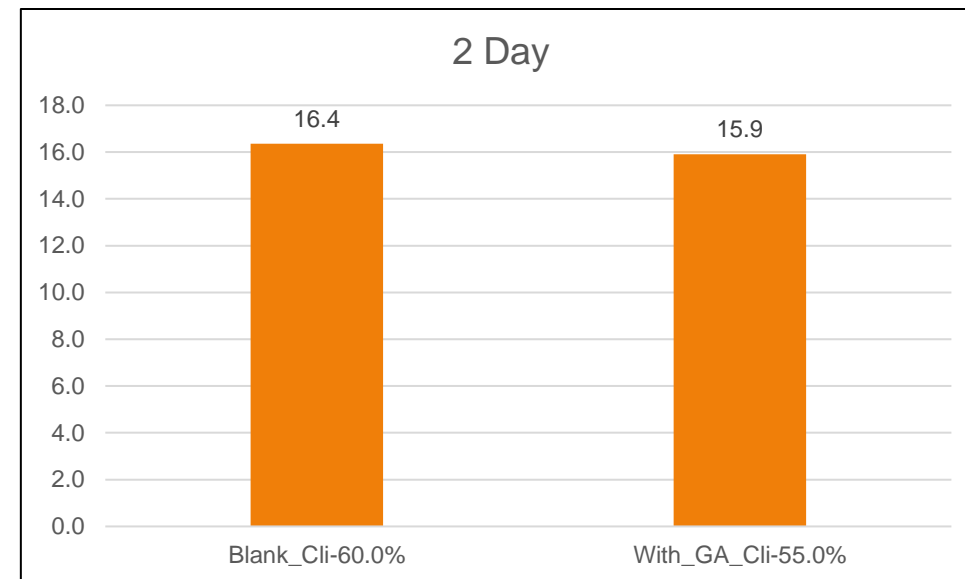
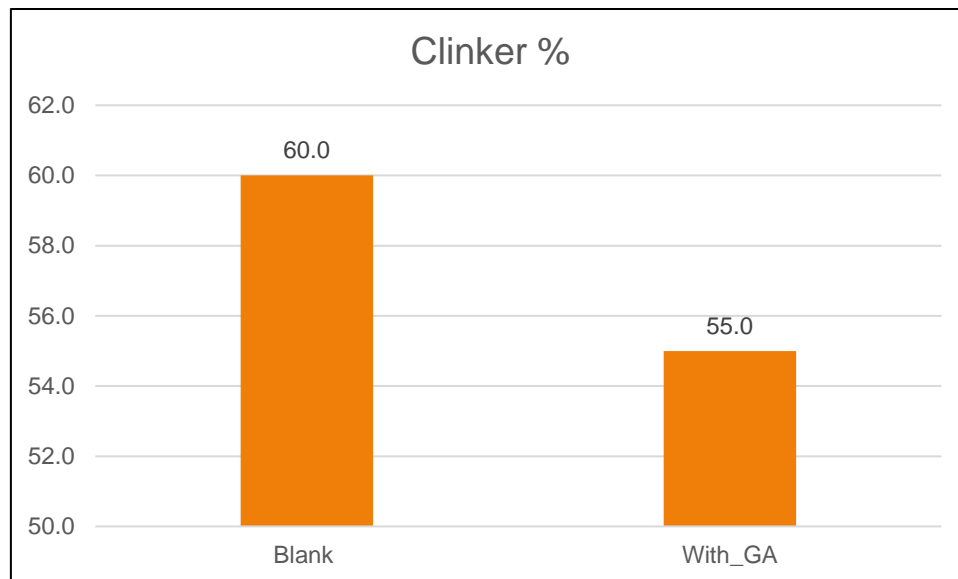
Case Study 3: Plant C

- Location and size of the plant : North-Eastern Region / 1.0 MTPA (approx.)
- Initial clinker factor: 71.5%
- Reduction in clinker factor: **4.5%**



Case Study 4: Plant C

- Location and size of the plant : Bangladesh / 8.0 MTPA (approx.)
- Initial clinker factor: 59.5%
- Reduction in clinker factor: **5.0%**



Opportunities Ahead

- LC3 Cement
- Introduction of new low clinker cement in future

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Thank You

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