

Land Use Fact Sheet

Land availability, yields and fleet-support factors for renewable-fuel and electrification analysis.

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LAND AVAILABILITY & YIELDS

ITEM	VALUE
Global agricultural land	4 781 Mha
Global cropland	1 573 Mha
Utility-scale solar PV	0.5 MW/ha
Ethanol	7 000 L/ha/yr
gasoline equivalent	4 623 L/ha/yr
gasoline equivalent	98.0 GJ/ha/yr
Palm oil	3 t/ha/yr
diesel equivalent	75 GJ/ha/yr
Rapeseed	0.73 t/ha/yr
diesel equivalent	18.25 GJ/ha/yr
Soybean oil	0.47 t/ha/yr
diesel equivalent	11.75 GJ/ha/yr

CAPACITY & LOAD FACTORS

ITEM	VALUE
Solar PV	0.15
Wind	0.35
Biofuels	0.85
Average car usage	15 000 km/yr

EFFICIENCY ASSUMPTIONS

ITEM	VALUE
Transmission grid	0.95
AC/DC charging	0.85
BEV	20 kWh/100 km
=	5 000 km/MWh
ICE	6 L/100 km
=	53.5 kWh/100 km
=	1 869 km/MWh
Alcohol-to-jet	0.80
e-gasoline	0.33

ANNUAL ENERGY OUTPUT PER HECTARE

PATHWAY	MWH/HA/YR
Utility-scale solar PV	657
e-gasoline from PV	220
Ethanol	41.2
Alcohol-to-jet	33.0
HEFA from palm oil	20.8
HEFA from rapeseed	5.1
HEFA from soybean oil	3.3

CARS SUPPORTED BY 1 HECTARE

VEHICLE & FUEL	CARS
BEV on solar PV	176.9
ICE on e-gasoline (50% PV)	16.8
ICE on ethanol	5.1
ICE on renewable diesel — palm (high)	2.6
ICE on renewable diesel — soybean (low)	0.41

Solar-powered BEVs support ~35× more cars per hectare than the best biofuel pathway, and ~430× more than soybean HEFA diesel.

GLOBAL DIRECT LAND USE OF FUELS

BIOFUEL DEMAND TO REACH GLOBALLY	EJ
50% biojet in aviation	7.5
10% biofuels in road transport	4.8

SHARE OF AGRICULTURAL LAND NEEDED	
50% biojet in aviation	1.3%
10% biofuels in road transport	0.7%

SHARE OF CROPLAND NEEDED	
50% biojet in aviation	4.0%
10% biofuels in road (ethanol)	2.1%
10% biofuels in road (soybean)	26.0%

Oil yields by crop: FAO 2025 (ourworldindata.org/grapher/oil-yield-by-crop).

Indicative planning factors — check against project-specific data before use

Latest update: July 2026