Sunlight Energy vs. Energy Consumption

SUNLIGHT ENERGY FALLING ON THE EARTH

342	sunlight watts per m^2	Kiehl JT, Trenberth, Kevin, 1997 "Earth Annual Global Mean Energy Budget", Bulletin of American Meteor. Assn 78
342	Joules/sec per m^2	1 watt (power)=1 joule (energy)/sec
		(the total solar radiation arriving at the atmosphere is ~1361 watts/m^2. However, not all reaches the surface and not all is visible light.) Coddington, O.; Lean, J. L.; Pilewskie, P.; Snow, M.; Lindholm, D. (22 August 2016). "A Solar Irradiance Climate Data Record". Bulletin of the American Meteorological Society. 97 (7
30%	reflected back	6% atmosphere, 20% cloud, 4% earth
12756200	meters	Earth diameter - cross-section
1.27805E+14	m^2	Earth cross section area
3.05965E+16	Joules per second (Watts)	Sunlight power (Energy per time) falling on the earth

WORLD ENERGY CONSUMPTION

599.378	quadrillion BTU per year	2018 world power consumption (energy over time). Http://eia.gov
5.99378E+17	BTU per year	
1055	Joules per BTU	
6.32344E+20	Joules per year	
365	days per year	
24	hr per day	
60	min per hour	
60	seconds per minute	
2.00515E+13	Joules per second (Watts)	World "energy" consumption
1,526	Ratio of sunlight to world consumption	If 100% useable

The sunlight energy falling on the world is 1,526 times the world energy consumption

EARTH INTERNAL HEAT

4.70E+13	Watts	Davies, J. H., & Davies, D. R. (2010). Earth's surface heat flux. Solid Earth, 1(1), 5–24.
1	Joules per watt	
4.70E+13	Joules per second	
2.34	Ratio of Earth's heat to world consumption	If 100% useable

The amount of internal Earth heat energy is 2 times the world energy consumption

Let me know if you find errors or improvements

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Sunlight Energy vs. Energy Consumption

UNITED STATES

9,833,520	surface area - km^2	USA surface area
2.35E+15	Joules per second	sunlight falling on USA if full 24 hr.
78%	reduction for sunlight angle	39 degrees latitude
1.83E+15	Joules per second	If 100% useable
92.943	Quadrillion BTU per year	USA power (energy over time) consumption - 2018 (EIA.GOV)
9.2943E+16	BTU per year	
1055	Joules per BTU	
9.80549E+19	Joules per year	
365	days per year	
12	hr per day	
60	min per hour	
60	seconds per minute	
6.2186E+12	USA Joules per second	USA power consumption
294	Ratio of sunlight to USA consumption	If 100% useable
0.34%		
33,431	Km^2 of sunlight equal to USA consumption - about size of Maryland	

The amount of sunlight energy falling on the USA is 294 times its consumption and about equal to that falling on Maryland - pretty impressive. But there's another way of looking at it - if you controlled all the energy used in the US, you only control the state of Maryland compared with the sunlight falling on the whole country.

However, the average solar farm output is 200,000 watts per acre

200,000	Watts per acre	Actual output of a solar farm
31,092,994	acres	Needed to supply USA consumption from solar alone
125,829	km^2	Needed to supply USA consumption from solar alone
1.3%		of USA land area

Based on actual solar farm output, the whole state of Mississippi would be necessary To supply USA consumption.

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