

Carbon Footprint Calculation

29th July 2024

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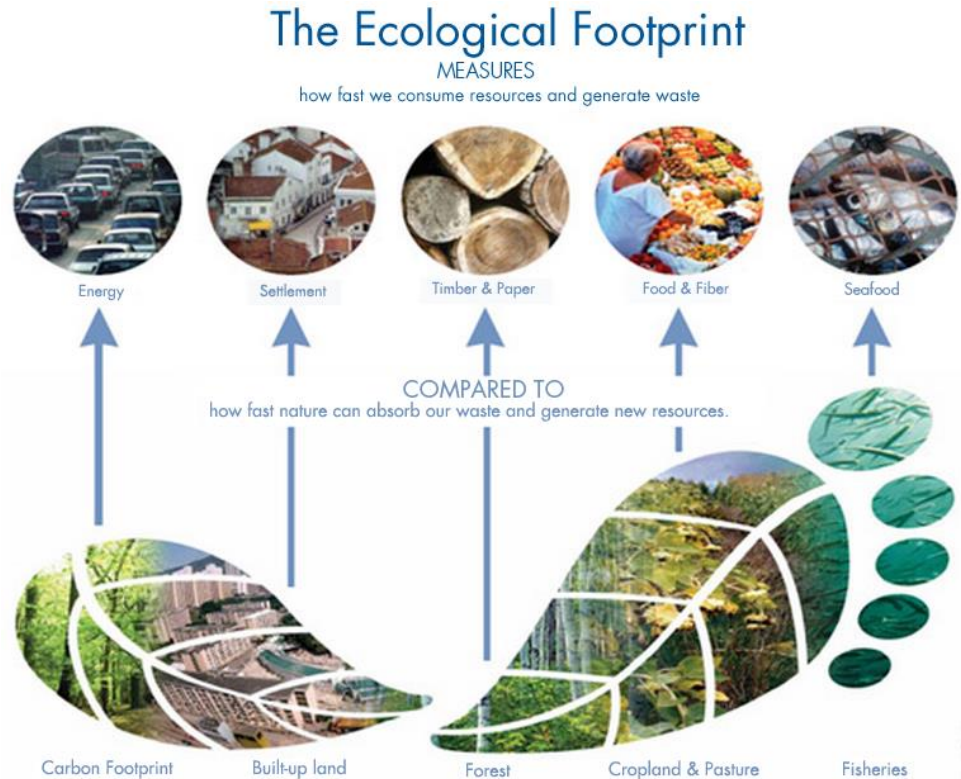
The Carbon Footprint

What is your carbon footprint?

HUMAN BEINGS USE	CAUSING ENV'T IMPACTS	LEADING TO HEALTH EFFECTS
•Products (Industry) •Shelter (Buildings) •Mobility (Transport) •Food (Agriculture)	•Climate Change •Heat Waves •Air Pollution •Water Pollution •Plastic Pollution	•Stroke, COPD, Cancers, •Respiratory Diseases, Child and Maternity Health, •Mental Health

At a meta level, we are one with mother nature.
Lead a life in sync with nature to be happy.

Does what you use, what you wear, where you live,
how you move, what you eat affect you/ the earth?



<https://www.footprintnetwork.org/our-work/ecological-footprint/>

[Carrying capacity of the earth?](#)

TATA SUSTAINABILITY GROUP

A carbon footprint refers to the total greenhouse gases (GHGs) like carbon dioxide, methane etc. emitted directly or indirectly by a person, household, business, facility, or community over a specified period of time (usually a year). A Carbon Calculator allows for easy computation of carbon footprints by taking high level information from users.

The TSG Carbon Calculator allows you to compute your carbon footprint. While a detailed carbon footprint would ideally include the footprint of all the products we consume such as food, white goods, fashion, electronics, etc, the TSG Carbon Calculator only takes into account fuel, electricity and personal travel related emissions. This would allow you to make more informed and conscious choices in the future.

TAKE A MINUTE TO FIND OUT YOUR CARBON FOOTPRINT

START HERE

<https://www.tatasustainability.com/Environment/CarbonCalculator>

HOW YOUR INDIVIDUAL
FOOTPRINT COMPARES TO

The rest of the world

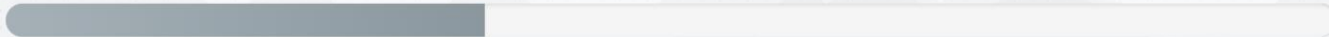
Annual per capita emissions (Tonnes CO₂)

Your Total



4.39 Tonnes of CO₂

Your Country Average



1.8 Tonnes of CO₂

World Average



4.5 Tonnes of CO₂

How to reduce your footprint?

MINIMIZE EMISSIONS FROM Electricity

2,800

Carbon Saving*



Where possible,
opt for renewable
energy for your
home
(family of 4)

650

Carbon Saving*



Install solar water
heaters

400

Carbon Saving*



Operate Air
Conditioner at 24
degree Celsius
instead of 18
degree Celsius

200

Carbon Saving*



Opt for 5-star rated
devices
*(savings from a 5-star
1.5 Ton AC vs 2-star)*

130

Carbon Saving*



Switch off the TV &
HD Set top box at
the plug, not with a
remote

50

Carbon Saving*



Switch to LED
lighting
*(savings from one 15 W
LED bulb)*

**Annual savings in kg CO₂e based on assumptions for average consumption for India*

MINIMIZE EMISSIONS FROM Travel

2,000

Carbon Saving*



Switch to electric
vehicles
(using clean electricity)

1,300

Carbon Saving*



Carpool to work
(every small car off the road
on working days)

1,000

Carbon Saving*



Use public transport
and active travel -
bicycle and walking

240

Carbon Saving*



Leverage virtual
meeting platforms
(Avoid one round-trip 2,000
km] by air)

140

Carbon Saving*



Regularly inflate
vehicle tyres
(improves vehicle mileage)

**Annual savings in kg CO_{2e} based on assumptions for average consumption for India*

MINIMIZE
EMISSIONS FROM

Lifestyle choices

1,000kg
every year for 100 years*



Participate in forest conservation and tree plantation drives. Plant and nurture 10 trees

1,200
Carbon Saving*



Take the stairs instead of elevator
(Reduce 50 lift moves between ground and third floor)

400
Carbon Saving*



Buy locally grown fruits & vegetables, as much as possible
(saves transportation emissions)

240
Carbon Saving*



Increase plantbased options in your diet
(reduce red meat)

10
Carbon Saving*



Find alternatives for disposable plastic products – like reusable bags, bottles, straws, etc

**Annual savings in kg CO_{2e} based on assumptions for average consumption for India*

Assignment 1: Carbon Footprint Calculation

Use the [Tata Sustainability Group calculator](#) to get an estimate of your carbon footprint. Please assume that you are living at your home for the calculations.

How many people stay in your home? What kind of home do you have? How many storeys in your building? Which floor(s) is your home at?

Please provide the calculations of your annual electricity bill in terms of units consumed. Which months is the bill higher and why?

Please share the calculations of annual cooking fuel consumption.

Please provide the calculations of your transport related emissions.

How does your overall carbon footprint compare with an Indian and at the world level on an average? What are your assumptions for this calculation? What are the aspects which are excluded from this calculation?

What dates have you considered for your yearly calculation? Here is a [spreadsheet](#) to help with the computation of your travel, electricity and cooking bills.

Can you find five or more ways to reduce your carbon footprint? Can you become a Net Zero Human Being? It is suggested that the trees can absorb approximately 25 kg of CO₂ per year ([CO₂ absorption potential of a tree](#)). Could planting trees help in bringing your energy consumption down?

Deadline

19th August 2024

Can we improve this carbon footprint estimate?

- Measuring energy consumption in buildings
- Understanding travel related emissions
- Estimating food related emissions
- Estimating product related emissions
- How about internet?
- Anything else?



Measuring energy consumption in buildings

Dictionary

Definitions from [Oxford Languages](#) · [Learn more](#)

English ▼



energy

/ˈɛnədʒi/

noun

1. the strength and vitality required for sustained physical or mental activity.
"changes in the levels of vitamins can affect energy and well-being"

Similar:

vitality

vigour

life

liveliness

animation

vivacity

spirit

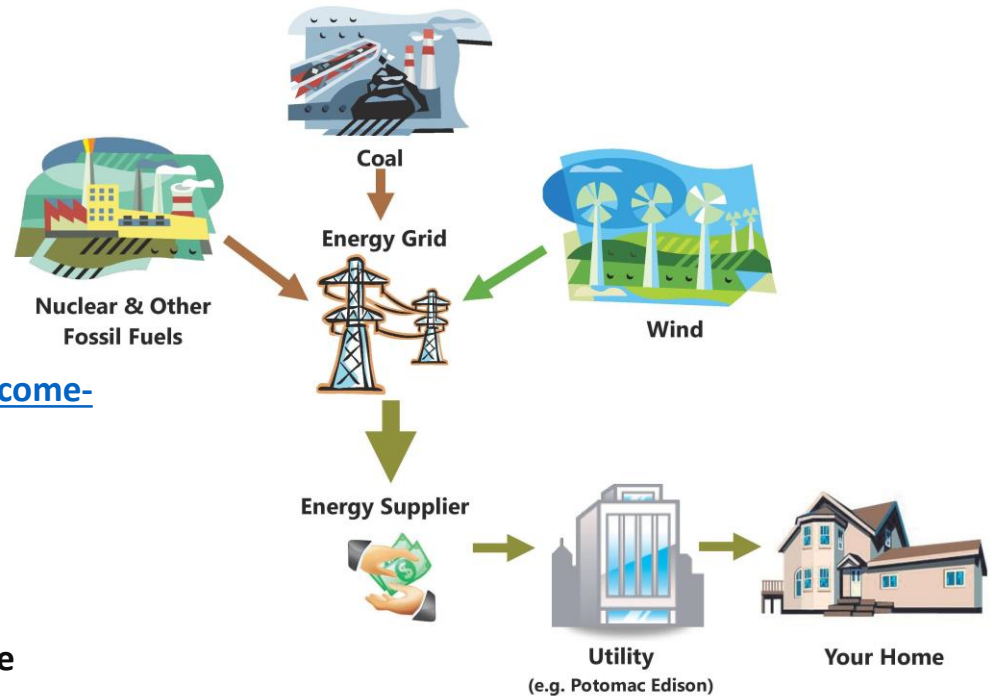


2. power derived from the utilization of physical or chemical resources, especially to provide light and heat or to work machines.
"nuclear energy"

Similar:

power

What powers the world?



Where Does Energy Come From?

<https://dcmp.org/media/7454-where-does-energy-come-from>

Energy 101: Where Electricity Comes From

<https://www.youtube.com/watch?v=AKuoleupGHc>

Thermal Power Plant | Boiler | Economizer | Turbine

<https://www.youtube.com/watch?v=m4CwaKTQikw>

How to make 220V Steam Dynamo - DIY Energy Generator

<https://www.youtube.com/watch?v=vfth8RT1j98>

Power Generation

<https://www.youtube.com/watch?v=F6YW8h8cML4>

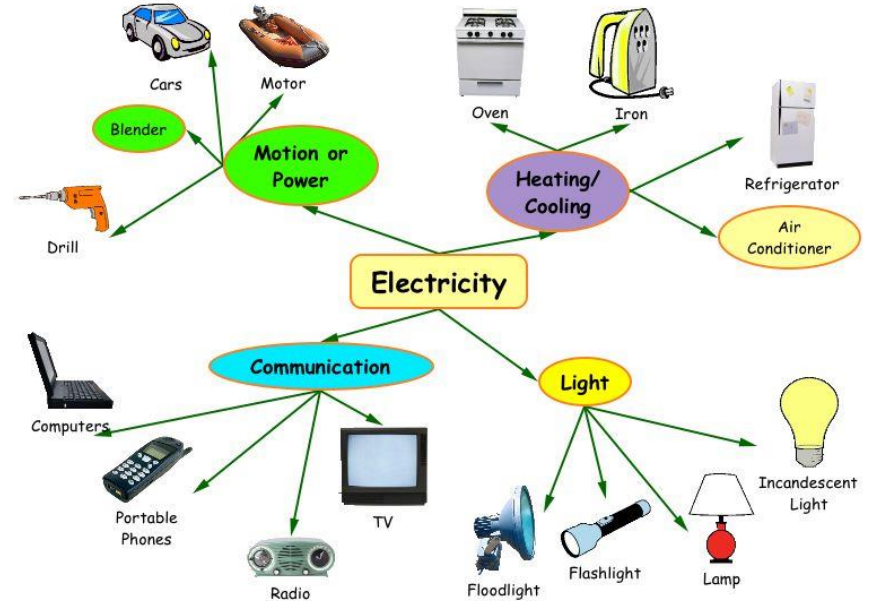
Source:

<https://frederickgreenchallenge.org/pages/handbooks/rs-handbook/chapter1>



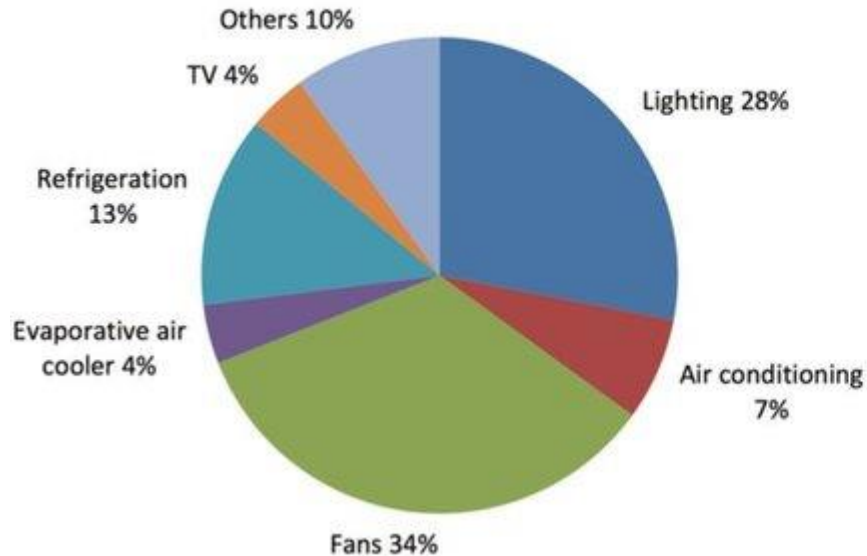
Energy use in Iron & Steel Industry

Uses Of Electricity In Our Daily Life

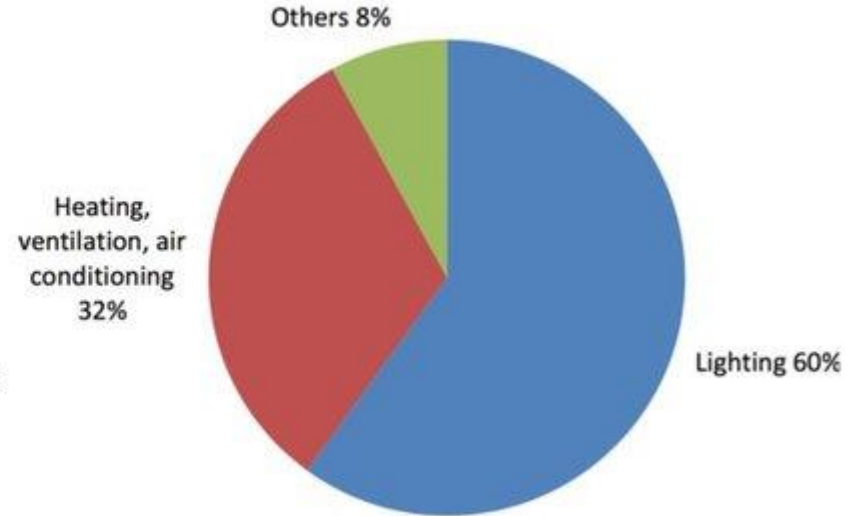


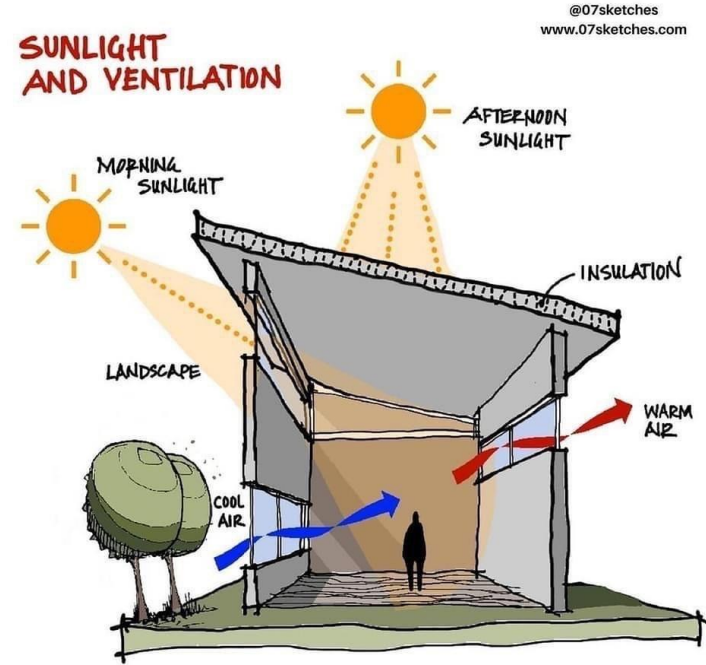
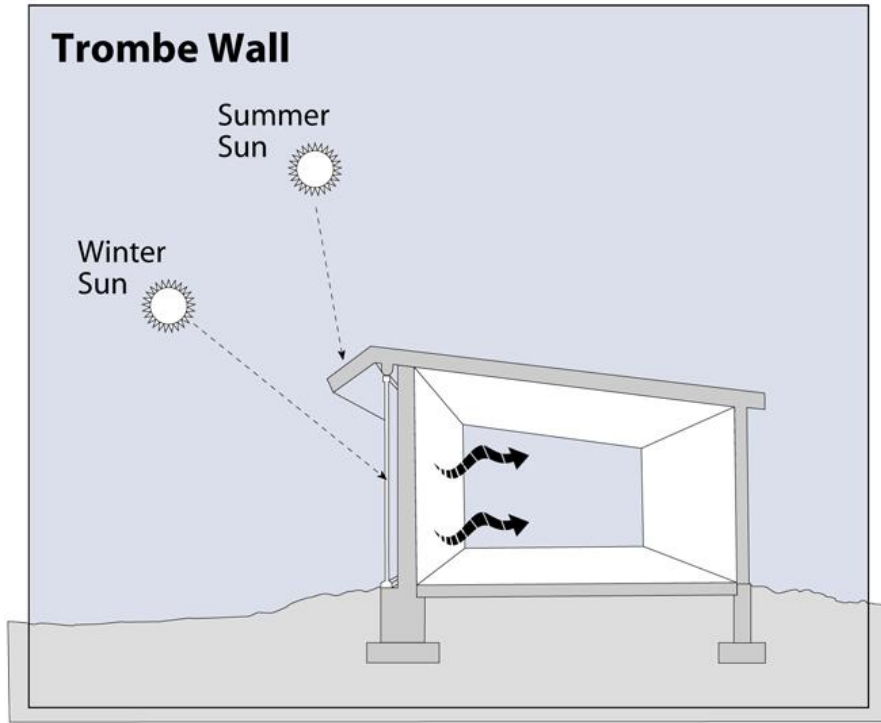
Energy use in buildings in India

Residential buildings



Commercial buildings

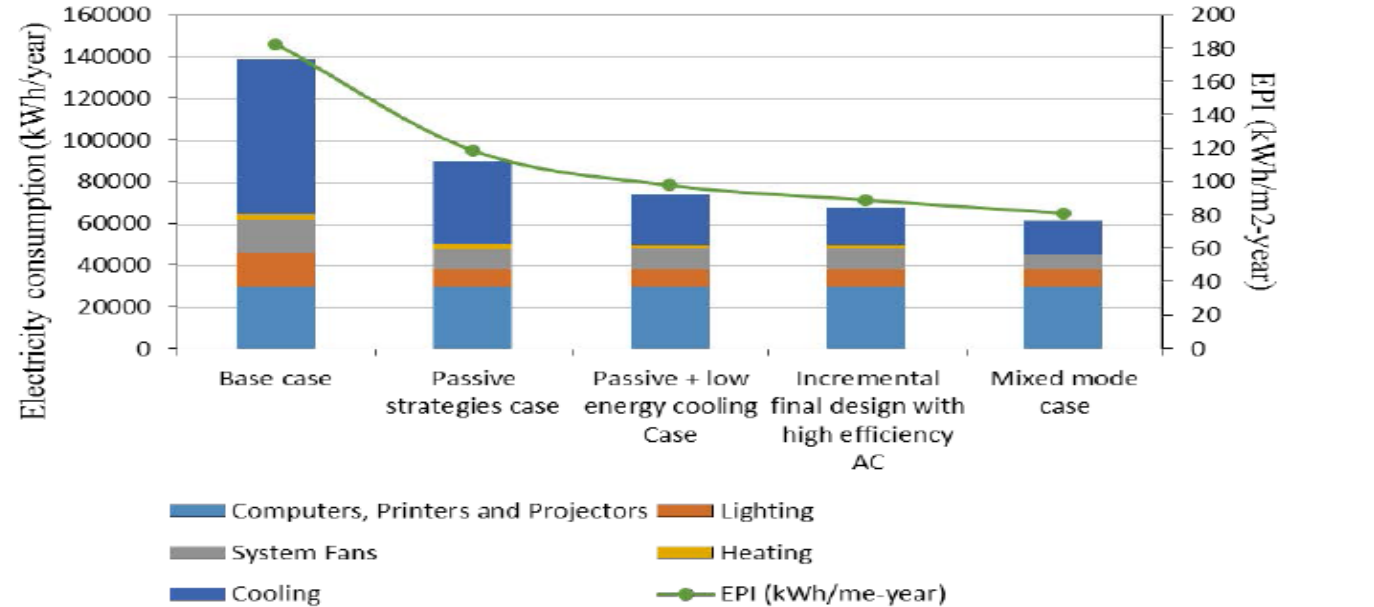




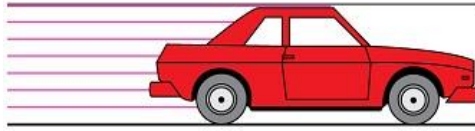
Eco-friendly ways of energy use

Source: <https://www.energy.gov/energysaver/passive-solar-homes>

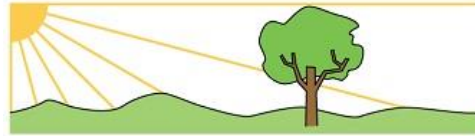
New Delhi climate



Energy transformation



An automobile engine changes chemical energy to mechanical and heat energy.



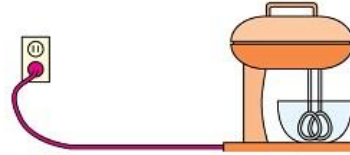
A tree changes radiant energy to chemical energy.



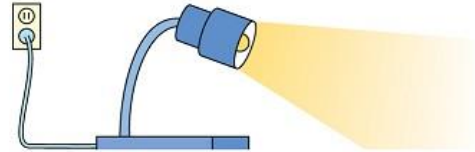
Hammering a nail changes mechanical energy to deformation and heat energy.



A thermonuclear reaction changes nuclear energy to radiant and heat energy.



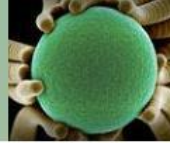
An electric mixer changes electrical energy to mechanical and heat energy.



A lamp changes electrical energy to radiant and heat energy.

Law of conservation of energy states that energy can change forms, but is neither created nor destroyed.

Units of Energy



1 calorie = heat required to raise
temp. of 1.00 g of H_2O by 1.0°C .

1000 cal = 1 kilocalorie = 1 kcal

1 kcal = 1 Calorie (a food
“calorie”)

SI units for energy: joule (J)

1 cal = exactly 4.184 J



James Joule
1818-1889

KNOW YOUR METER



- Meter Display
- Phase LED
- Calibration LED
- ISI marking
- Meter Rating plate

LCD Display

LCD Display Parameter/Symbol	Meaning
KWH	Current Meter Reading in Kilowatt Hour
MD KW	Current Month Maximum Demand in Kilowatt
I ph	Instantaneous Current
V	Instantaneous Voltage



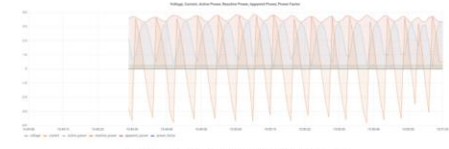
Units of Power

- Power is Energy used per unit Time
- SI unit of Power is Watt = Joule per second
- 1 kW = 1000 W
- Electrical Power (P) = Voltage (V) X Current (I)
- 1 unit of electrical energy consumed = 1 kWh = Power (kW) X Time (hour)

Energy measurements using Energy Monitors



data from a new AC : 1.25 kW max



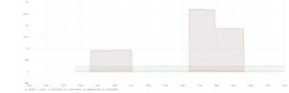
data from a old AC : 3 kW max



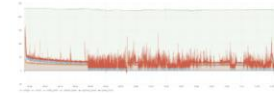
Fan : 80 W



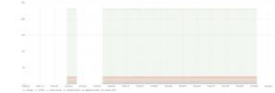
9 Fin oil Heater : 2 KW max



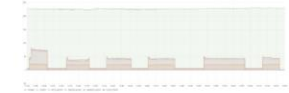
Geyser : 2 KW max



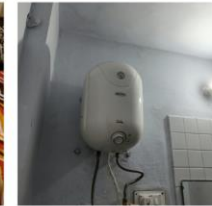
Laptop : Fluctuating (100 W max)

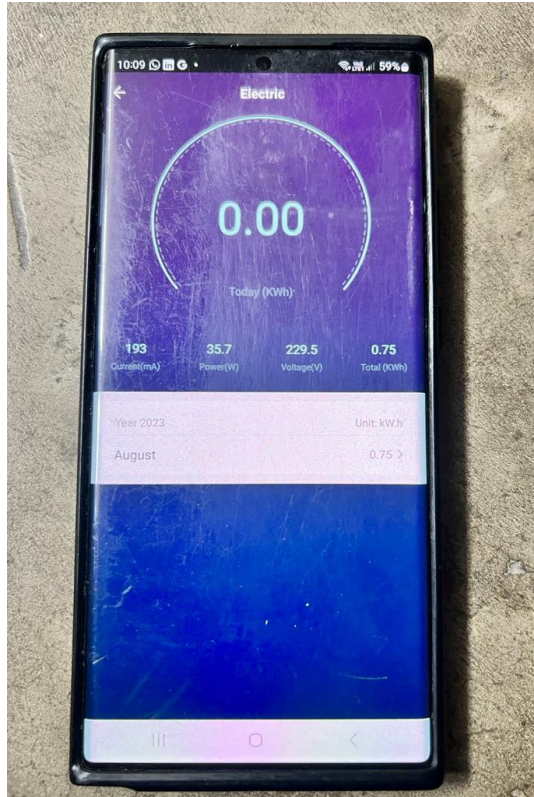


Light : 10 W max



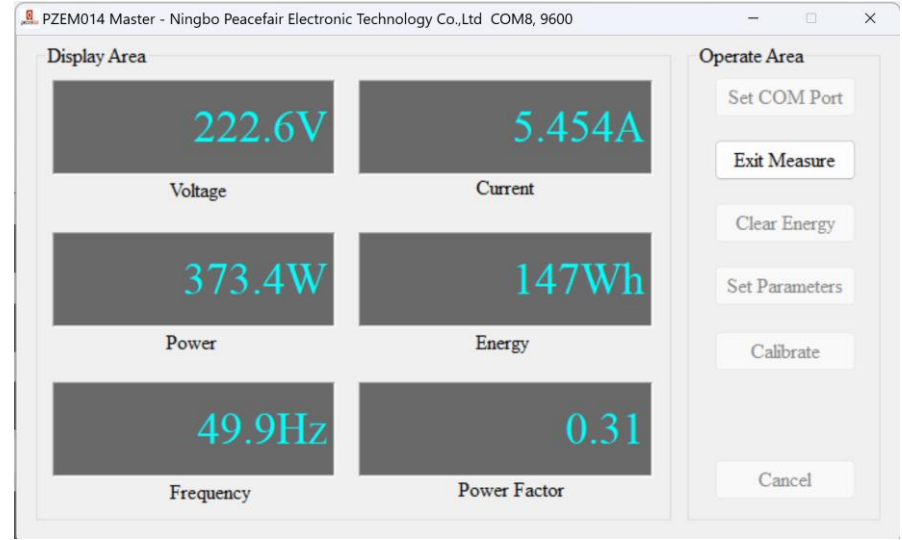
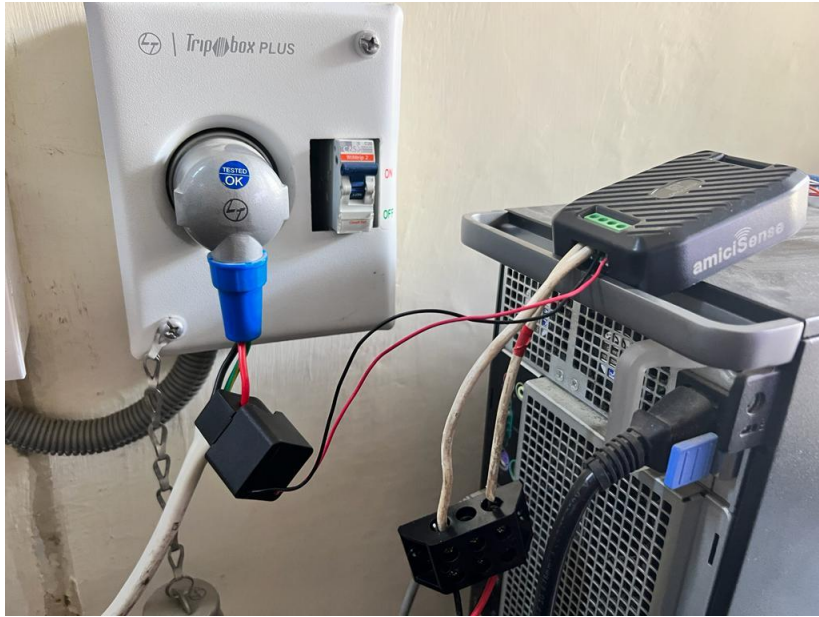
Fridge : 80 W max





Measuring
Power
consumption
using a
Smart Plug

[Power consumption by Household Appliances](#)



Energy Meter (with CT)

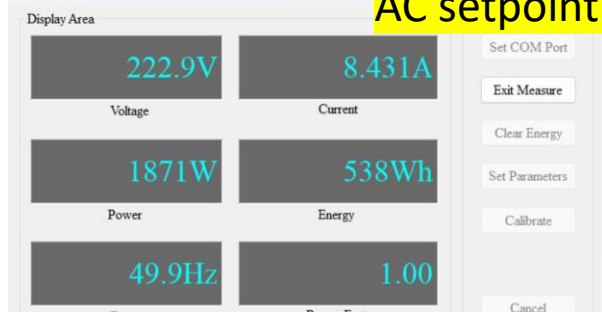
Power Factor = True Power/Apparent Power

Apparent Power = $373.4 / 0.31 = 1205 \text{ VA}$

Measurements for an inverter AC

PC20014 Master - Ningbo Peacetair Electronic Technology Co., Ltd. LUMI, 201

AC setpoint = 23.5 C



AC off, ODU running



AC setpoint = 30 C



AC off, ODU also off



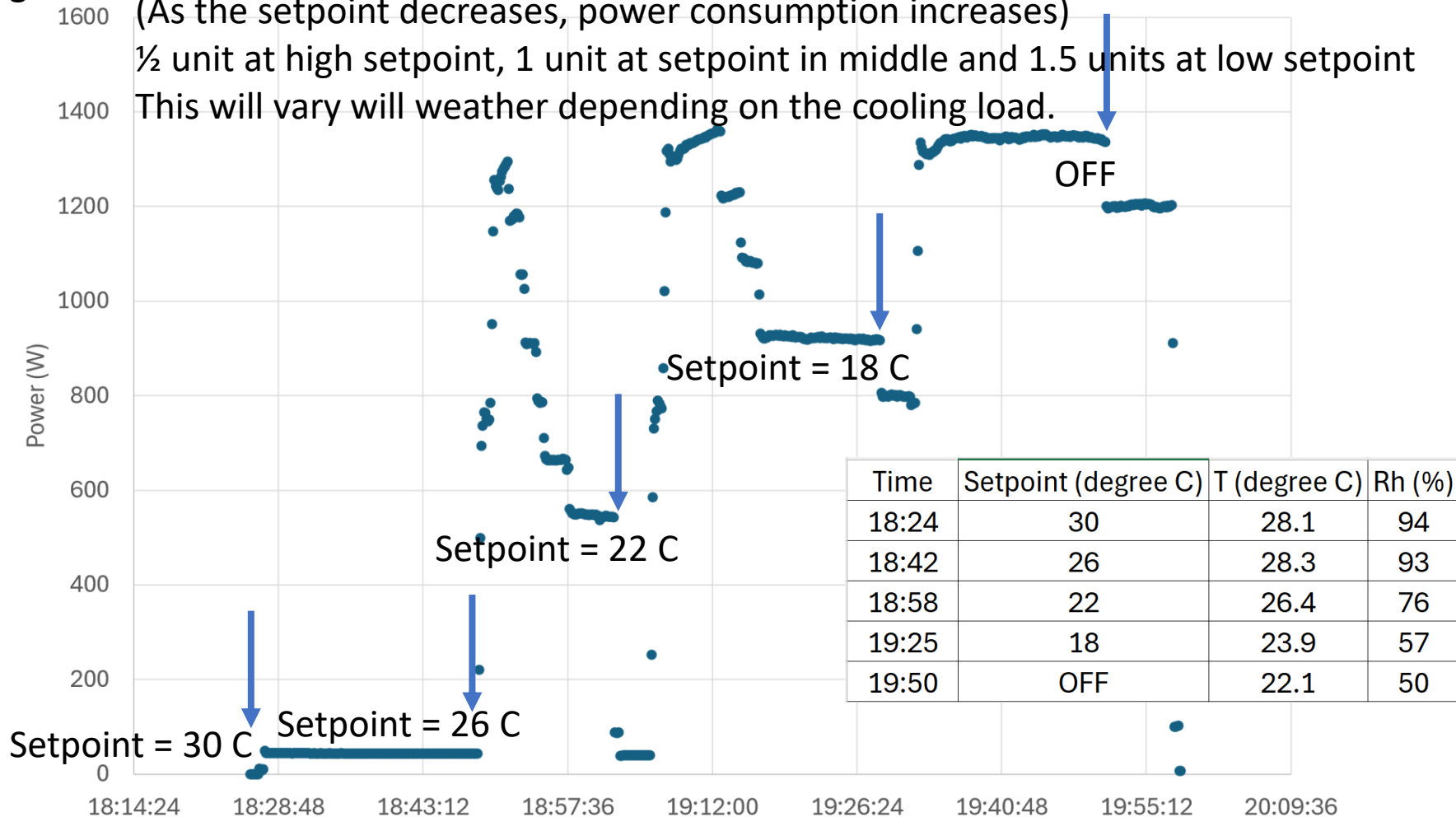
11-Aug-2024

AC Power vs Time for different setpoints

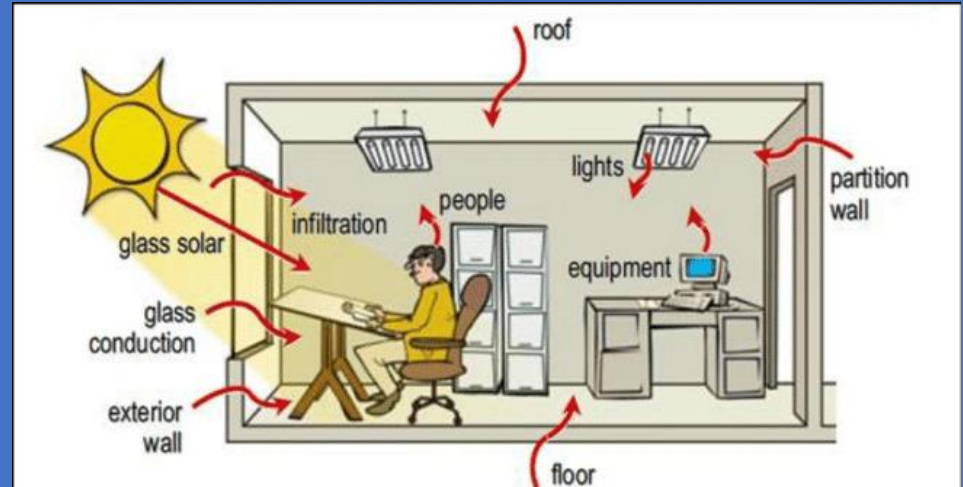
(As the setpoint decreases, power consumption increases)

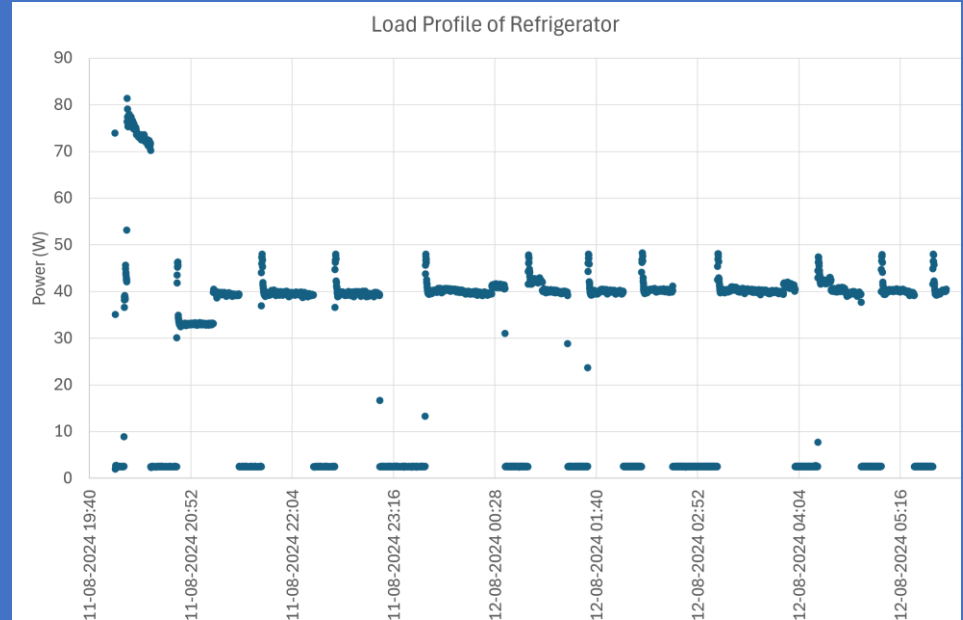
½ unit at high setpoint, 1 unit at setpoint in middle and 1.5 units at low setpoint

This will vary with weather depending on the cooling load.



Cooling load components for an AC

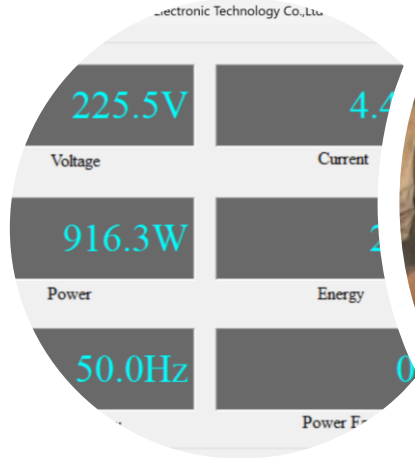




(Average Power Consumption = 28 W)

<https://www.amazon.in/Voltas-Beko-Frost-free-Refrigerator-Silver/dp/B07KV2FL7P?th=1>

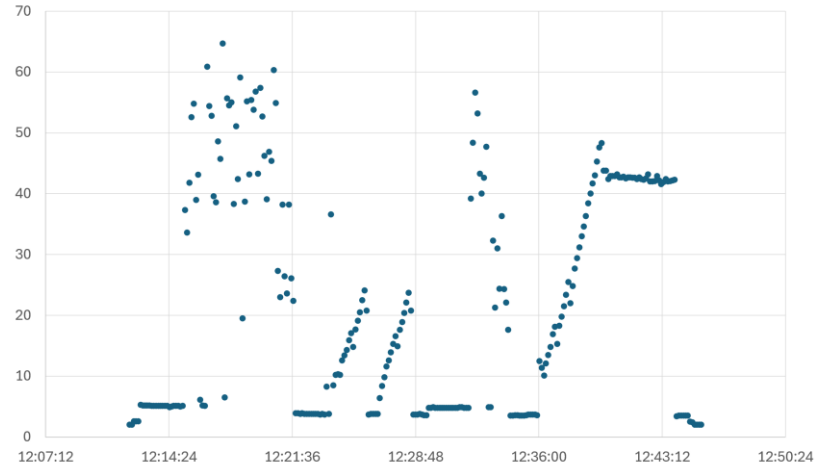
Load Profile of an Iron

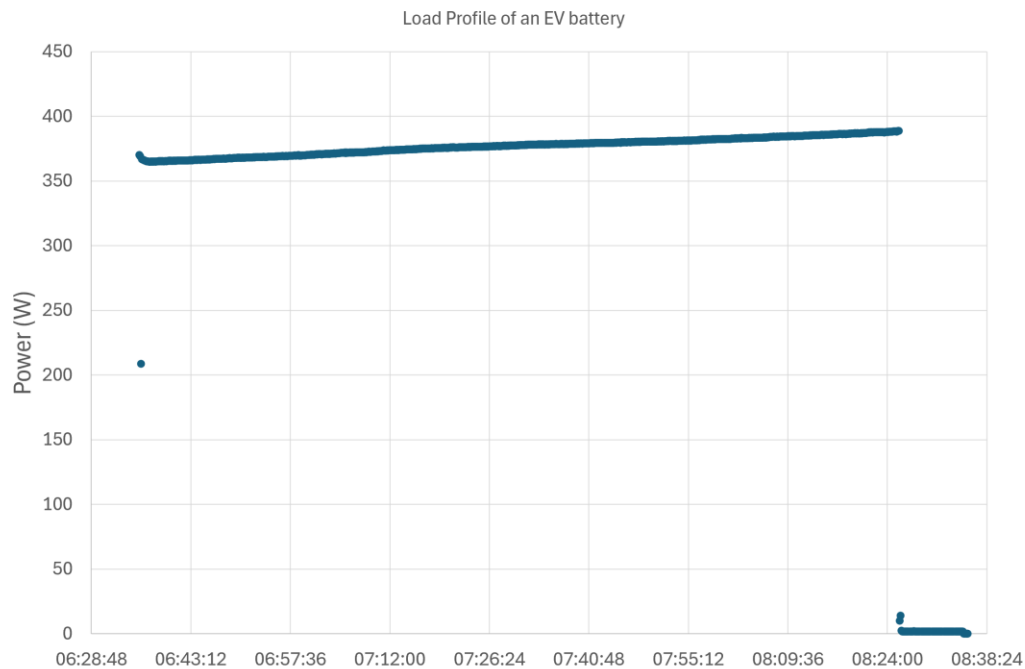




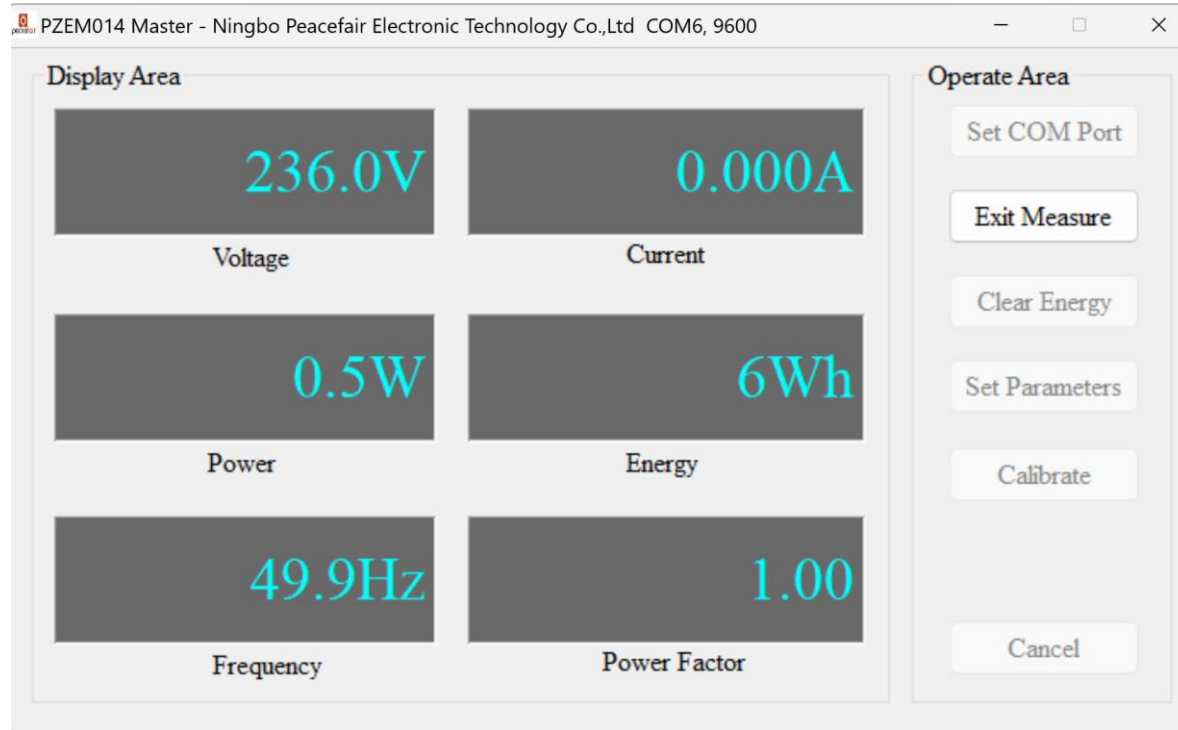
LG			
Model	T8088NEDLE T8088NEDLA	T7588NDDLE T7588NDDLA	T7288NDDLE T7288NDDLA T7288NDDL T7288NDDL T7288NDDL T7288NDDL
Capacity			
Weight	7.0 kg	6.5 kg	6.2 kg
Dimension (WxDxH)mm	540x540x910	540x540x870	
Input (Watt)			
Rated Voltage and Frequency - AC220V, 50Hz			
230W			
Manufactured by: LG Electronics India Pvt. Ltd.			

Load Profile of a Washing Machine
for a Quick Wash, Rinse and Spin Cycle





It typically charges in 4 hours from no charge to full charge.



Vampire Power for Mobile Phone
[Samsung Galaxy Note 20 Ultra 5G](#) (fully charged)

Electricity Bill



BSES Rajdhani Power Limited

Vaccine + Mask + Washing hands + Social Distancing = Victory over Covid

EBILL Customer

Bill of Supply for Electricity

Due Date (देय तिथि):

Name : Dr. JAY . DHARIWAL
Billing Address : S/O DR RAJ DHARIWAL 05 VAISHALI APARTMENTS
IIT DELHI
HAUZ KHAS NEAR BER SARAI DELHI 110016
Mobile / Tel. No. : 7990076246
Email ID : jaydhariwal@gmail.com
District / Division : Hauz Khas
Walking Sequence : IIT010180A0BA
Bill Month : FEB-24
Bill Date : 12-02-2024

Sanctioned Load : 1.00 (kW)
Contract Demand :
M D I : 3.20 (kW)
Power Factor : 0.998
Pole No. : HKSPV065S1
Meter Reading Status : DL
Cycle No. : 12
Tariff Category : Domestic [Residential]

GA No. : 153863565
Energisatation Date : 18-07-2022
Meter Type : 1PSK
Supply Type : LT
Bill No. : 100188601460
Bill Basis : Actual
O.D. No. : R/23/10390723196
CCTV Tagged : No
Street Light Tagged : No
Wi Fi Tagged : No

Customer Care Centre No. (ग्राहक सेवा केन्द्र का नंबर) 19123 (24x7 Toll Free)

Meter No. (मीटर नं.)	Unit (यूनिट)	Billed Consumption (Current)		Billed Consumption (Previous)		Multiplication Factor (गुणांक)	Current Consumption (वर्तमान खपत)	
		Date of Meter Reading (मीटर रीडिंग की तिथि)	Reading (रीडिंग)	Date of Meter Reading (मीटर रीडिंग की तिथि)	Reading (रीडिंग)		Days (दिन)	Unit (यूनिट)
46129275	kWh	09-02-2024	1738.00	09-01-2024	1283.00	1.00	31	455.00
46129275	kW	09-02-2024	3.20	09-01-2024		1.00		3.20
46129275	kVAh	09-02-2024	1739.00	09-01-2024	1283.00	1.00	31	456.00
46129275	kVA	09-02-2024	3.20	09-01-2024		1.00		3.20

Billing Details (बिल का विवरण)

Current Period Charges (वर्तमान अवधि का शुल्क) (10-01-2024 to 09-02-2024)

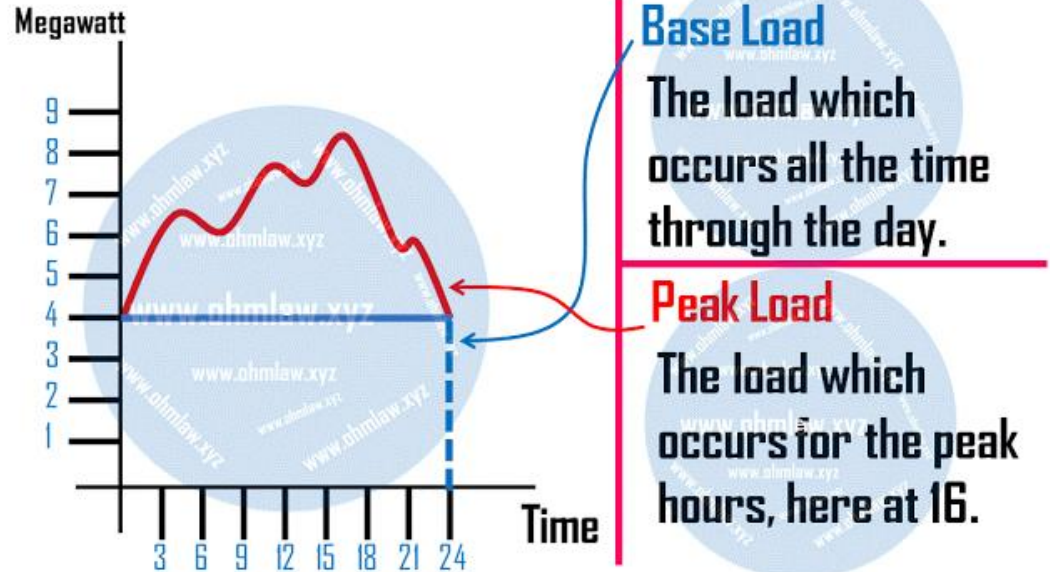
Adopt e-bill, Save trees, Provide email details to us through website/call/email.

Fixed Charge "A" ₹ (स्थायी शुल्क)	Consumption Measured During (खपत अवधि माप)	Energy Units Consumed / Billed (खपत / बिल में कमिल विद्युत यूनिट)	Slabwise Energy Charge (लैबल आधारित विद्युत शुल्क)		Slabwise Power Purchase Adjustment Charge (फिक्स्ड स्लाबी विद्युत अन्तः समायोजन शुल्क)		Time of Day (TOD) Charge टोलल ऑफ डे (टोललबी) शुल्क		Surcharge @ 8% on (Energy Charge + Fixed Charge - Rebate) = "E" ₹ (विद्युत शुल्क + फिक्स्ड शुल्क - रीबेट पर 8% अधिवस)	Electricity Tax @ 5% on Energy Charge, Surcharge on Energy Charge, PPAC amount & TOD Surcharge/Rebate amount = "F" ₹ (विद्युत शुल्क, विद्युत शुल्क में अधिवस, सुराज पर 5% रकम टोललबी अधिवस/ रकम पर 8% विद्युत अन्तः)	Total Amount (K = A+B+C+D+E+ F+G+H+I+J) ₹ (कुल राशि)
			Units Rate ₹ (यूनिट दर)	Amount = "B" ₹ (रकम)	PPAC % on B (B पर फिक्स्ड प्रतिशत)	PPAC Amount = "C" ₹ (फिक्स्ड रकम)	TOD % on "B" (B पर टोललबी प्रतिशत)	TOD Surcharge/ Rebate Amount = "D" ₹ (टोललबी अधिवस/रकम रकम)			
20.40 1.02 Mth(s)		142.00	3.00	426.00	27.08	115.36			148.47		2808.87
		142.00	4.50	639.00	27.08	173.04					
PPAC on Fixed Charge = "G"		39.00	6.50	253.50	27.08	68.65					
		62.00	3.00	186.00	35.83	66.64					
		62.00	4.50	279.00	35.83	99.97					
		8.00	6.50	52.00	35.83	18.63					
CCTV Units											
0.00											
Street Light Units											
Wi-Fi Units											
Total Units = 455				Total (B) = 1835.50		Total (C) = 542.29		Total (D) =		0.00	

• ELECTRIC Reward points. Pay online between 20-02-2024 to 27-02-2024 and earn
• Redeem your e-ELECTRIC points, login to "My Account" on www.bsesdelhi.com

Scan & Pay
BSES

Demand side management



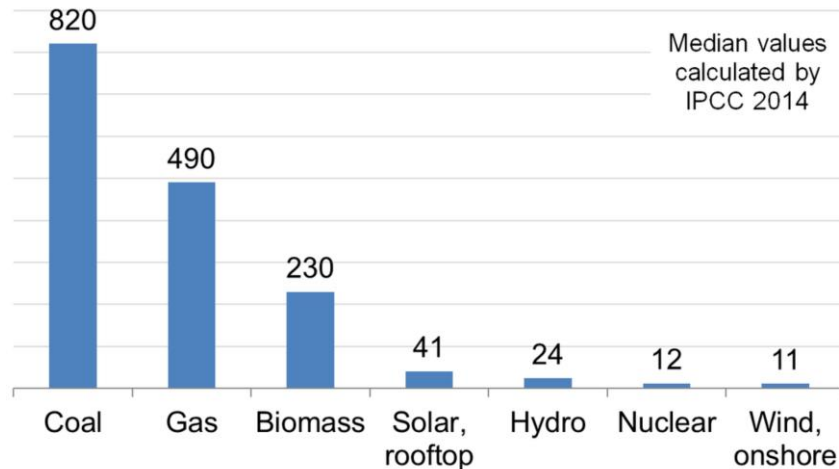
Shifting peaks – staggering the running of pump motors, AC, etc.
Behavioural Design

Assumptions at Station Level (only where data was not provided by station)

	Unit	Coal	Lignite	Gas-CC	Gas-OC	Oil	Diesel-Eng	Diesel-OC	Naphtha
Auxiliary Power Consumption	%	8.0	10.0	3.0	1.0	3.5	3.5	1.0	3.5
Gross Heat Rate	kcal /kWh (gross)	2,500	2,713	2,013	3150	2,117	1,975	3,213	2,117
Net Heat Rate	kcal /kWh (net)	2,717	3,014	2,075	3,182	2,193	2,047	3,330	2,193
Specific Oil Consumption	ml /kWh (gross)	2.0	3.0	n/a	n/a	n/a	n/a	n/a	n/a
GCV	kcal /kg (or m3)	3,755	n/a	8,800	n/a	10,100	10,500	10,500	11,300
Density	t /1,000 lt	n/a	n/a	n/a	n/a	0.95	0.83	0.83	0.70
Specific CO ₂ emissions	tCO ₂ /MWh	1.04	1.28	0.43	0.66	0.66	0.59	0.96	0.61

n/a = not applicable (i.e. no assumptions were needed)

Lifecycle CO₂-equivalent emissions (g/kWh)

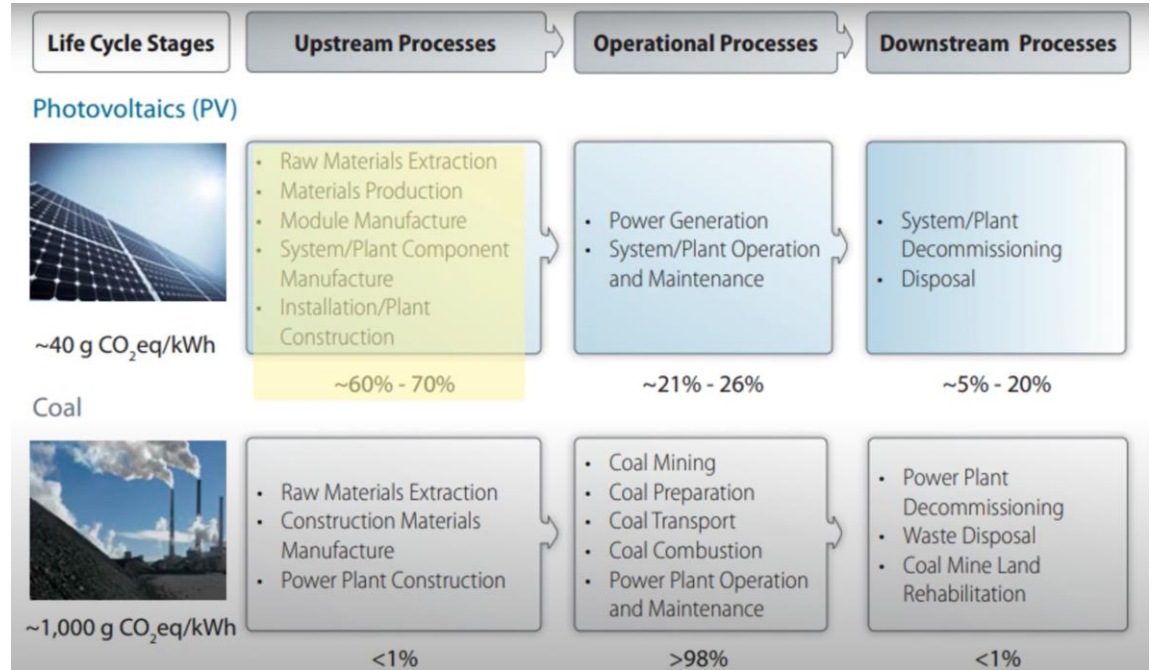


Emission Factors

Source: CO₂ baseline database for the Indian Power Sector, December 2022

<https://www.solar.com/learn/what-is-the-carbon-footprint-of-solar-panels/>

Coal vs. Solar PV GHG emissions



Computing emissions for how we plug in

Equipment type	Equipment Quantity	Operating hours per day	Number of days used per year	Rated Power consumption (W) of the equipment	Power consumption (W) of the equipment	Shared with how many people	Energy consumption (kWhr)	Carbon Footprint (kg CO2 equivalent)
Laptop	1	10	350	135	100	1	$=10 \times 100 \times 350 / 1000 = 350$	280
Refrigerator	1	24	365		28	2	$=24 \times 365 \times 28 / (2 \times 1000) = 123$	98
Fan1	1	16	270 (except winter)		40	1	$=16 \times 270 \times 40 / 1000 = 173$	138
Fan2 and so on	1	8	270		40	2	$=8 \times 270 \times 40 / (2 \times 1000) = 43$	35

Energy consumption (kWhr) = (Equipment quantity X Operating hours per year X Power consumption (W) of one equipment) / (Shared with how many people X 1000)

Carbon Footprint (kg CO2 eq) = Energy consumption X Emission Factor

Refer to [Home Electricity Footprint document from TERI](#)

The world is your oyster!



shutterstock.com · 612268772

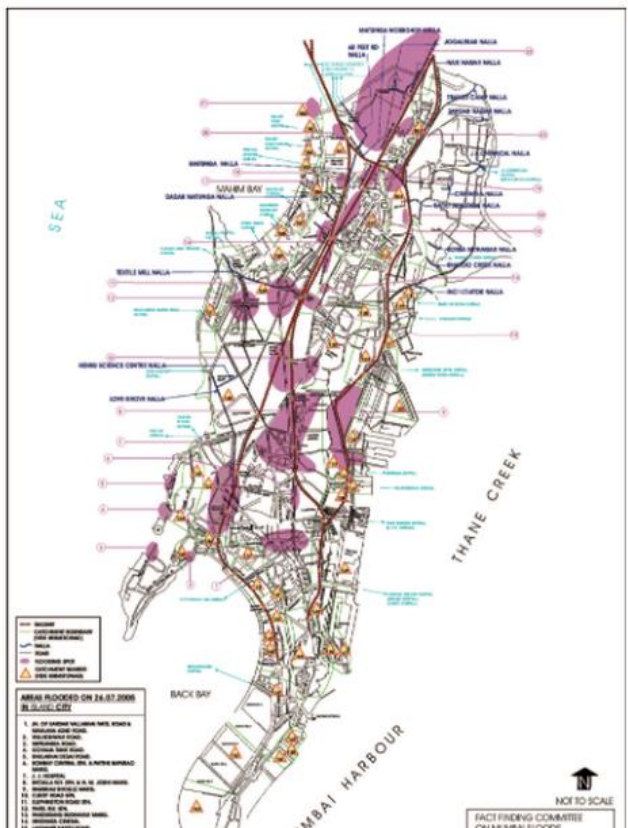




Walkable cities in the world

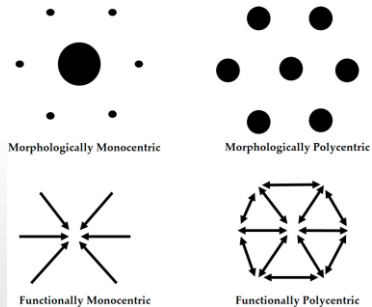
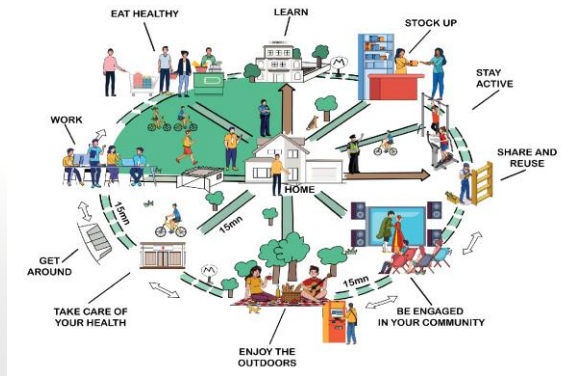


<https://www.forbes.com/sites/laurabegleybloom/2024/06/30/ranked-the-30-most-walkable-cities-in-the-world-according-to-a-new-report/>

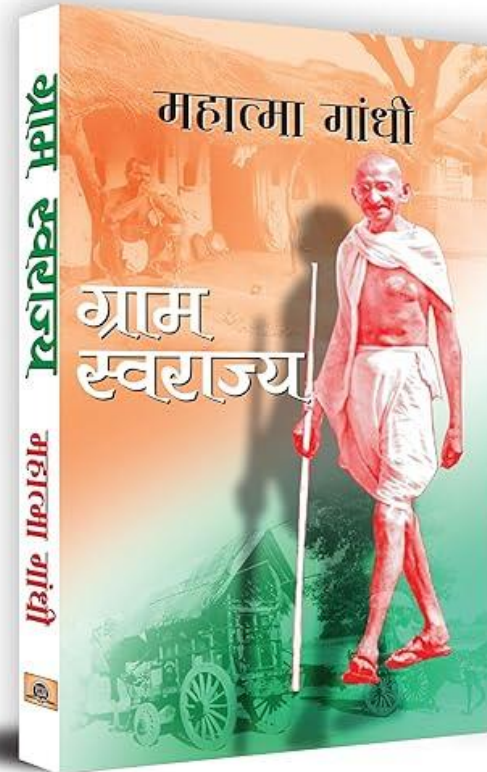
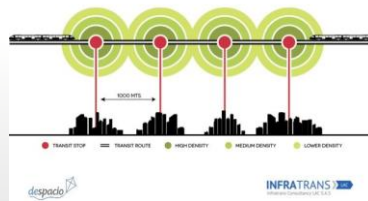


Cities with congestion or less walkability

A 15 minute city



Transit Oriented Development (TOD) - compact nodes linked by mass transit



<https://www.mkgandhi.org/articles/gram-swaraj-its-relevance-in-present-context.php>

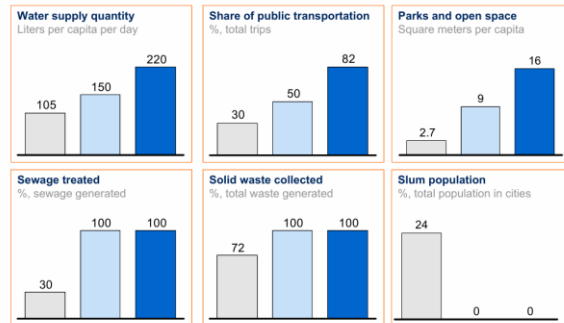
<https://vikaspedia.in/social-welfare/rural-poverty-alleviation-1/rashtriya-gram-swaraj-abhiyan>



Exhibit 7

The current performance of India's cities is poor across key indicators of quality of life

■ Current
■ Basic service standard
■ Best in class

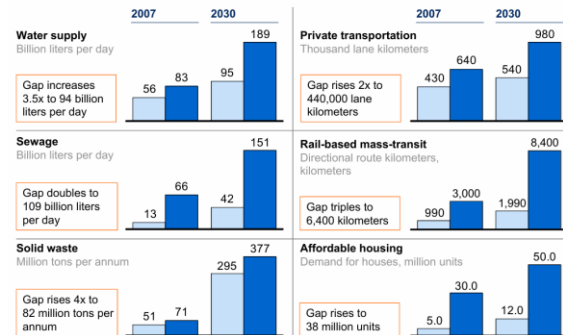


SOURCE: United Nations; press search; City Development Plans; The Energy and Resources Institute; Planning Commission; Census 2001; Central Pollution Control Board; McKinsey Global Institute analysis

Exhibit 8

On current trends, quality of urban services will deteriorate quite sharply by 2030

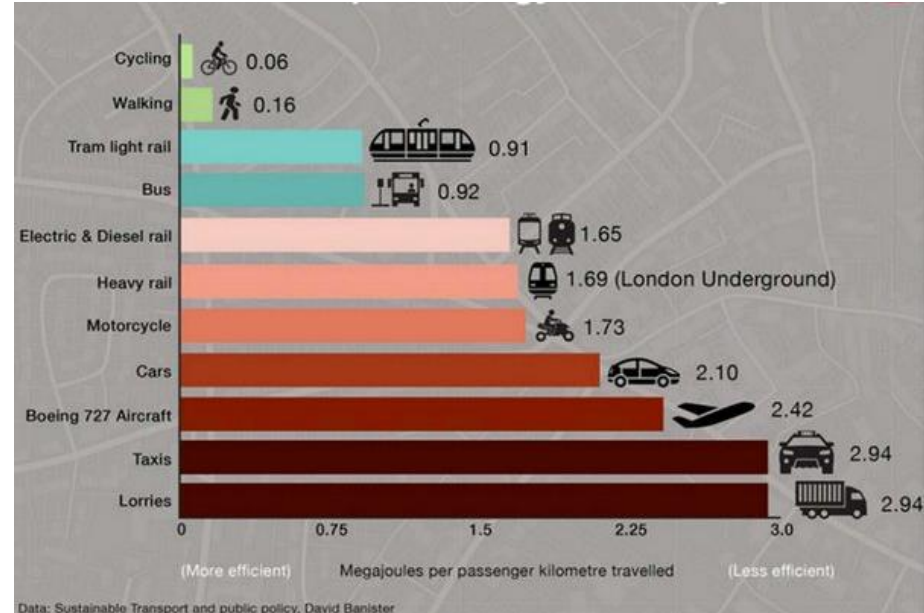
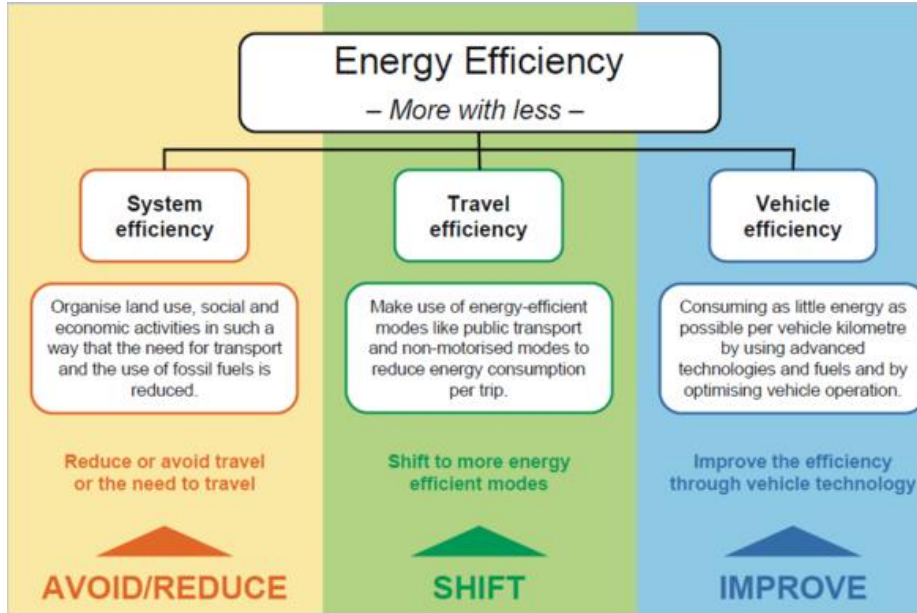
■ Supply
■ Basic service demand



SOURCE: United Nations; Handbook of benchmarks; Ministry of Urban Development; W. Smith; Transportation Policies and Strategies in Urban India; National Council for Applied Economic Research; McKinsey Global Institute analysis

<https://theurbanmycelium.com/william-whyte-recipe-for-good-public-spaces/>

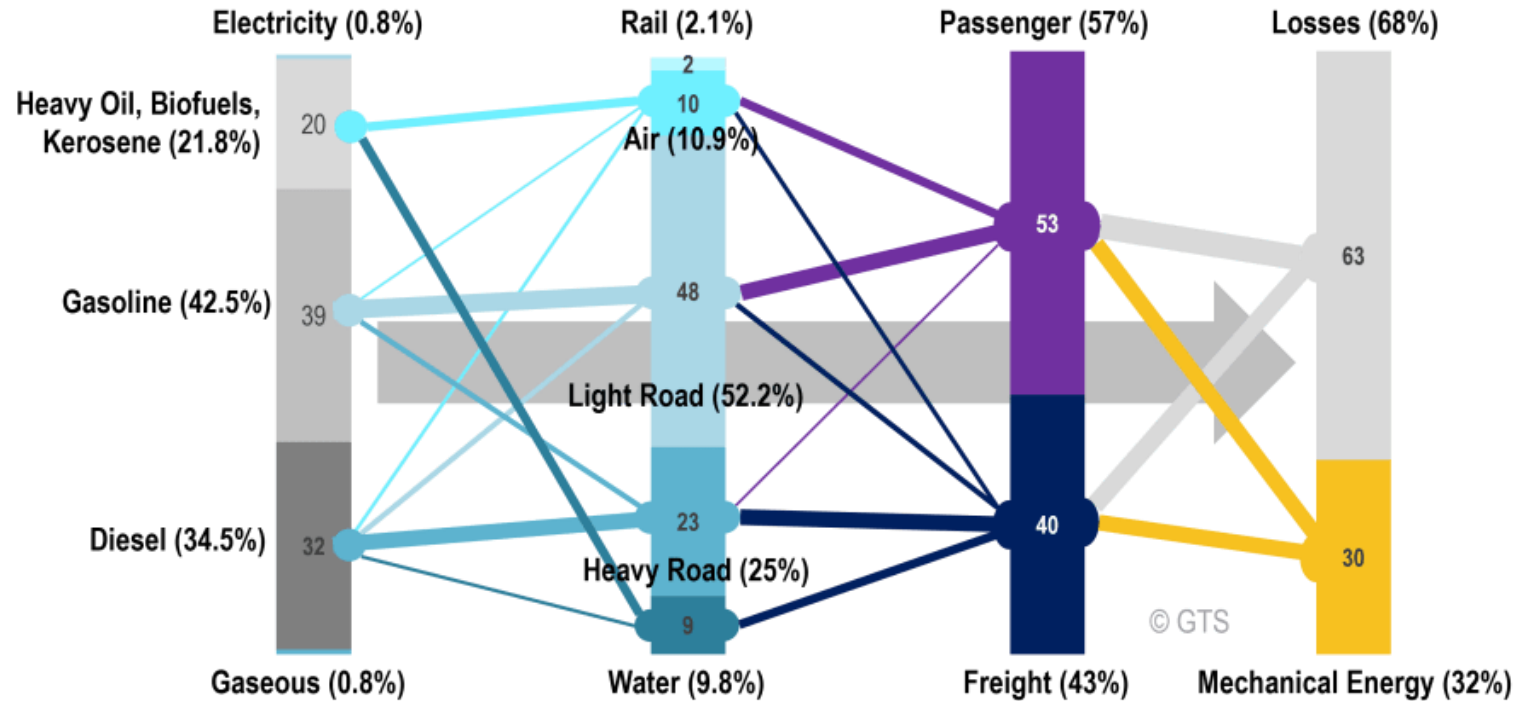
Energy Efficient mode of transportation



FUEL	SOURCES	PROCESSES
Liquid petroleum fuels Gasoline Diesel Kerosene Jet fuel Bunker fuel	Conventional oil fields (ground and shore-based) Non-conventional sources (tar sands, fracking)	Refining
Liquid synthetic fuels	Natural gas, coal	Gasification
Biodiesel	Oilseed crops Biomass from crops or wastes	Esterification, hydrogenation Gasification
Ethanol	Plant materials (corn, sugar cane) Cellulose	Saccharification, distillation Gasification, pyrolysis
CNG	Natural gas	Gasification
Electricity	Coal, gas, petroleum, nuclear, hydro, solar, wind	Electric generator (source dependent)
Hydrogen	Natural gas (grey hydrogen) Electricity (Green/Yellow hydrogen) Biomass (Turquoise hydrogen)	Steam reforming, compression Electrolysis Pyrolysis

Fuel Production Processes

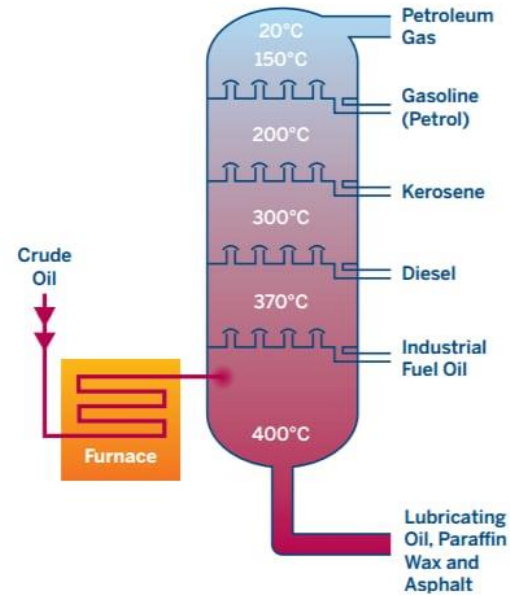
<https://transportgeography.org/contents/chapter4/transportation-and-energy/#:~:text=The%20dominance%20of%20petroleum%2Dderived,a%20more%20complicated%20storage%20system.>



Energy consumption by Fuel Type for Transport Sector

<https://transportgeography.org/contents/chapter4/transportation-and-energy/#:~:text=The%20dominance%20of%20petroleum%2Dderived,a%20more%20complicated%20storage%20system.>

Crude Oil extraction



How does 1 litre of petrol yield 2.3 kg of CO₂ emissions?

Gasoline is composed of hydrocarbons, which are hydrogen (H) and carbon (C) atoms that are bonded to form hydrocarbon molecules (C_xH_y). Air is primarily composed of nitrogen (N) and oxygen (O₂).

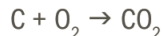
A simplified equation for the combustion of a hydrocarbon fuel may be expressed as follows:

Fuel (C_xH_y) + oxygen (O₂) + spark → water (H₂O) + carbon dioxide (CO₂) + heat

In this combustion reaction, we see that the hydrogen from the gasoline combines with oxygen from the air to produce water (H₂O). Similarly, the carbon from the fuel combines with the oxygen from the air to produce carbon dioxide (CO₂). The combustion process also produces heat that is converted into the mechanical energy that propels the vehicle.

So it's the oxygen from the air that makes the exhaust products heavier.

Now let's look specifically at the CO₂ reaction. This reaction may be expressed as follows:



Carbon has an atomic weight of 12, oxygen has an atomic weight of 16 and CO₂ has a molecular weight of 44 (1 carbon atom [12] + 2 oxygen atoms [2 x 16 = 32]).

Therefore CO₂ is 3.67 times heavier than carbon (44 ÷ 12 = 3.67).

This is how 1 L of gasoline, which contains about 0.63 kg of carbon, can produce about 2.3 kg of CO₂ (3.67 × 0.63 kg = 2.3 kg).

Petrol consists of Octane C₈H₁₈ [= 12*8/(12*8+18) = 84% Carbon] and other hydrocarbons.

Petrol density = 0.75 kg/litre

Can you do this for Diesel/CNG?

Fuel consumption for a flight

Basis 1 for calculation: from fuel consumption per flight

One way to calculate CO₂ emissions is from fuel consumption per flight.

A **Boeing 737-400** jet is typically used for short international flights.

For a distance of 926 km, the amount of fuel used is estimated to be 3.61 tonnes [1], including taxiing, take-off, cruising and landing.

Using a seating capacity of 164 [Wikipedia, viewed 28.2.08] and an average seat occupancy (or 'load factor') of 65% [2], this gives a fuel use of 36.6 g per passenger per km.

CO₂ emissions from aviation fuel are 3.15 grams per gram of fuel [1], which gives CO₂ emissions from a Boeing 737-400 of 115 g per passenger per km.

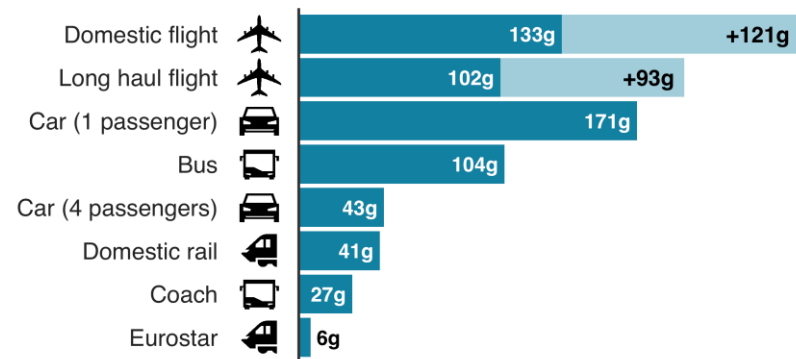
At a cruising speed of 780 km per hour [Wikipedia, 28.2.08], this is equivalent to 90 kg CO₂ per passenger per hour.

You can relate 90 kg CO₂ eq per person per hour to 50 billion tons CO₂ eq per year for planet!
Can you similarly compute the CO₂ emissions for a train/car/public transport/bike ride?

Emissions from different modes of transport

Emissions per passenger per km travelled

■ CO2 emissions ■ Secondary effects from high altitude, non-CO2 emissions



Note: Car refers to average diesel car

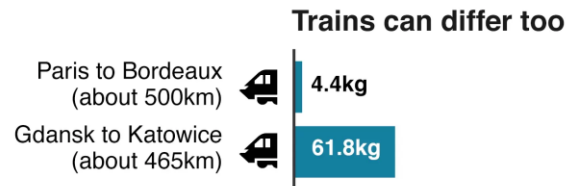
Source: BEIS/Defra Greenhouse Gas Conversion Factors 2019

BBC

Emissions from different journeys

Emissions per passenger for journey

■ CO2 emissions ■ Secondary effects from high altitude, non-CO2 emissions



Source: EcoPassenger

BBC

Emissions for how we get around

Travel type	km	CO2 per km	Total CO2	Comments
Air		0.121		
Rail		0.0078		
Metro		0.0139		
Bus		0.054		
Electric Bus		0.03782		
Cab		0.1431		
Electric Cab		0.1035		
Total				

	litre	CO2 per litre	Total CO2	Comments
Petrol	20	2.34		
Diesel	0	2.71		
CNG	0	2.07		
Total				

You can use other emission factors as well based on your own assumptions for the flight, rail, metro, etc.

Emissions about how we grow things





Emissions for how we make things



Measuring other emissions

Assignment 2

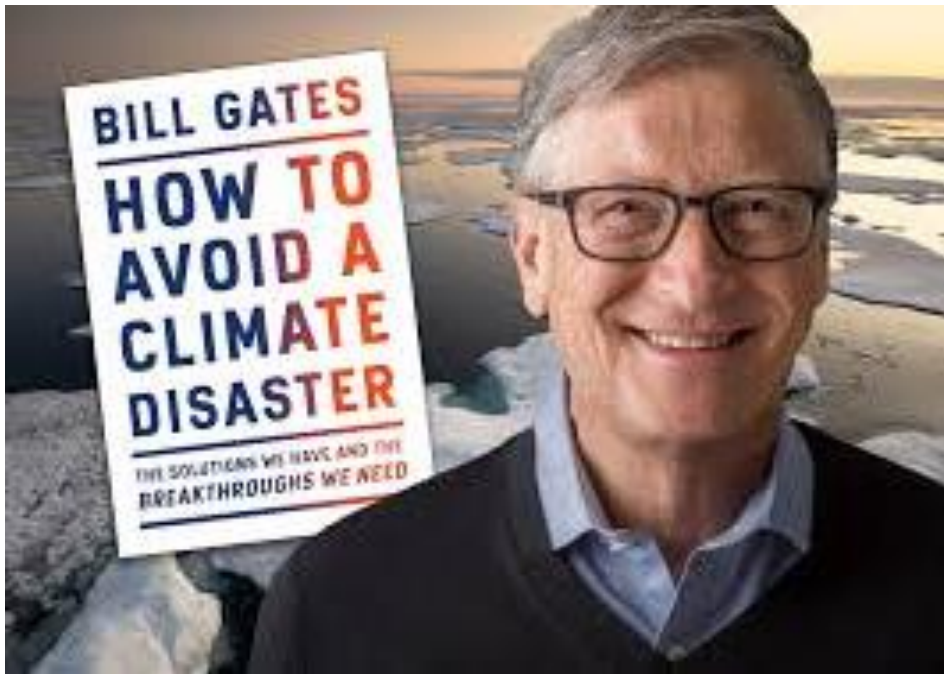
Please compute the annual energy consumption and the corresponding CO₂ emissions from the electricity use in your home and the places you frequently visit during your stay at your home. For instance, you might be going to the school, coaching class, office, etc. Please assume the emission factor for kgCO₂e/kWh as per your Electricity Distribution Company's energy supply. Please use this spreadsheet as a template.

How could you bring your electricity bill down? How much savings would it result in terms of cost and CO₂ emissions?

You have already computed transport emissions in assignment 1, which you can refine based on your improved understanding. Like before, please base your transport related emissions for your stay in your home. How can you bring these emissions down for yourself?

Let's say that you have to undertake a leisure trip from Delhi to your favorite destination (greater than 300 km away from Delhi). What would be the emissions (in kgCO₂e) for the travel to the place and back if you undertake the travel by flight, train, bus, car, bike or a mix of transportation options? Which mode of travel would you choose and why?

Last date: 1st September



Introduction: 51 Billion to Zero

- 1 Why Zero?
- 2 This Will Be Hard
- 3 Five Questions to Ask in Every Climate Conversation
- 4 How We Plug In
- 5 How We Make Things
- 6 How We Grow Things
- 7 How We Get Around
- 8 How We Keep Cool and Stay Warm
- 9 Adapting to a Warmer World
- 10 Why Government Policies Matter
- 11 A Plan for Getting to Zero
- 12 What Each of Us Can Do

How to get from 51 billion tCO₂e to 0?

Thank
you!

