

ODYSSEE SCOREBOARD METHODOLOGY

The scoring methodology is based on the OECD Composite Indicator methodology¹. This method allows the countries to be compared in a relevant range where minimum and maximum values indicators define the best and worst scores and countries are ranked between these two extrema. The indicators are calculated and normalized so that they range between 0 and 1 following this formula:

$$\text{Normalized score} = \frac{\text{Indicator} - \text{Min indicator}}{(\text{Max indicator} - \text{Min indicator}) * \text{direction}} + 0.5 * (1 - \text{direction})$$

Indicator: The indicator value of the country.

Min indicator: The minimum indicator value across all countries.

Max indicator: The maximum indicator value across all countries.

Direction: The favored direction in the level of indicator; -1 if the decline is favored, 1 if the incline is favored.

The main characteristics of the scoring methodology are as follows:

- Scoring is done separately for four sectors (households, transport, industry and services) and for all sectors together.
 - The score by sector is based on scores calculated for selected indicators representative of end-uses in buildings or modes in transport. For industry the score is directly based on an aggregate indicator that already accounts for the energy efficiency characteristics of the various industrial branches. For each indicator, three scores are calculated:
 - The first score S_1 , based on the present **level of the indicator**, is calculated as a moving **average of the last three years indicator values** to smoothen yearly variations.
 - The second score S_2 is based on the **trend** indicator since 2000 (variation 2000-2015).
 - The third score is derived from the two first, by equally weighting the level and trend scores: $\frac{S_1+S_2}{2}$
- The **score by sector** is calculated as a weighted score of each indicator. The weights correspond to the average shares over the last 3 years of each end-use or transport mode in the sector consumption.
- The global score results from the sectoral scores weighted by the share of each sector in the total final energy consumption³.
 - The global and sectoral scores are finally **normalized to 1**, with 1 corresponding to the highest score value⁴.
 - For the global score, as well as for the sectoral scores, three scoreboards are proposed:
 - the “level and trend” scoreboard,
 - the “level” scoreboard based on the level indicators,
 - the “trend” scoreboard based on the trend indicators.

¹ <https://www.oecd.org/sdd/42495745.pdf>

³ The consumption share by sector is based on the average share over the last 3 years.

⁴ This normalisation has been added to make the indicators scores consistent with the policy scores in the composite score.

The list of indicators by sector is given below.

Households

End-use	Indicator	Weighting factor
Heating	Consumption for heating per m ² scaled to EU climate and equivalent to central heating	Share of heating in total households consumption
Other thermal uses	Consumption per dwelling for cooking and water heating	Share of cooking + ½ of water heating in total households consumption ⁵
Appliances	Specific consumption of electricity per dwelling for appliances (including AC) and lighting	Share of appliances (incl. AC) & lighting in households consumption
Solar penetration	% of dwellings with solar water heater	½ share of water heating in households consumption

Transport

Modes	Indicator	Weighting factor
Cars	Specific consumption (l/100km)	Share of cars in total transport consumption
Trucks and light vehicles	Specific consumption (goe/tkm)	Share of trucks and light vehicles in total transport consumption
Air	Specific consumption (koe/pass)	Share of air in total transport consumption
Modal split: -Passengers	% of traffic by public mode	Share of buses and rail passengers in total transport consumption
-Goods	% of traffic by rail and water	Share of water and rail freight consumption in total transport

Services

End-use	Indicator	Weighting factor
Thermal end-uses	Thermal end-uses consumption ⁶ per employee scaled to EU climate	Share of thermal end-uses in total services
Electricity	Specific consumption of electricity per employee (including AC and excluding thermal uses ⁷)	Share of specific electricity consumption in total services

Industry

Category	Indicator
Indicator of trend	ODEX (energy efficiency index)
Indicator of level	Adjusted energy intensity at EU industry structure ⁸

⁵ Two indicators are related to water heating: the other thermal end-uses and the solar penetration. In order to have consistent weights (totalling 100%), we apply an equal weight between the two indicators equal to half of the share of water heating in total households consumption.

⁶ For countries for which the data by end-use are not available, the total fuel consumption is taken.

⁷ For countries for which data by end-use are not available, the total electricity consumption is taken.

⁸ The energy intensity of industry at EU structure represents a fictitious value of the industrial intensity calculated by taking for each industrial branch the actual sectoral intensity of the country and the EU industrial structure (i.e. the share of each branch in the value added of industry). For Finland and Sweden, as pulp & paper represents around half of the total industrial consumption, the adjusted indicator is based on physical quantities instead of value added for pulp & paper (production of paper and pulp) and on VA for the other branches.

Example of calculation of the scores in transport (fictive example with Austria)

First, for each indicator we calculated the scores normalized between 0 and 1. For instance, for the indicator of level of the specific consumption of cars:

Specific consumption of cars (l/100km)

aut	7.1
bel	7.3
bgr	7.8
cro	6.9
cyp	8.9
dnk	7.7
eso	7.8
esp	7.0
fin	6.7
fra	6.5
gbr	5.9
grc	6.7

Max indicator : 8.9

Min indicator : 5.9

Direction = -1 (decline in the indicator is favored)

Austria = 7.1

Normalized score calculation for Austria :

$$\frac{7.1 - 5.9}{(8.9 - 5.9) * (-1)} + 0.5 * (1 - (-1)) = 0.61$$

Then we applied the weights to the indicator scores to obtain the total score:

Austria (fictive example)	Cars	Trucks and light vehicles	Air	Public transport passengers	Rail and fluvial goods
Level scores normalized	0.61	0.96	0.96	0.68	0.53
Weights (share of each mode in transport consumption)	58%	25%	11%	4%	3%

Transport **level score** for Austria: $0.61 * 58\% + 0.96 * 25\% + 0.96 * 11\% + 0.68 * 4\% + 0.53 * 3\% = 0.74$

Then the score is normalized to 1 so as to give 1 to the highest value: if the highest value is 0.84 and the lowest 0.28, the transport **normalized level score** for Austria will be: $(1 - 0.28) * \frac{(0.74 - 0.28)}{(0.84 - 0.28)} + 0.28 = 0.87$.

The same is done for the calculation of the trend score.

For the **global score** (level and trend combined), an equal weight is applied between the level and the trend scores. If we assume a normalized trend score of 0.59, it would be: $0.87 * 50\% + 0.59 * 50\% = 0.61$. This score is also normalized so as to give 1 to the highest.