DATA CENTER SUSTAINABILITY

Best practices and future scenarios

The results of Data Centers Sustainability Project

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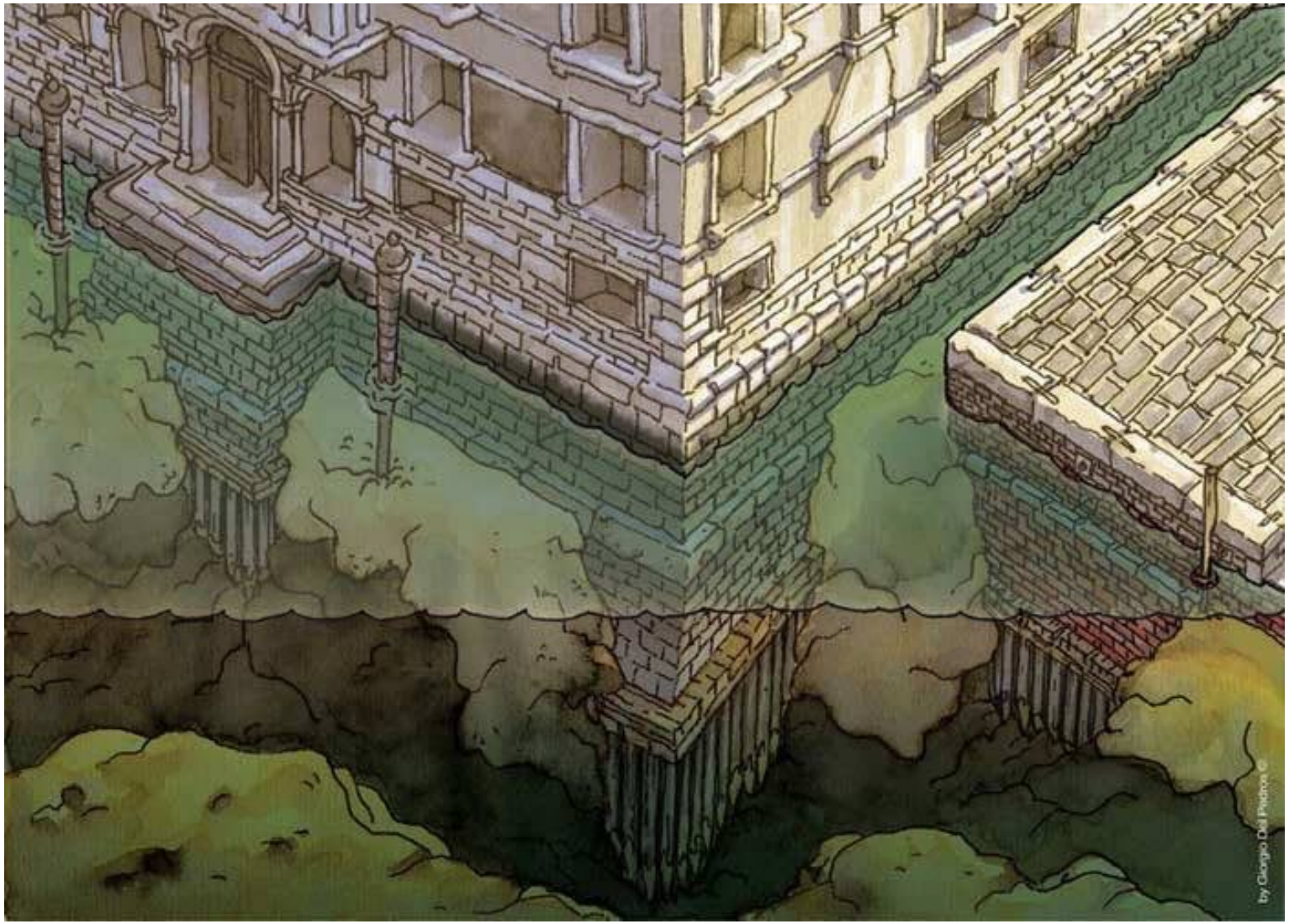
Joint Research

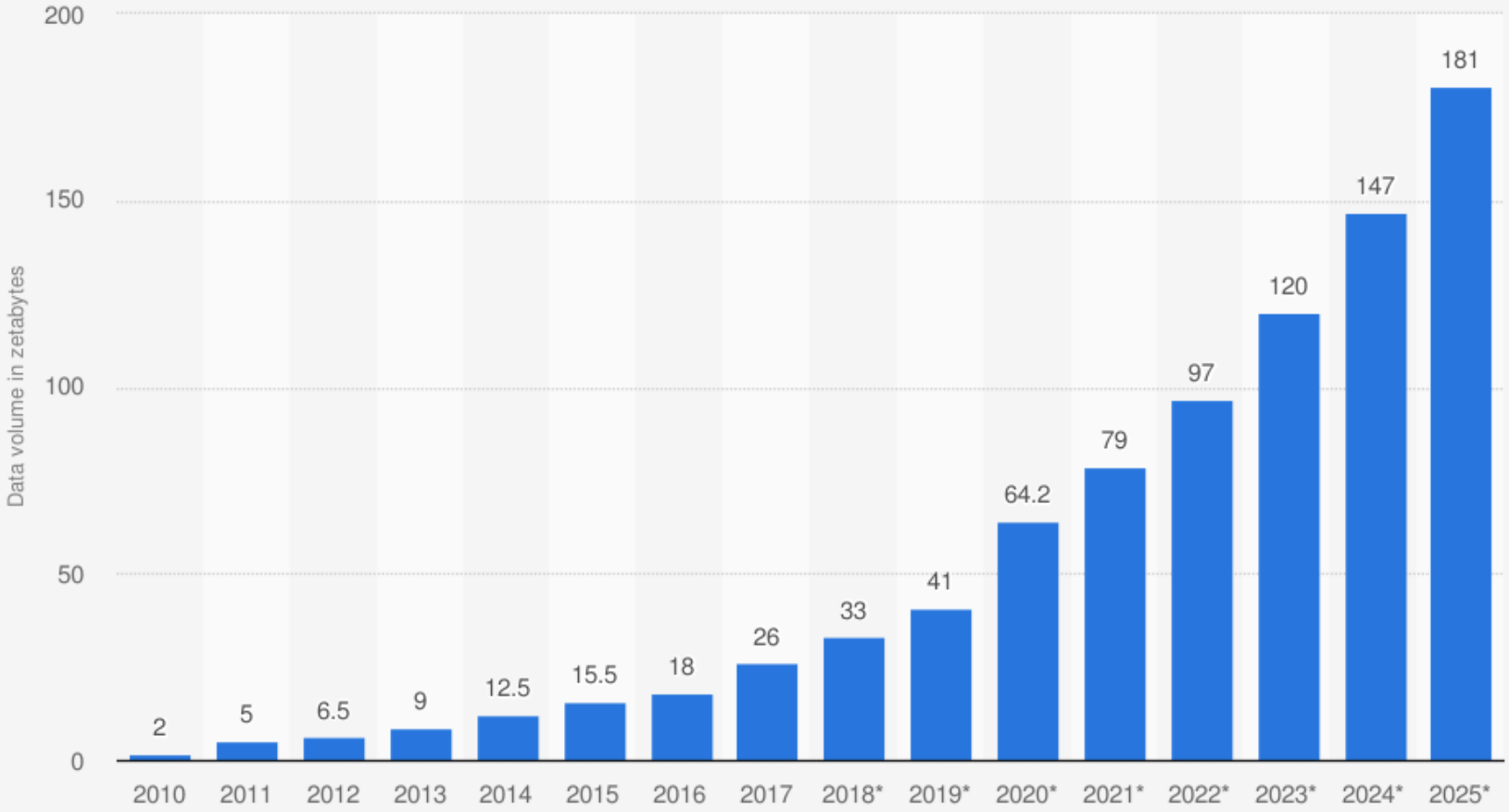
- The project was financed by Regione del Veneto and University of Padova through Unimpresa fund.

- Shared interest in understanding the impact of digital infrastructures with a focus on data centers.

Under the hood of cloud computing

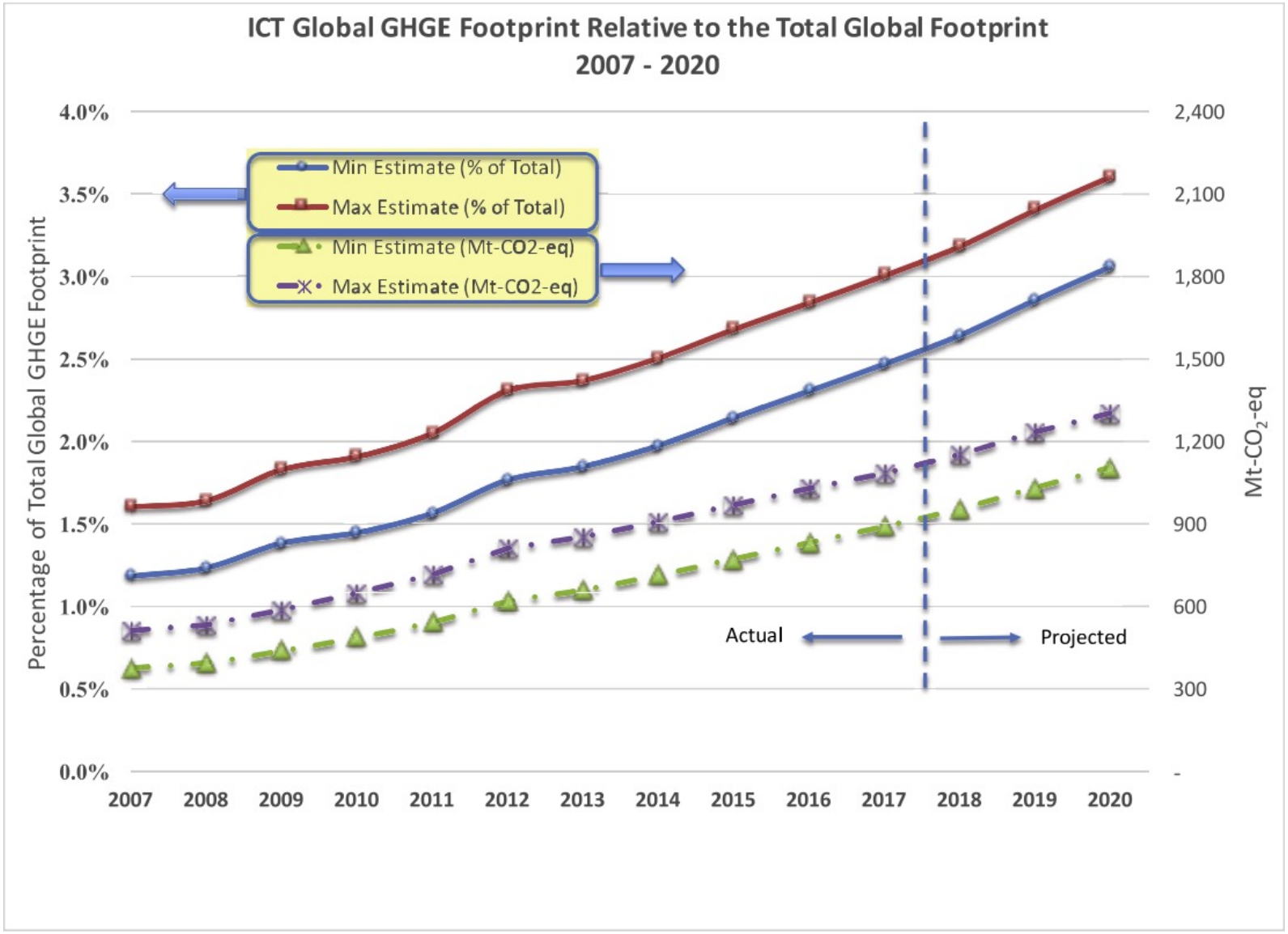


Volume of data/information created, captured, copied, and consumed worldwide from 2010 to 2025 (in zettabytes)

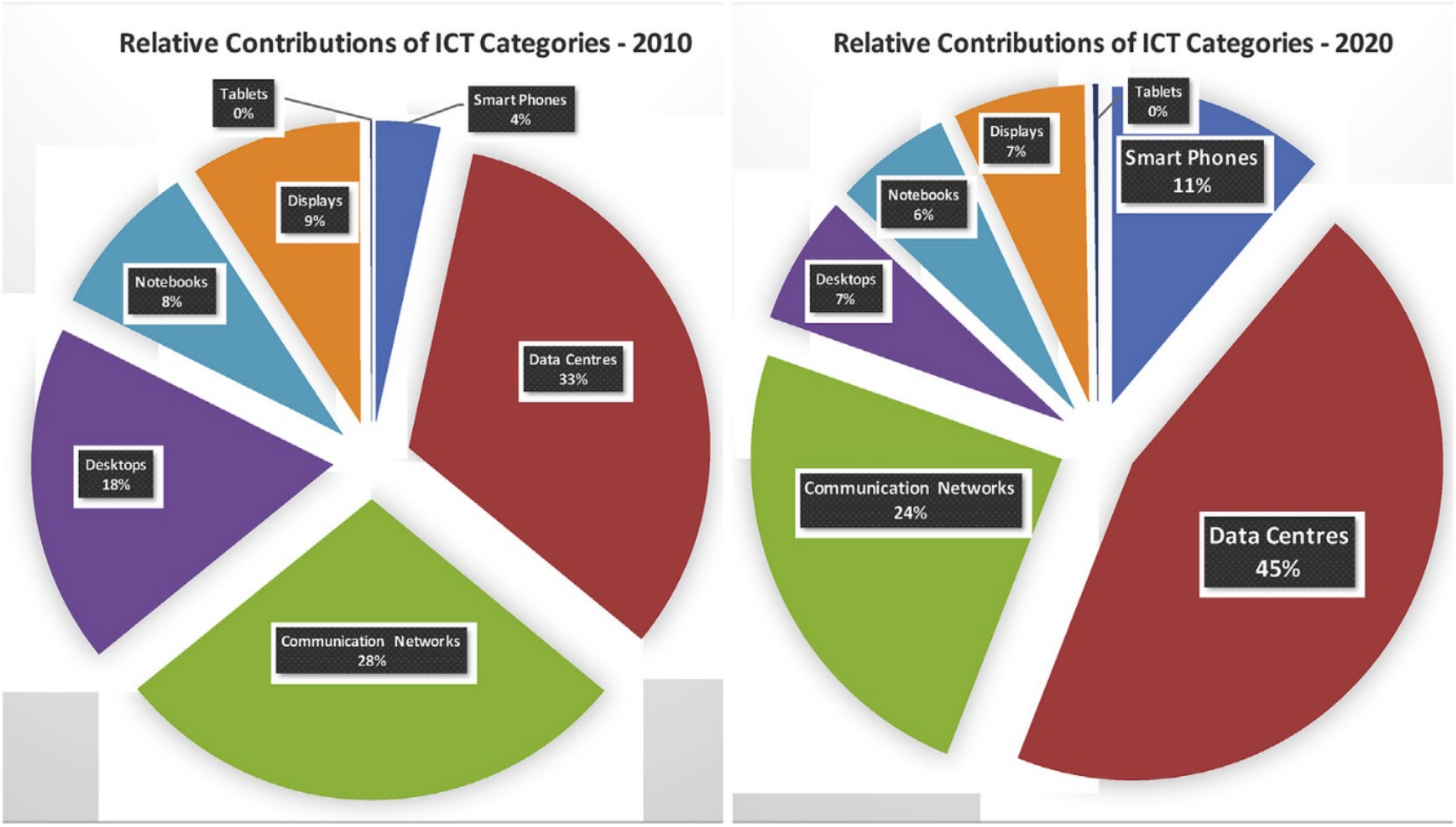


Sources
IDC; Seagate; Statista estimates

Additional Information:
Worldwide; 2010 to 2020

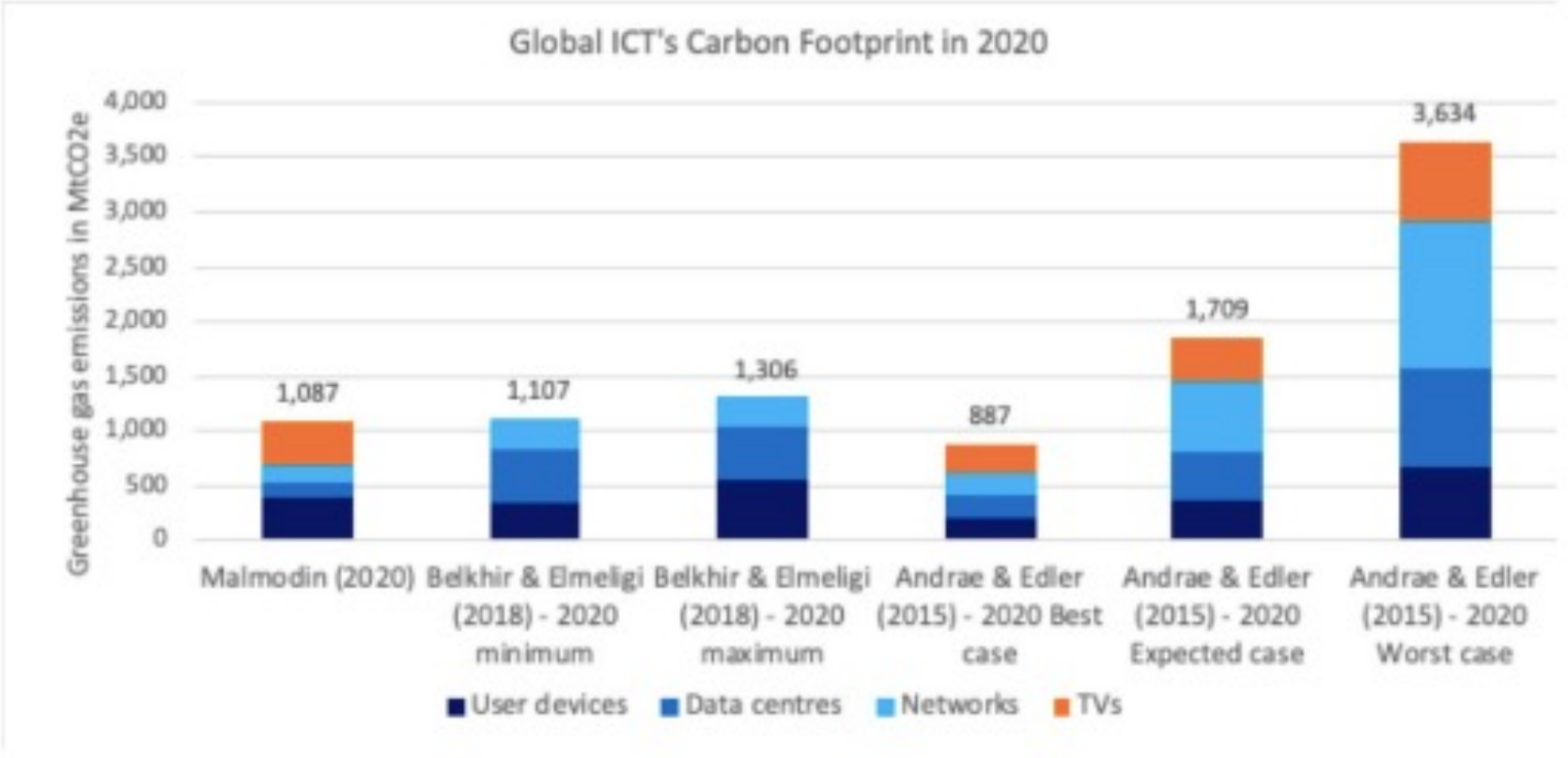


Source: Belkhir e Elmeligi (2018)



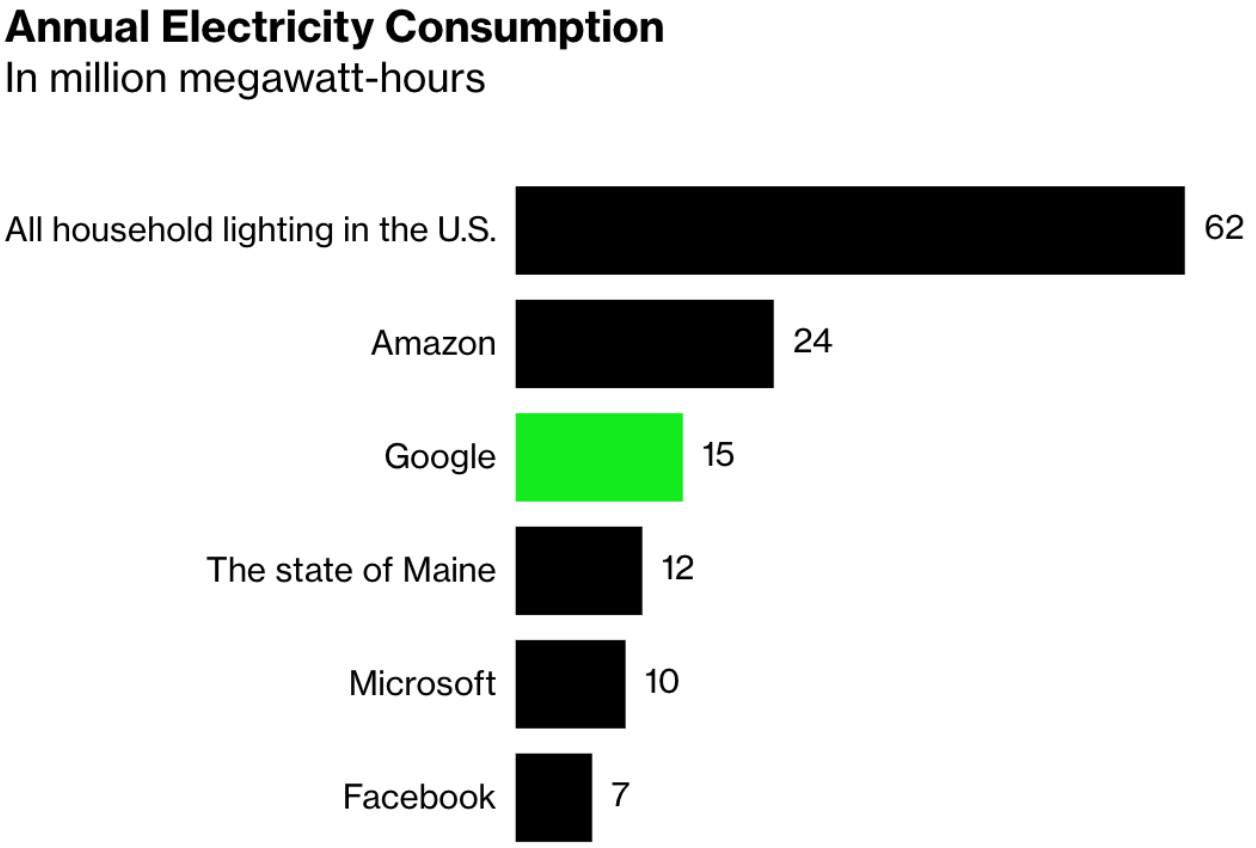
Source: Belkhir e Elmeligi (2018)

Estimates for global DT carbon footprint in 2020



Source: Freitag et al.(2020)

Electricity consumption



Source: Bergen, 2022

Objectives

- Analyze the initiatives of European Data Centers (DT) on environmental sustainability (EV)
- Identify DT managers' priority in terms EV
- Define metrics and actions to improve the sustainability of DT

Obstacles on the way

- Data centers is a relatively new and overlooked industry in the management field
- We could not find recommendation on actions or best practice to follow unless in the grey literature (European Union Join papers, industry association initiatives)
- Large digital companies shape the evolution of data center and have high level of secrecy (no data is available, no disclosure of information)

Our research strategy

- Focus group with Italian DT managers to identify priorities and policies implemented
- Survey on DT managers in Europe
- Text analysis of website of the DT in Europe
- Life Cycle Assessment of Vsix data center (Unipd)

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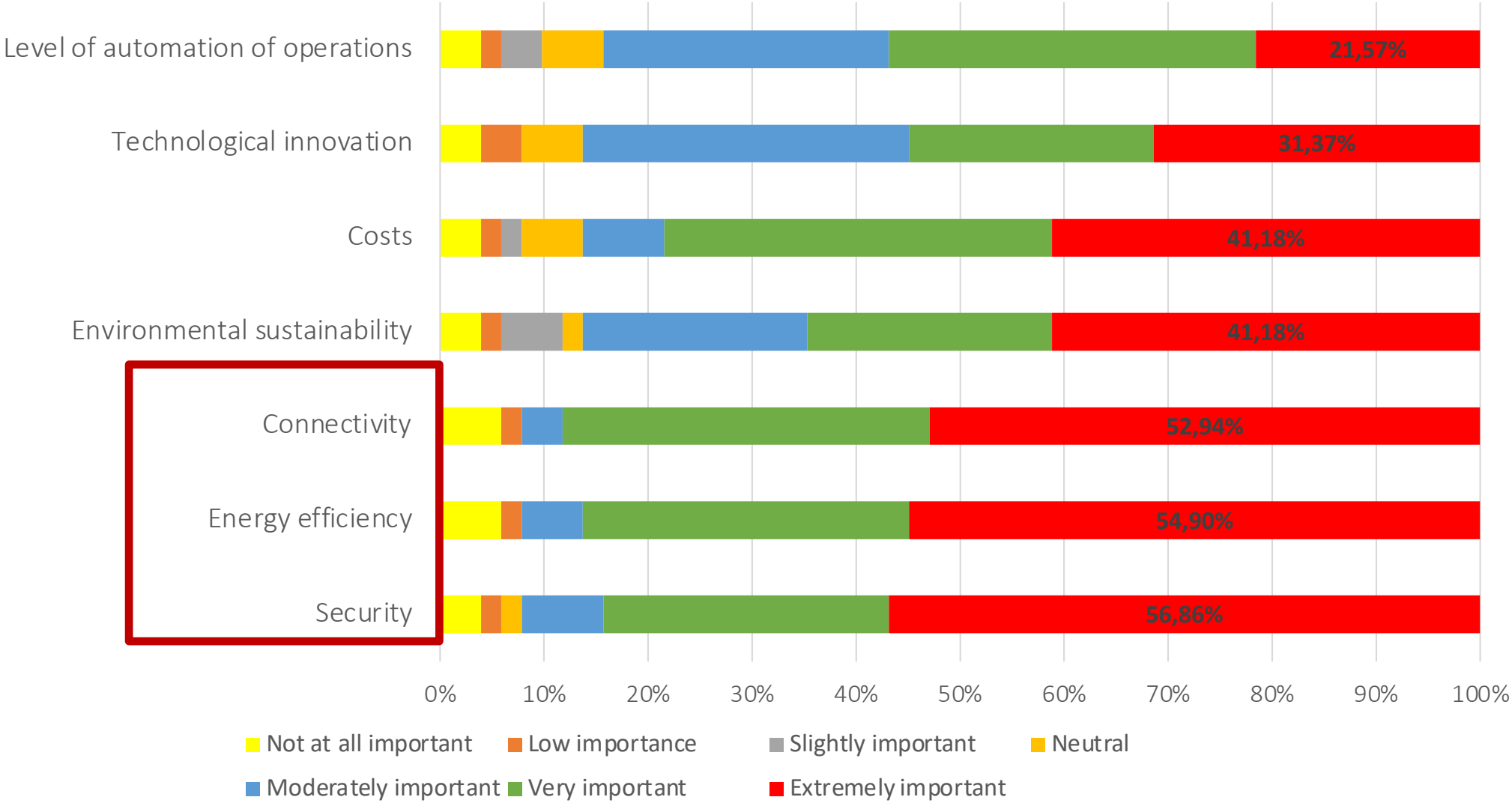
The methodology

- We obtained the list of 549 data centers from different sources/databases:
  1. https://www.datacentermap.com
  2. https://www.impresaitalia.info;
  3. list of companies that are part of the European Data Centre Association (EUDCA);
  4. https://cispe.cloud/members (CISPE's members101);
  5. https://sciencebasedtargets.org/companies-taking-action
- Online questionnaire targeted to managers/owners of DC
- **74 data centers answered** (13%)

Design principles in DC



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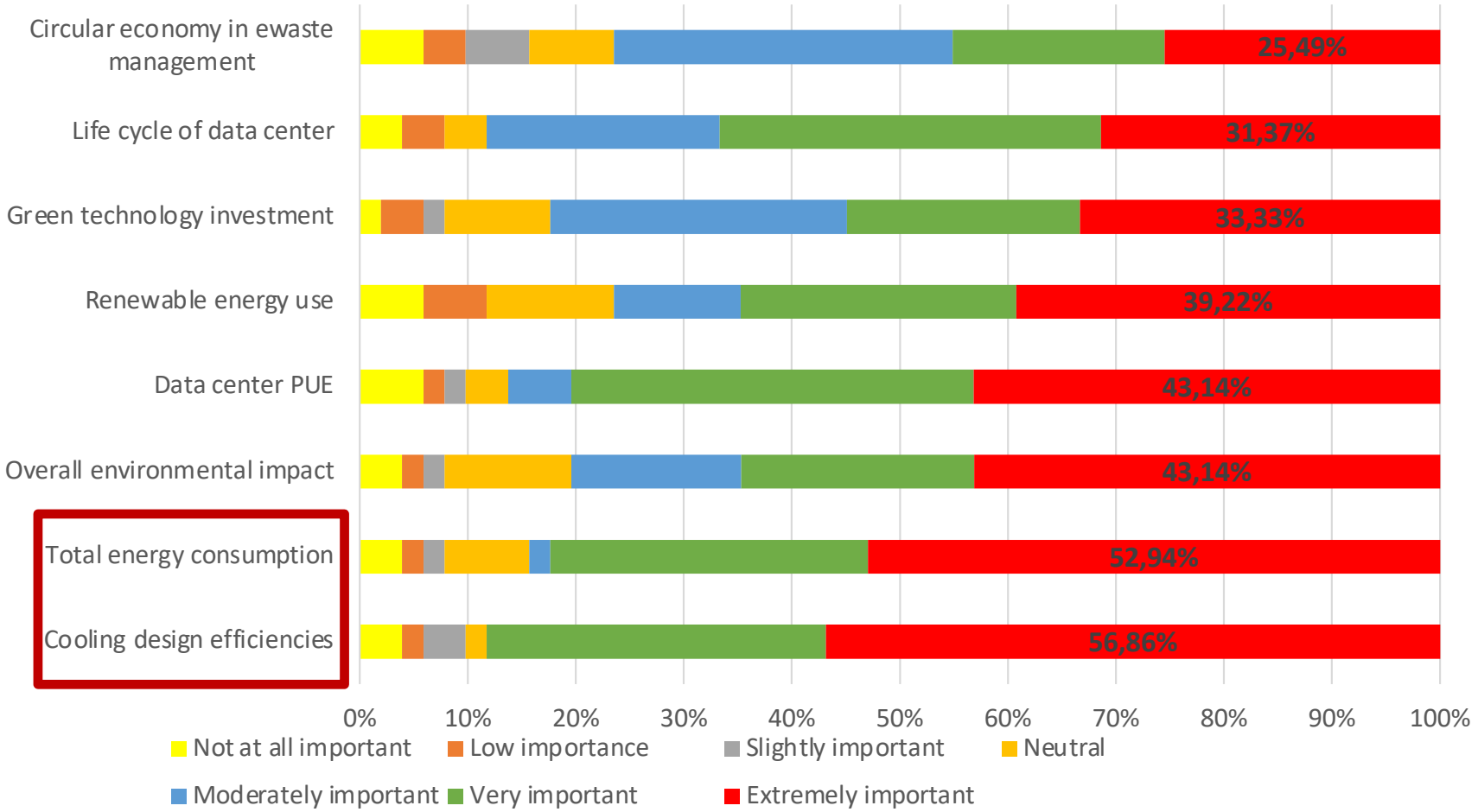
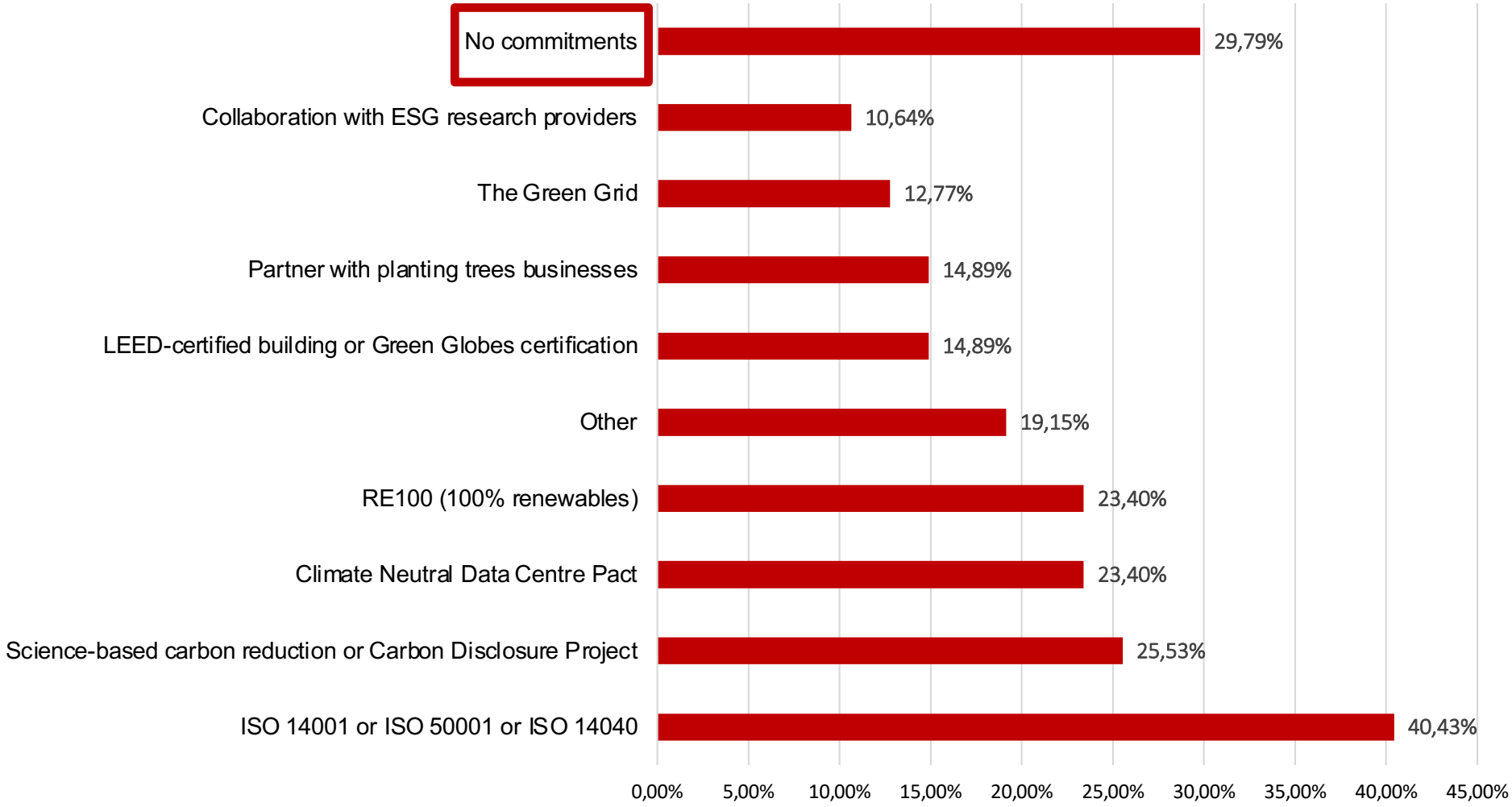
Green factors in DC design



Commitments on ES



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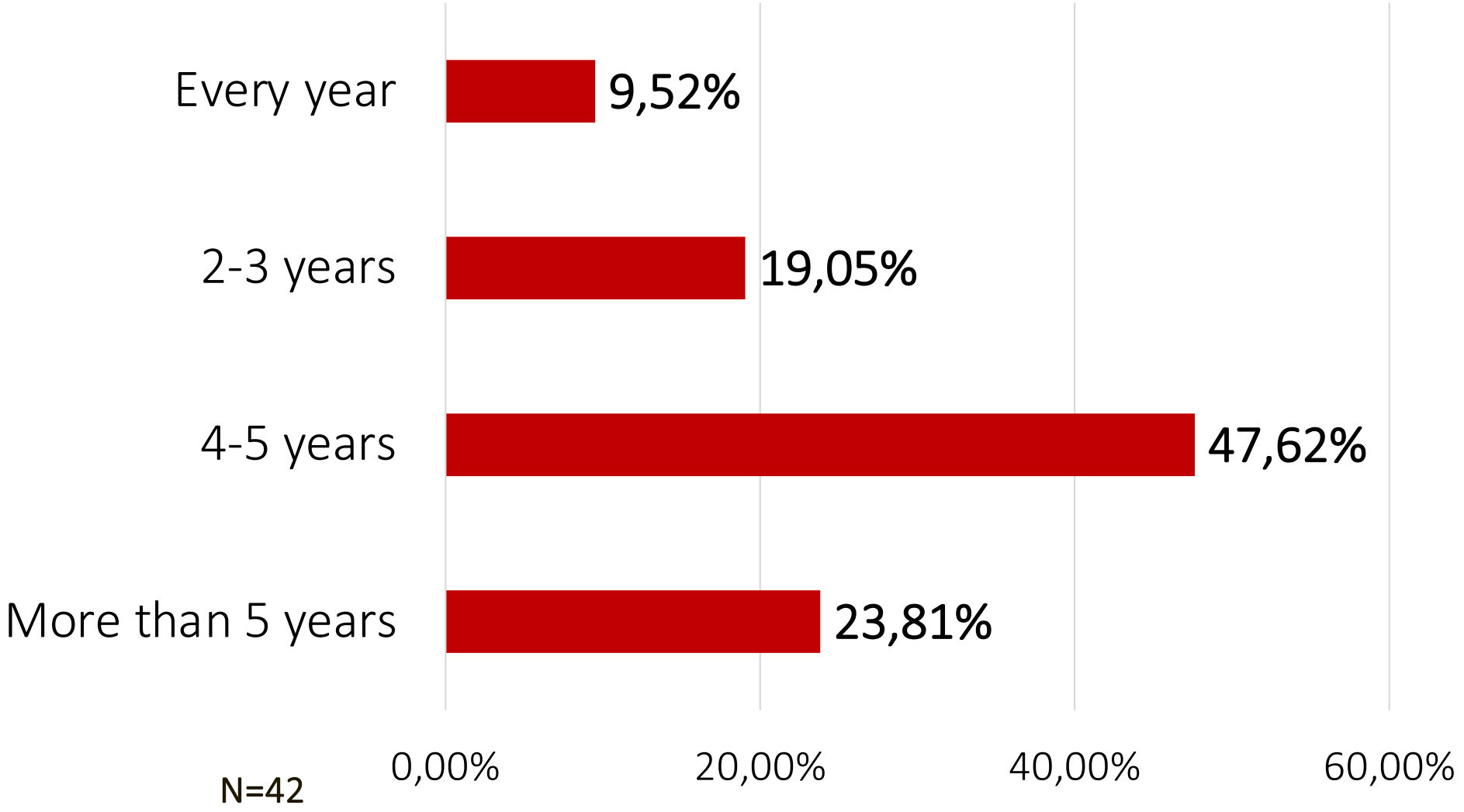
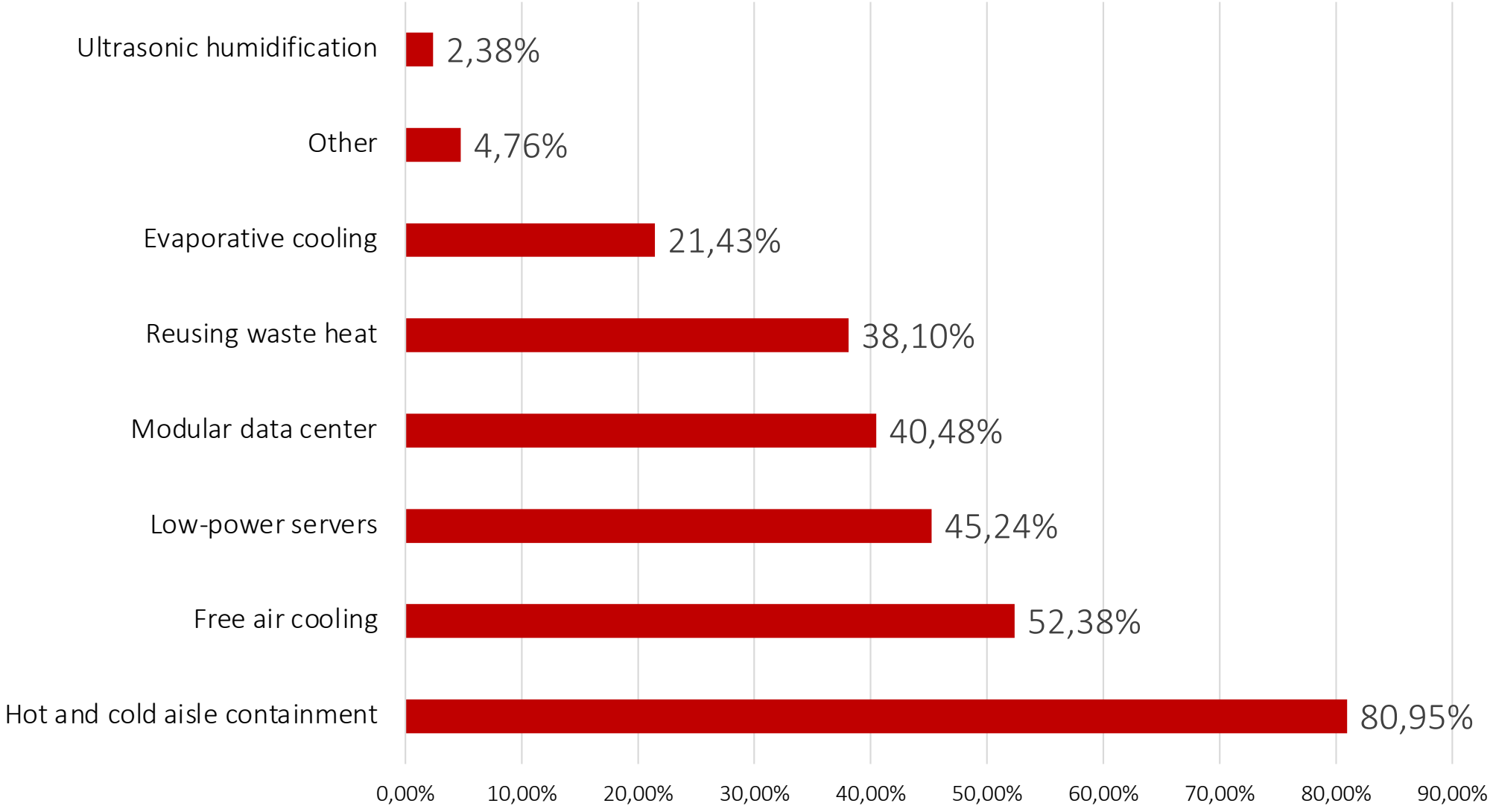
DC renovation rate



Green DT Initiatives



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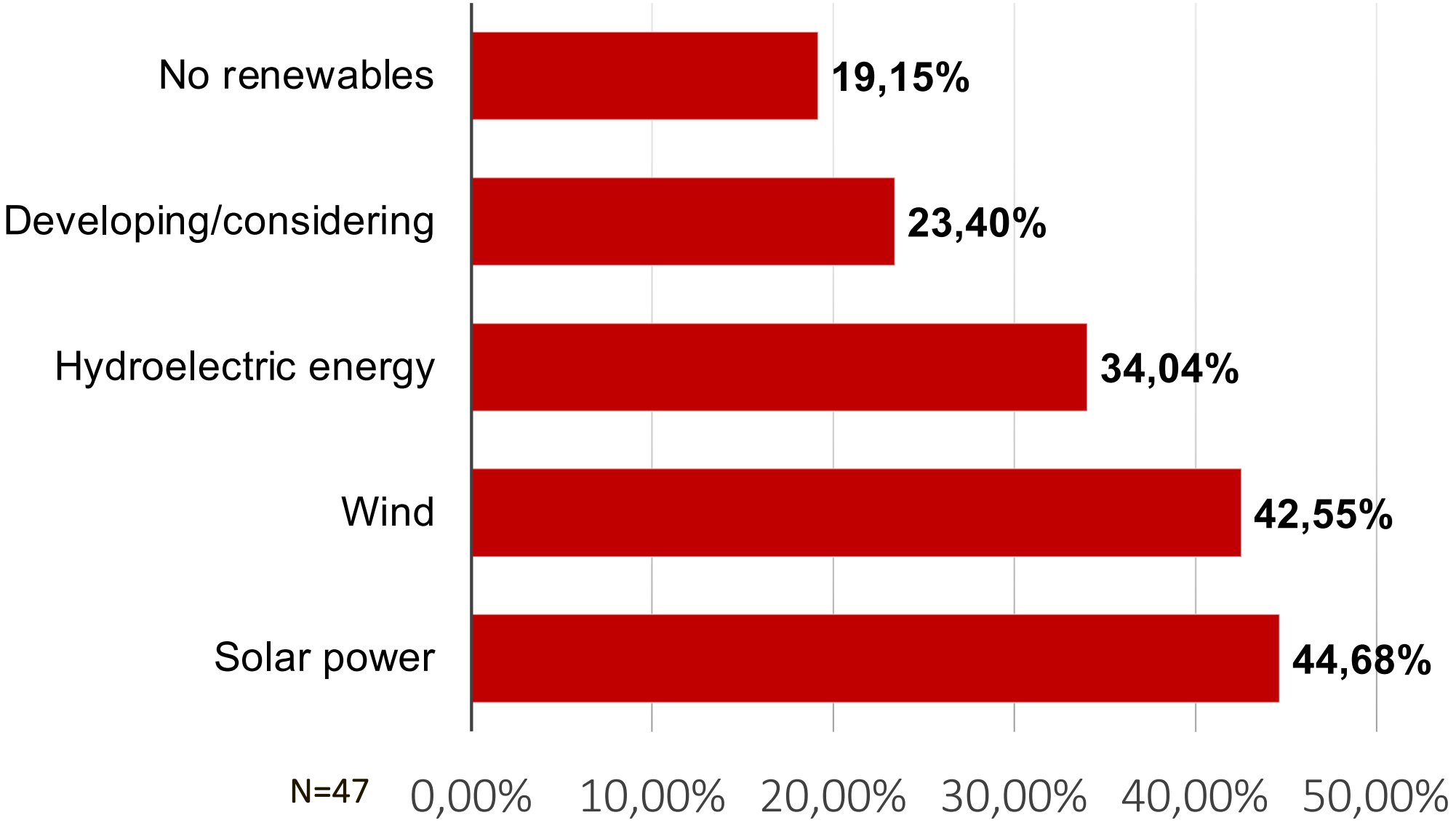
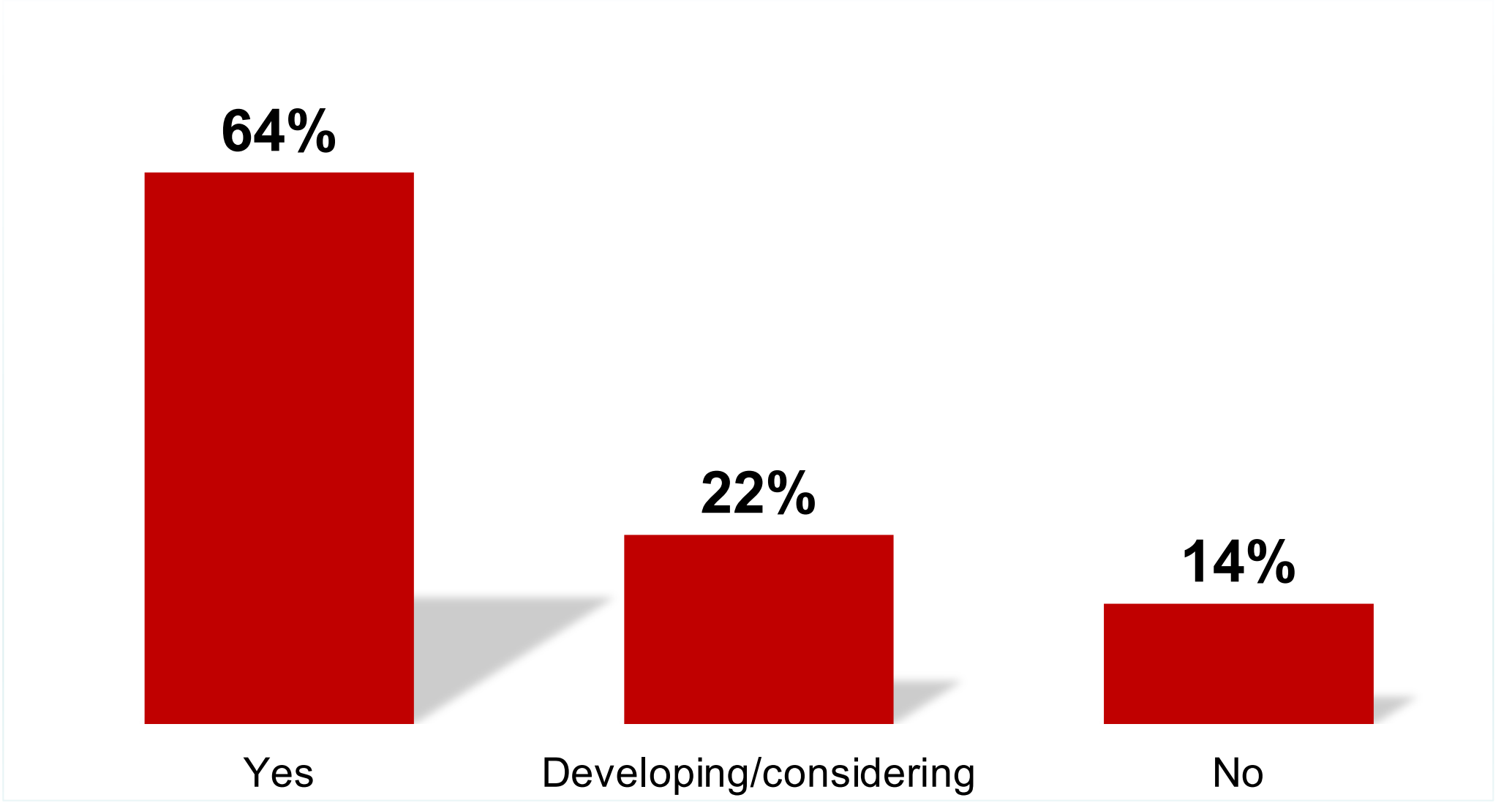
Renewables


No renewables
19,15%
Developing/considering
23,40%
Hydroelectric energy
34,04%
Wind
42,55%
Solar power
44,68%
N=47
0,00%
10,00%
20,00%
30,00%
40,00%
50,00%

ES policy



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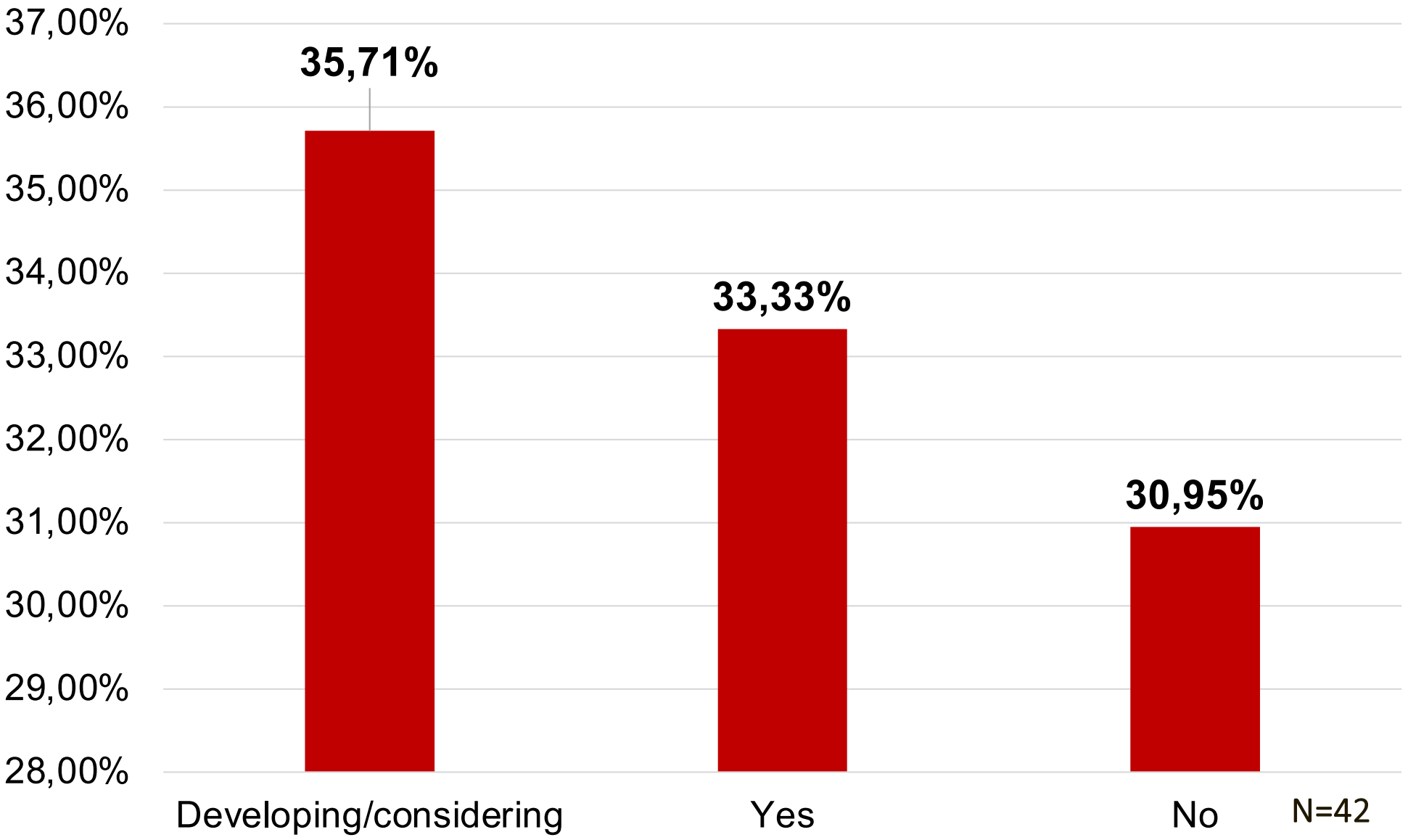
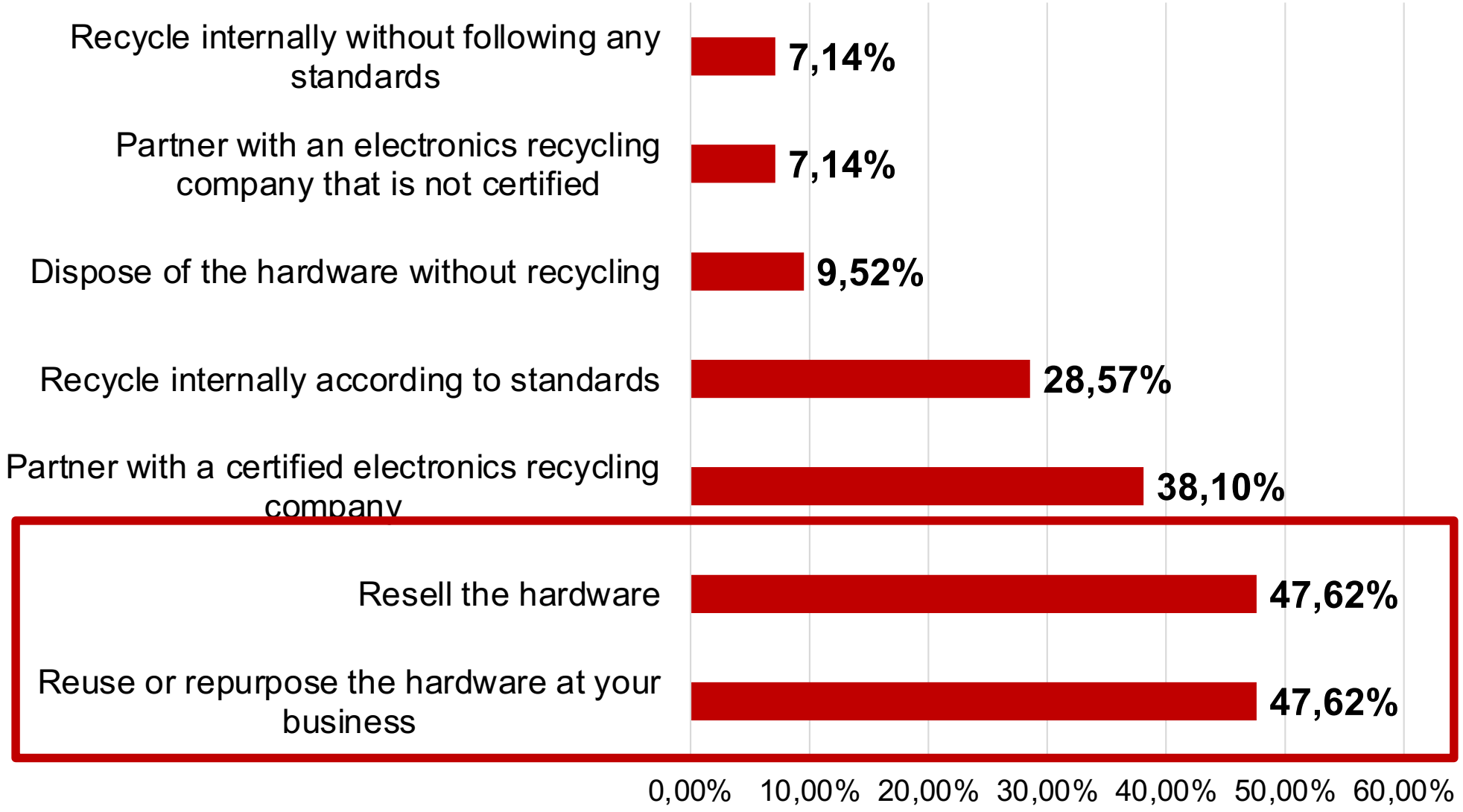
Life Cycle Assessment (LCA)



Circular economy



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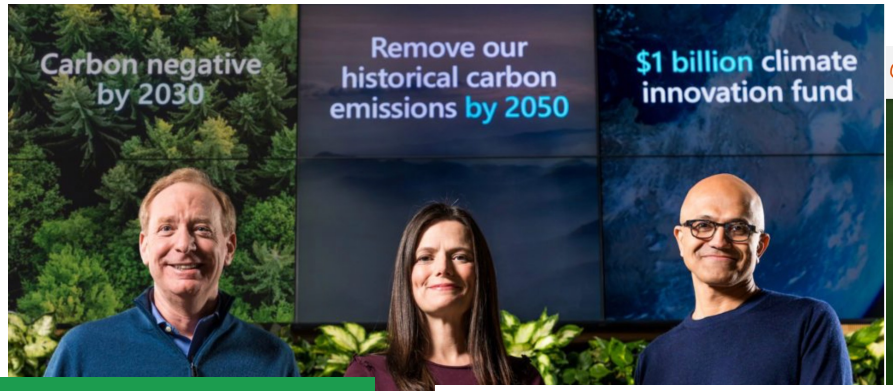
Commitments



AIMING FOR CARBON FREE BY 2030

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PRESS RELEASE

July 21, 2020

Apple commits to be 100 percent carbon neutral for its supply chain and products by 2030

Already carbon neutral today for corporate emissions worldwide, the company plans to bring its entire carbon footprint to net zero 20 years sooner than IPCC targets

Conclusions

Data centers have made investments in ES through:

- efficiency
- Increasing use of energy from renewable sources (solar, wind).

Still little awareness of upstream and downstream steps in the use of electronic product.

Limited use of LCA and circular economy

Focus on the use phase of the DT