



MULTI DIMENSION IMPACT ACCOUNTING (MDIA) Standard Values for Products

Water

One litre of water has a standard value of 100 units

A US gallon is 3.78541 litres	1 litre is 0.264172052 US gallons
An Imperial gallon is 4.54609 litres	1 litre is 0.219969 Imperial gallons

Therefore a US gallon of water has a standard value of 378.5 units

An Imperial gallon of water has a standard value of 454.6 units.

Milk

How much water used to produce a gallon of milk?

683 gallons of water → 6 pounds of Alfafa hay → 1 gallon of milk ¹

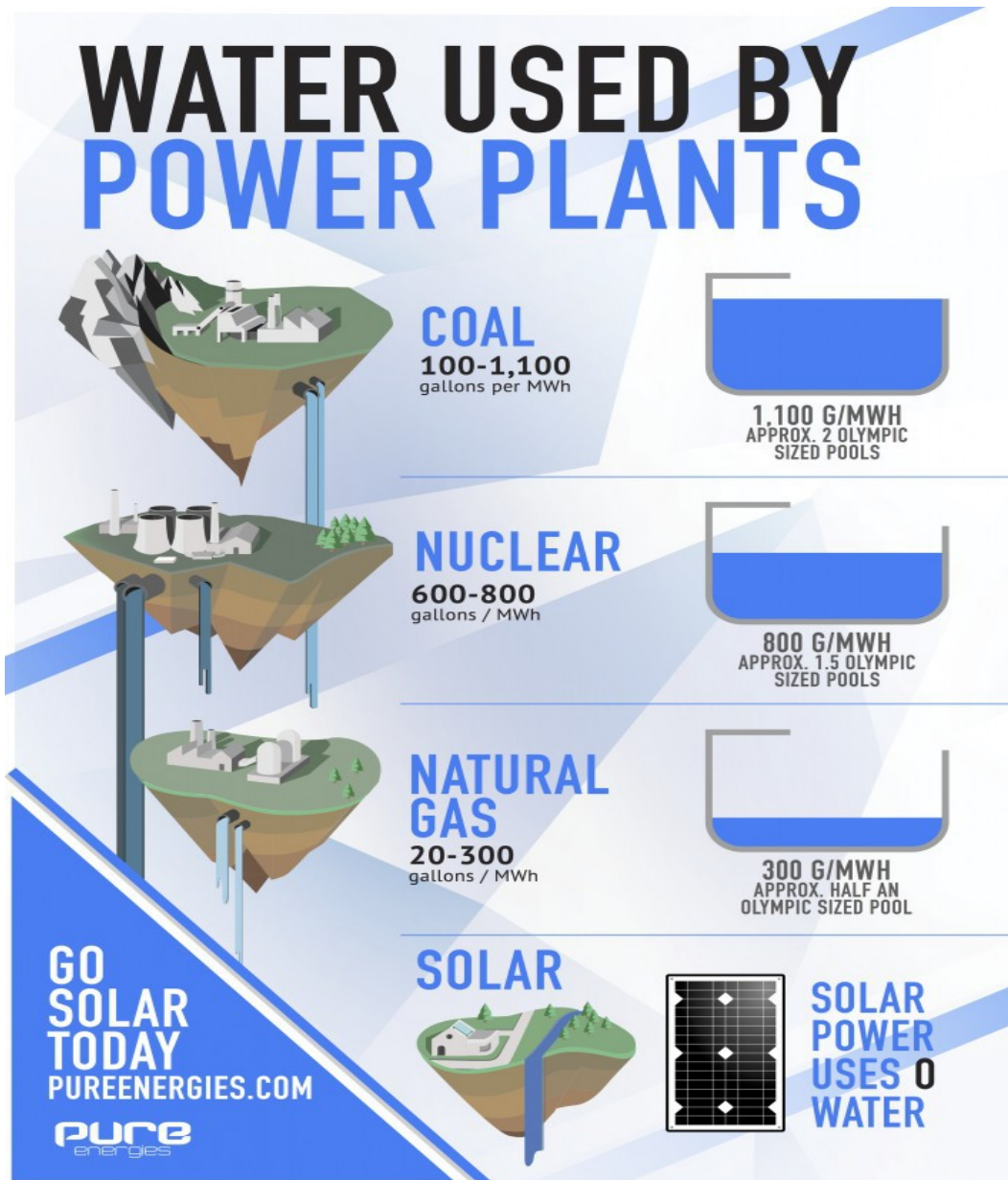
(1) According to a post by Mother Jones archived here:

<http://www.truevaluemetrics.org/DBadmin/DBtxt001.php?vv1=txt00007287>

Energy – Water Used by Power Plants

How much water used to make electricity in the USA?

- Between 100 and 1,100 gallons of water used per Mwh for coal fired power plants
- Between 600 and 800 gallons of water used per Mwh for nuclear power plants
- Between 20 and 300 gallons used per Mwh for natural gas fired power plants
- 0 used for solar power



The infographic is a good starting point. This is an infographic from pureenergies.com

URL: www.truevaluemetrics.org/DBimages/energy/Metrics/TEC-water-day-infographic.jpg

Food

Food consumption

	Meat lover	average	no beef	vegetarian	vegan
tCO2e per person per year	3.3	2.5	1.9	1.7	1.5

Food waste

	Extreme	Large	Moderate	Average	Low	Small	Negligible
Kg per person per year	150	100	70	50	20	10	5

Food distribution / transport

	Ship	Train	Truck	Air
Kg CO2e per t.km	0.015	0.037	0.200	1.100

Transport

Fuel consumption

10 litres per 100 km = 28.248 miles per gallon (Imperial)

10 litres per 100 km = 23.521 miles per gallon (US)

Emissions for automobiles in the USA

	g CO2e / km
Petrol (20 mpg)	366
Electric car (coal)	259
Petrol (30 mpg)	257
Electric car (oil)	217
Petrol (40 mpg)	203
Petrol (50 mpg)	170
Electric car (gas)	160
Electric car (solar)	79

Based on Nissan leaf rated at 29Kwh/100 miles

Solar is based on 45 g CO2e /kWh

Oil based on conventional extraction

Housing

US Cost of Usable Heat ...

	Efficiency	\$/million BTU
Fuel oil furnace	78%	37.3
Electric furnace	98%	34.9
Seasoned wood	63%	14.4
Air source heat pump	240%	14.2
Ground source heat pump	330%	10.4
Natural gas furnace	82%	9.2

(at 2012 prices and efficiencies)

UK Cost of Usable Heat ...

	Efficiency	Pence/KWh
Electric heater	100%	15.3
Heating oil boiler	78%	7.9
Air furnace heat pump	240%	6.4
Seasoned wood	65%	5.8
Natural gas	85%	5.6
Ground source heat pump	330%	4.6

US Housing Footprint ... CO2e impact for different energy types

	Tons CO2e / capita per year
Electricity	3.17
Natural gas	1.05
Fuel oil	0.25
LPG	0.13
Waste	0-.32
Water	0.27
	5.19

US Housing Footprint (2) ... use of energy for different purposes

	Tons CO2e / capita per year	
Space heating	1.13	22%
Water heating	0.71	14%
Appliances	1.40	27%
Cooking	.57	11%
Lighting	.48	9%
Refrigeration	.32	6%
Waste	.32	6%
Water	.27	5%

US Housing Footprint (3) ... home heat loss (normalized)

	Tons CO2e / capita per year
Roof	25%
Walls	35%
Windows	15%
Drafts	15%
Floors	10%

US Housing Footprint (4) ... Residential heat emissions

	kgs CO2e / kWh(th)
Electricity - coal	0.97
Electricity – natural gas	0.54.
Coal – brickett stove	0.53
Fuel oil – boiler	0.37
Fuel oil - condensing	0.34
LPG - boiler	0.30
Natural gas - boiler	0.30
Natural gas - condensing	0.27
Heat pump – natural gas	0.13
Heat pump – solar	0.01
Bio mass - pellets	0.03
Bio mass - chips	0.02

US Housing Footprint (5) ... Residential electric use (2008)

Cooling	18%
Lighting	15%
Refrigeration	10%
Water heating	10%
Television	8%
Heating	6%
Clothing drying	6%
Computing	4%
Dishwashing	2%
Cooking	2%
Washing	1%
Other	18%

US Housing Footprint (5) ... Electricity emission factors

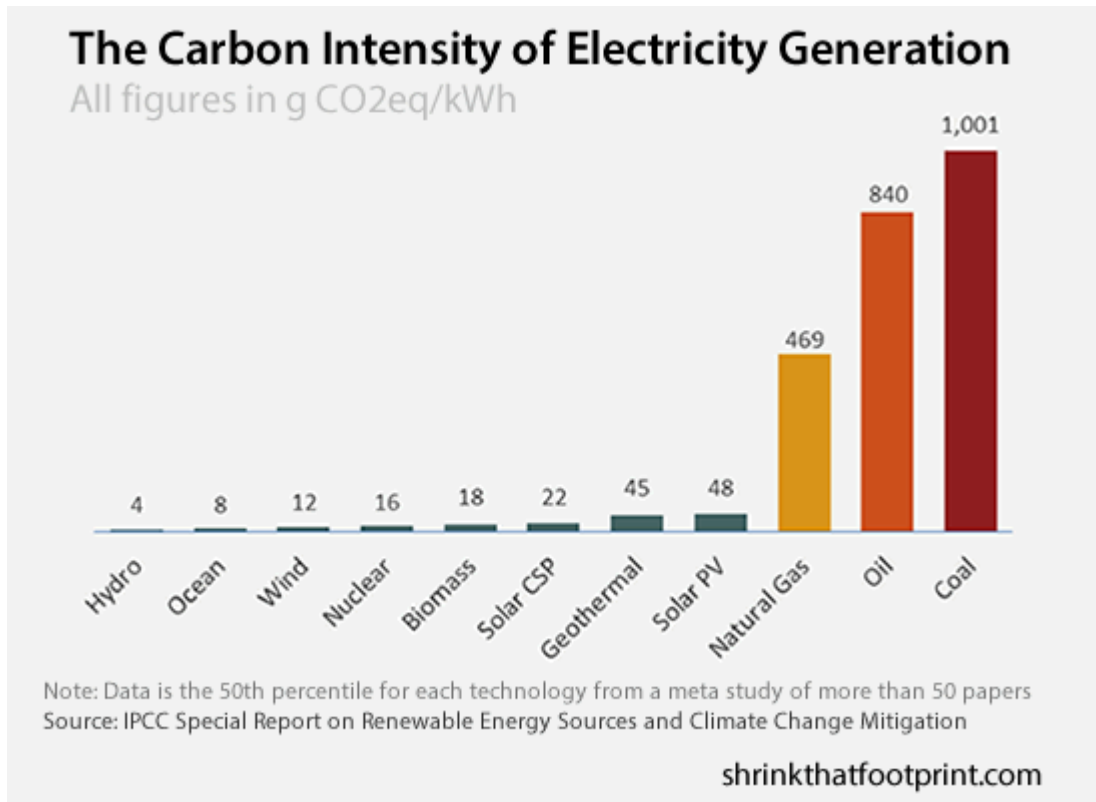
	TOTAL Kg CO2e / kWh	Direct	Indirect
Lignite	1.21%		
Coal	0.91%		
Oil	0.77%		
Natural gas	0.51%		
Solar PV	0.05%		
Wind	0.03%		
Biomass	0.03%		
Nuclear	0.02%		
Geothermal	0.02%		
Hydro	0.01%		

Residential electricity emissions

	Kg CO2e / capita		
Australia	2560		
New Zealand	518		
USA	2759		
Canada	907		
Mexico	224		
Saudi Arabia	<2500		
Venezuela	1334		
Argentina	351		
Brazil	55		
UK	985		
France	453		
Norway	152		
South Africa	877		
Japan	1126		
South Korea	755		
China	331		
India	135		

Note that China uses 18% of its electricity for residential use.
The USA uses 38% of electricity for residential use.

Carbon intensity of electricity generation



	g CO ₂ e /kWh	Value unit
Hydro	4	4
Ocean	8	8
Wind	12	12
Nuclear	16	16
Biomass	18	18
Solar CSP	22	22
Geothermal	45	45
Solar PV	48	48
Natural gas	469	469
Oil	840	840
Coal	1001	1001

Emissions for production of electricity

	g CO2e /kWh	Value unit
Coal	1000	
Oil	800	
Natural gas	500	
Nuclear	Less than 50	
Hydro	Less than 50	
Wind	Less than 50	
Solar	Less than 50	

Cities



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