A circular and long-term approach for Austrian motorways

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Agenda

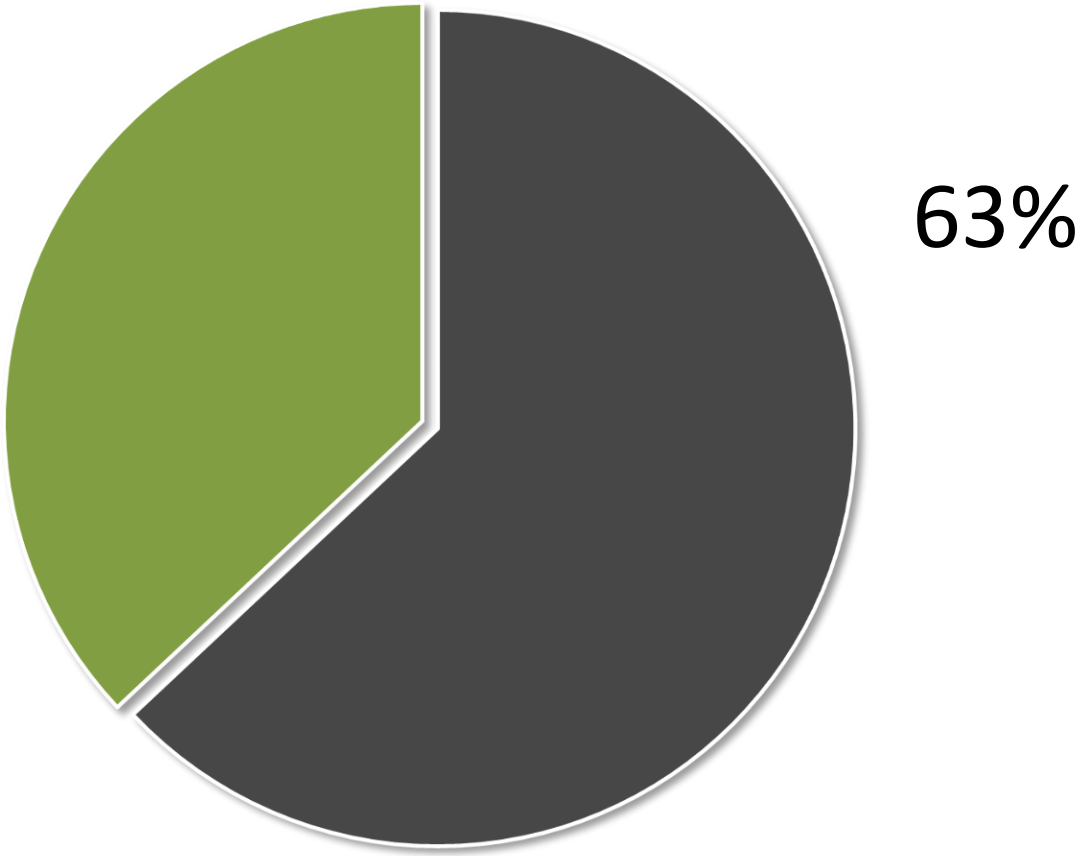
- ASFINAG – Austrian Motorway Network
- Concrete Pavement Recycling
- Technical Requirements: JPCP with Recycling Material
- Current situation
- Next steps

ASFINAG – Part of TEN-T Network

- Orient-East-Mediterranean Corridor: A 5, S 1, A 4
- Baltic-Adriatic Corridor: A 5, S 1, S 2, A 23, A 4, A 6, A 2, A 9
- Rhine-Danube Corridor: A 1, A 8, A 25, A 21, A 2, A 23, A 5, S 1, A 4
- Scandinavian-Mediterranean Corridor: A 12, A 13

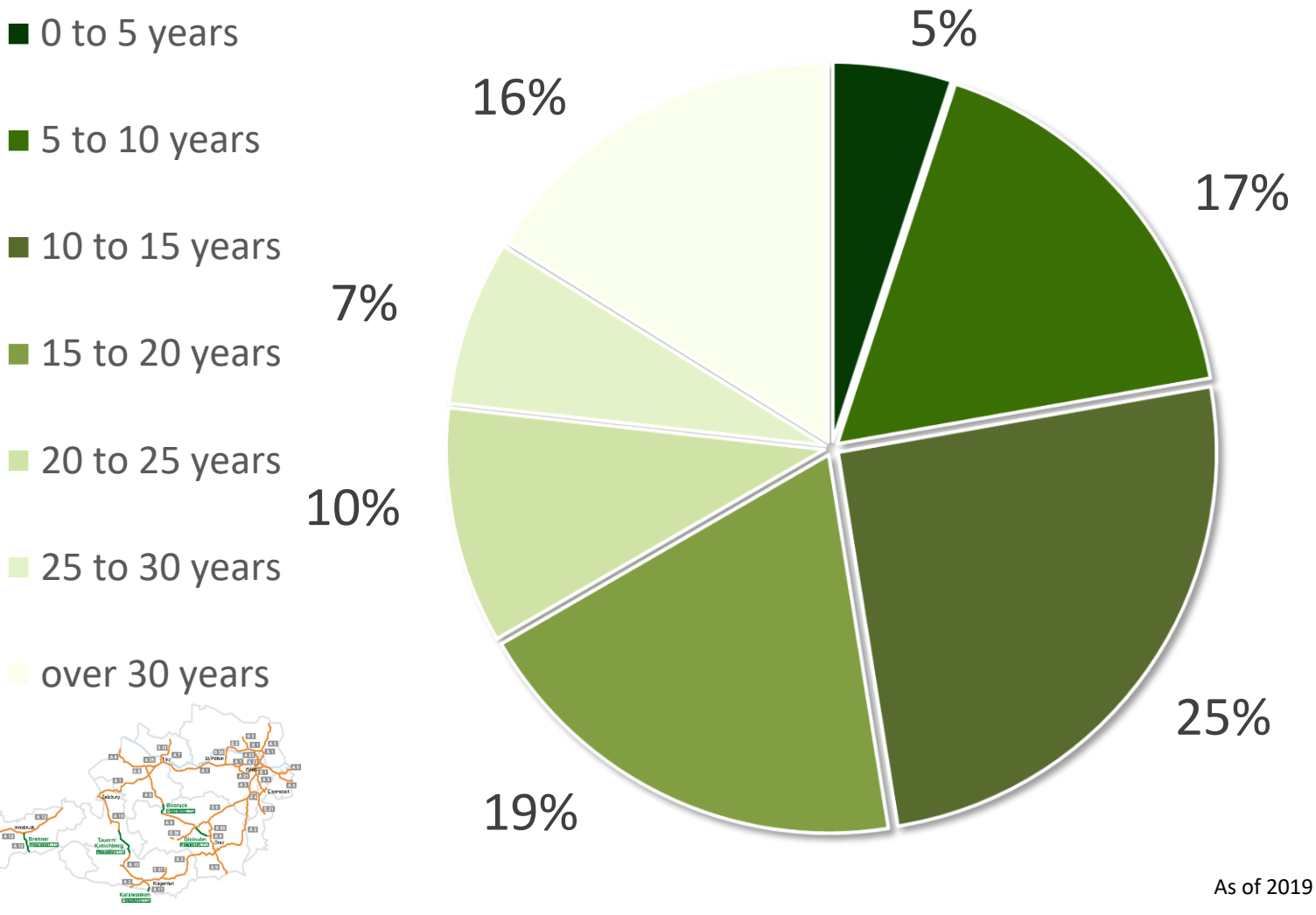
Tolled network length 2,233 km

ASFINAG – Pavement Types



As of 2019

Concrete Pavement – Age Distribution



As of 2019

Concrete Pavement Recycling – History

- Beginnings: first pilot project in 1990
- Economical objectives
  - Reduction of construction costs (not neglecting the LCC)
- Ecological objectives
  - Reduction of CO2 (→ fuel consumption)
  - Saving natural resources
    → Reduction of virgin material
    → Reduction of material to be brought to landfill site
- Technical objectives
  - Definition of a recycling process to obtain sustainable concrete pavements
  - Definition of standards and guidelines
- Renewal of more than 300 km concrete pavement motorway ✓

Concrete Pavement Recycling – Process

Main steps

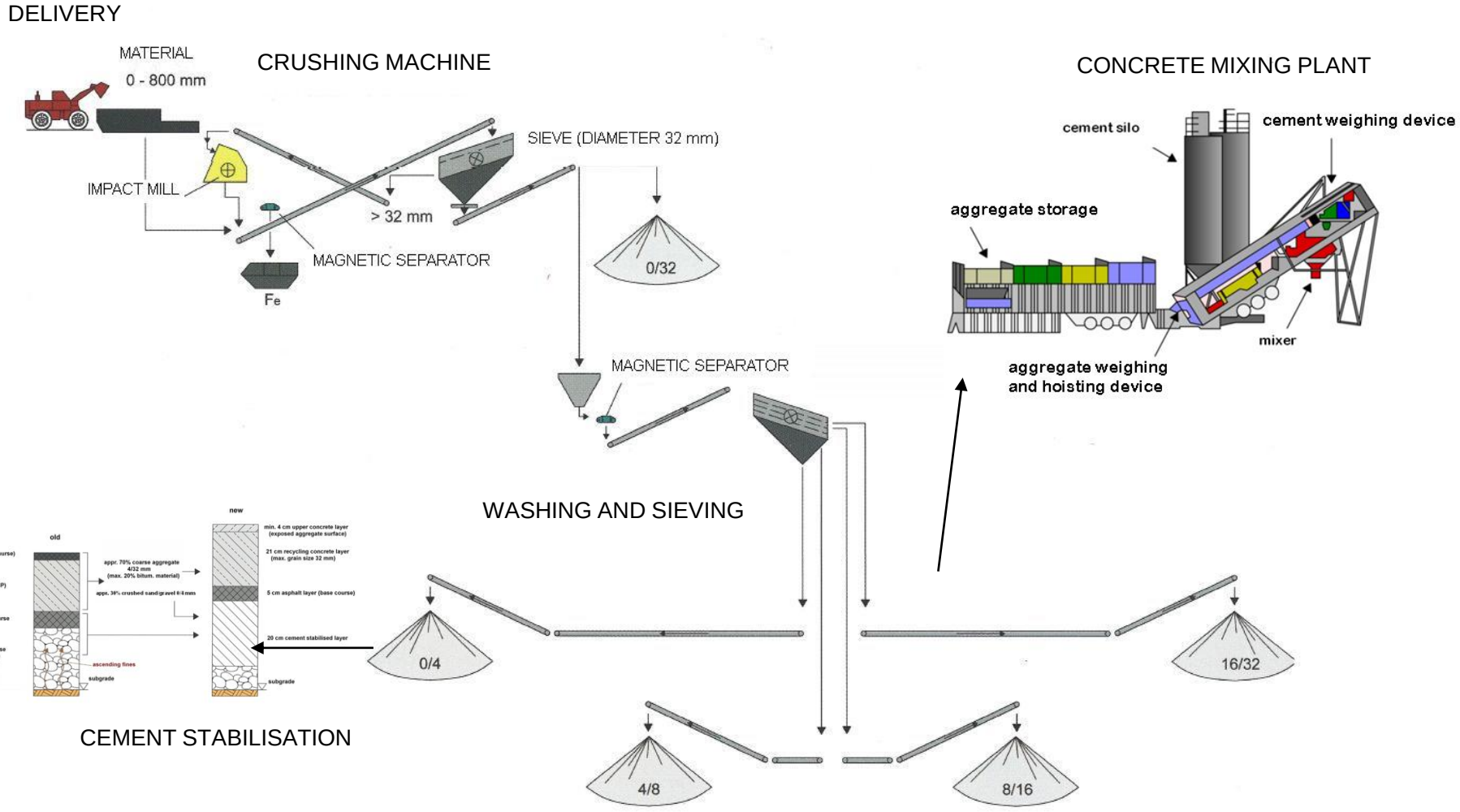
1. Preliminary analysis of old pavement
2. Demolishing of worn pavement
3. Removing and transport to recycling facilities
4. Crushing of old concrete and preparing for reuse in new concrete for bottom layer and in cement stabilisation
5. Production of new concrete with reused material
6. Construction of new concrete pavement

Concrete Pavement Recycling – Process

Recycling facility

Source: Asamer Holding AG

Concrete Pavement Recycling – Process



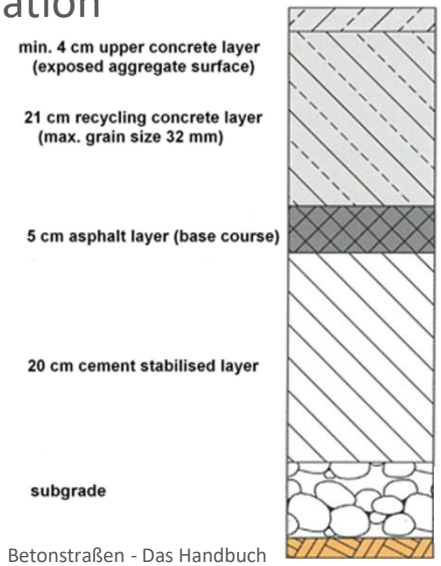
Source: Betonstraßen - Das Handbuch

Concrete Pavement Recycling – Requirements

According to Austrian standards and technical contract conditions:

- No recycled concrete in top layer → exposed aggregate concrete surface has increased demands concerning aggregates
- Recycled concrete is only allowed to use in bottom layer
- Min. aggregate size of the recycled concrete > 4 mm

  Fine material (granular gravel/sand) < 4 mm → cement stabilisation
- Freeze-thaw resistance
- No alkali-aggregate reactivity
- Sieving and dedusting before using in new concrete
- Amount of bituminous parts < 20 %
- Removal of joint sealant and steel
- Higher amount of cement in concrete production

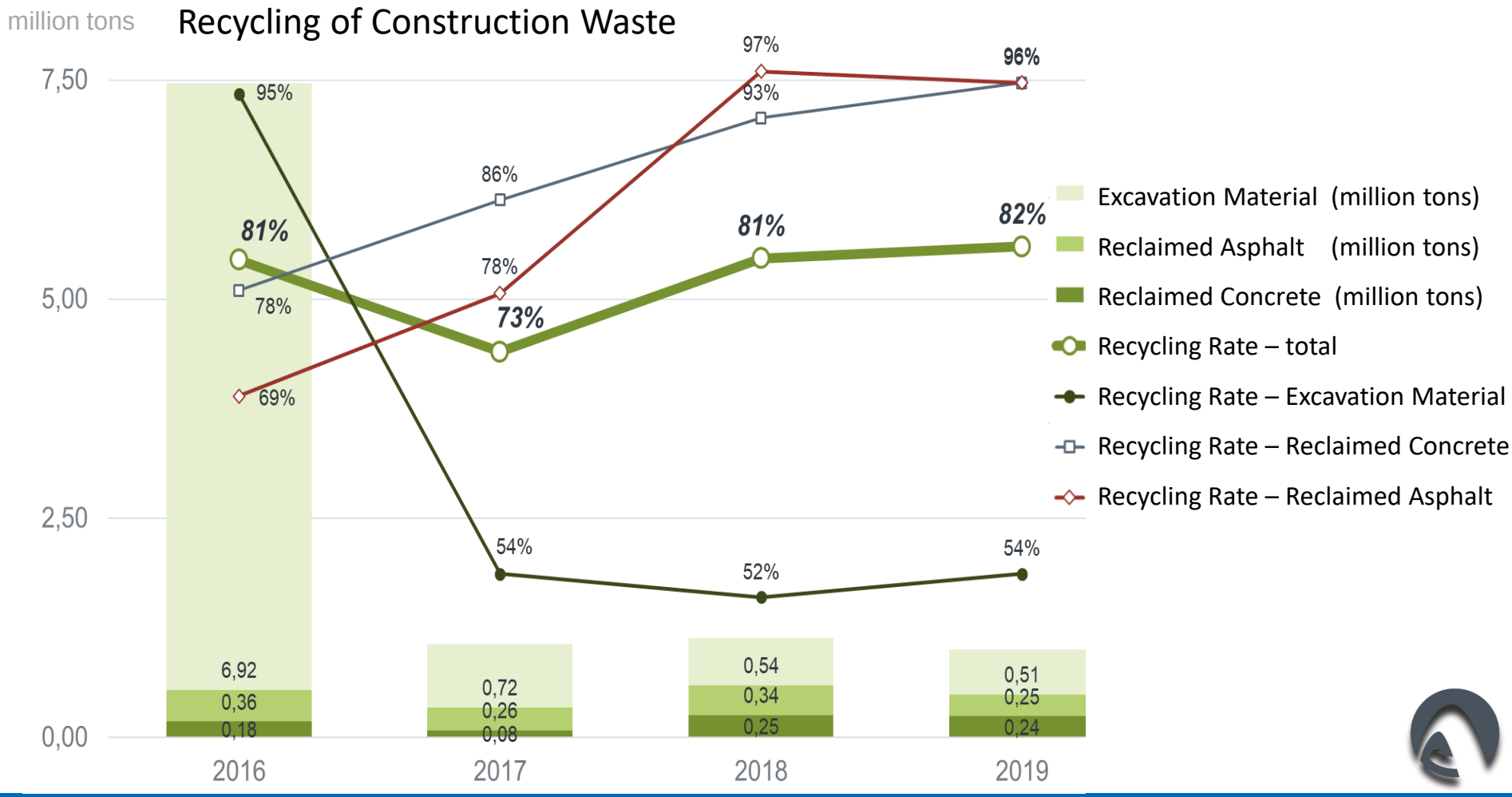


Source: Betonstraßen - Das Handbuch

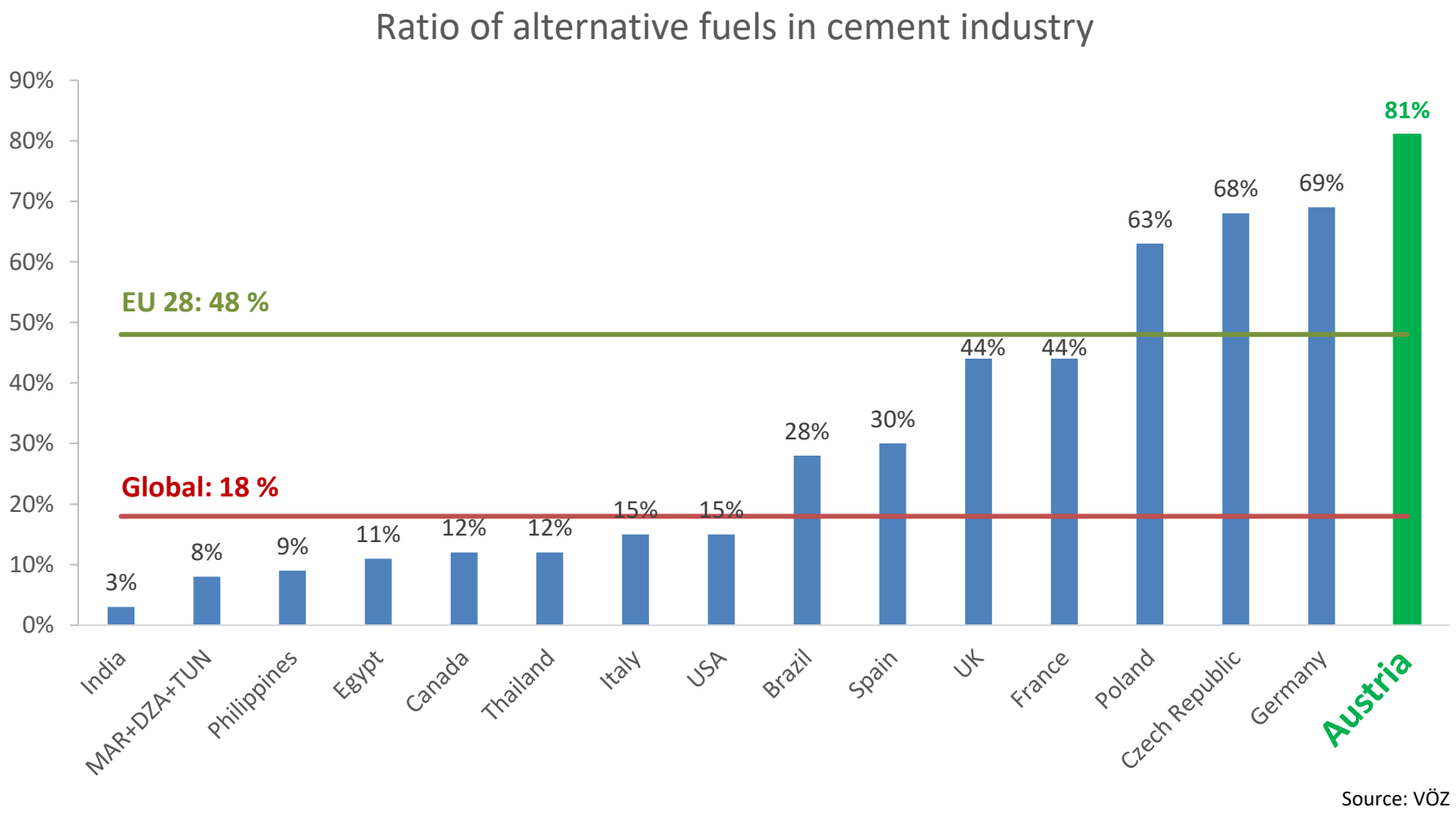
Current Situation – “Green Deal”

- EU DIRECTIVE 2008/98/EC on waste → recovery target > 70 %
- Austrian Decree for Recycling of Building Material
  - Defines documentation, rights and obligations
  - Defines different quality classes of materials and application areas
- ASFINAG’s strategic objectives
  - Reduction of CO_2 and improvement of energy efficiency in the entire business model → long-term objective: “climate neutrality”
  - Conservation of resources → saving costs
  - Improvement of sustainability rating → Prime Status (“C+”)
- Industry‘s objectives
  - Reduction of CO_2 in cement production process
  - Conservation of resources → saving costs in cement and construction industry

Current Situation – ASFINAG Strategy

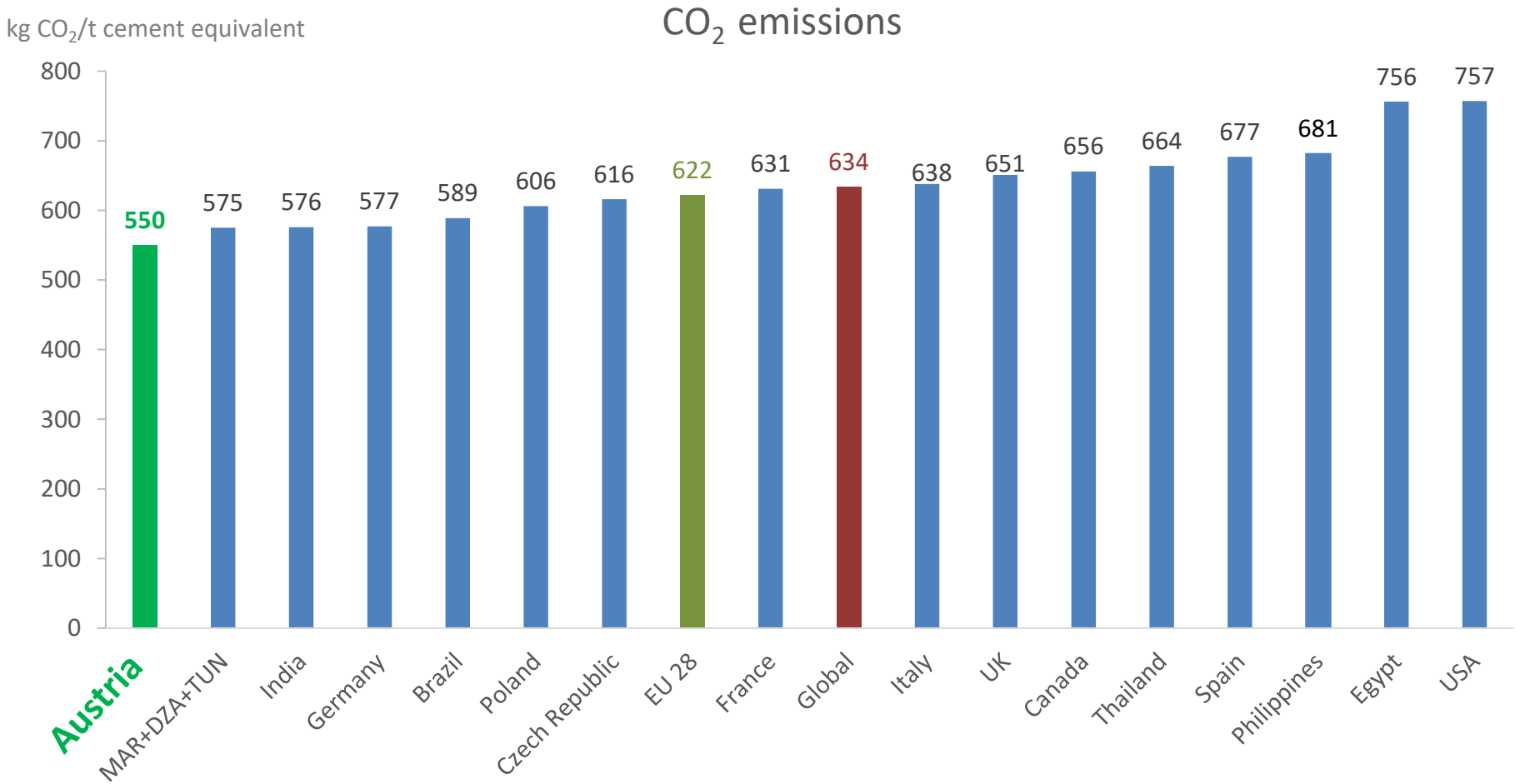


Current Situation – Cement Industry



Source: VÖZ

Current Situation – Cement Industry



Source: VÖZ

Summary

Homework done by state, administration and industry

- Recycling process, standards and regulations ✓
- National legal issues, processes, documentations ✓
- EU DIRECTIVE 2008/98/EC on waste

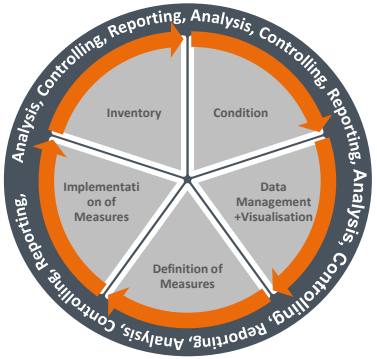
  → recovery target > 70 % (2020) ✓

Is it quite enough? ✗

Next Steps

ASFINAG's contribution to CO_2 reduction in *concrete* topics

- New strategic objectives (incl. KPI to be defined)
- Definition of environmental criteria for tender process
  - Rollout for asphalt projects in 2021
  - Next step: Definition for concrete projects
- R&D projects
  - "Green" concrete projects
  - Pavement R&D projects to increase robustness of assets for longer lifecycles
- Optimisation of life cycle management



Thank you for your attention!

RELIABILITY ALL THE WAY.

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