Energy Efficiency

The efficient use of energy to reduce the amount of energy required to provide products and services; while minimizing energy waste.
Green Solution – Saving Energy

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Energy Efficiency

- Energy consumption reduction
- Fuel consumption reduction
- Cost reduction
- Emission reduction
- Loss reduction
- Long term sustainability
Energy Efficiency

A – Well Done!

Power Conversion

- 100 Watts AC power
- 30 Watts
- 20 Watts

Half of the power is lost as heat

Computer
- DC Power Supply
- Voltage Regulation Module
- CPU
- Motherboard

70 Watts
30 Watts

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Energy Efficiency

- **Preventing Energy Loss**
  - Energy efficiency is essential for long term sustainability
  - Energy is lost before it reaches the end user (for example, your home)
  - Improvement in technology, better insulation for buildings, computer aided delivery of energy (smart grids), switching of appliances when not in use can help to reduce energy loss.
TRANSPORT ENERGY EFFICIENCY

- Velomobile: 18 Joules per metre passenger
- Cycling: 60 Joules per metre passenger
- Walking: 160 Joules per metre passenger
- Electric rail: 200 Joules per metre passenger
- Urban rail: 432 Joules per metre passenger
- Electric car (Tesla): 517 Joules per metre passenger
- Electric car (Nissan Leaf): 560 Joules per metre passenger
- Bus: 920 Joules per metre passenger
- Diesel rail: 1650 Joules per metre passenger
- Heavy rail: 1690 Joules per metre passenger (Londod Underground)
- Motorcycle: 1730 Joules per metre passenger
- Petrol cars: 1750 Joules per metre passenger
- Boeing 727 Aircraft: 2940 Joules per metre passenger

Data: Sustainable Transport and public policy.
Anatomy of an Energy Efficient Building
Anatomy of an Energy Efficient Home
Energy Efficient Manufacturing
An Energy Efficient Power Plant

Combined Heat and Power: Energy savings and efficiency

A 1-megawatt natural gas engine in a combined heat and power application converts 100 units of fuel into 35 units of electricity and 50 units of heat while losing 15 units of energy. With conventional generation the losses are more substantial: 165 units of fuel are needed to produce the same amount of electricity and heat, with total losses of 80 units of energy.

Conventional Generation
48% efficiency

Combined Heat and Power
85% efficiency

Source: U.S. Department of Energy Northeast CHP Technical Assistance Partnership
1. **No Poverty**: End poverty in all its forms everywhere for all people.
2. **Zero Hunger**: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
3. **Good Health and Well-being**: Ensure healthy lives and promote well-being for all at all ages.
4. **Quality Education**: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. **Gender Equality**: Achieve gender equality and empower all women and girls.
6. **Clean Water and Sanitation**: Ensure availability and sustainable management of water and sanitation for all.
7. **Affordable and Clean Energy**: Ensure access to affordable, reliable, sustainable and modern energy for all.
8. **Decent Work and Economic Growth**: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9. **Industry, Innovation and Infrastructure**: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
10. **Reduce Inequalities**: Reduce inequality within and among countries.
11. **Sustainable Cities and Communities**: Make cities and human settlements inclusive, safe, resilient and sustainable.
12. **Responsible Consumption and Production**: Ensure sustainable consumption and production patterns.
13. **Climate Action**: Take urgent action to combat climate change and its impacts.
14. **Life Below Water**: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15. **Life on Land**: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification.
16. **Peace, Justice and Strong Institutions**: Promote peaceful and inclusive societies for sustainable development.
17. **Partnerships for the Goals**: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

[Link to UN website: social.un.org]
Green buildings can improve people's health & wellbeing.

Green buildings can use renewable energy, becoming cheaper to run.

Building green infrastructure creates jobs & boosts the economy.

Green building design can spur innovation & contribute to climate resilient infrastructure.

Green buildings are the fabric of sustainable communities & cities.

Green buildings use 'circular' principles, where resources aren't wasted.

Green buildings produce fewer emissions, helping to combat climate change.

Green buildings can improve biodiversity, save water resources & help to protect forests.

Through building green we create strong, global partnerships.

https://www.worldgbc.org/green-building-sustainable-development-goals
How green offices can provide the foundations towards meeting several Sustainable Development Goals

- Green offices can enhance employee’s health, wellbeing & productivity
- Building green offices creates jobs and boosts the economy
- Green offices are a key part of sustainable cities and communities
- Green offices produce fewer emissions, helping to combat climate change
- Through building green offices, we create strong, global partnerships
- Green offices can use renewable energy, making them cheaper to operate
- Green offices can catalyse innovation and be resilient to climate change risks
- Green offices use ‘circular’ principles, where resources are not wasted
- Green offices can enhance biodiversity, save water resources and help to protect forests

https://www.worldgbc.org/green-building-sustainable-development-goals
How **green homes** can provide the building blocks towards meeting several **Sustainable Development Goals**

https://www.worldgbc.org/green-building-sustainable-development-goals
Greener solutions – Cleaner Environment
thank you