



ADMINISTRAÇÃO CENTRAL
DO SISTEMA DE SAÚDE, IP

OTIMIZAR RECURSOS
GERAR EFICIÊNCIA



Operation Zero

Launch Event

**Central Administration of the Health System (ACSS)
Facilities and Equipment Unit**

ECO@SAÚDE Team

1st September 2022



REPÚBLICA
PORTUGUESA

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Programa de sustentabilidade ambiental no Ministério da Saúde



1. Carbon Emissions from the Health Sector in Portugal (baseline calculation)

2. Target trajectory for the health sector's future emissions

3. Projection of future emissions from the health sector

4. Modeling actions

5. Operation Zero: Conclusions

1. Carbon Emissions from the Health Sector in Portugal (baseline calculation)



Objective: To calculate the total amount of greenhouse gases (GHG) that are generated by the activities of the Portuguese health system (carbon footprint).

System Limits: Portuguese health system, both publicly and privately financed, including the following health care provider codes:

- HP.1 (Hospitals);
- HP.2 (Residential long-term care facilities);
- HP.3 (Providers of ambulatory health care);
- HP.4 (Providers of ancillary services);
- HP.5 (Retailers and other providers of medical goods);
- HP.6 (Providers of preventative care);
- HP.7 (Providers of health care system administration and financing);
- HP.8 (Rest of economy) and HP.9 (Rest of the world)



Reference year for calculation: 2014

1. Carbon Emissions from the Health Sector in Portugal (baseline calculation)



Calculation Methods:

Top-down methods: Use Input-Output Analysis (IOA) to combine expenditure data of a given entity with global economic models and resource use/emissions data (environmental accounts: EEIO databases) to produce an estimate of the emissions by which an entity is responsible.

Bottom-up methods: Use reported data relating to an entity's consumption, along with emission factors to estimate emissions.

We used a “top-down” approach to calculate the GHG emissions footprint of the Portuguese healthcare system and added some “bottom-up” data where available (consumption of pressurized Metered-Dose Inhalers (MDI) and anesthetic gases (N₂O)) – **Hybrid Method**



1. Carbon Emissions from the Health Sector in Portugal (baseline calculation)



Data sources:

“Top-down” data

- ✓ Input-Output Table 2014: WIOD (World Input-Output Databases);
- ✓ Environmental accounts for CO₂ emissions (2014): WIOD (World Input-Output Databases);
- ✓ Environmental accounts for CH₄ and N₂O emissions: PRIMAP (PRIMAP-hist: historical series of national emissions);
- ✓ Portuguese health sector expenditure data: Statistics Portugal (INE).

“Bottom-up” data

- ✓ Anesthetic Gases (N₂O) consumption: Data reported by the Portuguese Environment Agency under the United Nations Framework Convention on Climate Change;
- ✓ Metered-Dose Inhalers (MDI) consumption: Data collected by the Shared Services of the Ministry of Health (SPMS) through the electronic drug prescription platform.

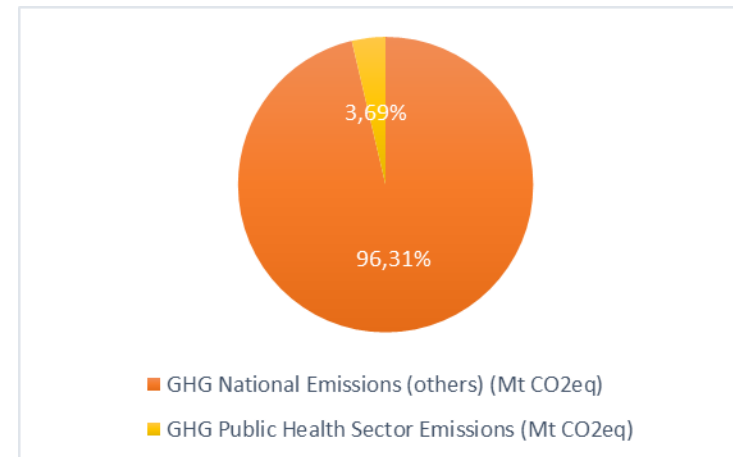
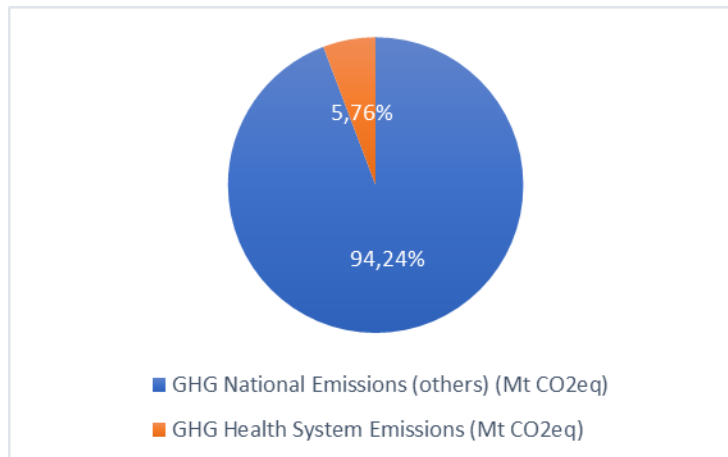
1. Carbon Emissions from the Health Sector in Portugal (baseline calculation)



Results of applying the calculation methods (cont.):

When considering the entire Portuguese health system, covering public and private entities, the total carbon footprint of the health sector in 2014 was about 3.92 Mt CO₂eq, representing about 5.8% of total GHG emissions at the national level;

Considering only the public sector of the Portuguese health system, the total carbon footprint in 2014 was around 2.51 Mt CO₂eq, representing about 3.7% of the national total.

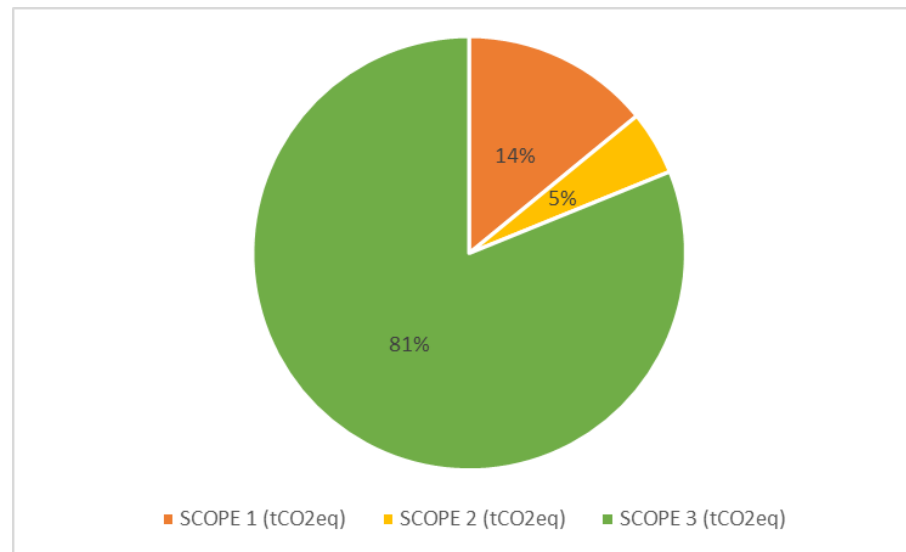


1. Carbon Emissions from the Health Sector in Portugal (baseline calculation)



Results of applying the calculation methods (cont.):

Most health system emissions were indirect (86%), resulting from Scope 2 (5% - electricity purchase) and Scope 3 (81% - supply chain) GHGP emission sources.



Direct emissions, from Scope 1 sources, directly controlled by the entities, represented around 14% of the total emissions footprint.

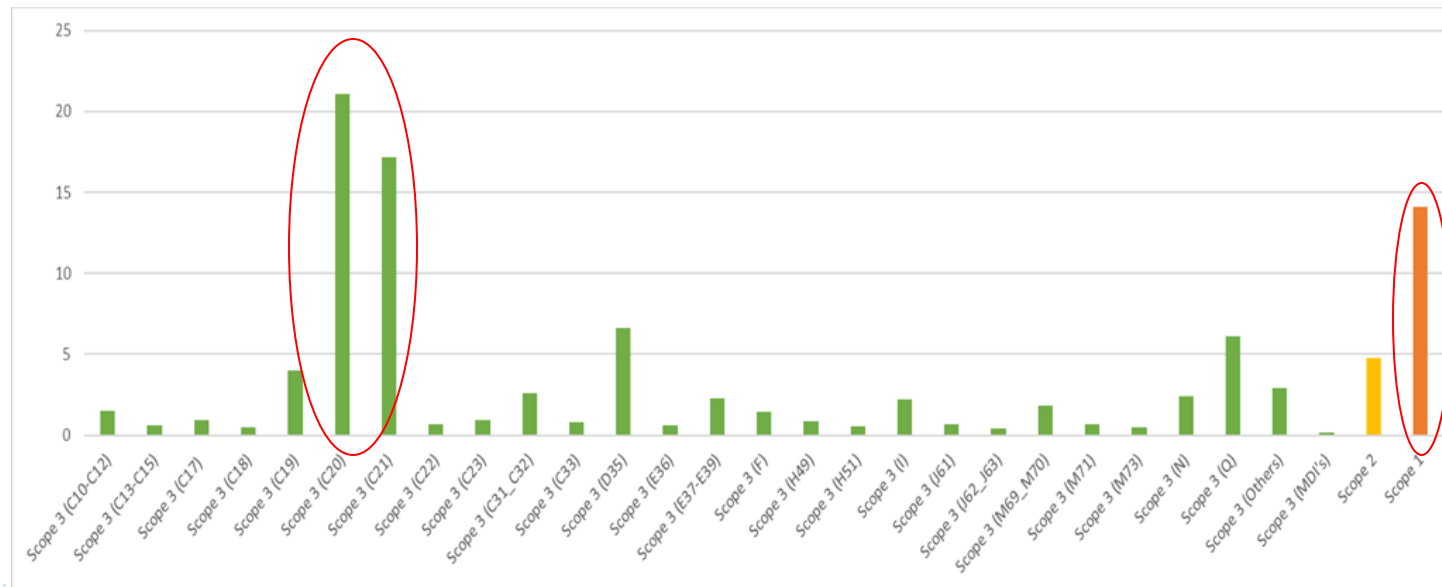
1. Carbon Emissions from the Health Sector in Portugal (baseline calculation)



Results of applying the calculation methods (cont.):

Emissions associated with the procurement of chemicals (Scope 3, C20), procurement of pharmaceuticals (Scope 3, C21), and direct emissions (Scope 1: fugitive or combustion emissions), were the main sources of GHG in the Portuguese Health Sector, representing more than 50% of the total GHG footprint of the Portuguese health system.

Considering only the public sector of the Portuguese health system, the distribution of emissions by sources followed also the described profile, so the “hotspots” of emissions were the same.





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2. Target trajectory for the health sector's future emissions



A national target trajectory for the health sector GHG emissions was derived considering the “2050 Carbon Neutrality Roadmap for Portugal” (Roteiro para a Neutralidade Carbónica 2050 (RNC2050)) approved by the Resolution of the Council of Ministers (RCM) N.º 107/2019, of 1st July.

Decarbonization trajectory established for Portugal until 2050 according to RNC2050 (reference year 2005):

- Reduction from 45% to 55% by 2030;
- Reduction from 65% to 75% by 2040;
- Reduction from 85% to 90% by 2050.



RNC 2050
Roteiro para a Neutralidade Carbónica

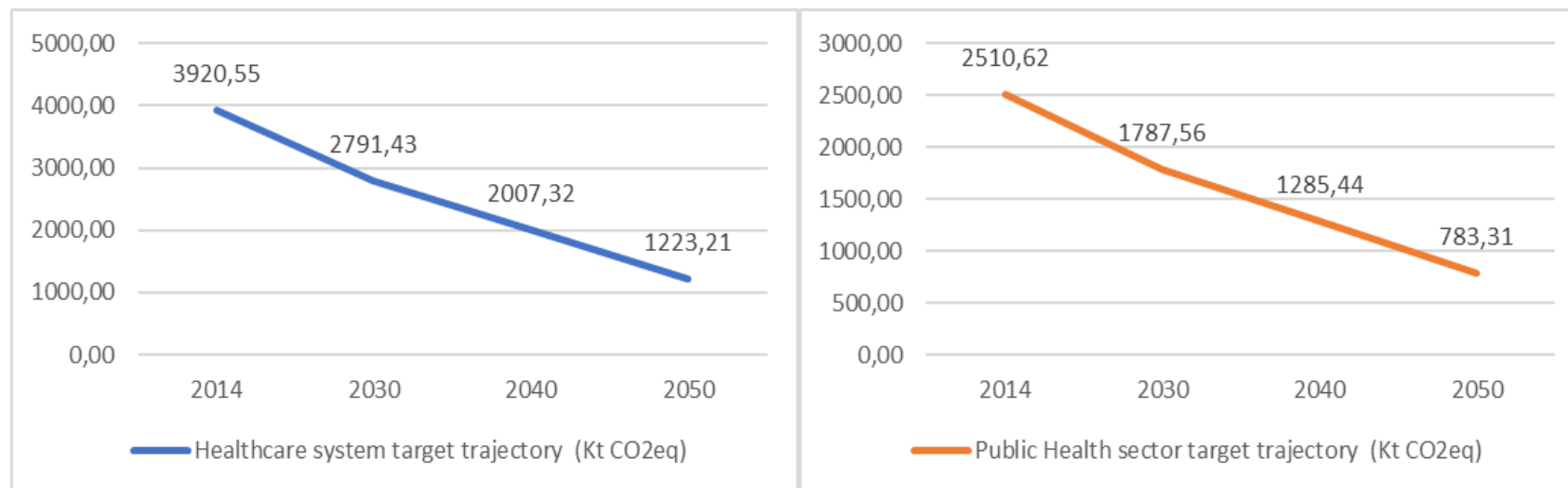
These targets reduction are aligned with the 1.5°C target limit set out in the Paris Agreement.

2. Target trajectory for the health sector's future emissions



Considering the decarbonization trajectory defined for Portugal in the RNC2050 (-45%, -65%, and -85%), a decarbonization target trajectory was traced for the Portuguese health system and for the public health sector, considering 2014 as the reference year:

- 29% reduction by 2030, 49% reduction by 2040, and 69% reduction by 2050:



Ideally, the emissions of GHG by the Portuguese healthcare sector should respect these trajectories.



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3. Projection of future emissions from the health sector



In the calculation of the future emissions projections, we assumed the time range between 2014-2050, calculating future emissions for 2025, 2030, 2035, 2040, 2045, and 2050.

Calculation Method: Hybrid Method

Data Sources:

“Top-down”

- ✓ Input-Output Table 2014: WIOD (World Input-Output Databases);
 - ✓ Environmental accounts of CO₂ emissions (2014): WIOD (World Input-Output Databases);
 - ✓ Environmental accounts of CH₄ and N₂O emissions: PRIMAP (PRIMAP-hist: historical series of national emissions);
 - ✓ Portuguese health sector expenditure data: Statistics Portugal (INE);
- ✓ Energy Technology Perspectives – 2017 (ETP 2017) - International Energy Agency (IEA);
 - ✓ European Commission projections for decarbonisation in the European Union: EU Reference Scenario 2020;
 - ✓ Projections of the future evolution of expenditure in the health sector - Institute for Health Metrics and Evaluation (University of Washington);
 - ✓ Eurostat: Population on 1st January by age, sex and type of projection.

“Bottom-up”

- ✓ Data reported by the Portuguese Environment Agency under the United Nations Framework Convention on Climate Change (Anesthetic Gases (N₂O));
- ✓ Data collected by the Shared Services of the Ministry of Health (SPMS) through the electronic drug prescription platform (Metered Dose Inhalers (MDI)).

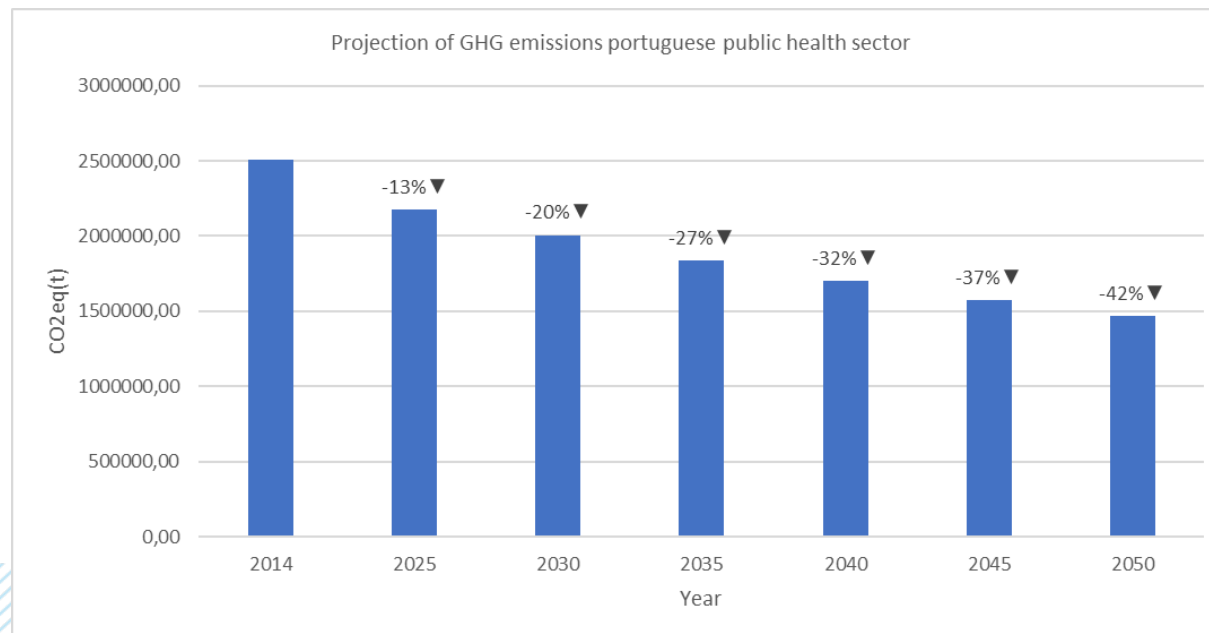
3. Projection of future emissions from the health sector



Projections results:

Considering the current projections for the decarbonization of the economy, and without considering any additional action taken by the sector to mitigate GHG emissions, the results showed a reduction of 42% in emissions of the system, in 2050, in relation to the baseline year;

Therefore, the total carbon footprint of the health sector in 2050 would be around 2.29 Mt CO₂eq, with around 1.46 Mt CO₂eq (64%) being the responsibility of the public sector.

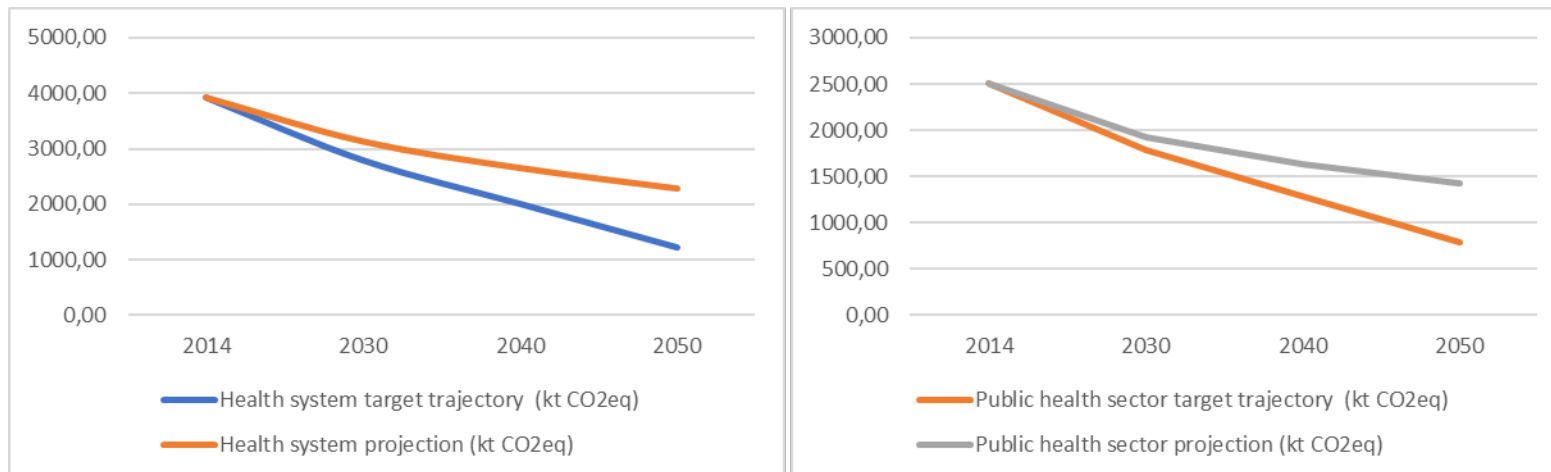


3. Projection of future emissions from the health sector



Projections results (cont.):

When comparing the emissions target trajectories of the health system with the projected emissions trajectories, there is a significant gap between the target emissions value and the projected emissions value across the years. Considering the entire health system, to reach the target value in 2050, projected emissions must undergo an additional reduction of 1034 kt CO₂eq. Focusing only on the public sector, to reach the target value for 2050, projected emissions must be reduced by 687,7 kt CO₂eq.



Year	2030	2040	2050
Gap (target trajectory vs projection) Kt CO ₂ eq	341,92	652,54	1068,41
Gap (target trajectory vs projection: Public Sector)) Kt CO ₂ eq	218,31	416,81	682,72



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4. Modeling actions



Aim: Modeling of measures to reduce the GHG footprint of the Portuguese health sector. The modeling of measures covered only the Portuguese public healthcare sector since that is the universe covered by the Portuguese Ministry of Health.

Methods: Apply to the emission calculation model changes, resulting from the implementation of measures, with a view to mitigating GHG emissions. These could be changes in emission factors or changes in the structure of consumption.

Actions to model: Decarbonization through the meeting of the established ECO@SAÚDE targets - promoting efficiency in the use of resources.



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4. Modeling actions



Action description:

The RCM n.º 104/2020, resulted in the publication of the Dispatch n.º 10372/2021, of 15th October, and in the creation of the “Environmental Sustainability Program at the Ministry of Health: ECO@SAÚDE”. This program establishes sustainability targets that the Portuguese public healthcare entities must achieve between reference year and 2030, as described below:

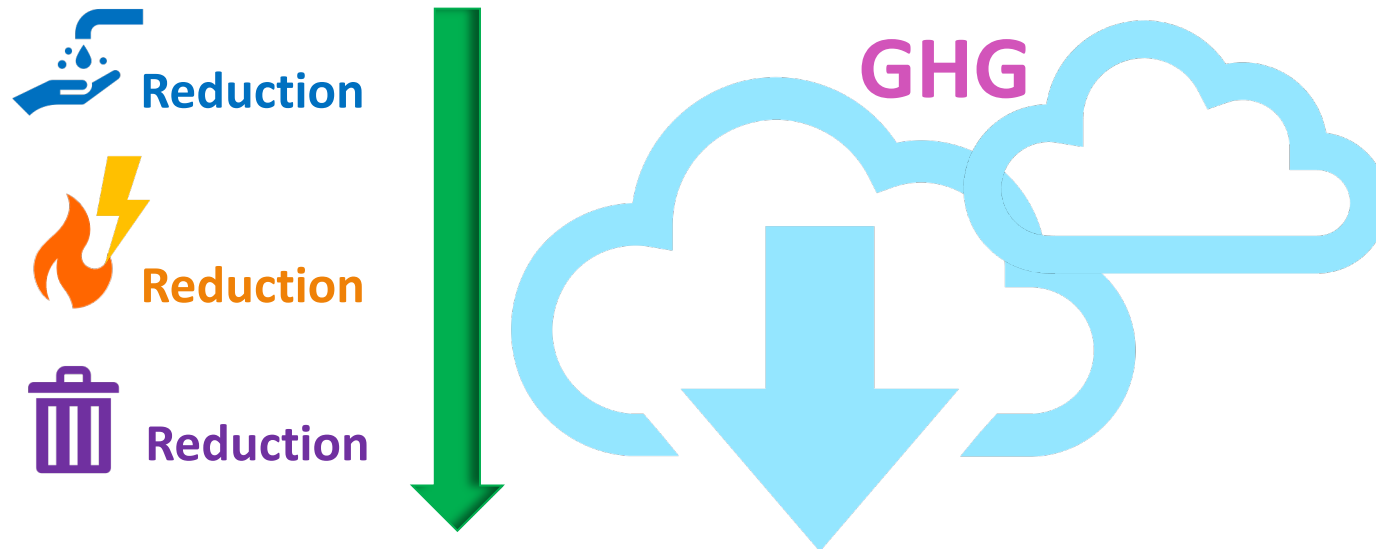
- a) Energy efficiency: 40% reduction in primary energy consumption;
- b) Self-consumption: 10% of energy consumption supplied through self-consumption solutions from renewable energy sources, by 2030;
- c) Water efficiency: 20% water reduction in consumption;
- d) Waste: 20% reduction in waste production;
- e) Rehabilitation and improvement of buildings: contribute to achieving a 5% rate of energy and water renovation of buildings covered by ECO@SAÚDE.

4. Modeling actions



Action description (cont.):

The meeting of the ECO@SAÚDE targets can influence Scope 1, Scope 2, and Scope 3 emissions, as they are devoted to the reduction of water and energy (gas and electricity) consumption, and waste production. Meeting these targets contributes, not only to the improvement of the efficiency in the use of natural resources but also to the promotion of the public health sector decarbonization.

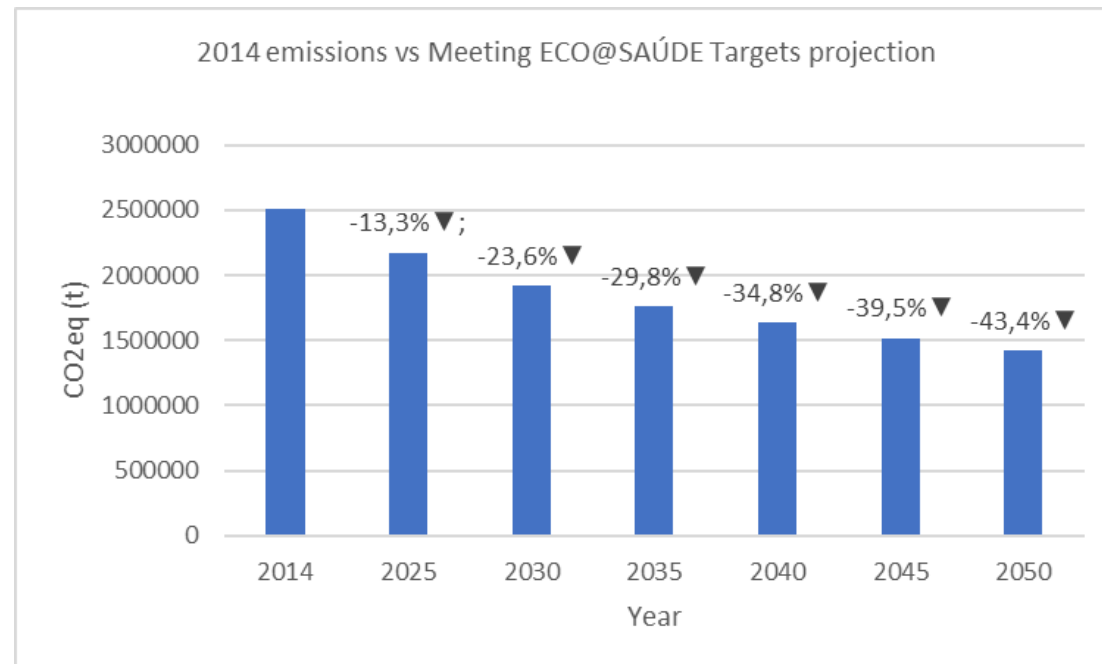


4. Modeling actions



Results:

The fulfillment of those target reductions allowed the following reductions in predicted GHG emissions values in relation to the emissions values of 2014:

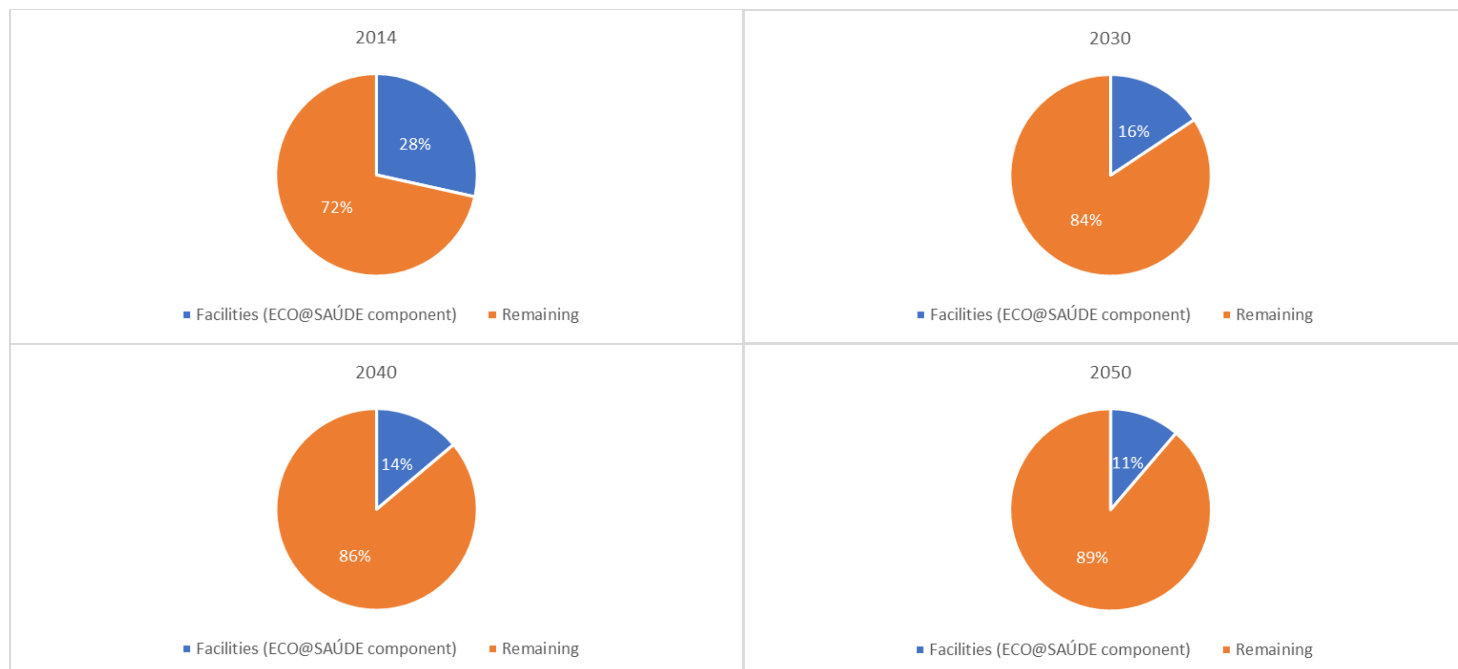


4. Modeling actions



Results (cont.):

The modeling of the fulfillment of the targets also showed a significant reduction in the facilities (energy and water consumption and waste production) contribution to the total predicted GHG emissions of the public health sector, as can be seen in the figure below:

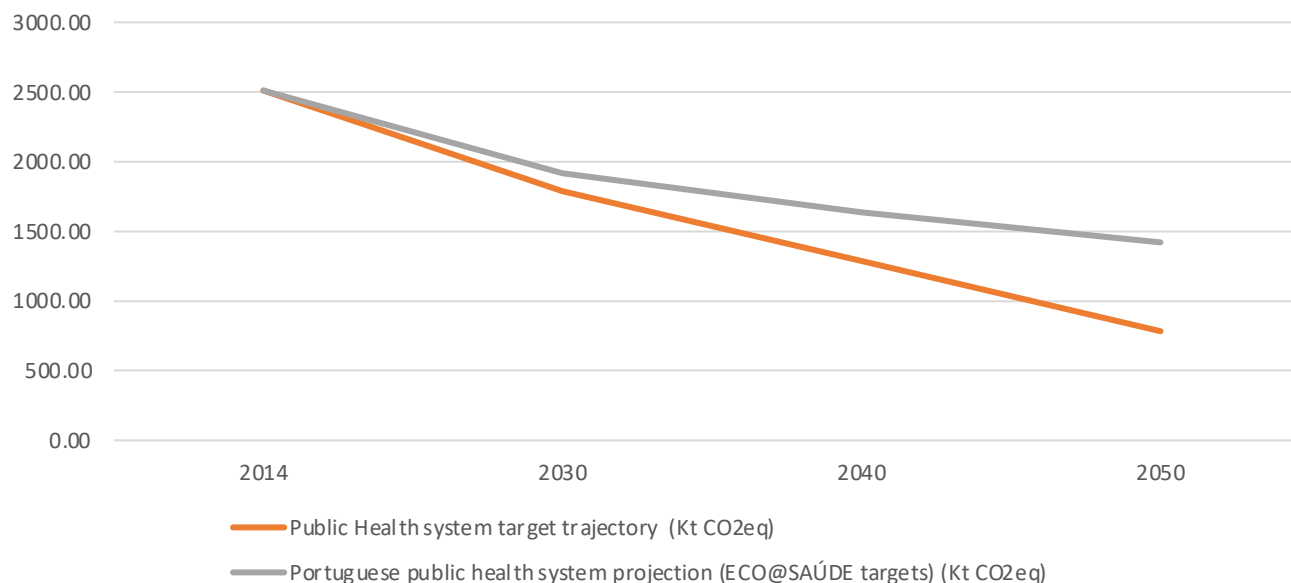


4. Modeling actions



Results (cont.):

The gap between the target emission trajectory and the projection has been reduced, nonetheless, it still exists a significant difference between the target emissions and the projected emissions each year.



Year	2030	2040	2050
Gap (target trajectory vs projection (Public Sector)) Kt CO2eq	380,34	548,62	793,15
Gap (target trajectory vs projection (Public Sector: ECO@SAÚDE targets) Kt CO2eq)	131,48	352,48	637,44

4. Modelling actions



Conclusions:

- Consumption of “chemicals and chemical products” and “basic pharmaceutical products and pharmaceutical preparations”, represent together more than 40% of the total GHG footprint of the Portuguese health system;
- The ECO@SAÚDE reduction targets, can’t influence those emissions and the great majority of indirect - Scope 3 emission sources;
- Decarbonising the supply chain of the public health sector is essential to meet the sector’s target trajectory, created in this study;
- The Portuguese public health sector need to make a comprehensive approach to its emissions, an approach that goes beyond the ECO@SAÚDE program, and beyond the activity of ACSS facilities and equipment unit.



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We were able to:

- Calculate our baseline GHG emissions and analyze the contribution of different direct and indirect emissions activities to this baseline;
- Project the future behavior of the health sector emissions and studied the effect of ECO@SAÚDE targets on the mitigation of GHG emissions;
- Identify areas where we (ACSS/UIE) can't exercise a direct influence, but which are considered core in the health system decarbonization process.

Main challenges/difficulties:

- Large quantity of assumptions that we need to make when applying the “top-down” methodology;
- Missing data related to anaesthetics consumption and to the projections of MDI'S and anaesthetic gases consumption evolution;
- Applying the methodology, it's a complex process that takes a lot of time when it's not done by experts;
- This methodology is not harmonized with the calculation of emissions used at national level (by the Portuguese Environmental Agency and Statistics of Portugal) which is based on the geographical criterion.



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We thank you for your attention

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