ENVIRONMENTAL PRODUCT INFORMATION

RENAULT TRUCKS E-TECH T 4X2

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ENVIRONMENTAL PRODUCT INFORMATION

Environmental product information is drawn from life cycle analyses (LCAs) carried out on our vehicles. These cover all phases in a truck's life, from the production of raw materials right through to final dismantling and recycling. It provides data concerning the environmental impact of each one of these phases. In some cases, the LCA, which is far-reaching and complex, includes approximations. The results reveal the most important environmental parameters in the product life cycle.

THE THEMES

The environmental product information studies the impact of:

- **materials:** extraction and processing of raw materials used to produce the vehicle.
- **production:** manufacturing processes used by the plants, component production at suppliers and on site transport of parts.
- **use phase:** production and consumption of electric energy. Homologation trials carried out for each type of engine as well as on-road tests make it possible to ascertain the effects of energy consumption. Depending on the conditions of use, a truck's actual energy consumption can differ from the published results.
- **maintenance:** consumables and materials used in preventive maintenance and the production of parts (impact calculated on the basis of average values).
- **end of life management:** dismantling of products, management of waste and recycling the truck's materials.

THE RESULTS

The results shown include:

- the vehicle's bill of materials
- the rates of recyclability and recoverability as defined by the ISO 22628 standard
- the inventory results which show the data for the resources used and the emissions produced (pollution and waste).
- the assessment of the potential contribution to global warming. al.

BENCHMARK VALUES

Life cycle analysis results vary considerably depending on the data used for the calculations, the most important being country and energy source, energy consumption an mileage. The results shown here are based on the benchmark values for a **Renault Trucks E-Tech T**, **a 4x2 tractor** designed for regional distribution, throughout its entire life cycle.

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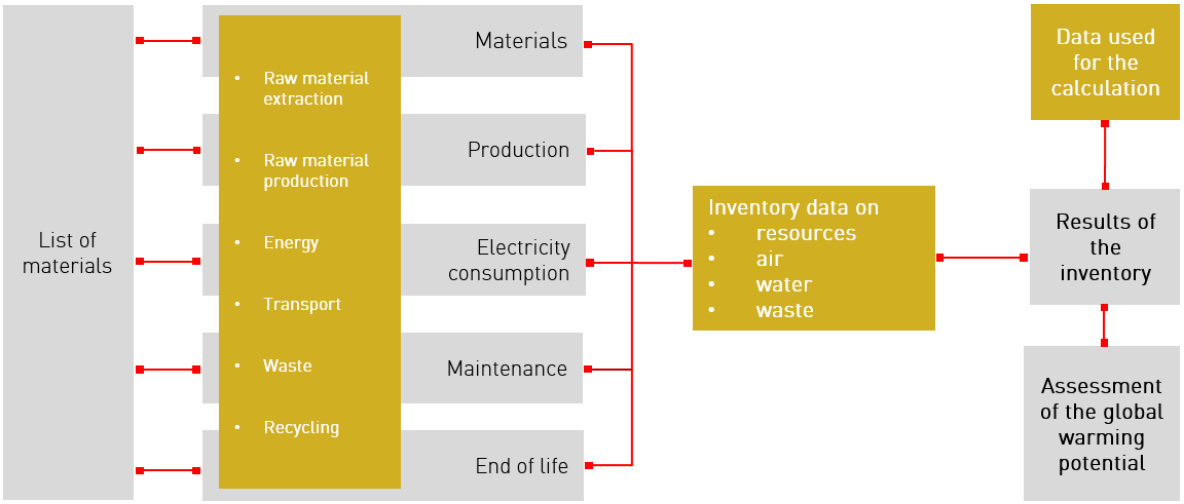
METHOD



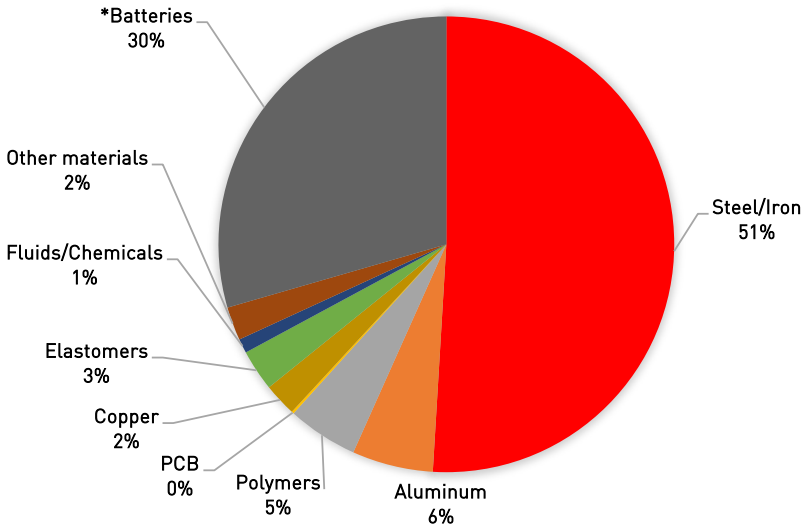
DATA USED FOR THE CALCULATION

Vehicle model	Power	Number of batteries	Vehicle type	Distance (km)
Renault Trucks E-Tech T	490 kW	6x90 kWh	Tractor 4x2	700 000

Bill of materials

Bill of materials used in the vehicle and taken into account for calculating the life cycle analyses.

Materials	kg
Iron/Steel	5185
Aluminum	585
Polymers	509
PCB	17
Copper	238
Elastomers	298
Fluids, chemicals	103
Other materials	242
*Batteries	3000
TOTAL	**10177**



* Li-ion NCA

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Rate of recyclability and recoverability

The vehicles are designed to ensure that the maximum amount of materials used in their construction can be reused.

Rate of recyclability* 92,5%
Rate of recovearbility* 97,6%

* Calculations according to the ISO 22628 standard: The rate of recoverability is the percentage of the vehicle's mass potentially able to be reused, recycled or recovered as energy (incineration with energy recovery); it is therefore always higher than the rate of recyclability.

Inventory results

	Unit	Materials	Production	Use phase	Maintenance	End of life	Total
Electricity - renewable*	MWh	11,46	5,85	According to country and primary energy source	4,08	-0,44	1258
Electricity - non-renewable*	MWh	0,05	3,02		1,566	-0,16	5
Other renewable energy*	MWh	0,003	0		0	0,0036	0
Other non-renewable energy*	MWh	95,7	201,1		16,8	-23,3	10378
Materials	kg	10179	0		927	-6015	5091
CO*	kg	96,2	19,1		1,8	-51,9	77
CO_2*	kg	22913	634		2893	-6490	26138
HC/VOC*	kg	60,3	6,9		8,7	-18,8	60
NOx*	kg	52,1	4		6,8	-12,97	54
SO_2*	kg	59,2	2,4		4,6	-14,7	55
Particulates*	kg	16,83	0,67		1,25	-6,19	16
Biological oxygen demand*	kg	0,73	0,13		0,17	0,04	1
Chemical oxygen demand*	kg	12,22	2,81		1,57	-0,07	18
CO_2-eq*	kg	25511	5077		4542	-7150	34258
CO_2-eq	kg	**56766**	**5077**		**4542**	**-16630**	**56034**
Use of water (excluding cooling)	m^3		8,66				
Use of water for cooling	m^3		2,17				
Non-hazardous waste treated	kg		339,16				
Non-hazardous waste to landfill	kg		10,21				
Hazardous waste treated	kg		193,54				
Hazardous waste to landfill	kg		4,7				

*Batteries excluded

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Inventory results

By country

	Unit	BE	CH	SP	FR	GB	IT	LU	NL	NO	SW	DE	EU28
Electricity - renewable	MWh	648	1086	1123	456	1052	1298	1184	592	1320	1023	1263	932
Electricity - non renewable	MWh	1226	929	717	1932	679	167	592	144	30	1079	391	758
Other renewable energy	MWh	0	0	0	0	0	0	0	0	0	0	0	0
Other non-renewable energy	MWh	771	495	1389	356	1230	1666	1297	1814	62	70	1545	1264
Materials	kg												
CO	kg	146	121	270	76	379	302	271	174	20	198	317	313
CO_2	kg	201579	177361	386677	97911	297629	413208	433701	487705	31695	40882	524052	382625
HC/VOC	kg	350	282	963	204	742	1382	670	960	24	57	792	762
NOx	kg	236	207	640	160	427	419	469	445	17	85	554	464
SO_2	kg	62	95	478	90	201	185	205	116	7	43	244	364
Particulates	kg	18	22	55	16	29	35	51	51	5	19	62	51
Biological oxygen deman	kg	0	0	0	0	0	1	0	0	0	0	0	0
Chemical oxygen demand	kg	111	171	507	68	53	275	514	525	5	7	650	420
CO_2 eq.	kg	**210945**	**185055**	**414341**	**103186**	**312196**	**447280**	**451989**	**514041**	**32364**	**42718**	**545922**	**402819**

By primary energy source

	Unit	Hard coal	Brown coal/ Lignite	Natural gas	Hydro power	Nuclear power	Wind power	PV solar cells	Solar thermal	Biomass
Electricity - renewable	MWh	13	23	7	1237	1	2579	6186	9185	2735
Electricity - non-renewable	MWh	9	13	2	0	2957	2	27	28	5
Other renewable energy	MWh	0	0	0	0	0	0	0	0	0
Other non-renewable energy	MWh	2807	2915	2312	7	24	31	187	144	99
Materials	kg									
CO	kg	187	795	185	12	6	31	77	93	2925
CO_2	kg	952154	1141468	458678	6189	4432	8733	54340	42010	23923
HC/VOC	kg	2386	532	924	3	14	16	192	86	246
NOx	kg	1313	929	326	4	19	12	94	79	874
SO_2	kg	836	964	38	3	19	12	120	47	432
Particulates	kg	152	159	10	3	6	4	19	10	81
Biological oxygen demand	kg	0	0	1	0	0	0	1	0	0
Chemical oxygen demand	kg	1833	1743	10	1	1	4	39	23	563
CO_2 eq.	kg	**1022271**	**1162227**	**483338**	**6279**	**4767**	**9172**	**58450**	**45911**	**32893**

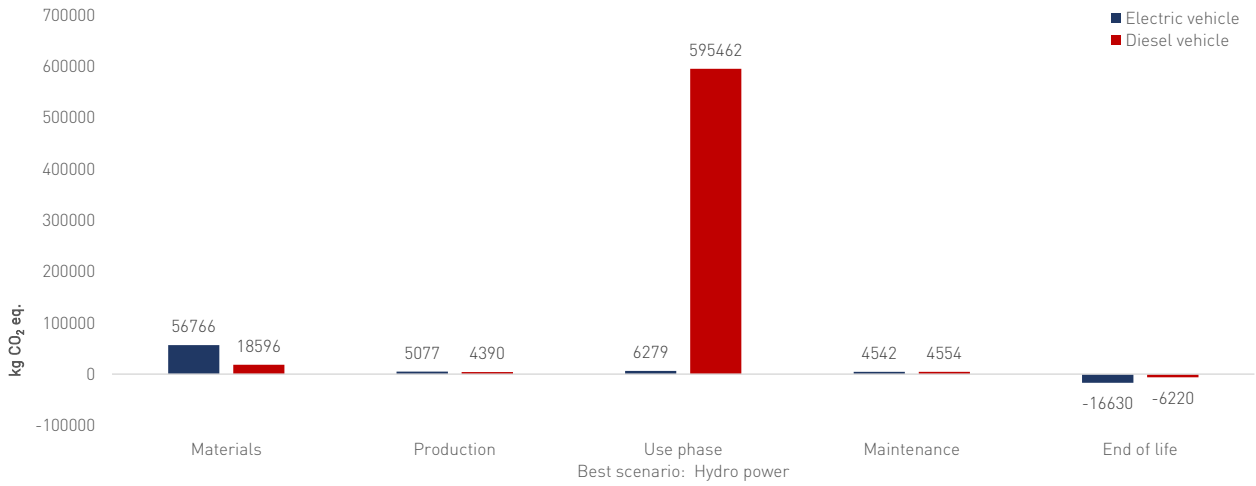
ASSESMENT OF THE IMPACT ON THE ENVIRONMENT

Assessing a product's environmental impact throughout its lifetime makes it possible to determine which aspects must be studied to improve its overall environmental performance. This assessment may be qualitative but also quantitative by using appropriate methods and tools

GLOBAL WARMING POTENTIAL

Life cycle analysis makes it possible to determine a vehicle's global warming potential throughout its operational life. This potential consists of the various greenhouse gas emissions it produces that affect the climatic system. It is expressed as the equivalent quantitiy of Carbon Dioxide (kg equ. CO_2).

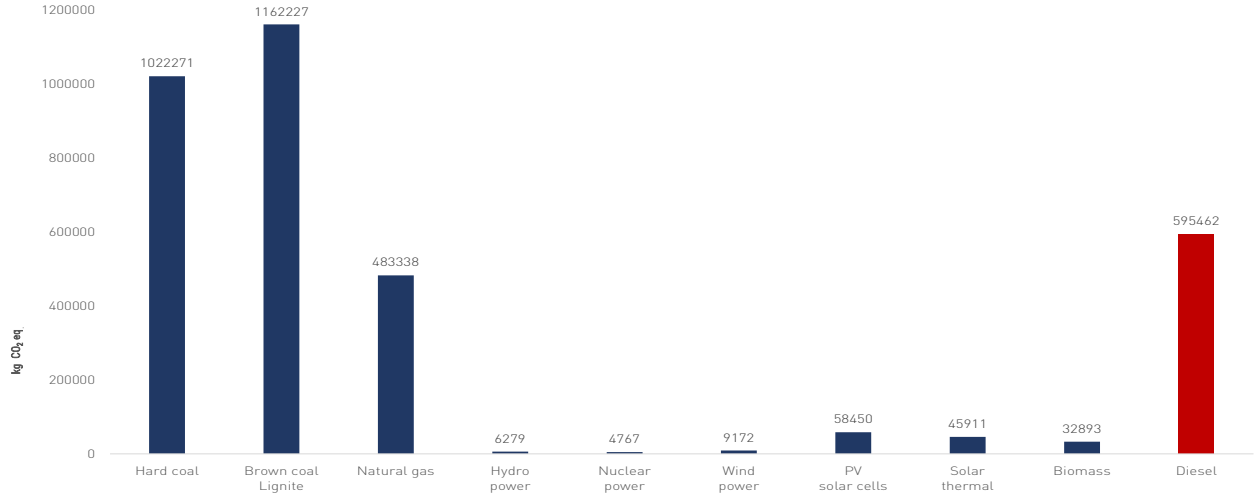
Life cycle emissions - CO_2eq.



Global warming potential for the different life cycles of Renault Trucks E-Tech T 4x2. The use phase shows the best case.

Use phase emissions from production of electricity - CO_2eq.

Energy sources and comparison with Diesel



ASSESMENT OF THE IMPACT ON THE ENVIRONMENT

COMMENTS

Over the entire life cycle of an electric truck, materials, including batteries, account for most of the greenhouse gases emissions, while the use phase, which is very predominant for a diesel vehicle, is less.

By switching to electric power, the reduction of the truck's climate impact during this use phase can be extremely important depending on the selection of the primary source of this energy and its production origin.

The analyses show that electricity produced from coal will have a high carbon impact, unlike electricity produced from nuclear or renewable energy sources. The results on the whole life cycle differ according to the national energy mixes within the European Union but show a gain in all countries that should increase as decarbonization progresses.

Powered by low-carbon electricity, of hydraulic origin at best, the **Renault Trucks E-Tech T 4x2** tractor shows a significant reduction in CO_2 emissions equivalent of its life cycle of over 90%.

By developing its 100% E-Tech electric range of vehicles Renault Trucks is substantially reducing the CO_2 emissions from products over their entire life. Renault Trucks is continuing its efforts to reduce batteries environmental impact by securing materials supply and recycling and by using new technologies.

Renault Trucks is preparing battery management in line with the principles of the circular economy. After their first service life, batteries can be reconditioned and reused on trucks. When used, they will be converted to applications other than mobility, and then recycled at the end of their life, with the recovered materials being reinjected into the manufacture of new units.

RENAULT TRUCKS

Renault Trucks is committed to improving sustainable goods mobility and is striving to reduce the effects its products have on the environment. Renault Trucks vehicles are designed to comply with legislation limiting atmospheric pollution and also to continue lowering fuel consumption which results in reducing carbon dioxide emissions.

Together with ever more fuel efficient transport solutions, Renault Trucks offers a full range of vehicles powered by alternatives to diesel fuel to enable operation in any environment: 100% electric; compressed natural gas; biofuels.

Renault Trucks implements an environmental policy based on specific commitments and a stringent management system that covers its dealer network, suppliers and partners. Its vehicles are manufactured in ISO 14001 certified production plants. It is geared to limiting its consumption of energy, water and raw materials but also to reducing waste production. Its products are designed to allow maximum reuse of the materials that have gone into their production.

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