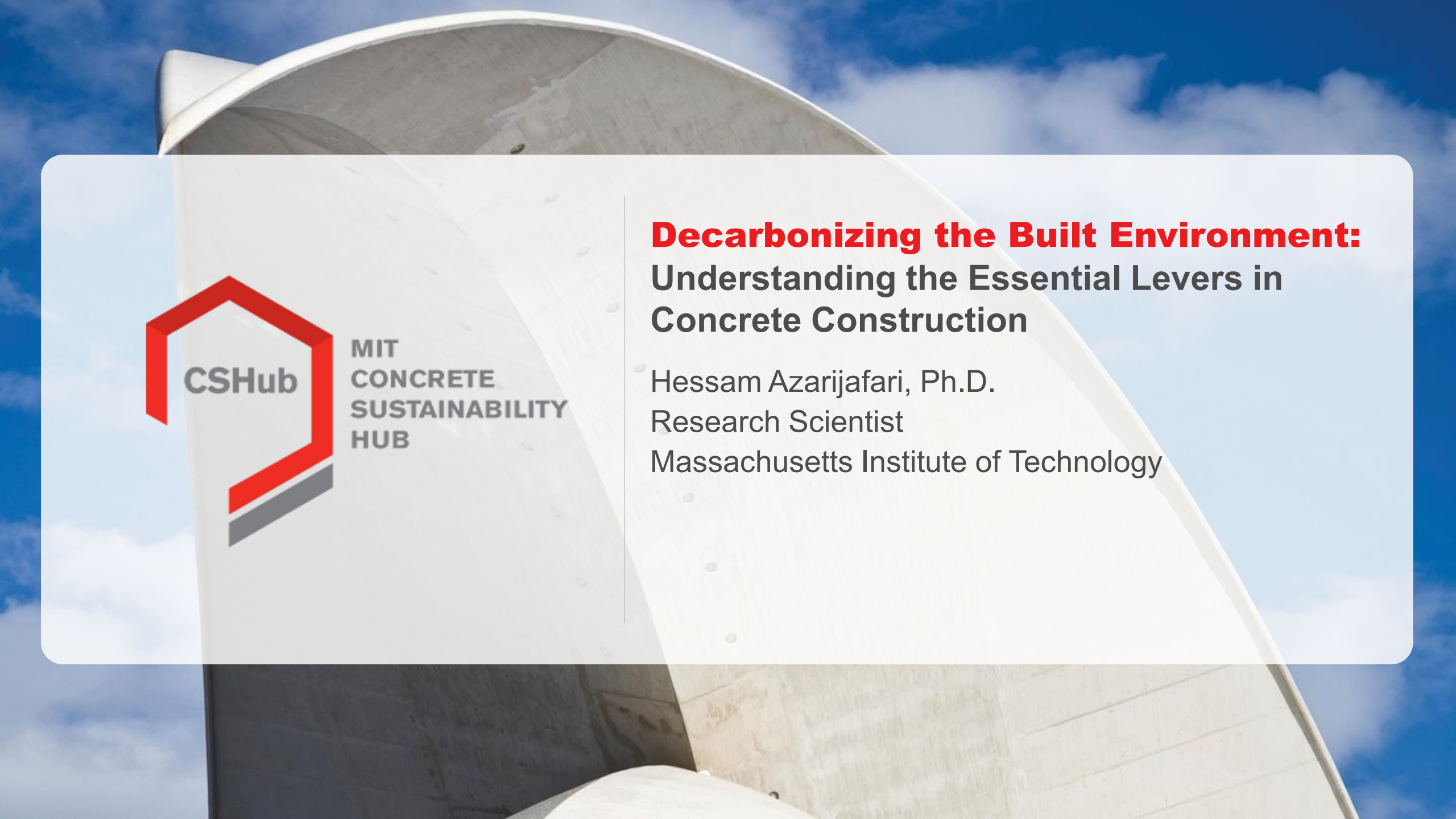

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Decarbonizing the Built Environment:
Understanding the Essential Levers in Concrete Construction

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Determination of GHG emissions threshold requires an extensive data collection effort

- Data should be granular enough to represent the local production capacity
- Data should consider the production size

- Objective:
  - Evaluate the GHG emissions associated with typical concrete mixtures produced by MA ready mix plants:
    - Mostly produced concrete mixtures for 3000-5000 psi design strengths
    - End-use application was tested (sidewalk vs. residential)

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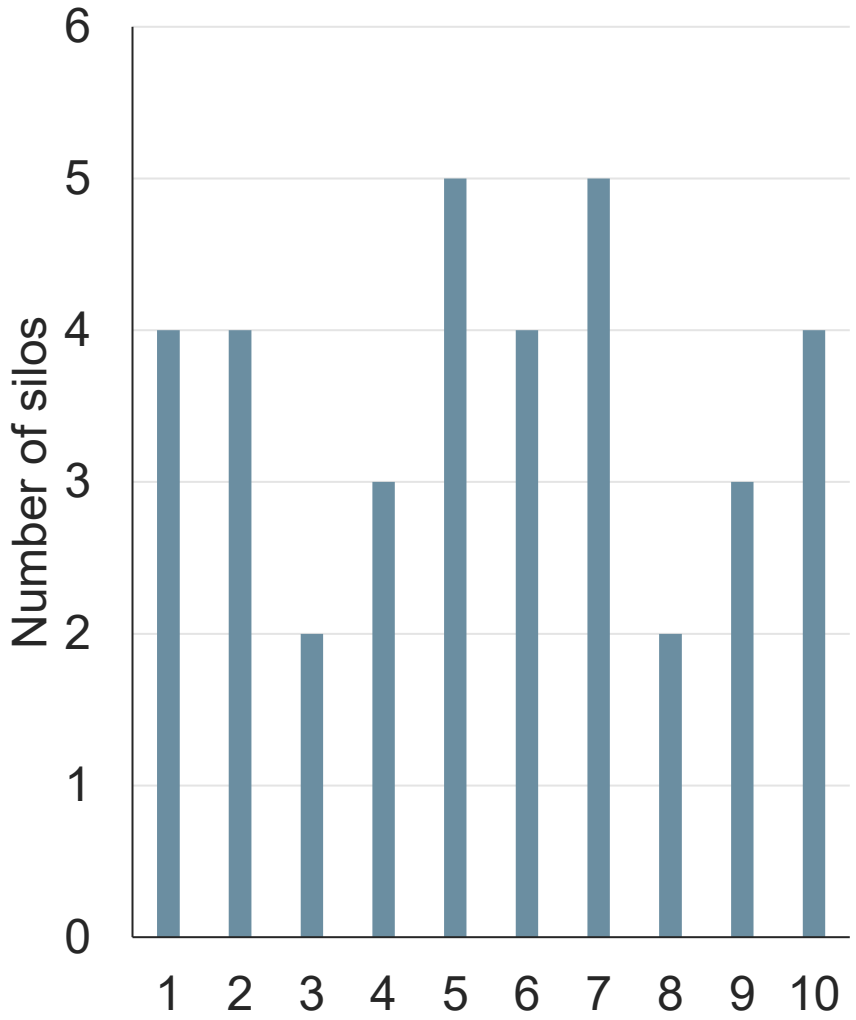
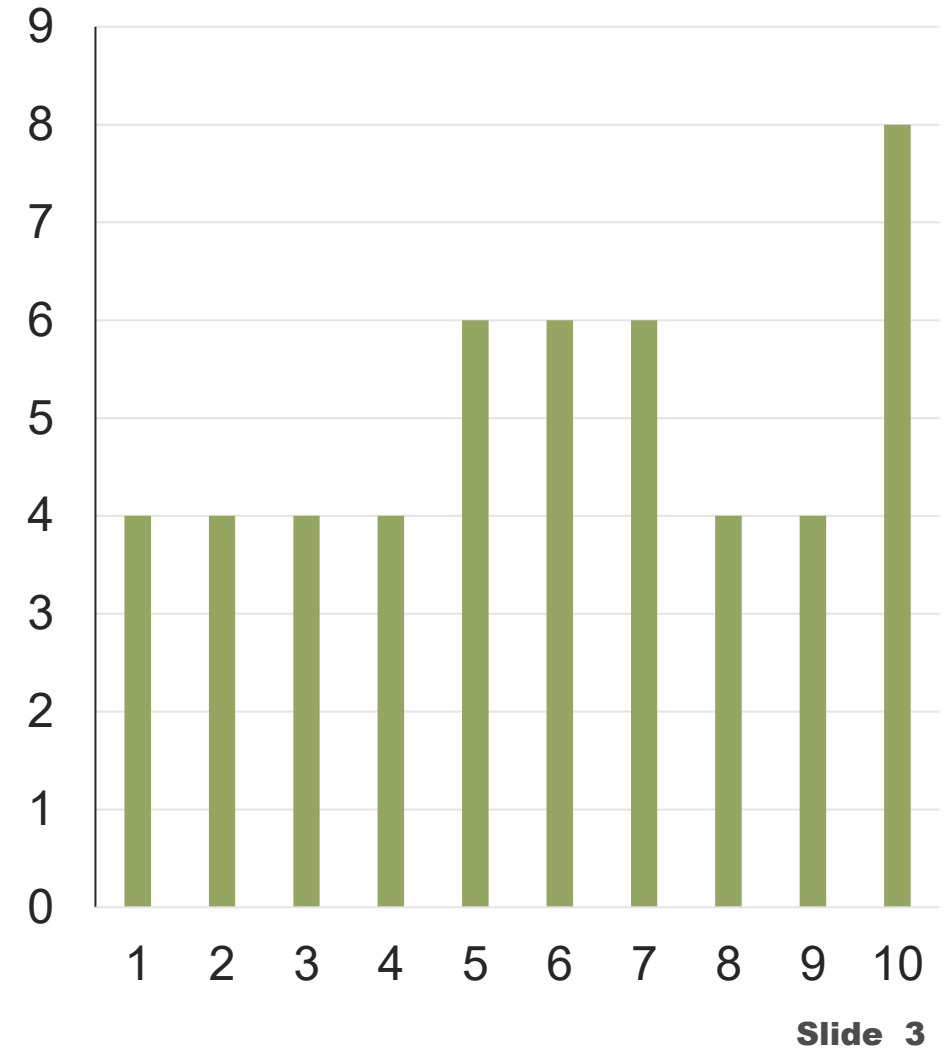
Majority of the surveyed plants have reported insufficient storage for lower-carbon mix adoption

Proposal for SCMs and OPC: minimum of 6



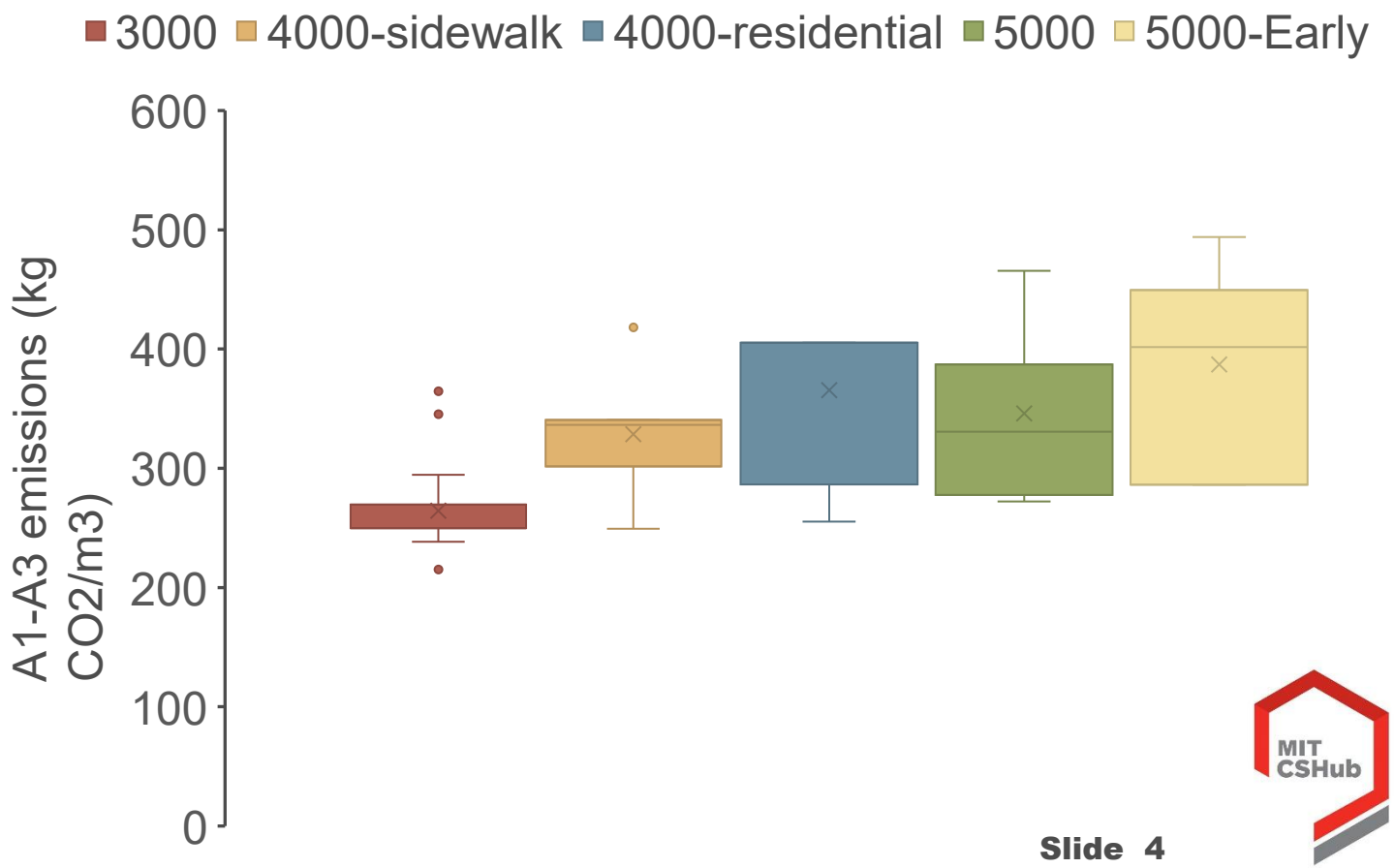
Proposal for optimized aggregates: minimum of 6



Current distribution of A1-A3 emissions from different ready-mixed plants

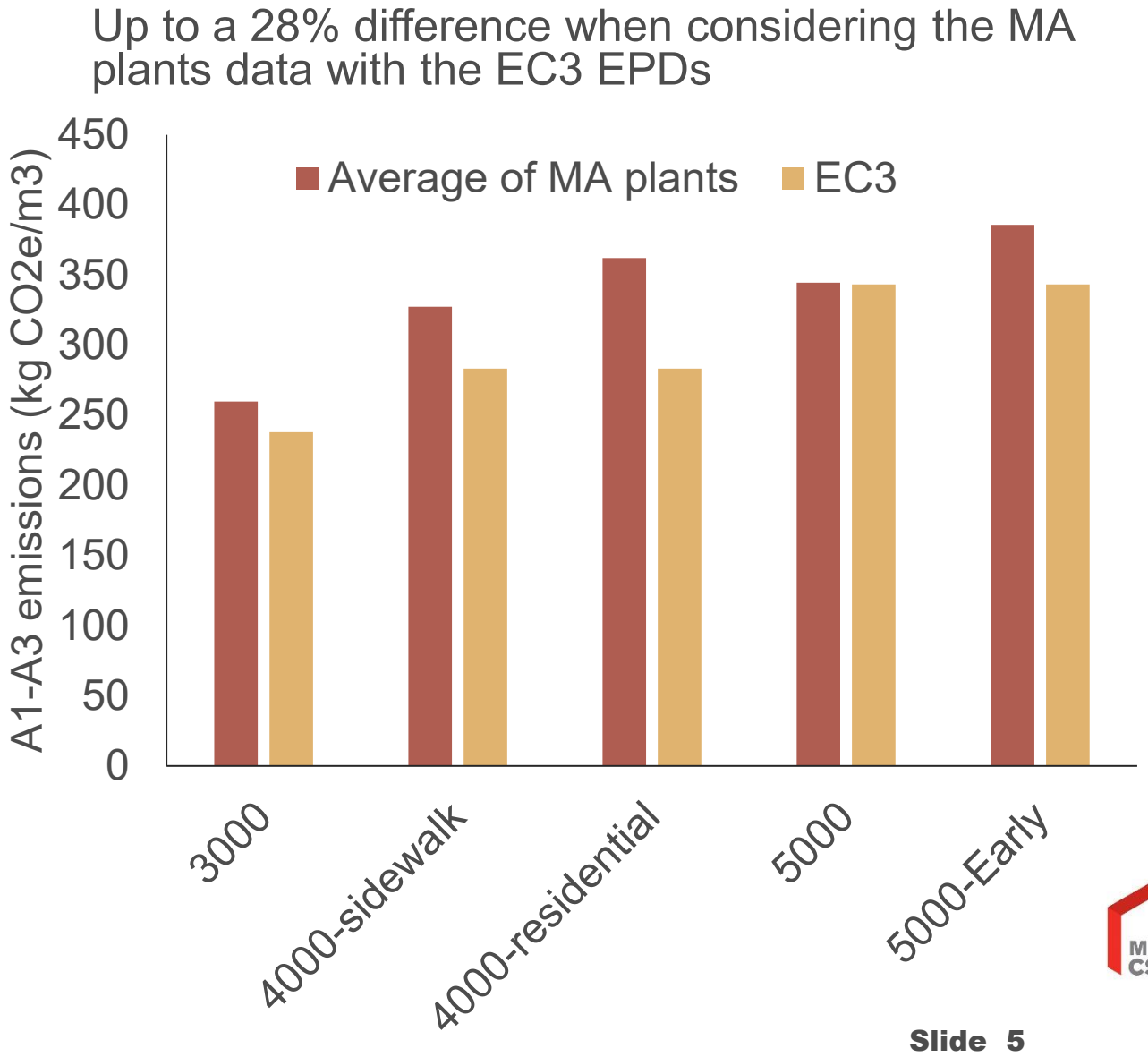
- Covers ~400,000 yd³ of concrete (~20% of Mass procurement)
- Majority of the cement is imported (imported cement = additional 15-100 kg CO2e /ton cement)
- Majority of the sand is hauled from out-of-state (= additional 3-10 kg CO2e /ton aggregates)

	3000	4000-sidewalk	4000-residential	5000	5000-Early
2024-2025 production (m3)	105,360	72,377	87,963	33,878	6,578

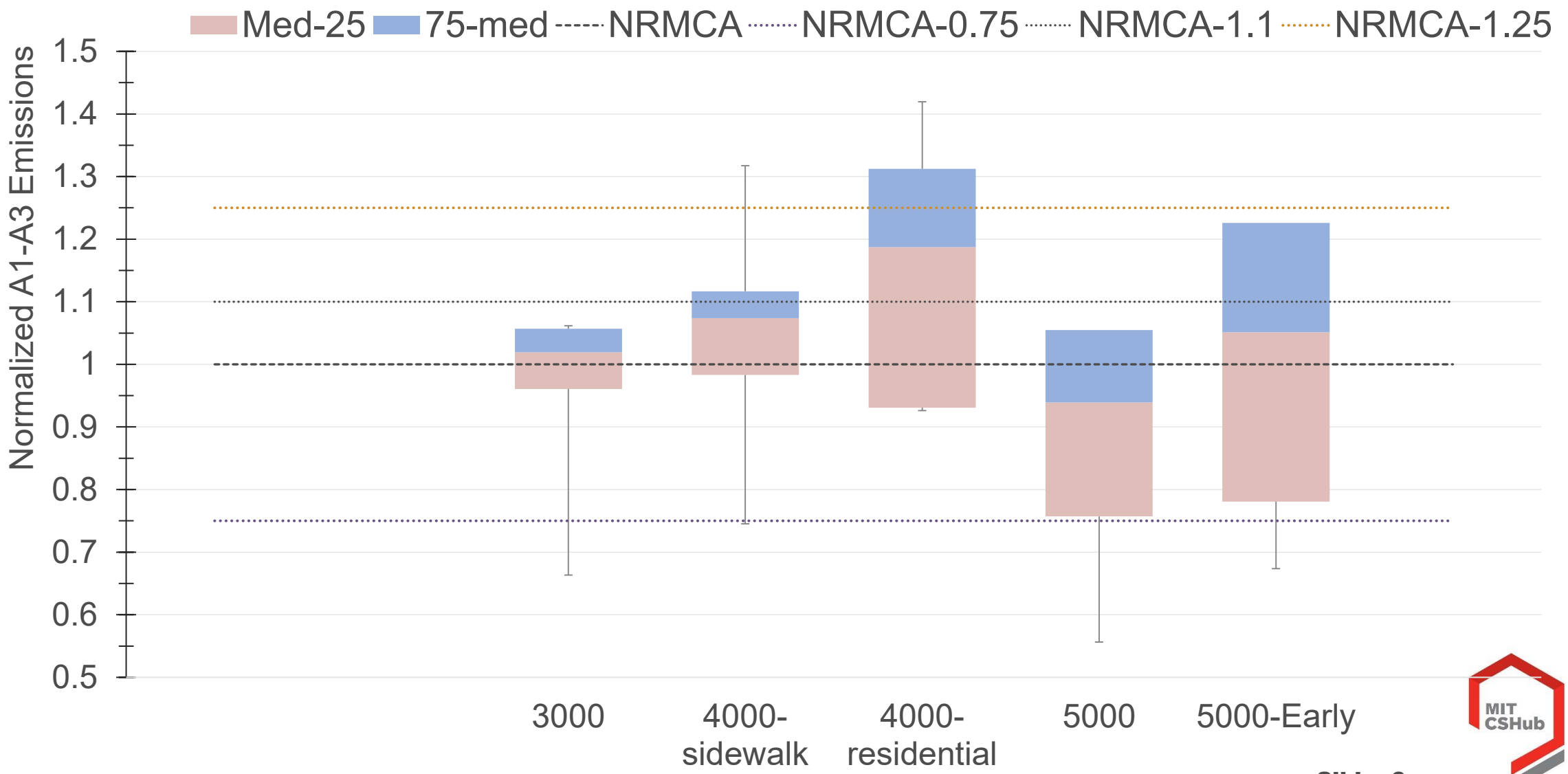


Data collection based on published EPDs may not represent the average emissions across various concrete mix designs

- EPDs are typically developed to satisfy the client's request for low-carbon mixtures
- EPDs represent less than 5% fraction of the produced mix designs for a plant



NRMCA average may not be the representative benchmark for the MA-produced mixtures, across different applications



Further suggestions for the Council Recommendation List

- Collect more data from Producers (comprehensive benchmark)
- Target “Build Clean” initiatives that prioritize construction practices offering embodied and lifecycle environmental benefits
- Incentivize local supply and relax permitting for new plants and quarries
- Support supply chain optimization and workforce development for near-term solutions
- Incentivize early adoption of lower-carbon industrial products by providing an insurance mechanism to de-risk early adoption
- Shift State purchasing through the Buy Clean Initiative to incentive-based procurement programs

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