



Casais, Gibraltar

**Energy Savings
Opportunity Scheme
(ESOS)**

Progress Update 1



Client:
Casais, Gibraltar

Produced by:

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INTRODUCTION & ESOS PHASE

Company

CASAIS Group is an international construction company, with CASAIS (Gibraltar) Ltd serving as its Gibraltar-based subsidiary. It has expanded globally and has operated in Gibraltar since 2005 where it has a consolidated position in developing construction, civil and engineering projects, and aims to reach the leadership, by being involved in both Government's and private projects.

Their portfolio in this territory counts recognized and emblematic works such as:

- University of Gibraltar.
- University Residences.
- Holiday Inn Express Hotel.
- New Waterport Schools.
- Hassan Centenary Terraces towers.
- Among others.

ESOS

In Phase 3, Progress Update 1 of the Energy Savings Opportunity Scheme (ESOS) (corresponding to the period from 6th December 2024 to 5th December 2025), the organisation assumes responsibility for verifying and reporting that during that period it has implemented the energy-saving measures previously included in the Action Plan.

This review aims to ensure that the auditor's or the company's commitment to reducing energy consumption is not only focused on identifying opportunities, but also on their actual implementation and monitoring during the indicated time window.

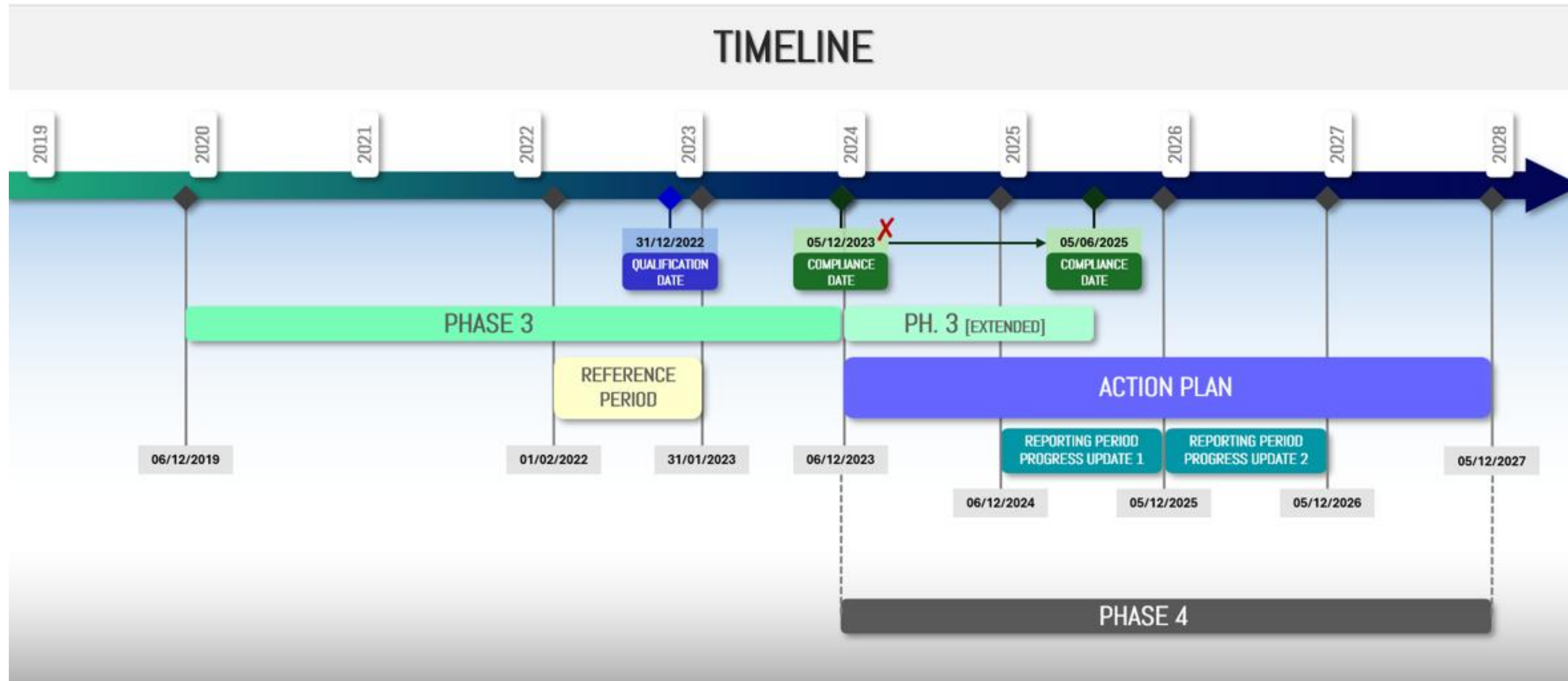


Figure 1: ESOS Timeline (by Sustainabuild)

Actions to be implemented:

1. Building:

B1. Establish a schedule to Increase employee awareness on sustainable practices, ie. Reminders to switch off lights, computers, printers and close doors, establish temperature optimal set points, use natural ventilation etc. *[Not implemented – Reason 1]*

2. Transport

T1. Monitoring system: to track fuel consumption in real-time, identify patterns of inefficient driving, and provide feedback to drivers. *[Not implemented – Reason 1]*

T2. Establish a schedule to increase employee awareness on efficient driving habits. *[Implemented]*

T3. Establish a maintenance schedule for vehicles. *[Implemented]*

T4. Establish a travel schedule planning. *[Implemented]*

3. Other (construction sites)

O1. Establish a schedule to increase employee awareness on efficient use of equipment. *[Not implemented – Reason 1]*

Reasons for Non-Implementation of the measures:

1. Given that the implementation date was **December 2025**, coinciding with the submission date of the present **Progress Update 1**, there is no opportunity to assess the impact of the measure. Therefore, it will be included in the evaluation for the period corresponding to **Progress Update 2** (6th December 2025 to 5th December 2026).

Other considerations:

- The measures previously classified as *'Implemented'*, were implemented prior to the period covered by Progress Update 1 and remains in effect throughout this period. Accordingly, the savings associated with this measure have been calculated based on the consumption data for the corresponding reporting period.
- The source of data used for the saving estimates are actual company fuel bills for Progress Update 1 period (6th December 2024 - 5th December 2025). And comparison with analogue data in reference period (February 2022 - January 2023).
- To calculate the total consumption for the Progress Update 1 period, it was necessary to **extrapolate the data** for the final months, as this document was drafted with a certain lead time prior to submission to allow for review and timely submission.
- For the calculation of energy savings during the Progress Update 1 period, it was necessary to **account for the company's growth in operational workload**, which has a direct impact on fuel consumption due to more frequent and, in some cases, longer travel requirements. To evaluate the impact fairly using a relative metric, energy savings were calculated through the Energy Intensity Ratio (EIR), with the number of active projects serving as the reference unit. Below is presented for each relevant period (i.e. Reference period and Progress Update 1 period): the number of active projects, total consumption, and relative consumption (i.e., Energy Intensity Ratio, EIR):

RP:

Active projects: 4

Total consumption: 776,218.45 kWh

EIR: 194,054.61 kWh/project

PU1:

Active projects: 6

Total consumption: 1,000,958 kWh

EIR: 166,826.33 kWh/project

- For the *'travel schedule planning'* measure, the energy savings have been estimated in comparison with fuel consumed in vehicles used for travels only, because the measure only applies to those vehicles.

Note: All the calculations related to extrapolation, normalization and energy savings for each measure has been detailed in depth in the [Appendix](#).

LEGEND Nomenclature of the parameters and approaches detailed in [Appendix](#).

Parameter nomenclature

R	Extrapolation ratio based in Progress Update duration and available information
D_{PU1}	Duration (in days) of the Progress Update 1 period
D_{AI}	Duration (in days) of the time period for which data is available
E_{AI}	Total energy consumed calculated for the period which data is available
E_{PU1}	Total energy consumed for Progress Update 1 period
E_{RP}	Total energy consumed for Reference Period per project
E_{RP,tr}	Energy consumed per project in travel vehicles calculated for Reference Period
E_{RP,n-tr}	Energy consumed per project in non-travel vehicles calculated for Reference Period
E_{PU1}	Total energy consumed per project after measures calculated for Progress Update 1 period
ES_{PU1}	Total energy savings per project calculated for Progress Update 1 period
p_i	Percentage of the measure's 'i' impact on the associated energy-consumption reduction
ES_{i,j}	Energy savings per project allocated to measure 'i' following the approach 'j'
ES_j	Total energy savings per project estimated for Progress Update 1 period following approach 'j'
E_{wo-i}	Total energy consumed per project after applying all measures except measure 'i'
E_j	Total energy per project consumed after measures, estimated following approach 'j'
ES_{Pk,C}	Energy savings per project allocated to measure 'i', following the approach C, for permutation 'k'

Measure Estimated Savings approaches

A	Isolated Effect
B	Conditional marginal effect
C	Average of sequential attributions

This appendix describes in detail the methodologies used to estimate energy consumption for PU1 through extrapolation and normalization, and to fairly compare it with the Reference Period. It also outlines how energy savings are allocated and verified for each implemented measure:

Extrapolation

Given the impossibility of having complete data for the entire period corresponding to PU1, the data have been extrapolated following the procedure detailed below:

Period	Start day	End day	Duration (in days)
Progress Update 1 [PU1]	06/12/2024	05/12/2025	365
Period with Available Information [AI]	06/12/2024	31/10/2025	330

This information serves as a basis for establishing a ratio with reference to the time that serves as the basis for the extrapolation:

$$R = \frac{D_{PU1}}{D_{AI}} = \frac{365}{330} = 1.106$$

From this figure, in conjunction with the total consumption calculated from the available invoices, the extrapolated total for PU1 can be obtained:

$$E'_{AI} = 904,975.72 \text{ kWh}$$

$$E'_{PU1} = E'_{AI} \cdot R = 1,000,958 \text{ kWh}$$

Normalization

A normalization process is also necessary, since the company's workload has increased between the Reference Period (RP) of ESOS Phase 3 and the period corresponding to Progress Update 1 (PU1). This must be considered by establishing a relative indicator (Energy Intensity Ratio - EIR) that enables a fair comparison between the two periods. The number of active projects is used as the reference unit for this purpose:

Period	Total Energy - E'_i (kWh)	Number of projects	EIR - E_i (kWh/project)
Reference Period [RP]	776,218.45	4	194,054.61
Progress Update 1 [PU1]	1,000,958	6	166,826.33

Energy savings after applying measures

The total energy saved per project can be calculated as:

$$ES_{PU1} = E_{RP} - E_{PU1} = 194,054.61 - 166,826.33 = 27,228.28$$

Together with the estimated values in the Action Plan for the percentage impact of the measures, we can allocate, after a preliminary analysis, the energy savings for each measure, taking into account the following considerations:

1. The measures affect consumption simultaneously, so their percentage impacts cannot be simply added, instead, they operate in a combined manner.
2. The measure T4 only affects the consumption corresponding to the vehicles used for travel purposes.

Accordingly, the data corresponding to the total consumption and fractions of total consumption attributable to vehicles used for travel purposes and to vehicles used for non-travel purposes for the Reference Period should be presented (also normalized by projects to maintain the integrity of the results), since they serve as the basis for the subsequent verification and calculation of energy savings:

$$E_{RP} = E_{RP,tr} + E_{RP,n-tr}$$

$$E_{RP} = 194,054.61$$

$$E_{RP,tr} = 123,980.28$$

$$E_{RP,n-tr} = 70,074.33$$

The final percentages for each measure (T2, T3 and T4) are as follows:

$$p_{T2} = 5\% \mid p_{T3} = 5\% \mid p_{T4} = 7.425\%$$

This can be verified through the following procedure, which takes into account the portion of total energy that is actually affected by each measure:

$$ES_{PU1} = E_{RP,n-tr} \cdot (1 - p_{T2}) \cdot (1 - p_{T3}) + E_{RP,tr} \cdot (1 - p_{T2}) \cdot (1 - p_{T3}) \cdot (1 - p_{T4})$$

$$ES_{PU1} = 70,074.33 \cdot (1 - 0.05) \cdot (1 - 0.05) + 123,980.28 \cdot (1 - 0.05) \cdot (1 - 0.05) \cdot (1 - 0.07425)$$

$$ES_{PU1} = 27,228.28$$

Energy savings for each measure

To calculate the contribution of each measure separately, several approaches can be used, of which the most accurate is the one ultimately applied. These are detailed below:

A. Isolated effect

The energy savings of each measure are calculated independently:

$$ES_{T2,A} = E_{RP} \cdot p_{T2} = 194,054.61 \cdot 0.05 = 9,702.73 \text{ kWh/project}$$

$$ES_{T3,A} = E_{RP} \cdot p_{T3} = 194,054.61 \cdot 0.05 = 9,702.73 \text{ kWh/project}$$

$$ES_{T4,A} = E_{RP,tr} \cdot p_{T4} = 123,980.28 \cdot 0.07425 = 9,205.49 \text{ kWh/project}$$

If we sum the isolated contributions, the result does not match the total reduction (ES_{PU1}) previously calculated:

$$ES_A = ES_{T2,A} + ES_{T3,A} + ES_{T4,A} = 28,610.95 \text{ kWh/project} > ES_{PU1} = 27,228.28 \text{ kWh/project}$$

This occurs because effects that overlap when the measures are implemented simultaneously are being added together. Consequently, additive aggregation leads to double counting, whereas the actual system behaves multiplicatively.

B. Conditional marginal effect

This approach calculates the difference between the scenario with all measures applied and the scenario excluding the measure under evaluation. This yields the true marginal contribution of each measure.

$$E_{wo-T2} = E_{RP,n-tr} \cdot (1 - p_{T3}) + E_{RP,tr} \cdot (1 - p_{T3}) \cdot (1 - p_{T4}) = 70,074.33 \cdot 0.95 + 123,980.28 \cdot 0.95 \cdot 0.92575$$

$$E_{wo-T2} = 175,606.66 \text{ kWh/project}$$

$$ES_{T2,B} = E_{wo-T2} - E_{PU1} = 175,606.66 - 166,826.33 = 8,780.33 \text{ kWh/project}$$

$$E_{wo-T3} = E_{RP,n-tr} \cdot (1 - p_{T2}) + E_{RP,tr} \cdot (1 - p_{T2}) \cdot (1 - p_{T4}) = 70,074.33 \cdot 0.95 + 123,980.28 \cdot 0.95 \cdot 0.92575$$

$$E_{wo-T3} = 175,606.66 \text{ kWh/project}$$

$$ES_{T3,B} = E_{wo-T3} - E_{PU1} = 175,606.66 - 166,826.33 = 8,780.33 \text{ kWh/project}$$

$$E_{wo-T4} = E_{RP,n-tr} \cdot (1 - p_{T2}) + (1 - p_{T3}) + E_{RP,tr} \cdot (1 - p_{T2}) \cdot (1 - p_{T3}) = 70,074.33 \cdot 0.95^2 + 123,980.28 \cdot 0.95^2$$

$$E_{wo-T4} = 175,134.29 \text{ kWh/project}$$

$$ES_{T4,B} = E_{wo-T4} - E_{PU1} = 175,134.29 - 166,826.33 = 8,307.95 \text{ kWh/project}$$

However, summing the marginal contributions also does not reproduce the total reduction (ES_{PU1}) previously calculated:

$$ES_B = ES_{T2,B} + ES_{T3,B} + ES_{T4,B} = 25,868.62 \text{ kWh/project} < ES_{PU1} = 27,228.28 \text{ kWh/project}$$

This is because the marginal contribution of each measure inherently includes the impact of the other two measures; therefore, the three marginal contributions are not mutually complementary.

C. Average of sequential attributions

In this approach, the measures are applied in a specific order and the savings achieved at each step are recorded. Since there are three measures that occur simultaneously, and since the order of application affects the outcome, because the calculation baseline changes at each step, the most appropriate method to model the simultaneity of the measures is to apply the 'Shapley value' methodology. This consists of performing the calculation for all six possible permutations and computing, for each measure, the average of its sequential contributions.

Permutations	$ES_{Pk,T2}$	$ES_{Pk,T3}$	$ES_{Pk,T4}$	ES_C
P1 [T2 -> T3 -> T4]	9702.73	9217.59	8307.96	27228.28
P2 [T2 -> T4 -> T3]	9702.73	8780.33	8745.22	27228.28
P3 [T3 -> T2 -> T4]	9217.59	9702.73	8307.96	27228.28
P4 [T3 -> T4 -> T2]	8780.33	9702.73	8745.22	27228.28
P5 [T4 -> T2 -> T3]	9242.46	8780.33	9205.49	27228.28
P6 [T4 -> T3 -> T2]	8780.33	9242.46	9205.49	27228.28
Average - $ES_{i,c}$	9237.70	9237.70	8752.89	27228.28

With this method, the sum of the averaged contributions does match the total reduction (ES_{PU1}) previously calculated.

$$ES_C = ES_{T2,c} + ES_{T3,c} + ES_{T4,c} = 27,228.28 \text{ kWh/project} = ES_{PU1} = 27,228.28 \text{ kWh/project}$$



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ESOS Phase 3 - Progress Update 1 (6th December 2024 - 5th December 2025)

Project Name

CASAIS

Project Number

S0001

PROGRESS UPDATE 1

INCLUDE/EXCLUDE	CATEGORY	Actions to be implemented to reduce energy consumption, by organisational purpose ¹	Intended date to implement	Implemented / Not Implemented		Additional Information	Official Implementation Date	Estimated Total Energy Savings (over reporting period) [kWh/project]	Optional: % savings against baseline	Source of data used for estimated savings	Additional Comments	
☑	INCLUDED	BUILDING	Establish a schedule to increase employee awareness on sustainable practices , i.e. Reminders to switch off lights, computers, printers and close doors, establish temperature optimal set points, use natural ventilation etc.	Dec-25	<input type="checkbox"/>	NOT IMPLEMENTED	Given that the implementation date was December 2025, coinciding with the submission date of the present Progress Update 1 , there is no opportunity to assess the impact of the measure. Therefore, it will be included in the evaluation for the period corresponding to Progress Update 2 (6 th December 2025 to 5 th December 2026).	N/A	N/A	N/A	N/A	N/A
☑	INCLUDED	OTHER	Establish a schedule to increase employee awareness on efficient use of equipment	Dec-25	<input type="checkbox"/>	NOT IMPLEMENTED	Given that the implementation date was December 2025, coinciding with the submission date of the present Progress Update 1 , there is no opportunity to assess the impact of the measure. Therefore, it will be included in the evaluation for the period corresponding to Progress Update 2 (6 th December 2025 to 5 th December 2026).	N/A	N/A	N/A	N/A	N/A
☑	INCLUDED	TRANSPORT	Monitoring system: to track fuel consumption in real-time, identify patterns of inefficient driving, and provide feedback to drivers	Dec-25	<input type="checkbox"/>	NOT IMPLEMENTED	Given that the implementation date was December 2025, coinciding with the submission date of the present Progress Update 1 , there is no opportunity to assess the impact of the measure. Therefore, it will be included in the evaluation for the period corresponding to Progress Update 2 (6 th December 2025 to 5 th December 2026).	N/A	N/A	N/A	N/A	N/A
☑	INCLUDED	TRANSPORT	Establish a schedule to increase employee awareness on efficient driving habits .	We are already doing it	<input checked="" type="checkbox"/>	IMPLEMENTED	This measure was implemented prior to the period covered by Progress Update 1 and remains in effect throughout this period. Accordingly, the savings associated with this measure have been calculated based on the consumption data for the corresponding reporting period.	Apr-25	9,237.70 kWh/project	5.000%	Actual company fuel bills for Progress Update 1 period (6 th December 2024 - 5 th December 2025). And comparison with analogue data in reference period (February 2022 - January 2023). Note: To calculate the total consumption for the above mentioned period, it was necessary to extrapolate the data for the final months, as this document was drafted with a certain lead time prior to submission to allow for review and timely delivery.	For the calculation of energy savings during the Progress Update 1 period, it was necessary to account for the company's growth in operational workload, which has a direct impact on fuel consumption due to more frequent and, in some cases, longer travel requirements. To evaluate the impact fairly using a relative metric, energy savings were calculated through the Energy Intensity Ratio (EIR), with the number of active projects serving as the reference unit. Below is presented for each relevant period (i.e. Reference period and Progress Update 1 period): the number of active projects, total consumption, and relative consumption (i.e., Energy Intensity Ratio, EIR): RP: Active projects: 4 Total consumption: 776,218.45 kWh EIR: 194,054.61 kWh/project FU1: Active projects: 6 Total consumption: 1,000,958 kWh EIR: 166,826.33 kWh/project Note: Please see detailed calculations in Appendix.
☑	INCLUDED	TRANSPORT	Stablish a maintenance schedule for vehicles	We are already doing it	<input checked="" type="checkbox"/>	IMPLEMENTED	This measure was implemented prior to the period covered by Progress Update 1 and remains in effect throughout this period. Accordingly, the savings associated with this measure have been calculated based on the consumption data for the corresponding reporting period.	Apr-25	9,237.70 kWh/project	5.000%	Actual company fuel bills for Progress Update 1 period (6 th December 2024 - 5 th December 2025). And comparison with analogue data in reference period (February 2022 - January 2023). Note: To calculate the total consumption for the above mentioned period, it was necessary to extrapolate the data for the final months, as this document was drafted with a certain lead time prior to submission to allow for review and timely delivery.	For the calculation of energy savings during the Progress Update 1 period, it was necessary to account for the company's growth in operational workload, which has a direct impact on fuel consumption due to more frequent and, in some cases, longer travel requirements. To evaluate the impact fairly using a relative metric, energy savings were calculated through the Energy Intensity Ratio (EIR), with the number of active projects serving as the reference unit. Below is presented for each relevant period (i.e. Reference period and Progress Update 1 period): the number of active projects, total consumption, and relative consumption (i.e., Energy Intensity Ratio, EIR): RP: Active projects: 4 Total consumption: 776,218.45 kWh EIR: 194,054.61 kWh/project FU1: Active projects: 6 Total consumption: 1,000,958 kWh EIR: 166,826.33 kWh/project Note: Please see detailed calculations in Appendix.
☑	INCLUDED	TRANSPORT	Establish a travel schedule planning	We are already doing it	<input checked="" type="checkbox"/>	IMPLEMENTED	This measure was implemented prior to the period covered by Progress Update 1 and remains in effect throughout this period. Accordingly, the savings associated with this measure have been calculated based on the consumption data for the corresponding reporting period.	Apr-25	8,752.89 kWh/project	7.425%	Actual company fuel bills for Progress Update 1 period (6 th December 2024 - 5 th December 2025). And comparison with analogue data in reference period (February 2022 - January 2023). Note: To calculate the total consumption for the above mentioned period, it was necessary to extrapolate the data for the final months, as this document was drafted with a certain lead time prior to submission to allow for review and timely delivery. Note: for this measure, the energy savings have been estimated in comparison with fuel consumed in vehicles used for travels only, because the measure only applies to those vehicles.	For the calculation of energy savings during the Progress Update 1 period, it was necessary to account for the company's growth in operational workload, which has a direct impact on fuel consumption due to more frequent and, in some cases, longer travel requirements. To evaluate the impact fairly using a relative metric, energy savings were calculated through the Energy Intensity Ratio (EIR), with the number of active projects serving as the reference unit. Below is presented for each relevant period (i.e. Reference period and Progress Update 1 period): the number of active projects, total consumption, and relative consumption (i.e., Energy Intensity Ratio, EIR): RP: Active projects: 4 Total consumption: 776,218.45 kWh EIR: 194,054.61 kWh/project FU1: Active projects: 6 Total consumption: 1,000,958 kWh EIR: 166,826.33 kWh/project Note: Please see detailed calculations in Appendix.
Combined Total								27,228.29 kWh/project	-	-	-	-