HOW-TO GUIDE

Impact Estimates for High-Performing Appliances

Using the Standardised Impact Metrics for High-Performing Fans and TVs Appliances to produce impact estimates

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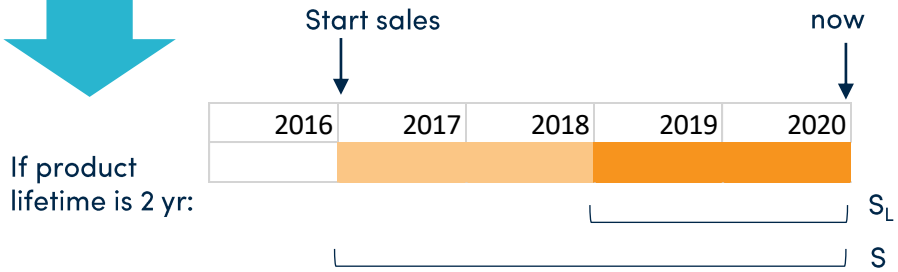
Information you will need to use the metrics

- Number of products sold, by product type, in the time period you wish to calculate
- Product warranty period

- In some cases, it makes sense to count all products ever sold: **S**, while in others the estimated number of currently operating systems: $\mathbf{S_L}$ (i.e., within the lifetime of the product)



To keep in mind:
Results calculated using these metrics should be described as estimates

These metrics apply to high-performing appliances.
Eligibility Criteria:
Warranty period of min 1 year
Availability of user manual

Specific metrics or coefficients apply to specific appliances

The metrics apply to high-performing appliances sold in off- and weak-grid environments in a developing country context.

Metrics should not be used when it is clear that specific products and services do not have the estimated impact.

Calculating Impact Estimates – Formula Selection

1. Pick which impact area you want to calculate an estimate for

2. Check if a calculation is possible for your appliance type

3. Use the formula

Impact Metrics – Overview of Formulas

Metric		Appliance Type	Formula
1. Appliance Access/Household Access			
1a	Number of people benefitting from high performing appliances, cumulatively	Fan TV	$S \times (1 - D_{R\text{-}Access}) \times (1 - D_L) \times H$
1b	Number of people benefitting from high performing appliances, currently	Fan TV	$S_L \times (1 - D_{R\text{-}Access}) \times (1 - D_L) \times H$

Calculating Impact Estimates – Coefficient Selection

4. Look up which variables appear in the selected formula

5. Select the value that corresponds with your appliance type

Impact Metrics – Overview of Variables

Variables (standard value)		Fan	TV
$D_{R\text{-}Access}$	Discount for repeat sales for estimating new access impact	5%	16%
$D_{R\text{-}GHG}$	Ratio capturing sales replacing a diesel genset powered appliance for estimating GHG emissions	3%	6%
D_L	Discount for loss: products not working or not in use, excluding loss in supply chain	3%	7%
H	Household Size	5.5	5.5
E	The percentage of customers using products to support enterprise (including those that have opened a new business)	3%	9%
IG	Percentage of customers/households creating additional income		4%
G	Average amount of greenhouse gases avoided per appliance, in kg CO_2e/year,[5] due to	84	59

Calculating Impact Estimates – Coefficient Selection

Note: The pink variables that do not have a value are values that companies need to input from their own data: number of sales, and the estimated product life span!

Impact Metrics – Overview of Variables

Variables (input by user)		Fan	TV
S	Number of units sold (cumulative i.e. ever)		
S_L	Number of units sold which are estimated to currently be in use (based on the products estimated lifespan being [1.5 x warranty] period)		
P_L	Estimated product lifespan (1.5 x warranty)		

Estimated product lifespan is calculated as [1.5 x warranty]

Calculating Impact Estimates – Example

COMPANY INPUTS:

- Calculate for 2000 Fans being sold
- Warranty period of the fans: 2 years

Coefficient	Value
$D_{R\text{-}GHG}$	3%
D_L	3%
G	84

P_L = 2yr x 1.5

3. Environmental Sustainability

3a	Metric tons of CO_2e emissions avoided, from diesel displacement	Fan TV	$S \times D_{R\text{-}GHG} \times (1 - D_L) \times G \times P_L$

2000 x 3% x (1 – 3%) x 84 x 3.5

= 17.111 kg CO_2e = **17.1 metric tons of CO_2e**

Reporting Impact Estimates – Example

"The 2000 fan units have helped to avert an estimated 17.1 metric tons of CO_2e (not including embodied emissions)* due to estimated reduction in diesel generator emissions"

** CO_2-equivalent (CO_2e) emissions include the Kyoto gases carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), but exclude fluorinated gases. CO_2e emissions are calculated based on 100-year Global Warming Potential (GWP100) values from the IPCC Second Assessment Report*

3. Environmental Sustainability

Metric	3a. Metric tons of CO_2e emissions avoided from diesel displacement
Unit of measurement	Metric tons of carbon dioxide equivalent (CO_2e).[5]
Definition	Metric tons of CO_2e averted due to estimated reduction in diesel generator emissions of CO_2, CH_4 and N_2O, per off-grid high performing appliance; over expected lifetime of the product
Usefulness of metric	Enables us to highlight the estimated environmental benefits of (off-grid) energy efficient appliances by capturing the immediate effects of reductions in several major climate altering greenhouse gases including carbon dioxide. Reductions are seen due to the replacement of appliances previously used that were powered by diesel generation sets.
Impact Statement	The high performing *[insert type of]* appliances industry has helped to avert an estimated X metric tons of CO_2e (not including embodied emissions)
Calculation	$S \times D_{R\text{-}GHG} \times (1 - D_L) \times G \times P_L$ Number of products sold (S) x ratio capturing number of sales replacing a diesel genset powered appliance ($D_{R\text{-}GHG}$) x discount for loss (D_L) x annual CO_2e emissions avoided (G) x estimated lifespan of appliance product (P_L) Conversion: 1 metric tons = 1000 kg
Assumptions	• That appliances and energy sources replaced (e.g. appliances powered by diesel generation sets) were functioning and commonly used at an average estimated rate
Notes	• Use of the following standardized footnote is strongly recommended when calculating and reporting CO_2e emissions avoided: *CO_2-equivalent (CO_2e) emissions include the Kyoto gases carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), but exclude fluorinated gases. CO_2e emissions are calculated based on 100-year Global Warming Potential (GWP_{100}) values from the IPCC Second Assessment Report* • Applies where newly purchased high performing appliances are solar-powered and are replacing previously used appliances that were powered by a diesel generator • Does not include embodied energy from manufacturing and transporting products

Final Notes...

- Always check the detailed guidelines for the metrics for definition, assumptions made, impact statement and notes
- Always check the detailed section for the default variables for definition, justification, limitations and sources
- Defaults should be used where appropriate, unless companies or other users have more accurate and specific inputs from their own robust and reviewed research.

https://www.gogla.org/impact/gogla-impact-metrics

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