university of groningen / Green Office

Cost & Benefit Analysis



22 May 2025

Context

New challenges require new techniques!

- How to assess environmental effects?
- Does the new project add value to society and the environment?
- Do the benefits outweigh the costs?
- How can we determine which project offers greater potential and long-term impact?
- Determine which initiatives of GO brought value to the university ?

The answer to all these questions ⟶ YES!

Methodology - Past

Our approach has two separate ways.

Start with analysis of **past** performance:

- Base research on the European Sustainability Reporting Standards (ESRS), which builds on CSRD.
- Decide on the most appropriate factors to include (e.g., which stakeholders are involved).
- Report the costs, risks, CO2 eq. emissions and benefit.
- Conduct a double materiality analysis.
- Validated by professional accountants.

Methodology - Past

This data will further be used to analyze the past performance of RUG Green Office (GO).

Such an approach enables the evaluation of both the sustainability and financial impacts that GO initiatives have brought to university.

It also allows for assessing the contribution of GO initiatives to the university's sustainability efforts, tracking performance and comparative analysis.

Methodology - Future

In addition to analyzing past performance, we aim to evaluate the future potential of GO projects.

To achieve this, we have chosen the Discounted Cash Flow (DCF) model, which accounts for the time value of money.

The DCF model applies the Net Present Value (NPV) rule to assess the profitability of projects and compare them using this metric.

$$NPV = \sum_{n=0}^{N} \frac{CF_n}{(1+r)^n}$$

A positive NPV indicates a project with strong future potential.

Methodology - Future

The NPV rule focuses solely on the financial aspect.

However, Green Office is a non-profit organization, therefore are equally interested in the value the project brings to the environment and society.

For this we evaluate environmental and social impacts of the projects.

$$EV = \sum_{n=0}^{N} \frac{EVF_n}{(1+r)^n} \qquad SV = \sum_{n=0}^{N} \frac{SVF_n}{(1+r)^n}$$

This provides an approximate evaluation of their broader impacts, enabling us to compare the primary benefits the Green Office aims to deliver and to assess the overall quality of each project.

Methodology - Future

Then the NPV rule will be adjusted to incorporate the environmental and social value.

The result of this calculation is referred to as the **Integrated Value (IV)**.

$$IPV = NPV + b * SV + c * EV > 0 \qquad with\ b, c > 0$$

However, unlike the NPV, the IV incorporates not only the financial aspects of a project but also its estimated environmental and social impacts, providing a more reliable evaluation.

Similar to the NPV, the IV serves as a decision-making tool, indicating that a project should be accepted if the value is positive.

Results

Incorporation of environmental and social metrics will further emphasize the positive impact of GO initiatives on both the environment, society & university sustainability.

Three directions of GO assessment:

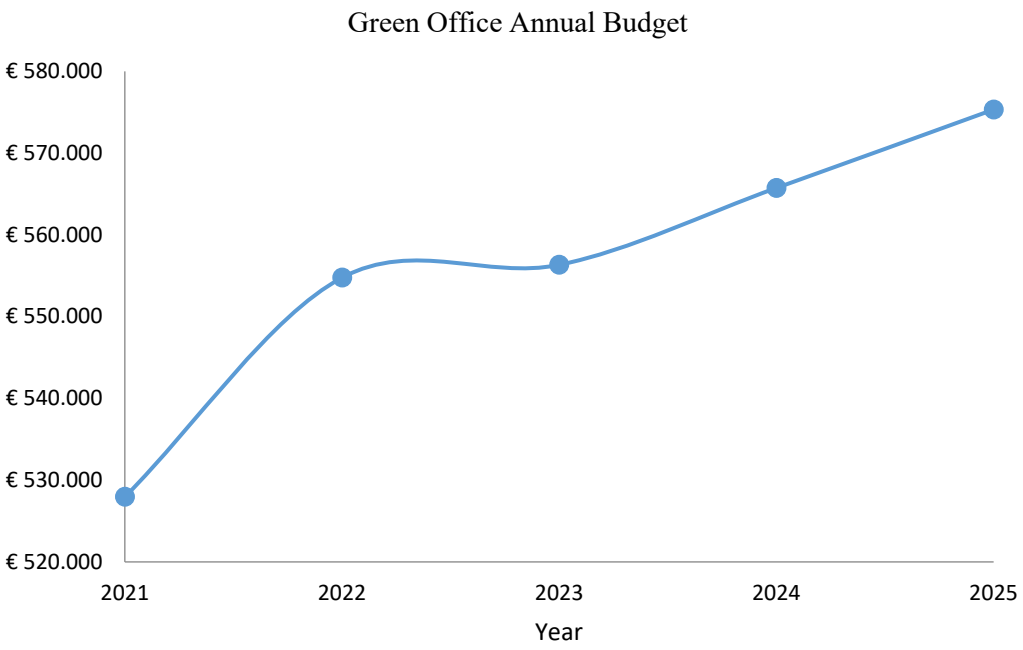
- Budget
- Past Green Office performance
- Future project evaluation

Now, we dive into the results.

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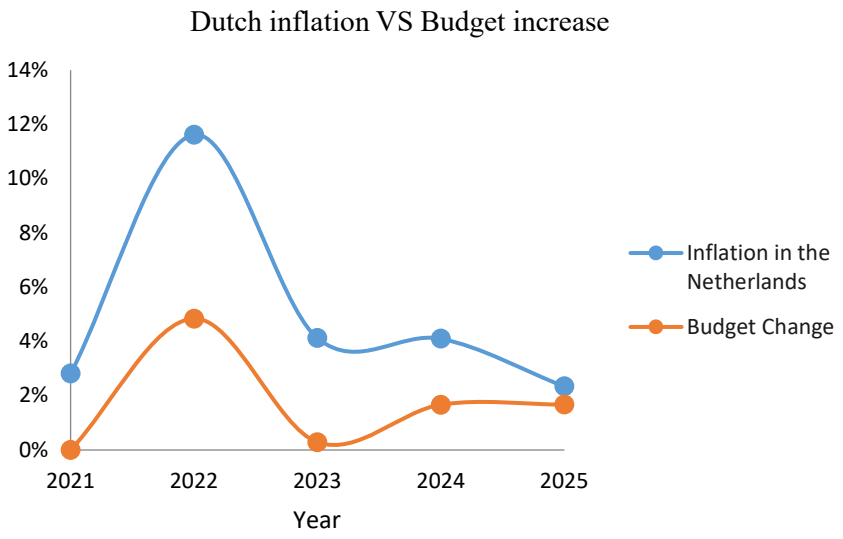
Budget

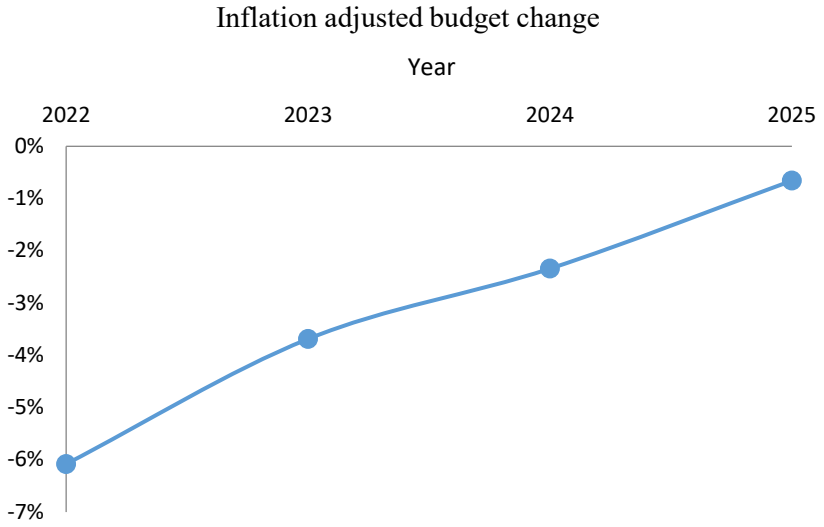
Budget



- The GO budget was increasing with years
- Starting from 2021, it increased by €47 thousand
- Can the sustainability improvement be explained by this?

Inflation Adjusted Budget





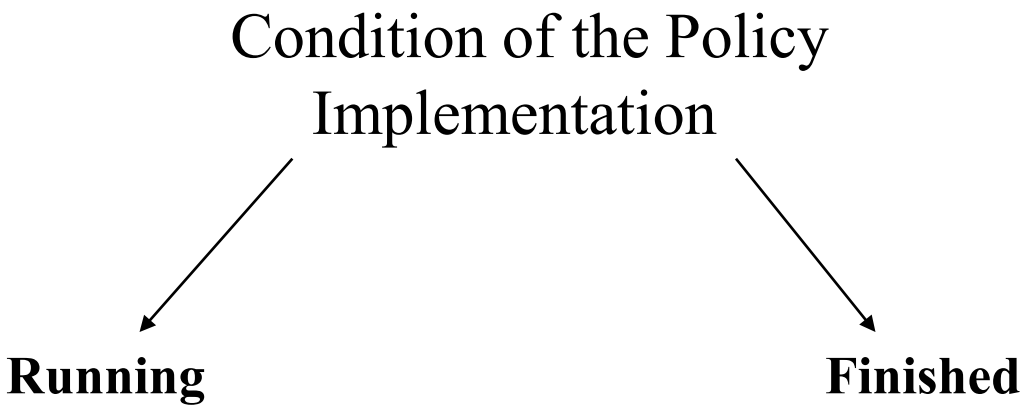
- Not the case for GO!!!
- Adjusted for Dutch inflation, GO's real budget has declined over the past five years and continues to do so

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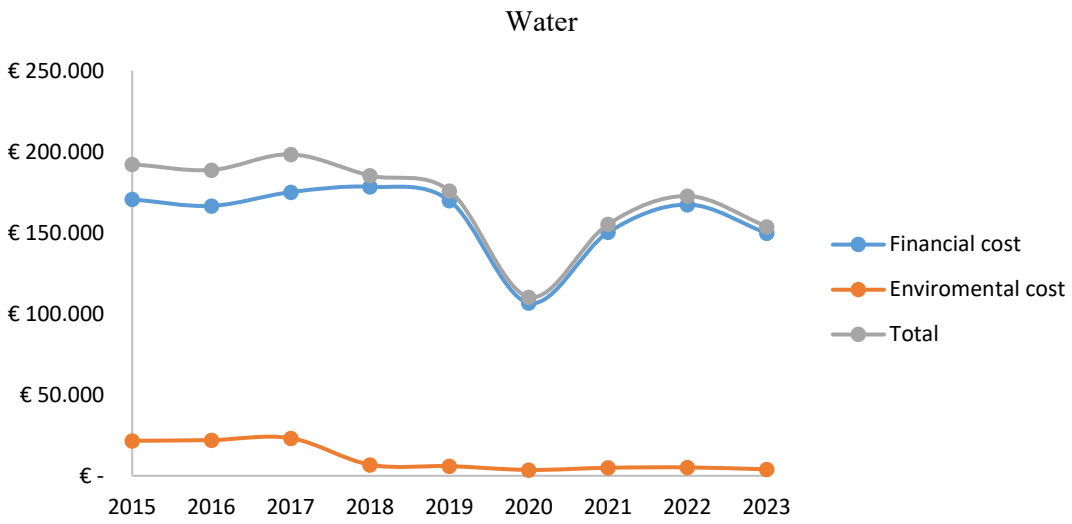
Past Performance

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Past Performance



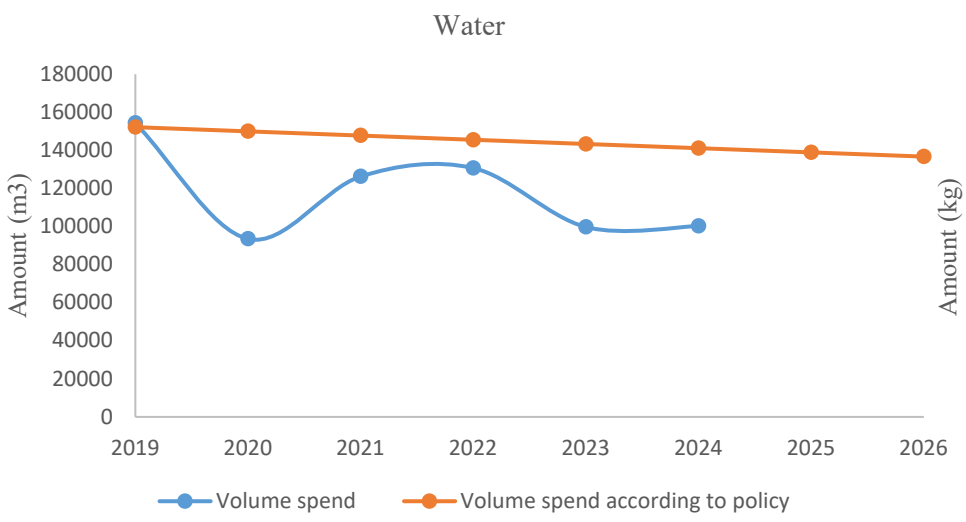
Past Performance - Running

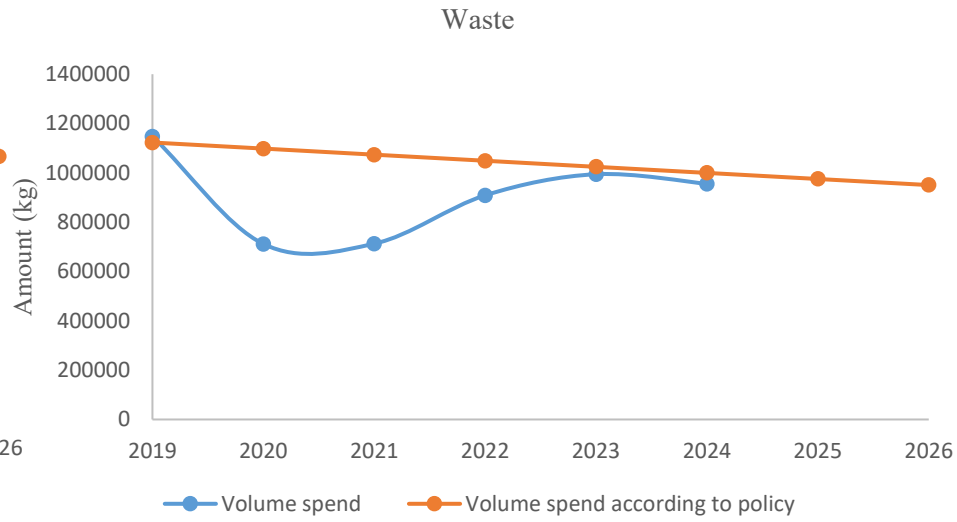


- The amount of money spent on water gradually decreases throughout the years.
- In line with the environmental cost paid for water usage.
- This demonstrates the positive effect of the RUG Green office efforts to decrease water usage.

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Past Performance – Running

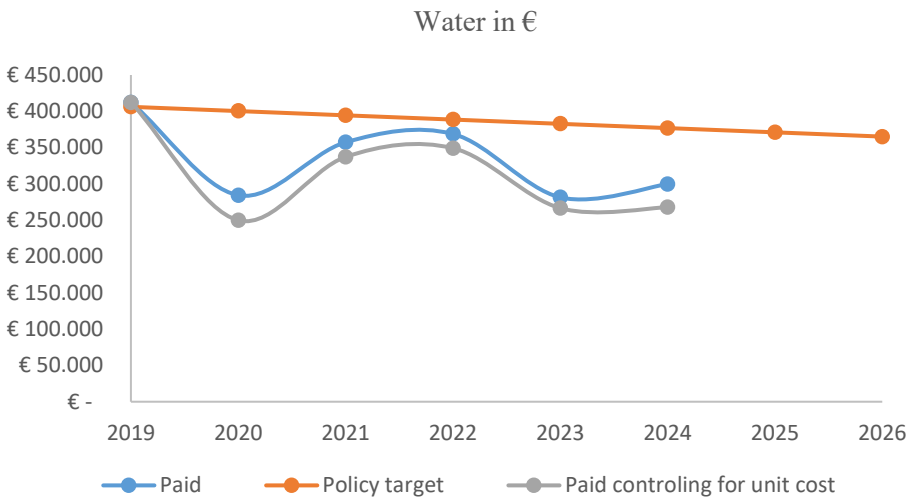


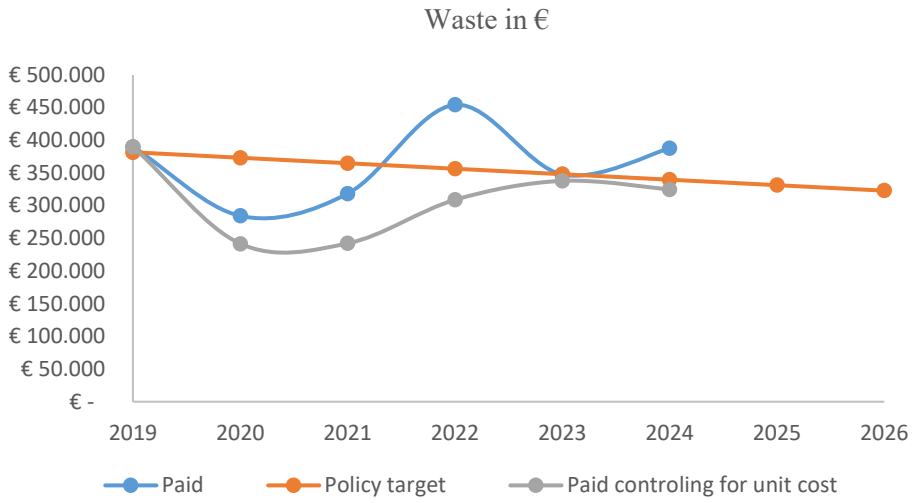


- Comparing GO performance with university sustainability aims set by the "Sustainability Roadmap"
- GO successfully reaches its aims
- Regularly surpassing set goals

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Past Performance – Running

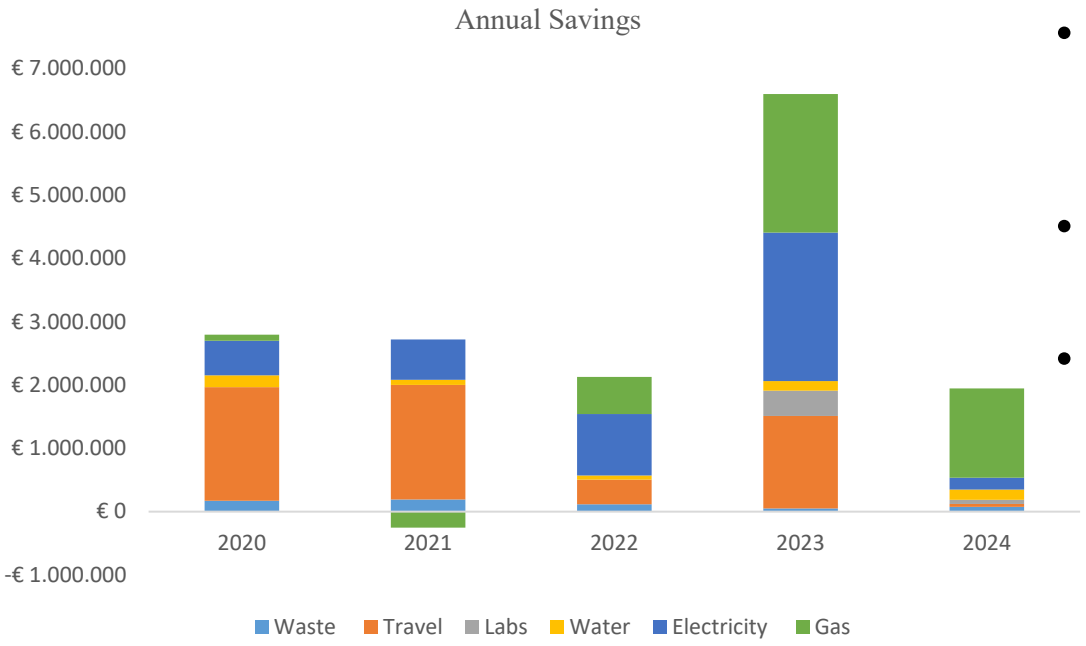




- Looking at the same results from financial angle
- Makes picture about GO contribution more clear
- Controlling for fluctuations in prices per unit, demonstrates efficient work of GO which helps reduce university utility spendings

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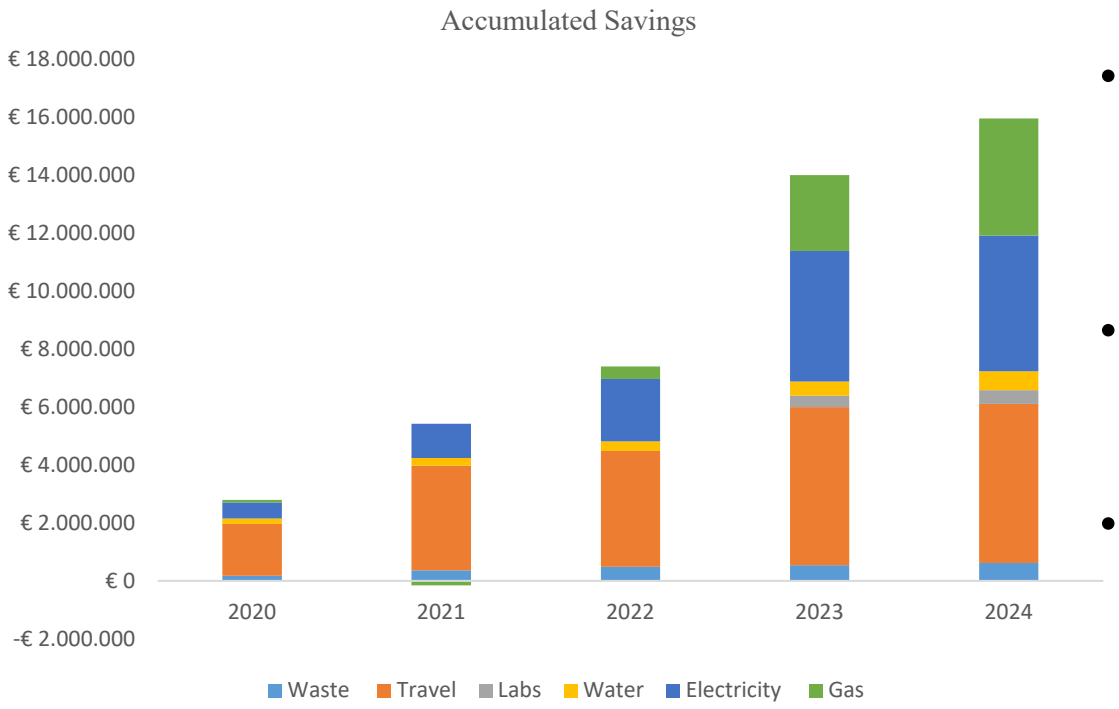
Past Performance - Finished



- All planet related fields see a financial improvement during past years
- Travel, electricity and gas taking the highest share
- 2023 being the best year with annual savings of about €6.6 million

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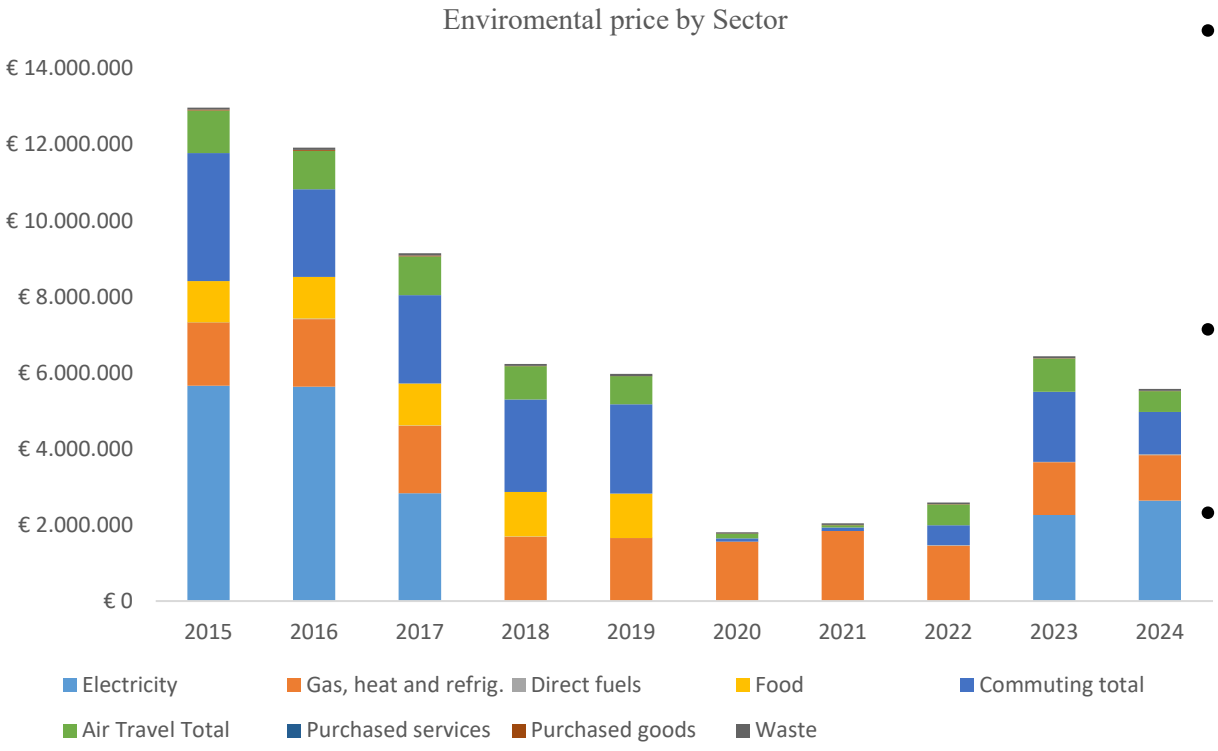
Past Performance - Finished



- Results of sustainability initiatives are even more impressive when looking at accumulated savings
- Clearly demonstrating which initiatives were most successful on financial bases
- With last year reaching almost €16 million savings

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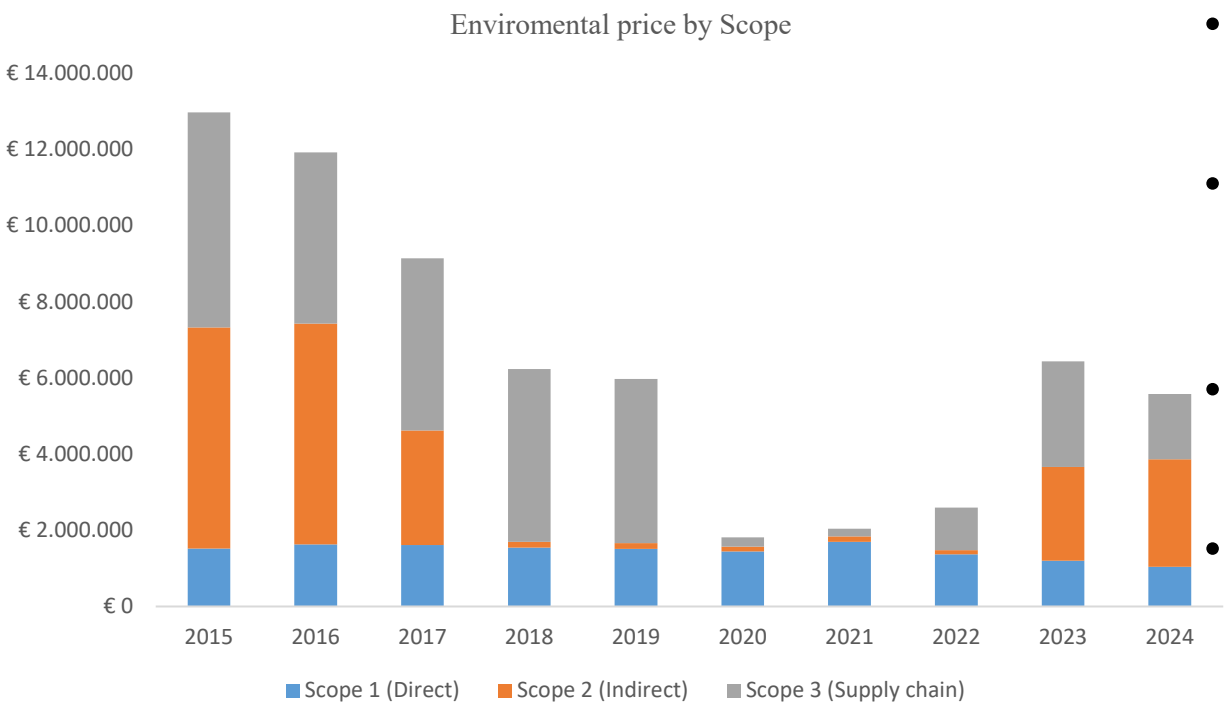
Past Performance - Environmental



- As a non-profit organization, the environmental cost is another important metric that reflects the impact of GO's work.
- Gradual improvement can be observed throughout the years
- Making RUG a much more sustainable place

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Past Performance - Environmental



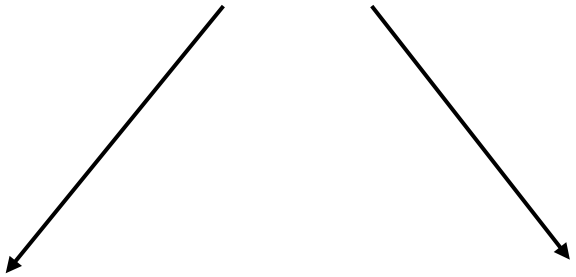
- To clarify the picture – look at scope of emissions
- Direct emissions of the RUG demonstrate gradual decrease with years
- Further demonstrating the value of GO's initiatives
- Alongside RUG's recognition as the 3rd top-ranked institution in the Global Green Metric Ranking

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Future Performance

Future Performance

Two approaches were considered equally important



Project

Compare the added value of the coming from projects

Policy

Compare the added value of the coming from policy

Future Performance

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$$IPV = NPV + b * SV + c * EV > 0 \qquad with\ b, c > 0$$

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Enviromental & Social Value

Enviromental :

$$EV = \sum_{n=0}^{N} \frac{EVF_n}{(1+r)^n}$$

1. NPV rule.
2. Proxy – tons of CO2 eq. emitted
3. All 3 Scopes
4. Shadow price – € 195/tCO2 for damage caused/avoided
5. Diccount factor 2%

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Enviromental & Social Value

Social:

$$SV = \sum_{n=0}^{N} \frac{SVF_n}{(1+r)^n}$$

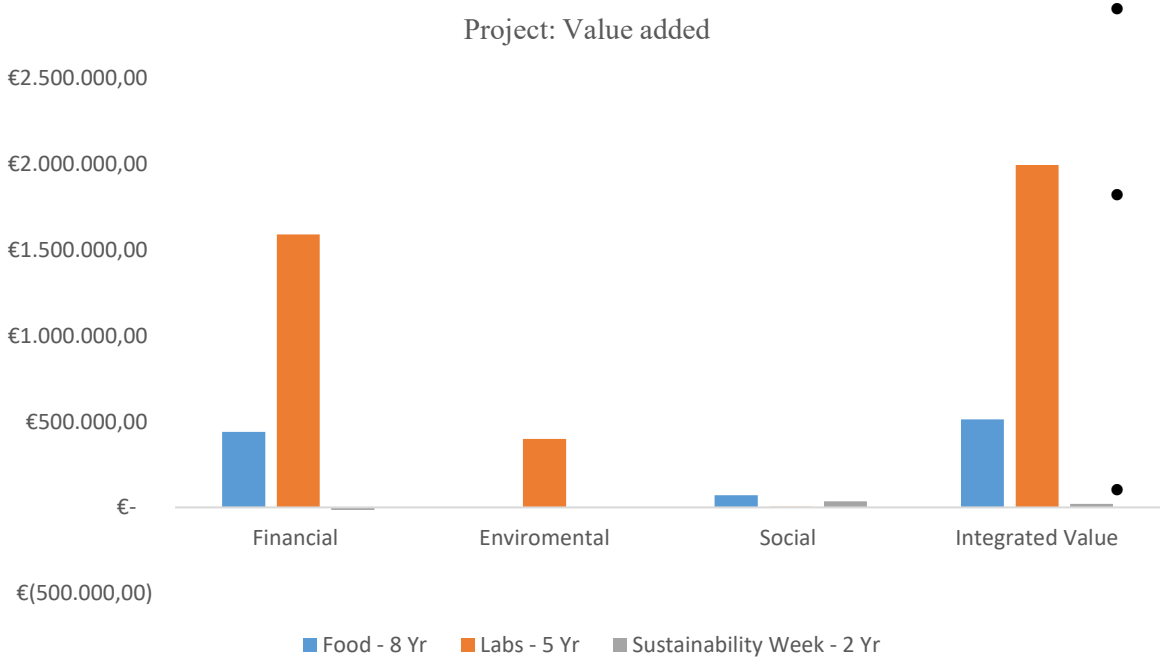
1. NPV rule.
2. Proxy – quality of life years added OR willingness-to-pay (WTP)
3. Focused on Scope 1 & 2
4. Shadow price – EUR 119000/year per quality of life year

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Project Selection

- A new project selection methodology was developed to enhance effectiveness
- It incorporates financial, environmental, and social dimensions
- By evaluating the benefits each project delivers across these areas, the selection process has been strengthened
- This contributes to further improving the overall impact of GO's initiatives

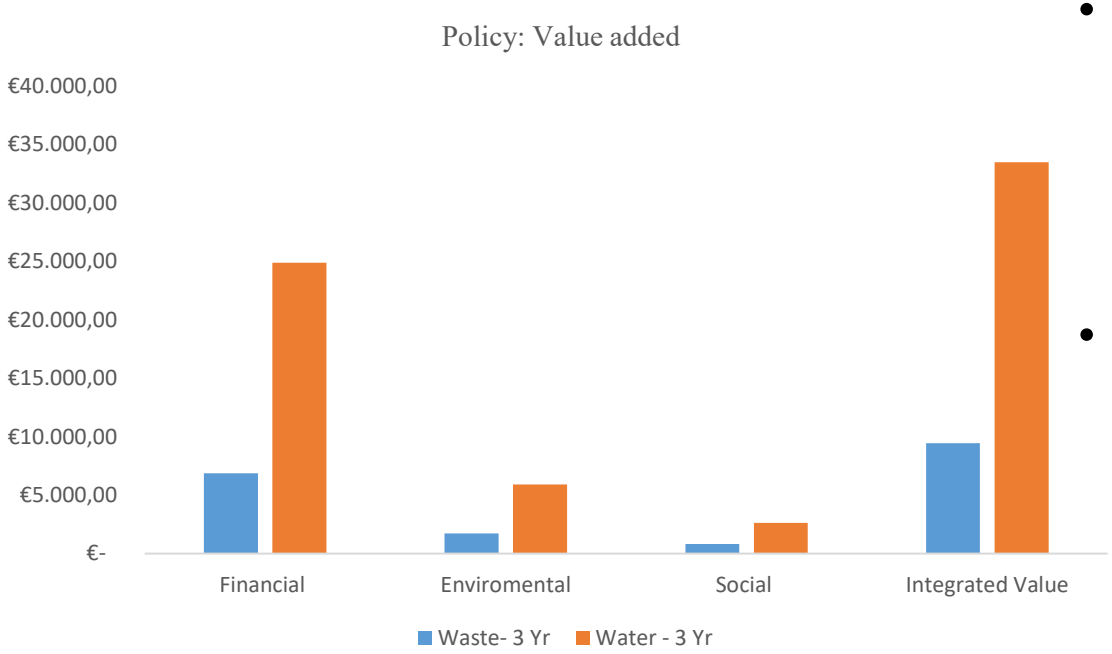
Future Performance - Project



- The project choice is based in the integrated value (IV).
- Alternatively, the investment decision can be based on Social (SV) or Environmental (EV) value.
- The 5-year laboratory project will bring more value at the completion.

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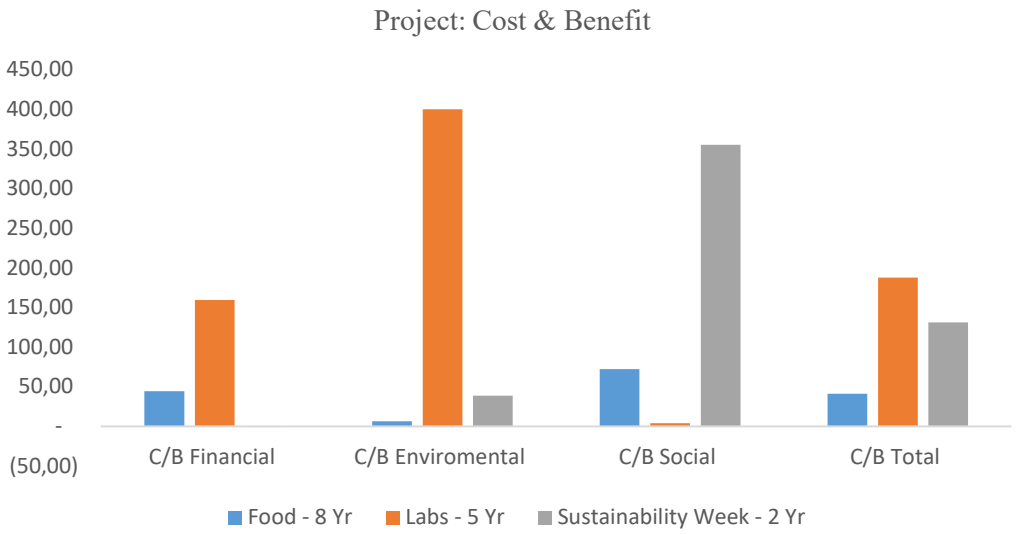
Future Performance - Policy



- The same methodology can be applied to assess the residual benefits of implementing the policy
- It also illustrates the policy's impact across various aspects of RUG's operations and campus life

Cost & Benefit Analysis

- An additional possible metric is the cost and benefit **ratio**.
- If the value is above 1 then the benefits outweigh the cost.
- The project brings more benefits than it costs.



Conclusion

- By integrating the latest advancements in accounting and financial evaluation, we aim to establish a reliable metric for assessing the performance of GO initiatives.
- This approach combines the evaluation of financial aspects along with consideration of the Green Office's mission to create long-term benefits for the environment and society.
- The Integrated Value (IV) decision-making framework provides an easy to apply comparison tool, which clearly indicates how much value the project generates.

Q&A

Any questions?

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Contact Info

In case you have any questions feel free to address them to:

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