



Polytechnic School, University of São Paulo

Mudanças climáticas & Construção

Propostas de ação

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NATIONAL INSTITUTE ON ADVANCED ECO-EFFICIENT
CEMENT-BASED TECHNOLOGIES



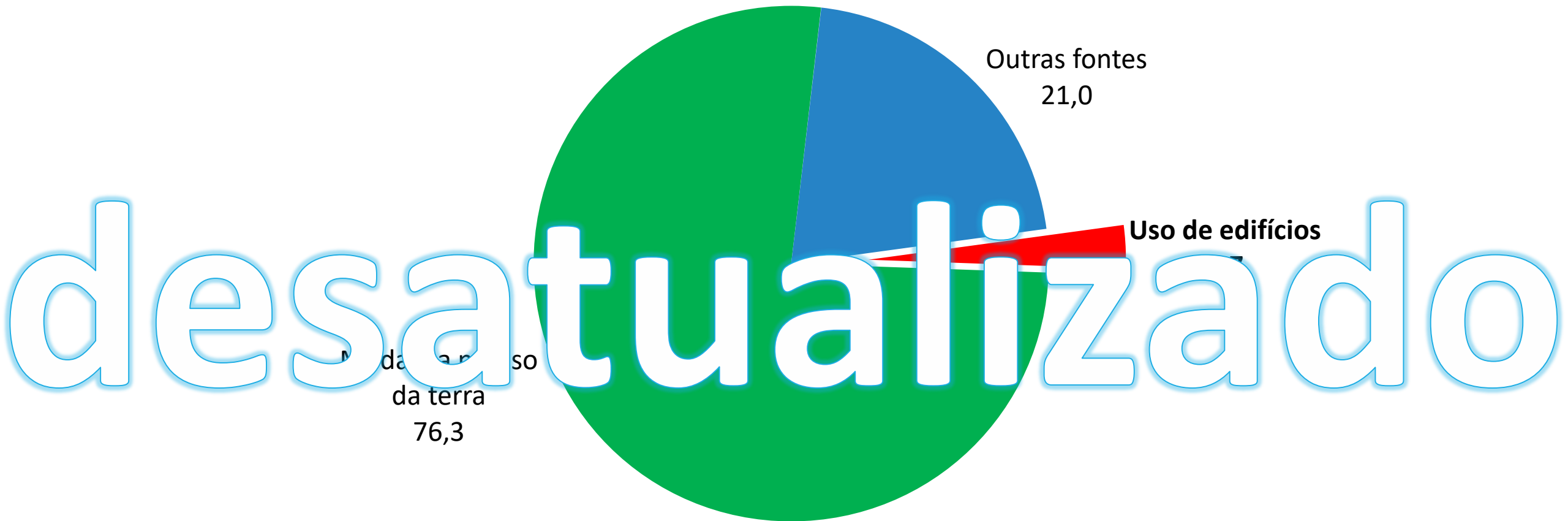
medir

Uso dos edifícios: Global



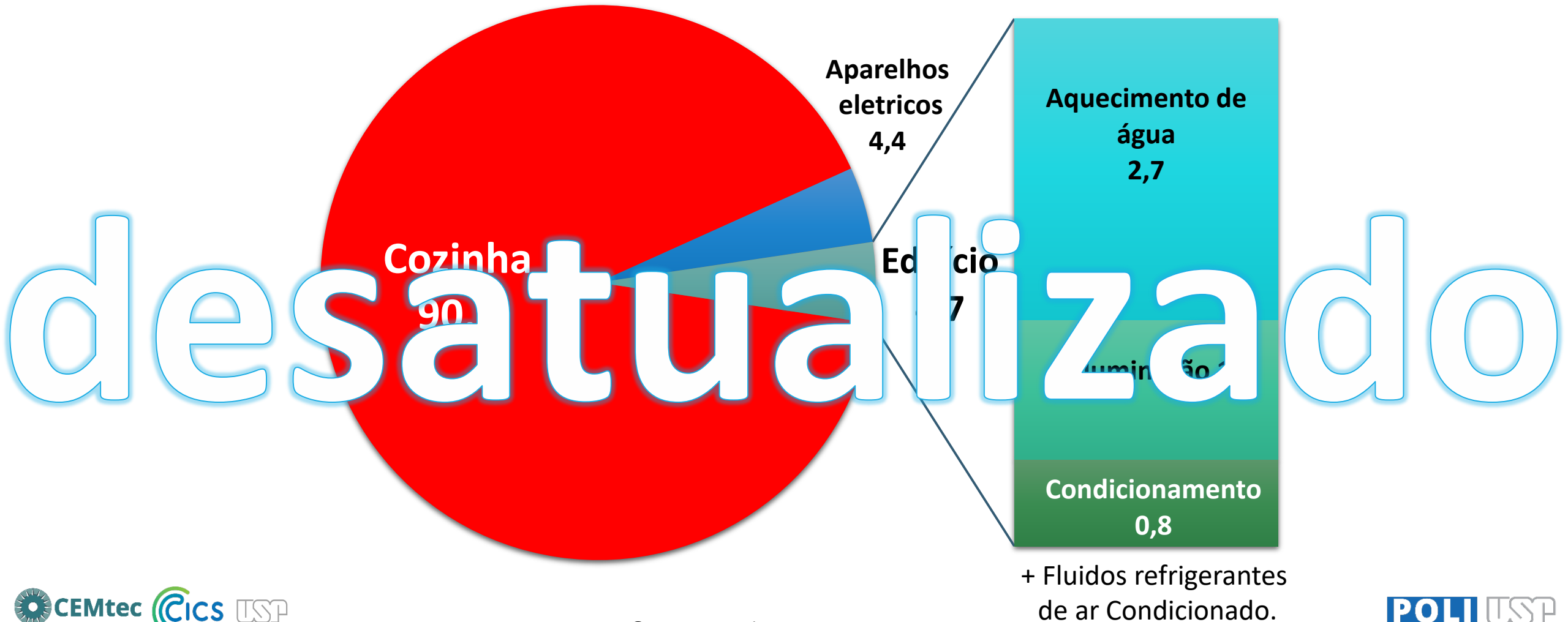
CO₂
25%

Brasil: CO2 no uso de edifícios (% Emissões totais, 2005-2010)

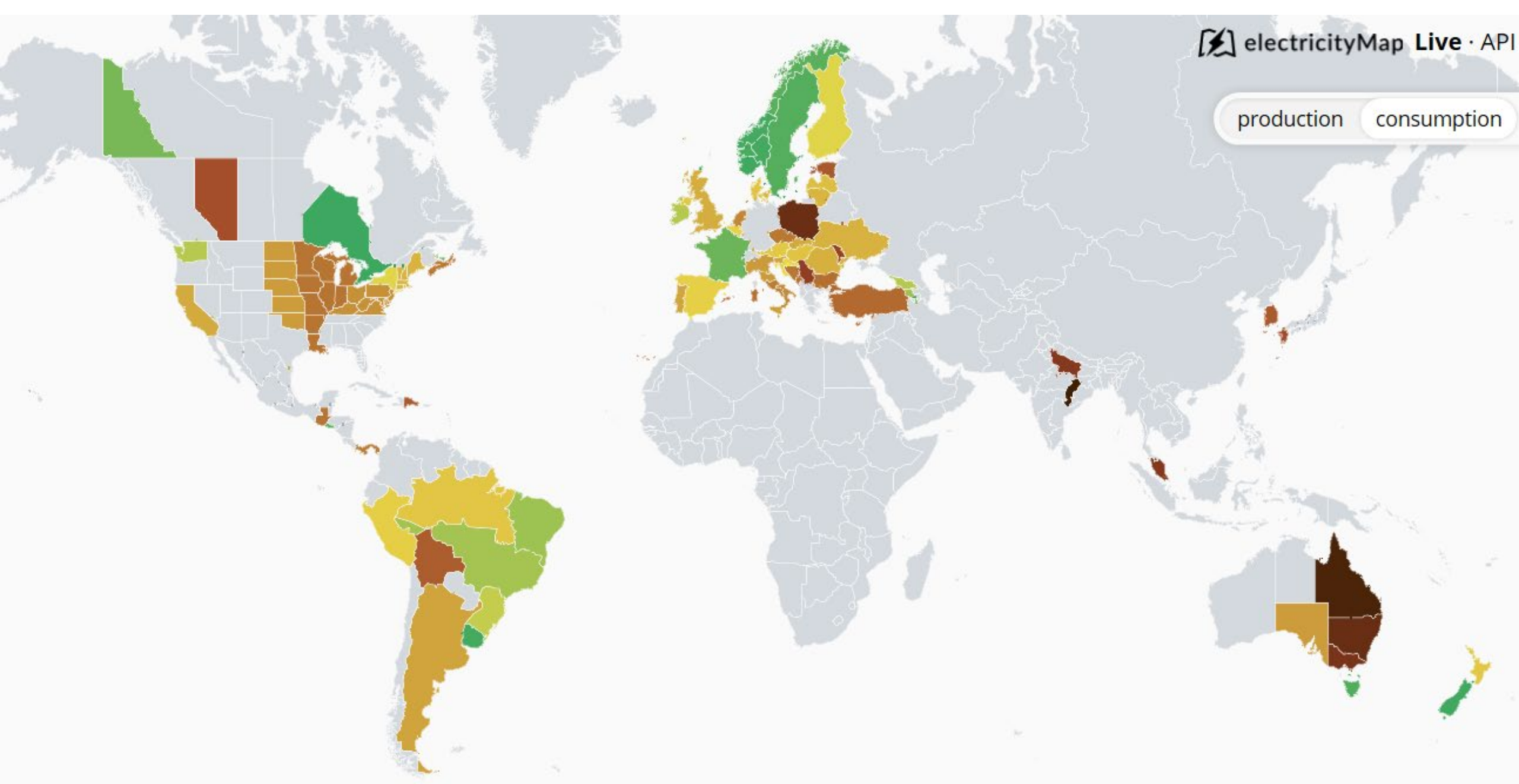


Calculos propios a partir do inventario 2005 e BEN 2010, a pedido do WWF
Inclui emissões de lenha combustível (considerando 50% renovavel) e eletricidade.

Brasil: CO₂ no uso de residências (2005-2010)



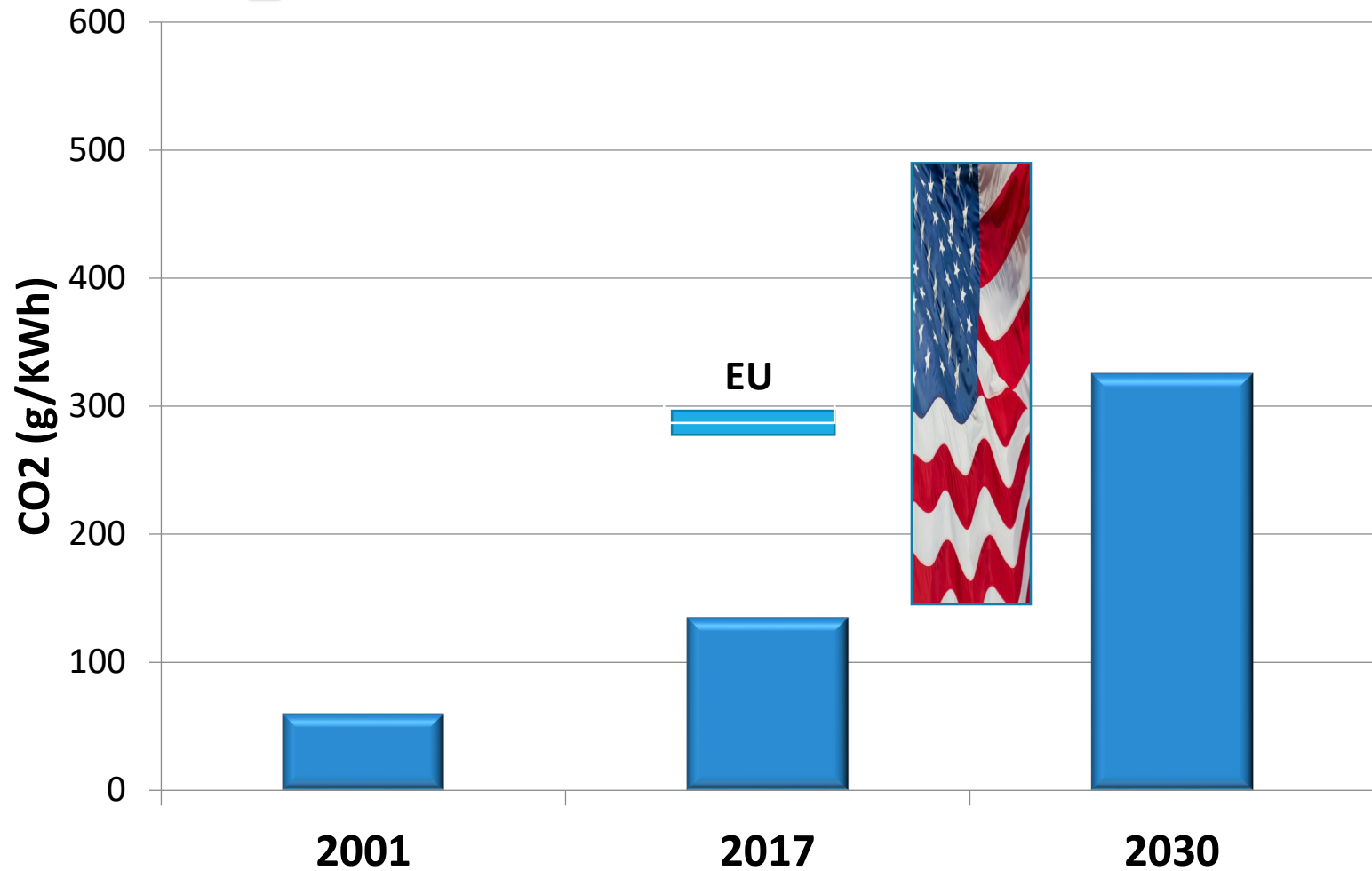
production consumption



	CO₂ Emissions Factor (kg CO₂/Btu)	Heat Rate (Btu/kWh)	Emission rate (kg CO₂/MWh)
Coal, steam generator	95.3	10,080	960.6
Petroleum, steam generator	73.2	10,156	743.4
Natural Gas, combustion turbine	53.1	11,378	604.2
Natural gas, combined cycle	53.1	7,658	406.6

Table 3. Average Emissions Factors, Heat Rates, and Emission Rates of the U.S. Fossil Fuel Generation Fleet, 2014 (EIA).^{38 39} The emission rate of electricity generation is a key indicator of the climate impact of the power sector, and varies significantly by fuel and technology.

CO₂ na eletricidade



(Estimativa pessoal a partir do PNE 2030 e WRI (2001) e fontes Internet)

CO2 na extração da madeira serrada nativa (selective logging)



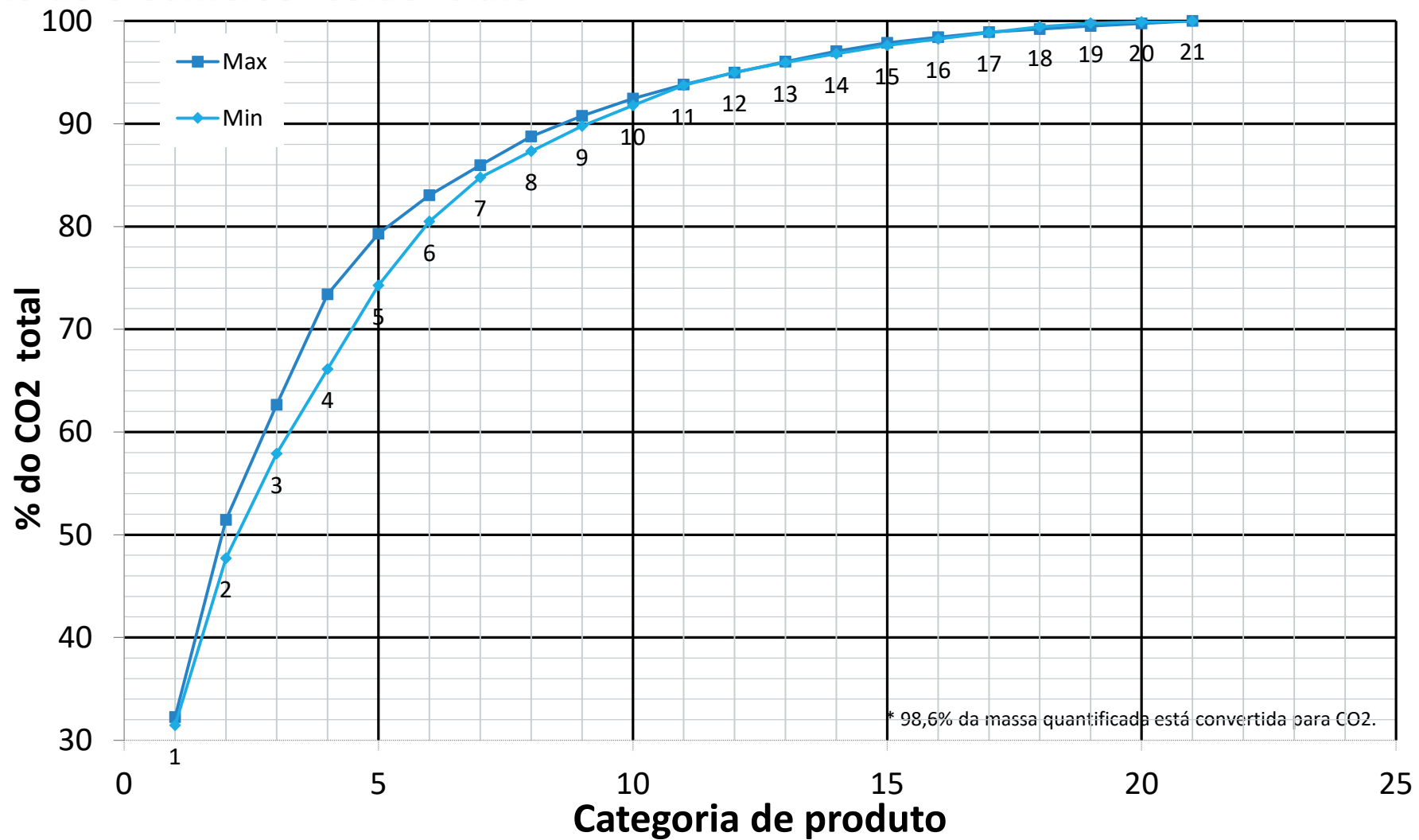
Madeira serrada plantada



0,03 a 0,2 tCO₂/t

Poucas Famílias de materiais controlam

inventário* de 3 edifícios residenciais

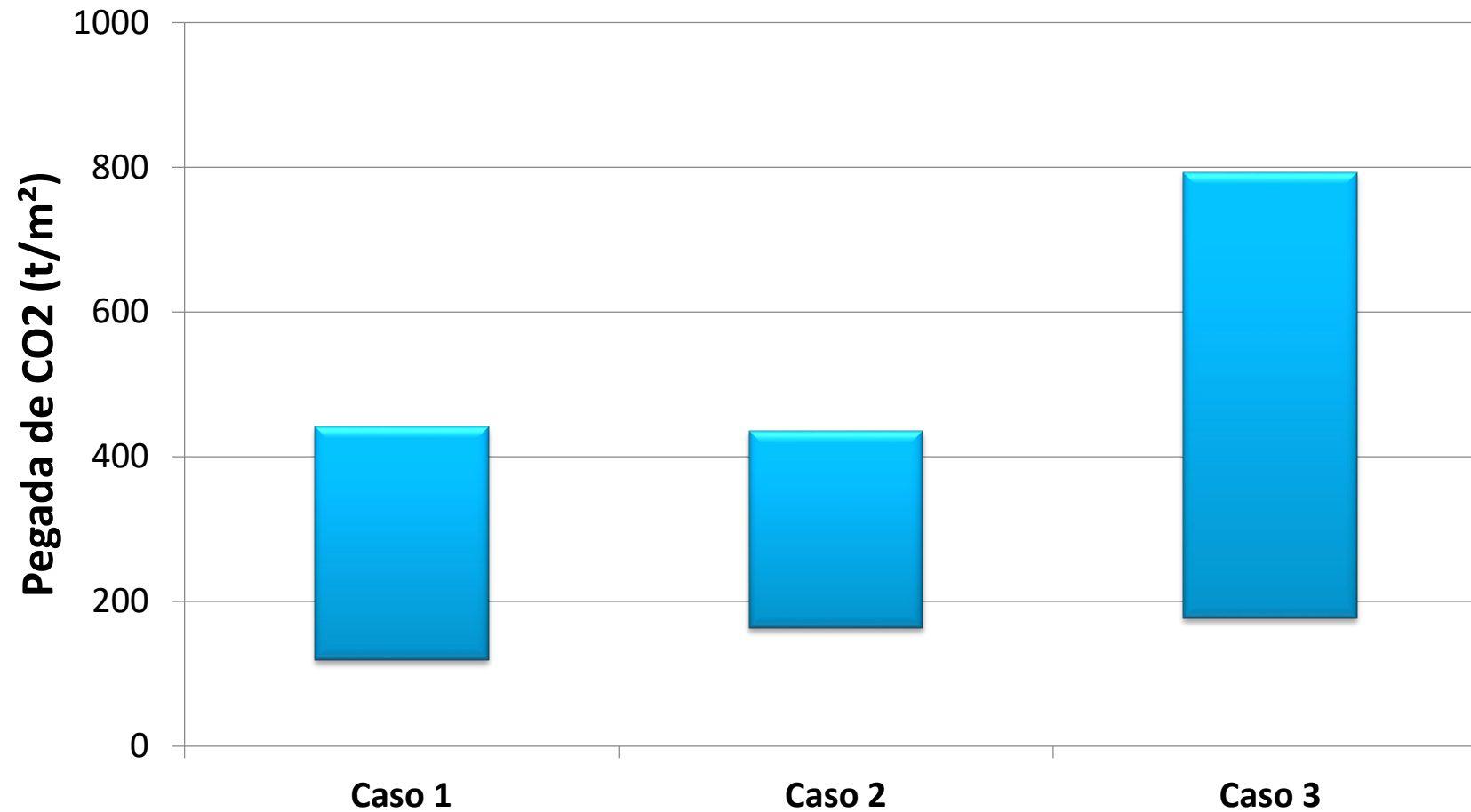


gerir

indicadores

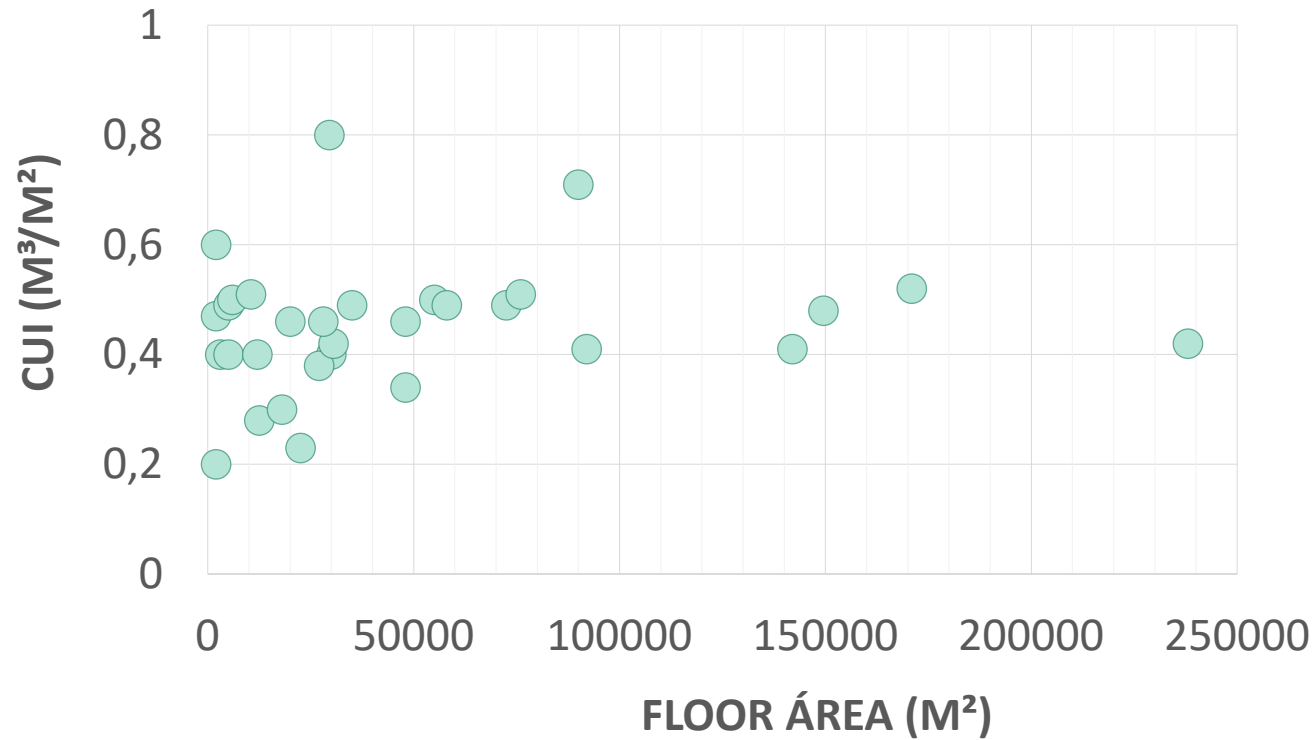
Pegada de CO2 de edifícios residenciais

Estudos de caso



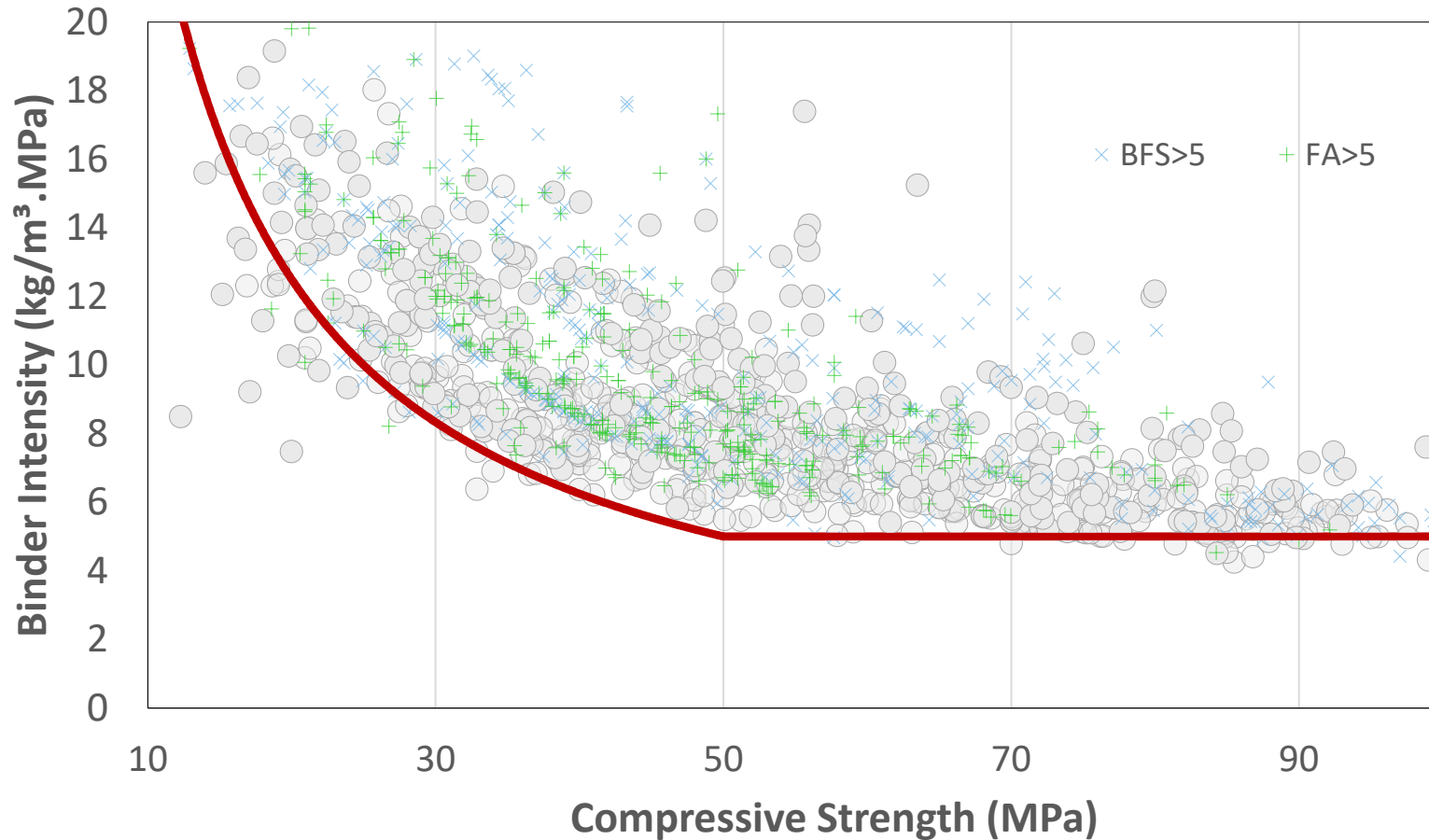
benchmark + metas

Benchmark of concrete use in buildings ($m^3 \cdot m^{-2}$) – Singapore



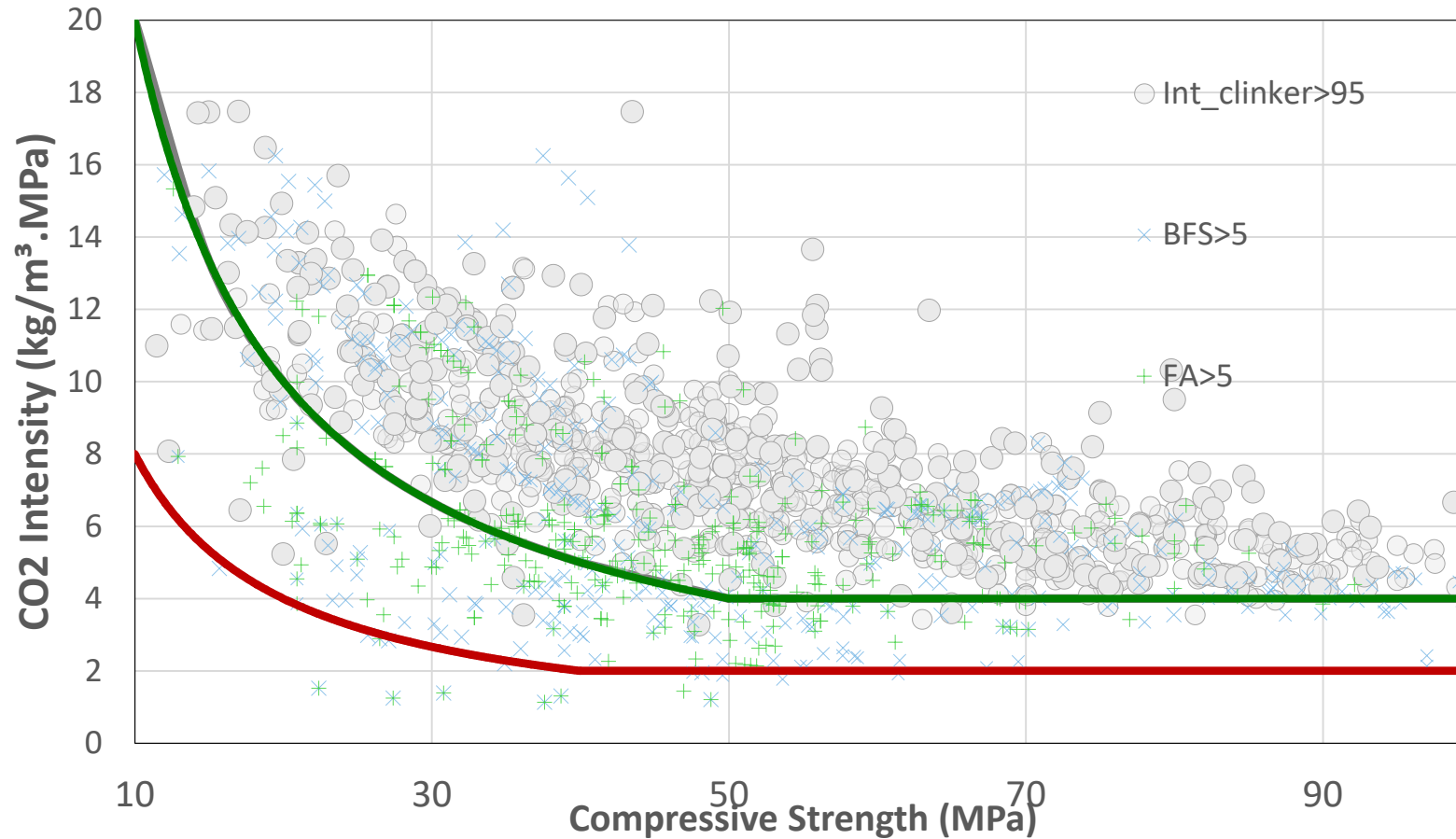
Packing, filler potential for concretes

Binder intensity



Packing, filler potential for concretes

CO2 Intensity



ROADMAP TECNOLÓGICO DO CIMENTO

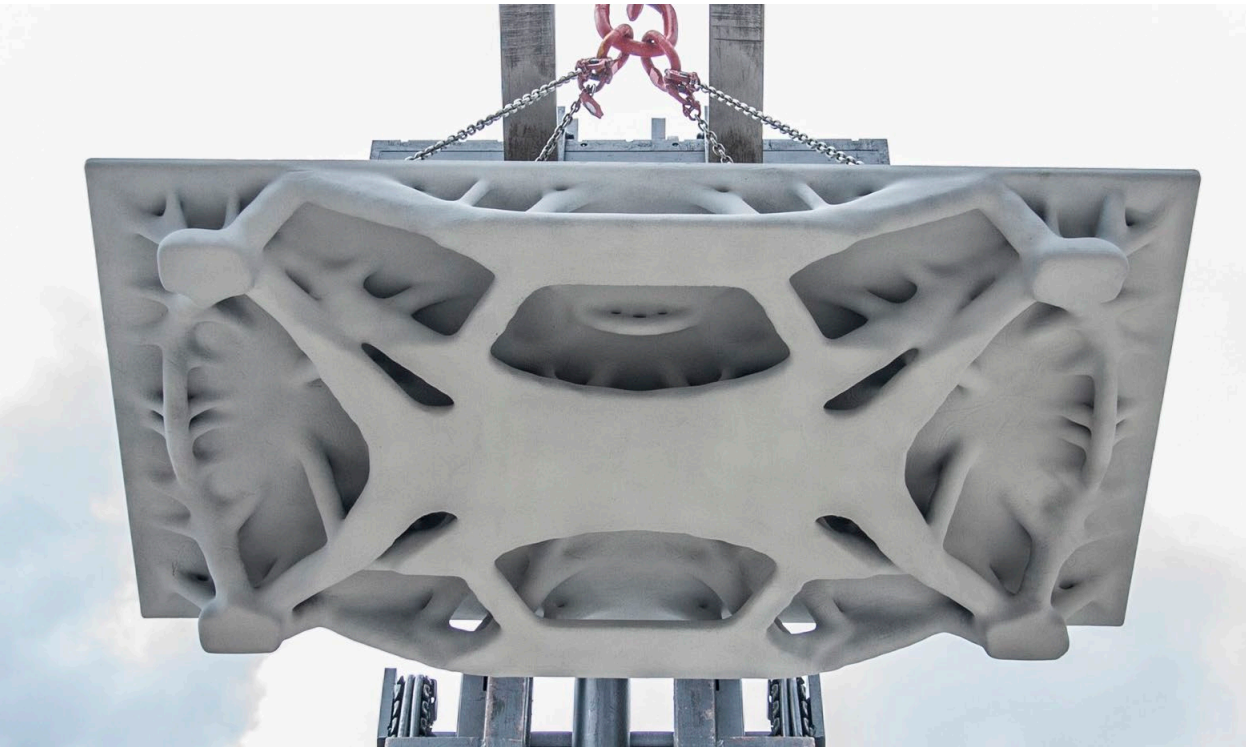


Potencial de redução das emissões
de carbono da indústria do cimento
brasileira até 2050.

reportar

inovar

Topology optimized & dematerialization

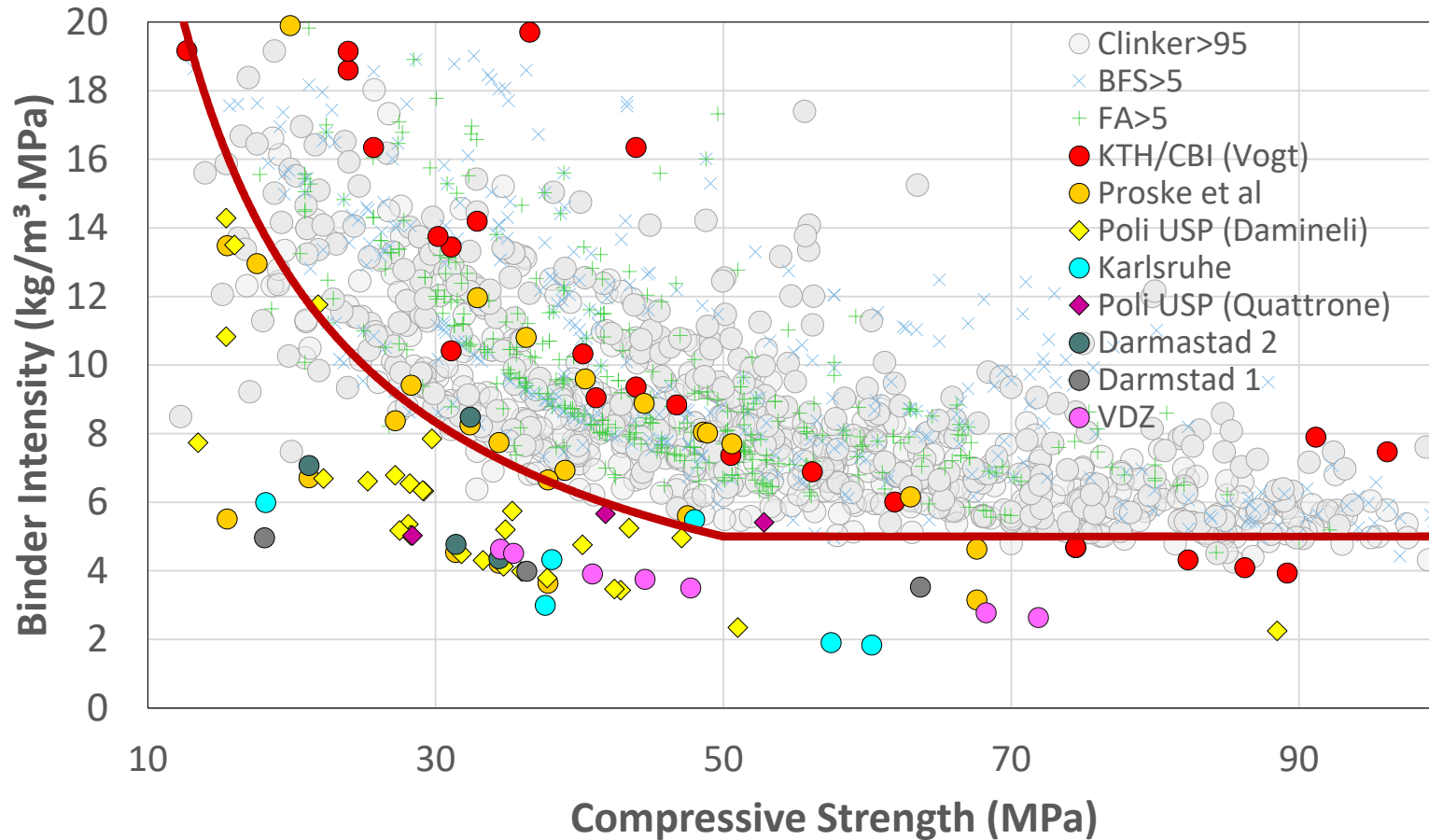


B Dillenburger DFAB ETH

<http://dbt.arch.ethz.ch/project/topology-optimisation-concrete-slab/>

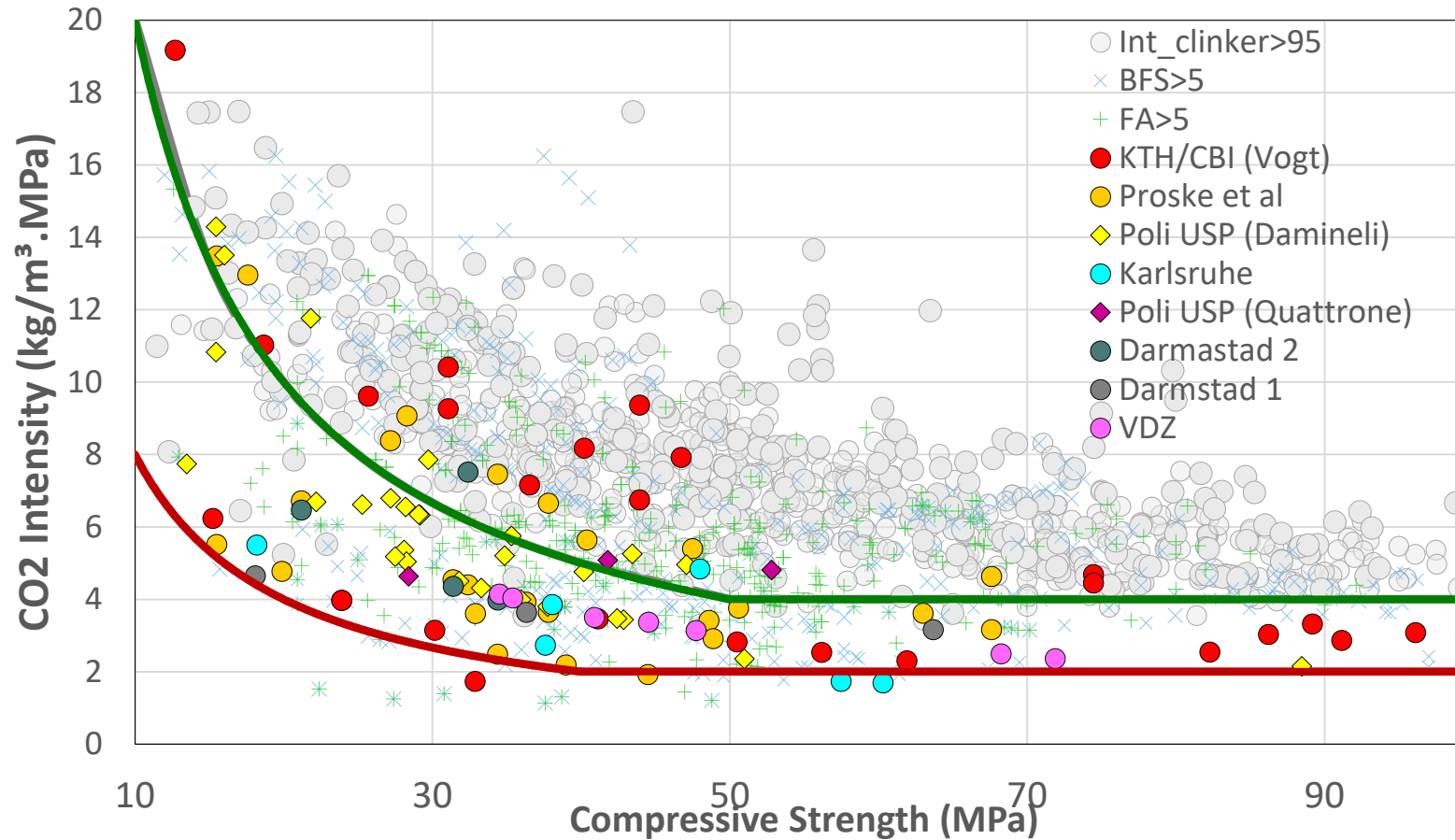
Packing, filler potential for concretes

Binder intensity



Packing, filler potential for concretes

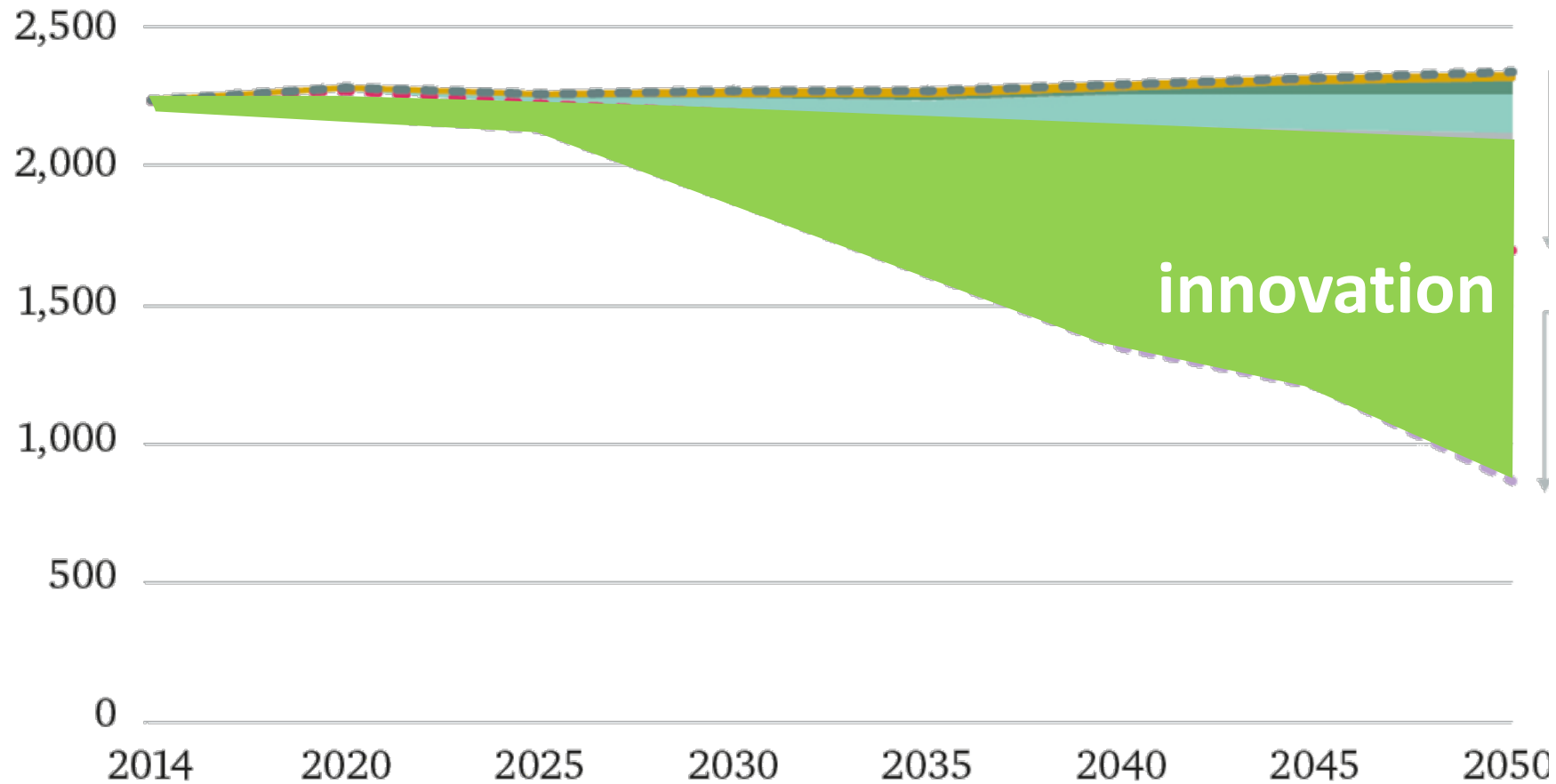
CO2 Intensity



The role of RD&I for sustainable cementitious

Paris Agreement requires innovation

Direct CO₂ emissions
(mt CO₂/yr)



Adapted from
[Carbon brief](#)

O projeto CICS



aflalo / gasperini arquitetos



EMBRAPII

POLI-USP

MATERIAIS PARA CONSTRUÇÃO ECOEFICIENTE

adaptar





08/12/2010 – Porto Alegre



Adequação de normas, modelos e regulamento do solo

- Aumento da frequência de eventos extremos
- Cargas de ventos
- Drenagem de chuvas torrenciais
- Estoques de água
- Áreas suscetíveis a enchentes
- Aumento do nível do mar

retrofit

Conclusão

- São necessárias ações setoriais, a nível de empresa e do território.

Obrigado!

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