Environmental Product Declaration

In accordance with ISO 14025:2006 for:

[*T12E Electric Bus*]

from

[*Yutong bus Co. ,Ltd.*]

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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An EPD should provide current information, and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

Programme information

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
PCR 2016:04 Public and private passenger buses and coaches (2.0.2) **UN CPC 49112&49113，valid until 2024-12-04**
PCR review was conducted by: *The technical Committee of the International EPD System. Review chair: Maurizio Feschi. The review panel may be contacted via info@environdec.com*
Life Cycle Assessment (LCA)
LCA accountability: Yutong Bus Co. Limited
Third-party verification
Third-party verifier: *<Camilla Landen，Bureau Veritas Certification Sweden AB>* *In case of accredited certification bodies:* *Accredited by:< Bureau Veritas Certification Sweden AB, accredited by SWEDEC with accreditation number 1236>* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third-party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see ISO 14025.

Company information

Owner of the EPD: Yutong bus Co.,LTD.， No. 6, Yutong Road, Guancheng Hui District,Zhengzhou City, Henan Province, China.

Description of the organisation:

Yutong Bus Co., Ltd. is a large commercial vehicle group with buses and trucks as its main business, and its products cover buses, trucks, special vehicles, parts and components and construction machinery. As the core business of Yutong Group, Yutong Bus is a global leading bus enterprise, with products oriented to the segments of public transportation, passenger transportation, tourism, groups, school buses and special travel, etc. In 2022, Yutong Bus had a global sales volume of 30,198 vehicles, and the market share of large and medium-sized buses in China reached 28.2%, leading the industry for 20 years in a row. The cumulative export of products exceeded 90,000 vehicles, forming a development layout covering six regions, including the Americas, Africa, Asia-Pacific, the CIS, the Middle East, Europe, etc., with a global share of more than 10%. Up to now, the cumulative sales of new energy buses exceeded 175,000 vehicles, leading the global scale of production and sales, and has become an international mainstream bus supplier.

Yutong continues to carry out research and development of new energy technology, has mastered the core technology of the whole industrial chain of new energy buses such as batteries, motors, electric drives, electric control, electric axles, etc., and has released the YEA new energy technology brand, which is the first electric exclusive platform integrating software and hardware in the industry, and integrates the two cores of the C architecture and the vehicle operating system YOS in a cross-domain way, realizing the function fusion and redistribution, and greatly improving the arithmetic power and control efficiency. Yutong new energy commercial vehicle solutions have landed in more than 100 countries and regions around the world, especially in Qatar's top soccer tournament. 888 Yutong new energy vehicles successfully complete the transportation protection task, China's new energy technology to win international recognition.

Yutong is committed to promoting the development of new energy in global public transportation and is actively integrating into the global wave of zero carbon emissions, joining more overseas customers to join the "Zero Carbon Alliance" and contributing to the realization of the global green environment.

Product-related or management system-related certifications: IATF 16949:2016, ISO 14001:2015, ISO 45001:2015 , SA8000 and regularly publish CSR reports. Yutong bus’s system and products meet quality, safety, and performance requirements, enhancing the company’s credibility and trust.

Name and location of production site: Yutong bus Co., LTD., No.6, Yuxing Road, Economic and Technological Development Zone, Zhengzhou City, Henan Province, China.

Product information

Product name: T12E Electric Bus

Product identification: T12E

Product description:The expected service life time is 15 years, 800,000 km. Passenger capacity is 53, including 52 seating + 1 standing. Driven by electric motor in rear axle. T12E is the T series family - 12 meters section product, the length of 12.2 meters, mainly used for short and medium-distance tourism, feeder and group travel and other operational scenarios.Additional technical specification can be obtained in table below.

Table 1: Technical description of the vehicle

Expected service life time	15 years
Lifetime distance	800,000KM

Passenger capacity	53, including 52 seating + 1 standing
Drive mode	rear axle drive
Axles and tyres	2 axles，7 tires
Front axle load (max)	7200kg
Medium axle load (max)	/
Rear axle load (max)	12300kg
Gross vehicle weight[1]	19500kg
Wheel base	2141/1844mm
Front overhang	2795mm
Rear overhang	3360mm
Dimension	12245*2550*3710
Minimum diameter of turning circle	18.5m
Maximum wheel lock	57°/45°
Rated power of the electric motor	215kW
Electric capacity of battery	422.87kWh
Driving cab	Forward left rudder
Brakes and safety	Disc Brakes, Wabco Braking Systems，EBS+ESC
Suspension	Air suspension
Steering	Electro-hydraulic power steering
Electrical systems	Ocoga CAN bus instrumentation，LED light fixtures
Air conditioning system	Pure electric heating and cooling air conditioning, pure electric heating and cooling defroster, heating with electric heated radiator. Driver's and passenger's heating and cooling zone can be adjusted differently. Refrigerant is R407c
Sound level of moving vehicle	67.9dB
Sound level of stationary vehicle	N/A
Sound level of compressed air,service brake	62.8dB
Sound level of compressed air, parking brake	63.3dB
Sound level of compressed air, during the pressure regulator actuation	67.9dB

UN CPC code: 49112
Geographical scope: Production in China, use and end-of-life in Denmark, Finland and Norway.

[1] Gross vehicle weight: the BOM weight of the vehicle, the weight of the driver and the equipment mass of the European bus, and the weight of the maximum number of passengers

LCA information

Functional unit : Transport of 1 passenger for 1 km

Table 2, Functional Unit

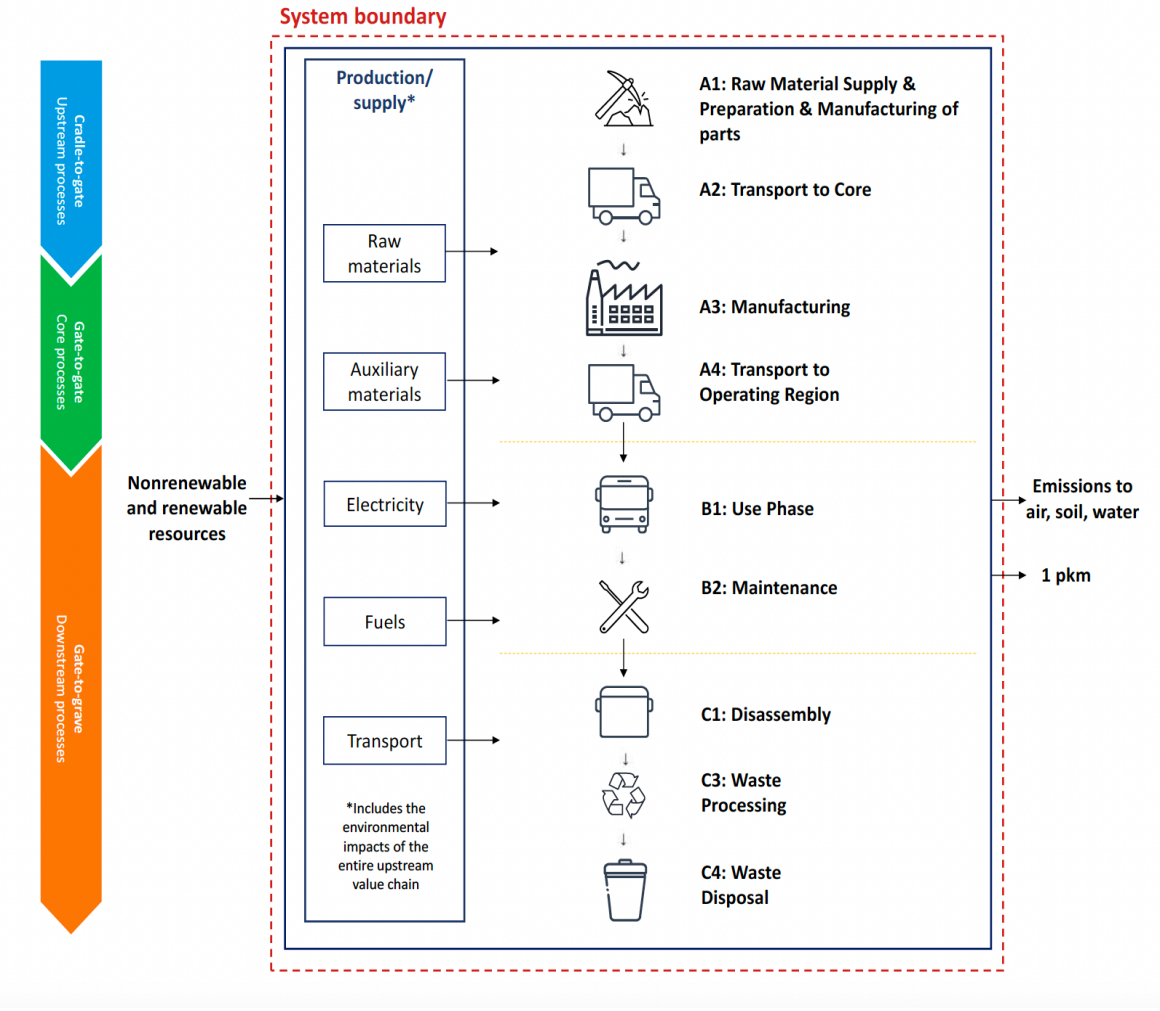
Passenger Capacity	Lifetime distance (km)	Passenger* distance (PKM)
53	800000	42400000

Reference service life: 800,000 KM

Time representativeness:2022

Database(s) and LCA software used: Ecoinvent v3.9.1,USLCI,EU&DK input output database and simaPro 9.5.0.0

System diagram:



Description of system boundaries:

Cradle-to-grave, including A1 raw material acquisition and production, A2 transportation to manufacturer, A3 manufacturing, A4 transportation to customer, B1 operation, B2 maintenance, B6 Energy during use, C End-of-life

Excluded lifecycle stages:

A5 Construction- installation process, B3 Repair, B4 Replacement, B5 Renovation, B7 water use and D potential benefit in recycling are not considered in this study.

Data collection period:

From 2022.1.1 to 2022.12.31 (including upstream supplier and manufacturing data)

Assumptions:

1) By the end of the report, more than 96.4% of the total weight of the buses had been collected as raw data. The LCA study was conducted to the maximum extent of our knowledge. For missing background data, we used a similar background data methodology to replace the missing data to close the gap.

2) The transportation distances used for A2 raw material transportation are from Gaode Map and are defined based on the distance from the supplier's factory location to the Yutong Bus production plant.

3) The distance and mode of transportation of T12E electric bus to Denmark, Finland and Norway are based on the knowledge of international shipping routes. Its land transportation distance from Yutong factory to the port is provided by the company.

4) The electricity consumed in the use of the bus is converted based on 800,000KM of the bus, and the tires and lubricants used in the maintenance phase are counted and calculated based on the data in the internal vehicle maintenance and repair manuals of Yutong bus. The maintenance and scrapping caused by traffic accidents during the use of vehicles are assumed not to occur in the evaluation process due to the small probability of occurrence.

5) Waste Disposal scenario is calculated according to the BOM, which is provided by Yutong, the metal of buses accounts for about 70.5%, rubber and plastic products account for about 18.4%, other reusable materials such as glass, flooring, leather, etc. account for about 8.1%, and the remaining other mixed materials account for about 3.0%. A sensitivity analysis was performed assuming that the distance from the vehicle to the dismantling plant is 100 KM.

6) The average emission factor of China's national mix was used for the electricity used in stages A1-A3. The suppliers of Yutong buses are located in various provinces and cities in China. Since the Chinese power grid increasingly adopts extra-high voltage to transmit power, and the power structures of different regional power grids are becoming more and more homogeneous, the calculation process adopts the default, conservative Chinese power factor. A sensitivity analysis has been conducted for this.

7) In the process of evaluation, if we could not obtain the data of suppliers due to the limitation of conditions, we used the EPD reports of the same industry and similar products to supplement the data.

8) Electricity, residual mix has been applied in operation stage. Assuming the emission factor of residual mix electricity used in Denmark, Finland and Norway stays stable in the next coming 15 years. Due to its large contribution in T12E life-cycle performance, a sensitivity analysis has been conducted for this.

Cut-off rules:

The following procedures were followed for the inclusion and exclusion of inputs and outputs:

1) All input and output terms for each unit process are included in the calculations. Data gaps are partially filled by conservative assumptions using averaged or generalized data, and any assumptions are documented;

2) According to PCR 2016:04, the elementary flow of a declared product should contain 95% of the data. Therefore, the exclusion threshold for this study is set at 0.01%;

3) Consumption and emissions from roads and plant infrastructure, equipment for each process, personnel and amenities within the plant are ignored;

4) Employee business travel, employee commuting, etc. can be excluded;

5) Cut-off guidelines do not apply to toxic and hazardous substances, any toxic and hazardous materials and substances should be included in the inventory;

6) Long-term, over 100-year environmental impact emissions are excluded.

Data quality:

1) Activity data within the system boundary (e.g., material or energy flows into the product system) are collected, calculated and provided by Yutong.

2) Generic data were selected from the companion Ecoinvent v3.9.1,USLCI, and EU&DK input output database in SimaPro v9.5.0.0 software.

3) LCI data are always preferentially matched to the actual place of occurrence.

4) The technical representativeness of the data meets the average technical level at this stage. Primary data from tier 1 suppliers were collected and data from tier 2 were selected from database.

5) Self-declared data from supplier is used as specific data.

Allocation rules:

Allocation was avoided or minimized as much as possible in this LCA project study. Physical methods are used for allocation when allocation is involved.

1) The products provided by the upstream suppliers of T12E electric buses are assembled parts, and the allocation of energy, resource, and environmental emission data (unit product/total production) is performed based on the information collected from the supplier survey.

2) In the case of multi-model bus production in Yutong's production workshops, workshops equipped with work hour statistics are apportioned electricity, water, diesel fuel, CO2 protection gas, etc. in accordance with the actual production work hours; workshops not equipped with work hour statistics are calculated in accordance with the total consumption of the process unit averaged to the total number of bus vehicles handled by the unit.

3) Waste disposal involved in Yutong's production period is distributed evenly across the entire plant's fleet of vehicles because it cannot be accurately allocated to a single model of bus.

4) Other LCA processes do not involve data allocation.

Content declaration

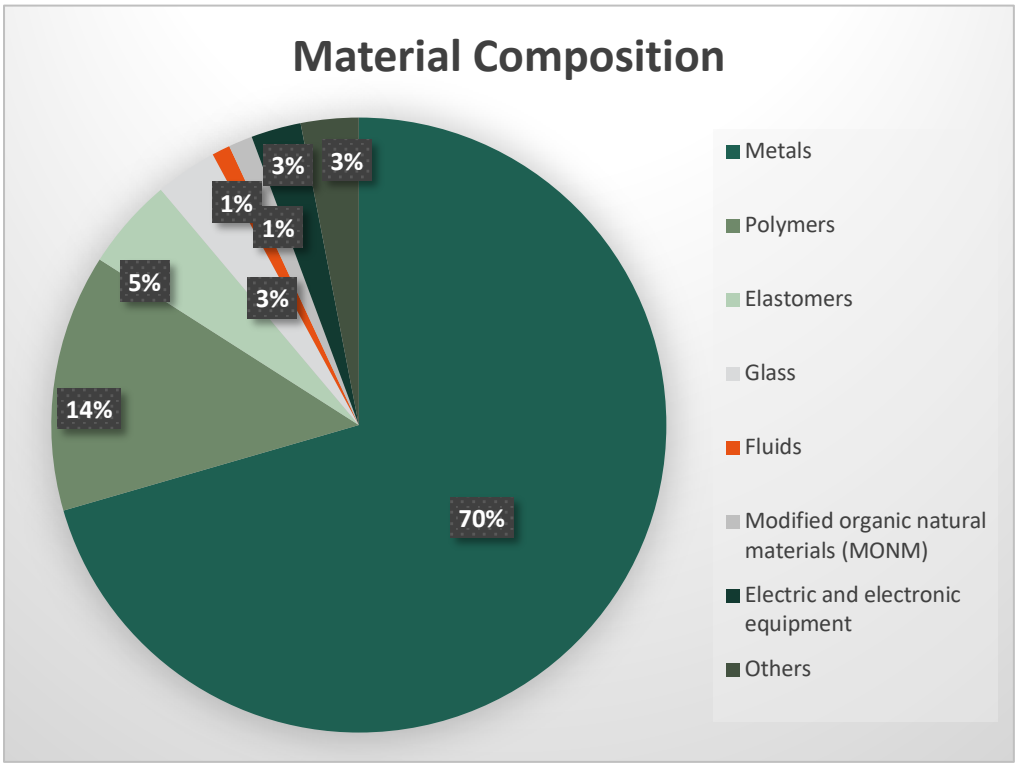


Figure1： Material Composition

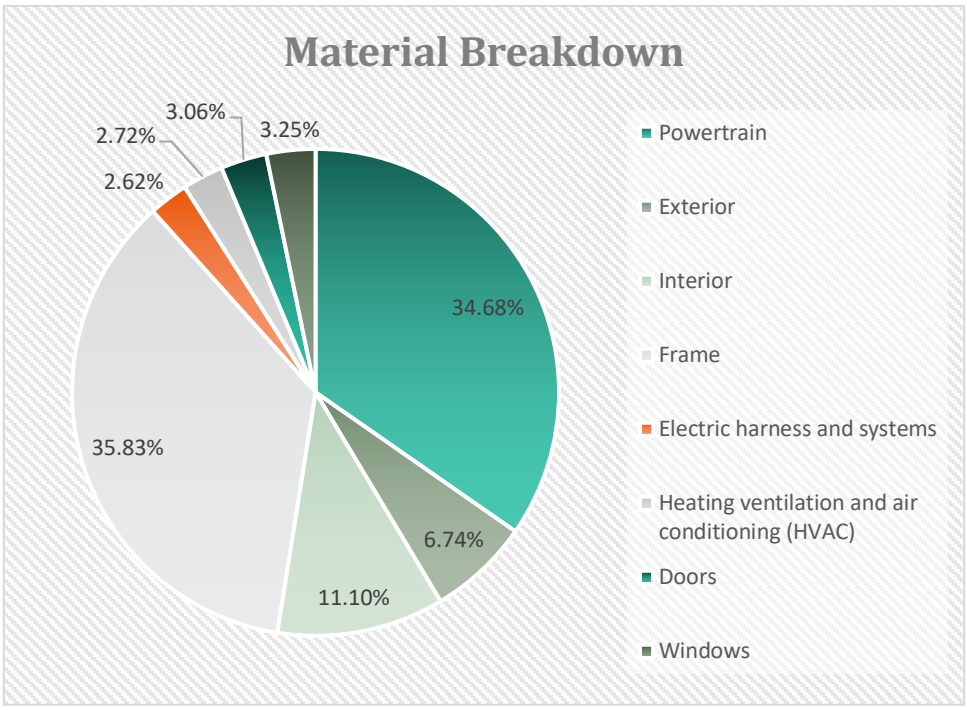


Figure 2: Material Breakdown by Vehicle Group

Results of the environmental performance indicators

Impact category indicators

Table 3 T12E Electric Bus operated in Denmark

Parameter		Unit	Upstream	Core	Downstream		Total
					Operation	Maintenance/EoL	
Global warming potential	GWP-fossil	kg CO2 eq	1.65E-03	1.66E-03	1.05E-02	2.08E-04	1.40E-02
	GWP-land use and land use change	kg CO2 eq	1.82E-06	3.53E-06	1.72E-06	4.41E-08	7.11E-06
	GWP-biogenic	kg CO2 eq	1.34E-06	2.28E-05	-4.12E-06	8.91E-06	2.89E-05
	total	kg CO2 eq	1.65E-03	1.69E-03	1.05E-02	2.17E-04	1.41E-02
Acidification potential		mol H+ eq	1.05E-05	3.12E-05	3.77E-05	3.75E-07	7.98E-05
Eutrophication potential	Aquatic freshwater	kg N eq	1.64E-06	7.67E-06	7.21E-06	2.14E-07	1.67E-05
	Aquatic marine	kg P eq	9.35E-07	2.25E-07	4.20E-06	2.51E-08	5.39E-06
	Terrestrial, accumulated exceedance	mol N eq	1.86E-05	8.46E-05	7.39E-05	1.03E-06	1.78E-04
Photochemical ozone creation potential		kg NMVOC eq	6.47E-06	2.31E-05	2.19E-05	4.37E-07	5.19E-05
Ozone depletion potential		kg CFC11 eq	2.27E-10	1.90E-10	2.01E-10	1.34E-12	6.20E-10
Abiotic depletion potential for fossil resources		MJ	1.42E-02	2.04E-02	1.65E-01	2.72E-03	2.02E-01
Abiotic depletion potential for minerals and metals(non-fossil resources)		kg Sb eq	4.88E-03	1.63E-08	7.65E-08	8.14E-10	4.88E-03
Water deprivation potential		m3 world depriv.	1.13E-03	1.66E-04	1.01E-03	1.65E-05	2.32E-03

Table 4 T12E Electric Bus operated in Finland

Parameter		Unit	Upstream	Core	Downstream		Total
					Operation	Maintenance/EoL	
Global warming potential	GWP-fossil	kg CO2 eq	1.65E-03	1.71E-03	6.70E-03	2.08E-04	1.03E-02
	GWP-land use and land use change	kg CO2 eq	1.82E-06	3.53E-06	6.32E-06	4.41E-08	1.17E-05
	GWP-biogenic	kg CO2 eq	1.34E-06	2.28E-05	1.14E-05	8.91E-06	4.44E-05
	total	kg CO2 eq	1.65E-03	1.74E-03	6.71E-03	2.17E-04	1.03E-02
Acidification potential		mol H+ eq	1.05E-05	3.19E-05	2.51E-05	3.75E-07	6.78E-05
Eutrophication potential	Aquatic freshwater	kg N eq	1.64E-06	8.00E-06	4.90E-06	2.14E-07	1.48E-05
	Aquatic marine	kg P eq	9.35E-07	2.25E-07	2.43E-06	2.51E-08	3.61E-06
	Terrestrial, accumulated exceedance	mol N eq	1.86E-05	8.83E-05	4.88E-05	1.03E-06	1.57E-04
Photochemical ozone creation potential		kg NMVOC eq	6.47E-06	2.38E-05	1.67E-05	4.37E-07	4.74E-05
Ozone depletion potential		kg CFC11 eq	2.27E-10	1.90E-10	1.19E-10	1.34E-12	5.38E-10
Abiotic depletion potential for fossil resources		MJ	1.42E-02	2.11E-02	1.94E-01	2.72E-03	2.32E-01
Abiotic depletion potential for minerals and metals(non-fossil resources)		kg Sb eq	4.88E-03	1.63E-08	6.53E-08	8.14E-10	4.88E-03
Water deprivation potential		m3 world depriv.	1.13E-03	1.66E-04	1.99E-03	1.65E-05	3.30E-03

Table 5 T12E Electric Bus operated in Norway

Parameter		Unit	Upstream	Core	Downstream		Total
					Operation	Maintenance/EoL	
Global warming potential	GWP-fossil	kg CO2 eq	1.65E-03	1.71E-03	8.15E-03	2.08E-04	1.17E-02
	GWP-land use and land use change	kg CO2 eq	1.82E-06	3.53E-06	1.59E-06	4.41E-08	6.98E-06
	GWP-biogenic	kg CO2 eq	1.34E-06	2.28E-05	1.28E-05	8.91E-06	4.59E-05
	total	kg CO2 eq	1.65E-03	1.73E-03	8.16E-03	2.17E-04	1.18E-02
Acidification potential		mol H+ eq	1.05E-05	3.18E-05	2.84E-05	3.75E-07	7.10E-05
Eutrophication potential	Aquatic freshwater	kg N eq	1.64E-06	7.95E-06	5.79E-06	2.14E-07	1.56E-05
	Aquatic marine	kg P eq	9.35E-07	2.25E-07	2.89E-06	2.51E-08	4.07E-06
	Terrestrial, accumulated exceedance	mol N eq	1.86E-05	8.78E-05	6.00E-05	1.03E-06	1.67E-04
Photochemical ozone creation potential		kg NMVOC eq	6.47E-06	2.37E-05	1.82E-05	4.37E-07	4.89E-05
Ozone depletion potential		kg CFC11 eq	2.27E-10	1.90E-10	1.93E-10	1.34E-12	6.11E-10
Abiotic depletion potential for fossil resources		MJ	1.42E-02	2.10E-02	1.50E-01	2.72E-03	1.88E-01
Abiotic depletion potential for minerals and metals(non-fossil resources)		kg Sb eq	4.88E-03	1.63E-08	6.91E-08	8.14E-10	4.88E-03
Water deprivation potential		m3 world depriv.	1.13E-03	1.66E-04	7.80E-04	1.65E-05	2.09E-03

Resource use indicators

Table 6 T12E Electric Bus operated in Denmark

Parameter		Unit	Upstream	Core	Downstream		Total
					Operation	Maintenance/EoL	
Primary energy resources-renewable	use as energy carrier	MJ, net calorific value	1.62E-03	7.55E-04	9.83E-03	5.29E-05	1.23E-02
	used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	total	MJ, net calorific value	1.62E-03	7.55E-04	9.83E-03	5.29E-05	1.23E-02
Primary energy resources-non renewable	use as energy carrier	MJ, net calorific value	1.96E-02	2.18E-02	1.74E-01	1.32E-03	2.17E-01
	used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	total	MJ, net calorific value	1.96E-02	2.18E-02	1.74E-01	1.32E-03	2.17E-01
Secondary material		kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water		m3	4.16E-05	6.14E-06	5.08E-04	8.31E-06	5.64E-04

Table 7 T12E Electric Bus operated in Finland

Parameter		Unit	Upstream	Core	Downstream		Total
					Operation	Maintenance/EoL	
Primary energy resources-renewable	use as energy carrier	MJ, net calorific value	1.62E-03	7.55E-04	9.44E-03	5.29E-05	1.19E-02
	used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	total	MJ, net calorific value	1.62E-03	7.55E-04	9.44E-03	5.29E-05	1.19E-02
Primary energy resources-non renewable	use as energy carrier	MJ, net calorific value	1.96E-02	2.26E-02	2.01E-01	1.32E-03	2.44E-01
	used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	total	MJ, net calorific value	1.96E-02	2.26E-02	2.01E-01	1.32E-03	2.44E-01
Secondary material		kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water		m3	4.16E-05	6.14E-06	1.15E-03	9.54E-06	1.21E-03

Table 8 T12E Electric Bus operated in Norway

Parameter		Unit	Upstream	Core	Downstream		Total
					Operation	Maintenance/EoL	
Primary energy resources-renewable	use as energy carrier	MJ, net calorific value	1.62E-03	7.55E-04	1.79E-02	5.29E-05	2.04E-02
	used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	total	MJ, net calorific value	1.62E-03	7.55E-04	1.79E-02	5.29E-05	2.04E-02
Primary energy resources-non renewable	use as energy carrier	MJ, net calorific value	1.96E-02	2.24E-02	1.58E-01	1.32E-03	2.01E-01
	used as raw materials	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	total	MJ, net calorific value	1.96E-02	2.24E-02	1.58E-01	1.32E-03	2.01E-01
Secondary material		kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels		MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water		m3	4.16E-05	6.14E-06	1.00E-03	2.12E-05	1.07E-03

Waste indicators (optional)

Table 9 T12E Electric Bus operated in Denmark

Parameter	Unit	Upstream	Core	Downstream		Total
				Operation	Maintenance/EoL	
Hazardous waste	kg	1.42E-06	6.41E-06	4.75E-06	1.73E-06	1.43E-05
Non-hazardous waste	kg	3.33E-04	1.81E-04	4.50E-04	2.07E-05	9.84E-04
Radioactive waste	kg	1.25E-07	7.89E-09	5.93E-07	6.25E-10	7.26E-07

Table 10 T12E Electric Bus operated in Finland

Parameter	Unit	Upstream	Core	Downstream		Total
				Operation	Maintenance/EoL	
Hazardous waste	kg	1.42E-06	6.41E-06	4.00E-06	1.73E-06	1.36E-05
Non-hazardous waste	kg	3.33E-04	1.81E-04	4.76E-04	2.07E-05	1.01E-03
Radioactive waste	kg	1.25E-07	7.89E-09	1.81E-06	6.25E-10	1.94E-06

Table 11 T12E Electric Bus operated in Norway

Parameter	Unit	Upstream	Core	Downstream		Total
				Operation	Maintenance/EoL	
Hazardous waste	kg	1.42E-06	6.41E-06	5.19E-06	1.73E-06	1.48E-05
Non-hazardous waste	kg	3.33E-04	1.81E-04	4.83E-04	2.07E-05	1.02E-03
Radioactive waste	kg	1.25E-07	7.89E-09	7.67E-07	6.25E-10	9.01E-07

Output flow indicators (optional)

Table 12 T12E Electric Bus operated in Denmark

Parameter	Unit	Upstream	Core	Downstream		Total
				Operation	Maintenance/EoL	
components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
material for recycling	kg	3.04E-04	2.90E-05	0.00E+00	1.04E-05	3.43E-04
materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
exported energy, electricity	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
exported energy, thermal	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 13 T12E Electric Bus operated in Finland

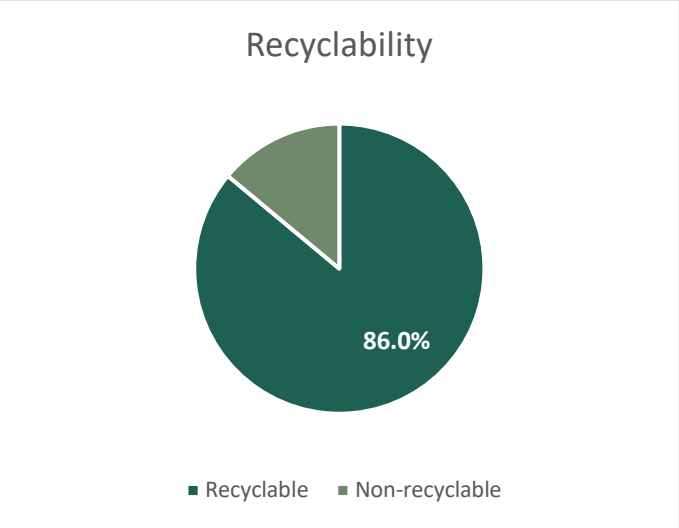
Parameter	Unit	Upstream	Core	Downstream		Total
				Operation	Maintenance/EoL	
components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
material for recycling	kg	3.04E-04	2.90E-05	0.00E+00	1.04E-05	3.43E-04
materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
exported energy, electricity	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
exported energy, thermal	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

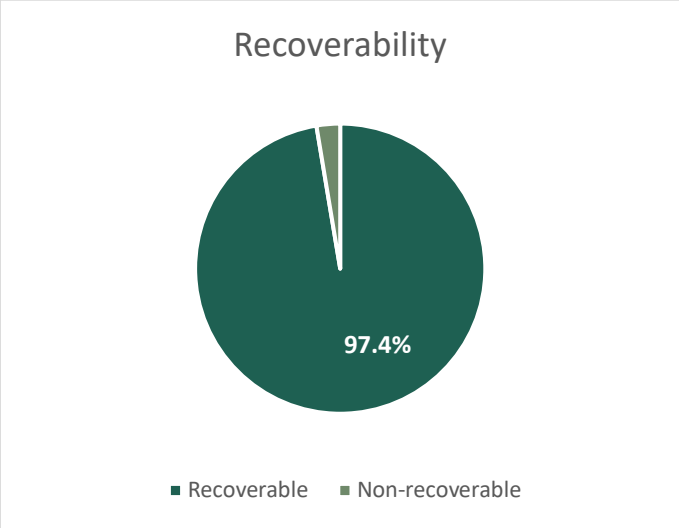
Table 14 T12E Electric Bus operated in Norway

Parameter	Unit	Upstream	Core	Downstream		Total
				Operation	Maintenance/EoL	
components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
material for recycling	kg	3.04E-04	2.90E-05	0.00E+00	1.04E-05	3.43E-04
materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
exported energy, electricity	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
exported energy, thermal	MJ per energy carrier	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Recyclability and Recoverability

Recyclability and recoverability rates are calculated according to ISO 22628:2002.





Additional Information

Electricity consumption during use stage

The electricity consumption of the bus to operate in its whole life time distance is calculated based on the following aspects.

Basic consumption data is acquired from UITP E-SORT (Standardized on-road test cycles) test report issued by the qualified third-party. SORT1,2, and 3 represent heavy urban, easy urban (mixed), and easy suburban, respectively. In this study, average energy use from SORT 1,2, and 3 has been obtained and calculated into the study.

For air condition and heating use, the weather situation in Denmark, Finland and Norway is considered. From November to February, the cabin needs heating due to the low atmosphere temperature. From March to October, the temperature is pleasure for passenger and there is no need to operate the air condition. The consumption of the heating system is gathered through experiment data.

The charging efficiency will degrade as time goes by. Normally it is above 95% from Yutong technical experts. Here we take 90% charge efficiency into calculation from conservative perspective.

The loss in batteries is omitted due to lack of data. The relevant data in shown in the table below.

Time	March to October	November to February
Season allocation	66.67%	33.33%
Energy use (KWH)	429926	270853
Total energy use in life time (KWH)	700779	

References

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