Energy
Efficiency
Management
Office

Importance of using Energy Efficiently

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Structure of Presentation

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Energy Efficiency

$$efficiency = \frac{energy\ output}{energy\ intput} \times 100\%$$

$$\eta = \frac{W_{out}}{W_{in}} \times 100\%$$

Energy efficiency is defined as the use of energy in an optimum manner to achieve the same service that could have been achieved using a common less efficient manner.

Energy efficiency can be achieved with renewable sources of energy or by changing the power consumption requirements so that the overall energy consumption is reduced without compromising the output received.

Energy Concerns

1. Electricity Consumption has **increased by 33.8%** in the last decade

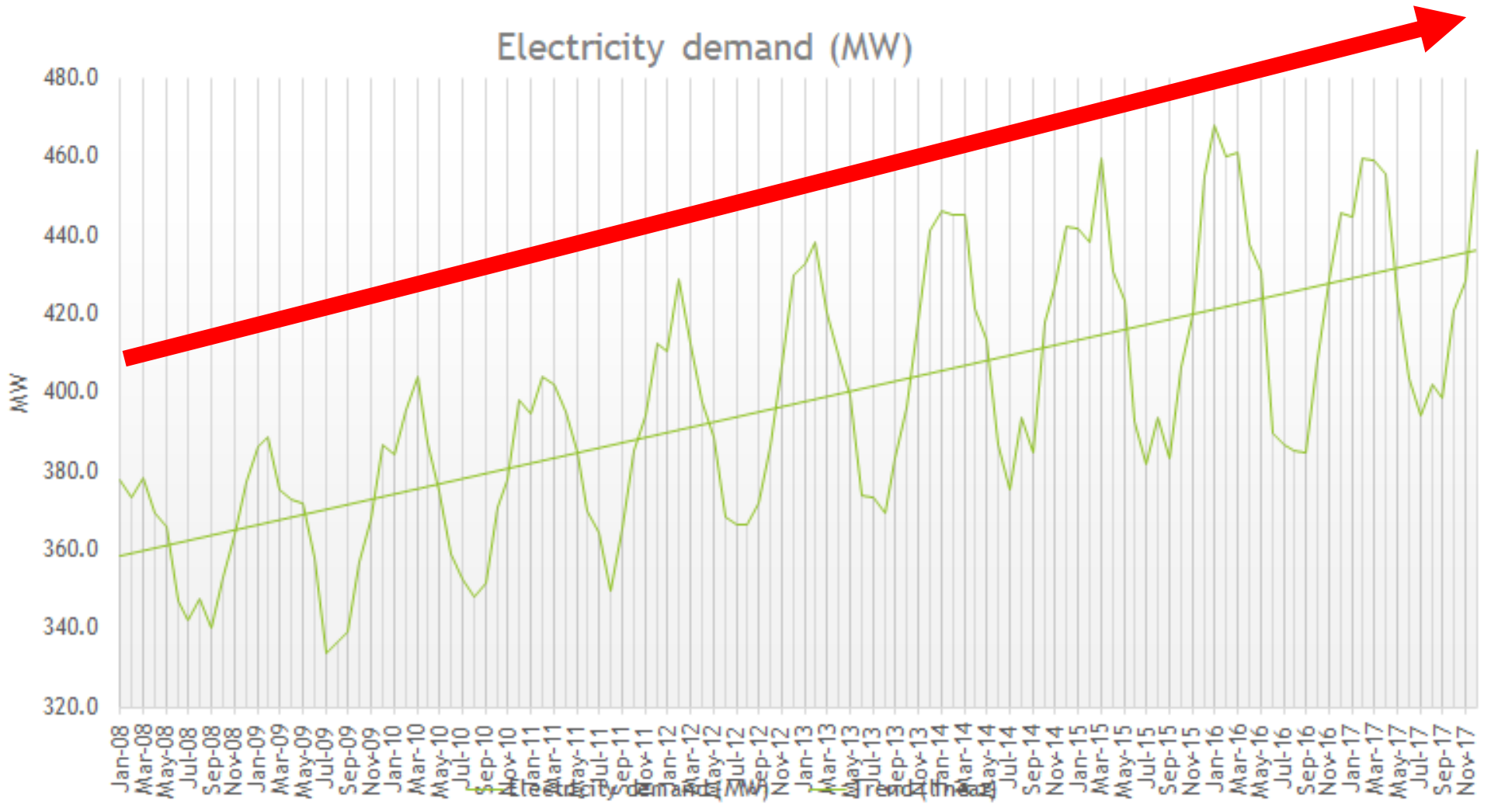
2. Total import bill of energy sources **increased by 36% from 2016 to 2017** (from Rs 21,610 M in 2016 to Rs 29,406 M in 2017)

3. Energy costs will keep on increasing: E.g. (2016 to 2017):

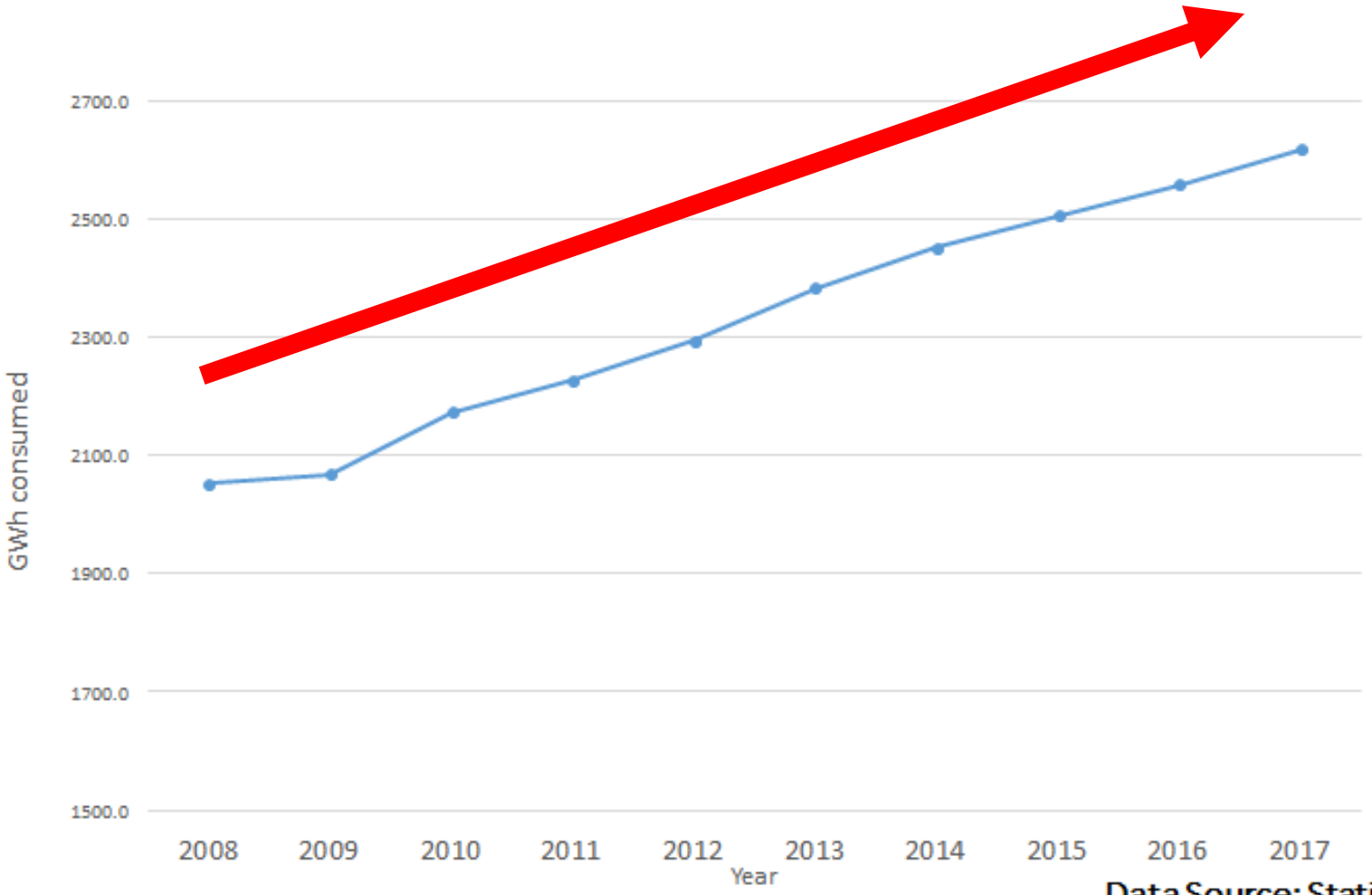
- Gasolene (+15.9%) - Diesel oil (+13.5%)
- Kerosene (+17.1%) - Fuel oil **(+34.9%)** - LPG **(+43.6%)**

4. Dependency rate on imported energy sources **increased from 83.6% in 2015 to 86.6% in 2017**

Electricity Peak Demand Trend 2017



Trend of Electricity Consumption, 2008-2017



Data Source: Statistics Mauritius

Why Energy Efficiency?

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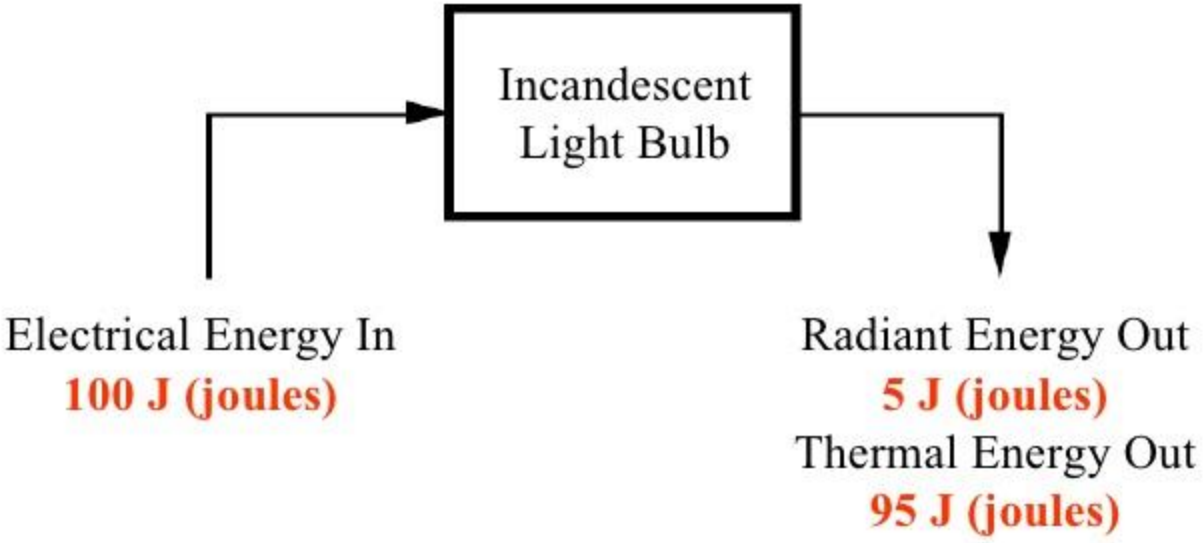
Any waste energy results in producing higher than necessary energy bills and carbon emissions.

"Missing Energy"

- Energy can change into more than one form simultaneously.
- If you feel a light bulb it is very hot. The "missing" energy was converted into low quality thermal energy.



Why Energy Efficiency? Cntd

- **Demand for energy will keep growing**
- **Climate change is at the centre of the political agenda**
- **Efficiency is the most cost-effective way to reduce consumption and CO_2 emissions**
- **Enlightened policy and advances in technology hold the key to progress in energy efficiency**

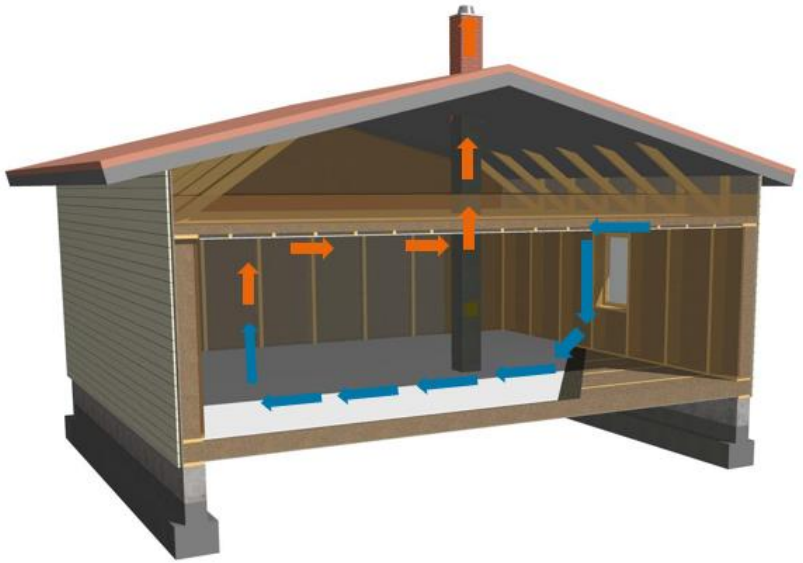
Why Energy Efficiency? Cntd

- **Reduction in energy bills**
- **Improvement in organizational effectiveness and competitiveness**
- **Compliance with forthcoming regulations**
- **Largest energy consumers (often at subsidized tariff) can greatly contribute to national effort for energy conservation**
- **Self-generation from renewable energy sources reduce dependency on national grid and prices imposed**

How to achieve Energy Efficiency?

- Training, awareness and sharing of info
- Switching of fuels
- Lighting fixtures reassessment
- Reconsider AC settings
- Insulation repairs for ACs
- Use and reuse

- Heat Gain prevention
- Ventilation



- LC/NC
- ~~Energivores~~

Industry

- Cogeneration – combining heat and power systems
- Improving electric motor efficiency (consumes 1/4th of energy) – IE4
- Improving light fixtures

Compressed Air Leakage

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Compressed air constitutes a widely used application that supports many industrial processes.

However, the efficiency of a compressed air system is often low due to, for instance, heat losses and leakages in the system, which stresses the importance of energy efficiency measures for compressed air systems

Steam Leaks

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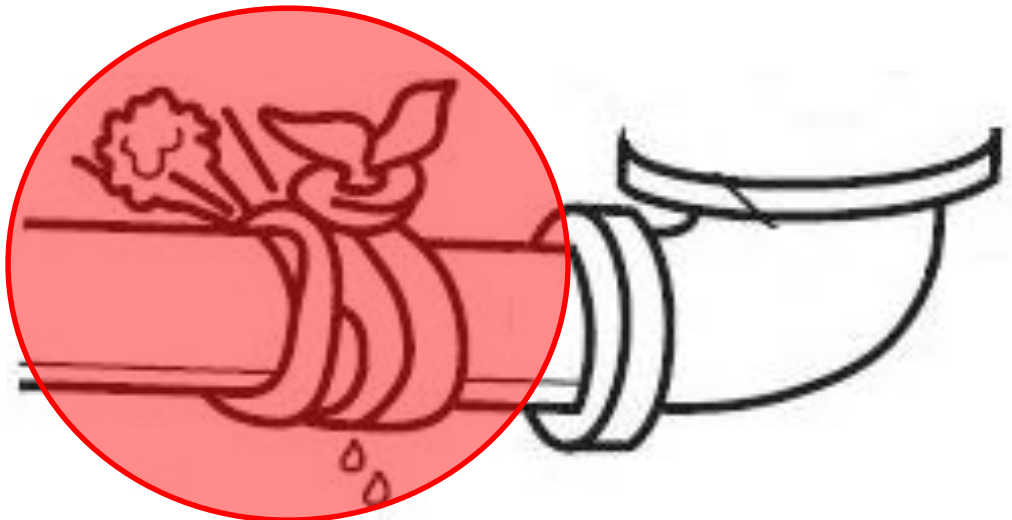

Refrigerators

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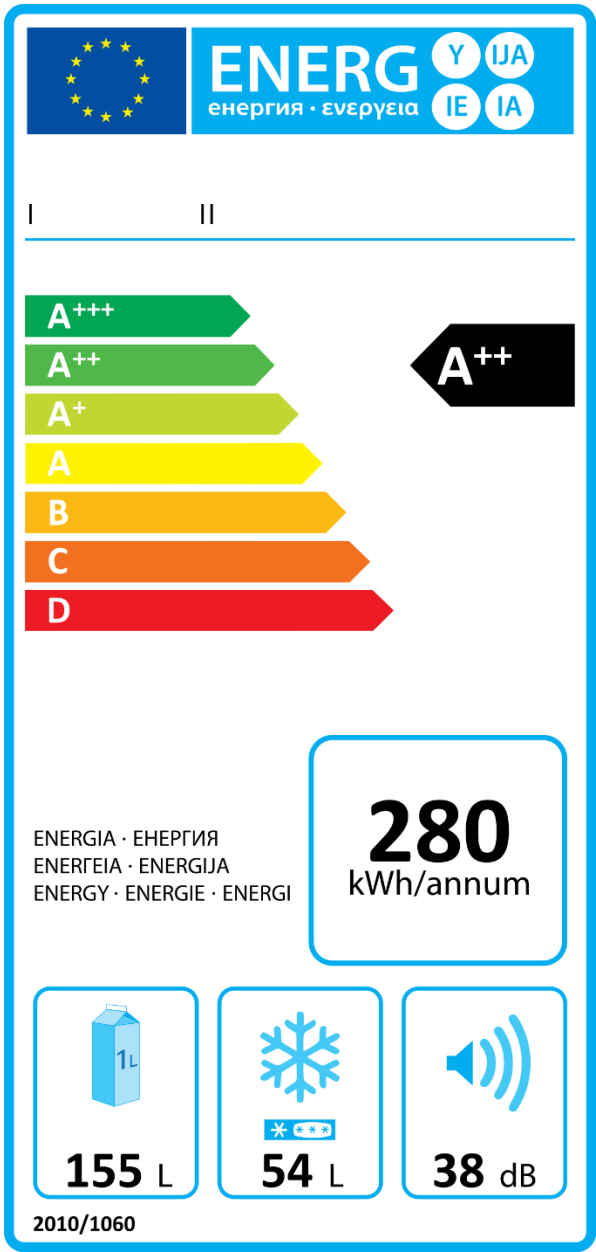
HVAC

- The choice of the appliance, systems and their consistencies
- The routes and insulation of the ducts and pipes
- Compactness of ducts, through-holes and rooms
- The purity of louvres, filters and valves
- Fine-tuning the system and automation control
- Use and maintenance



Energy Pyramid

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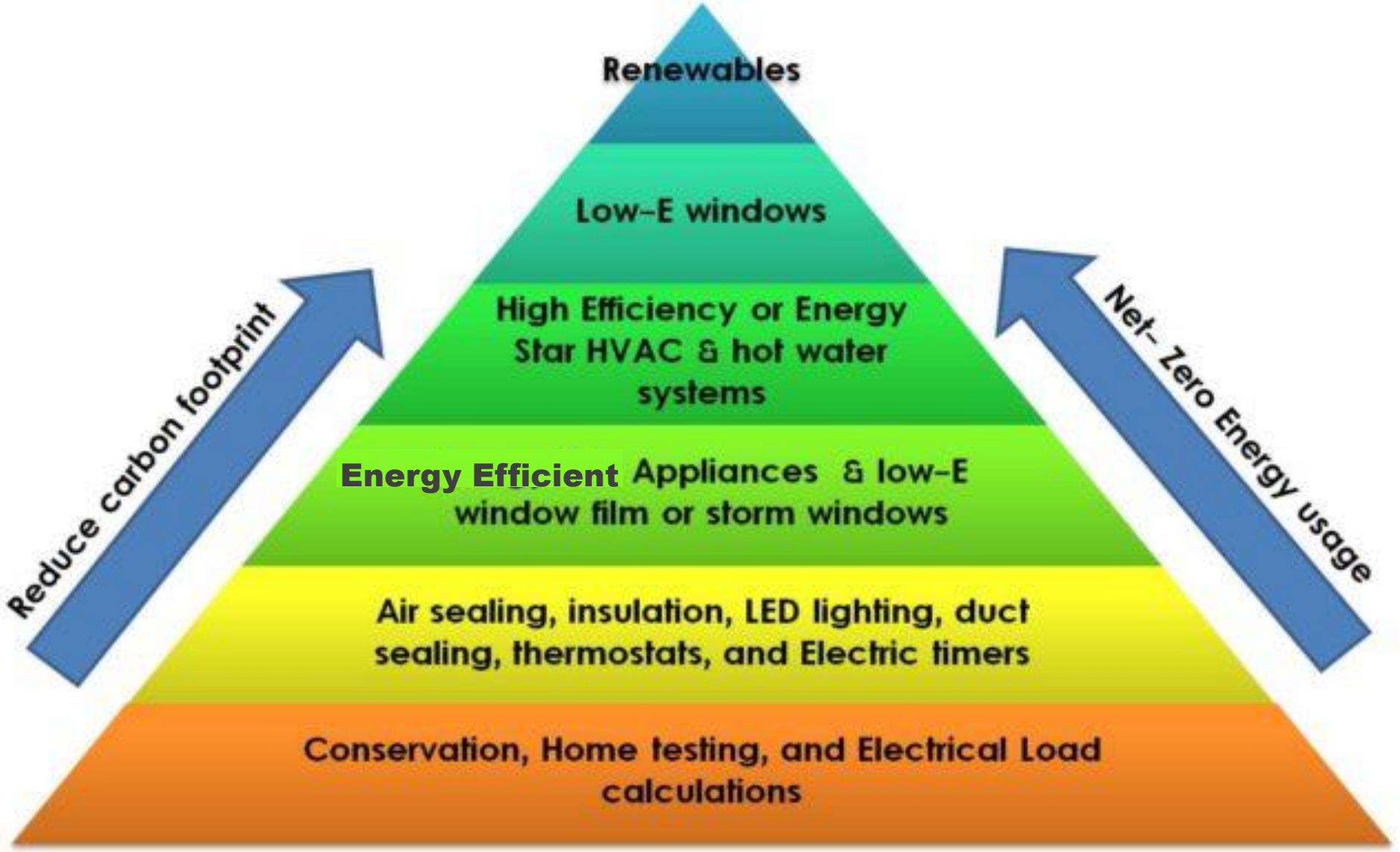
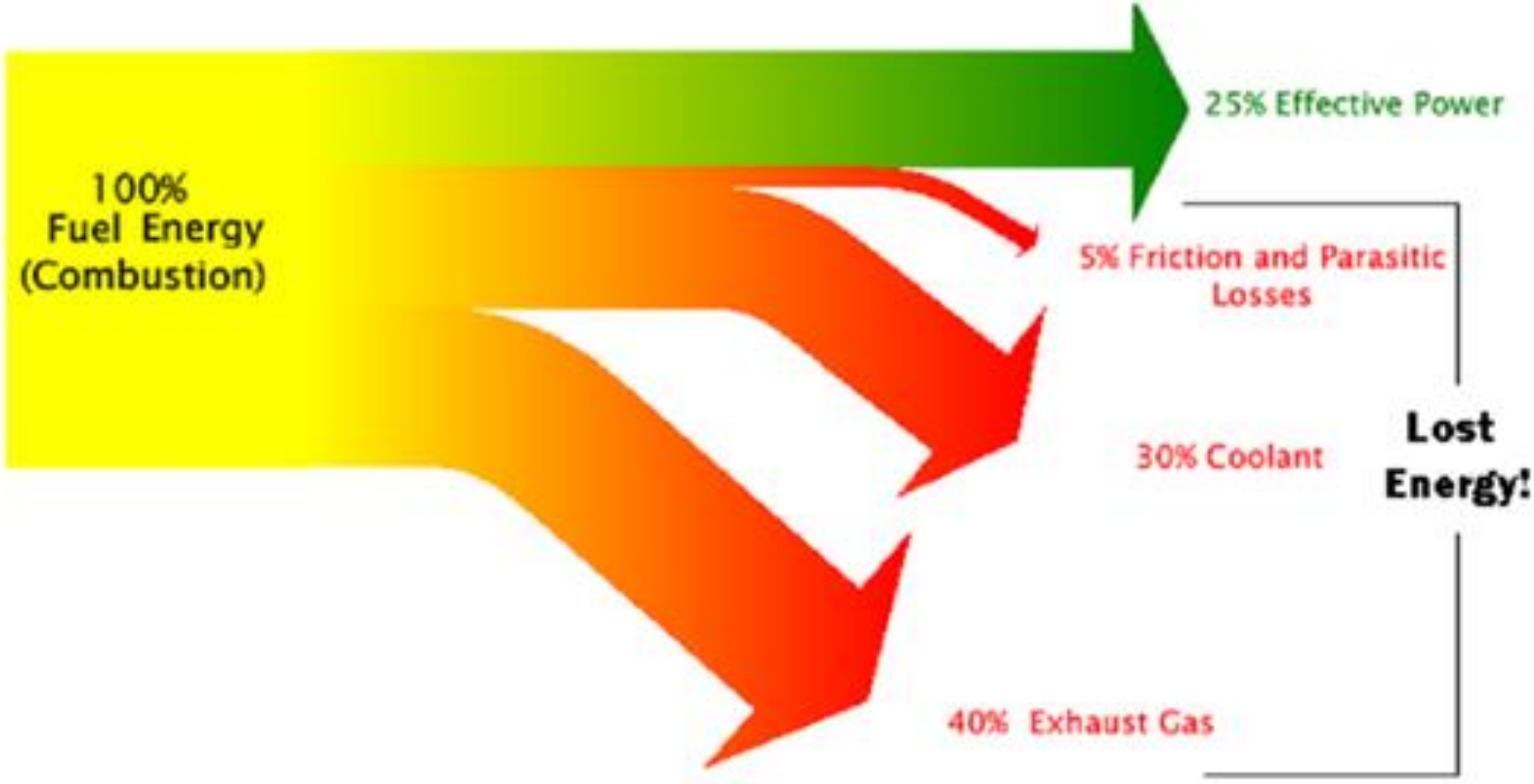


Sankey Diagram

Energy Loss in Gasoline Internal Combustion Engine

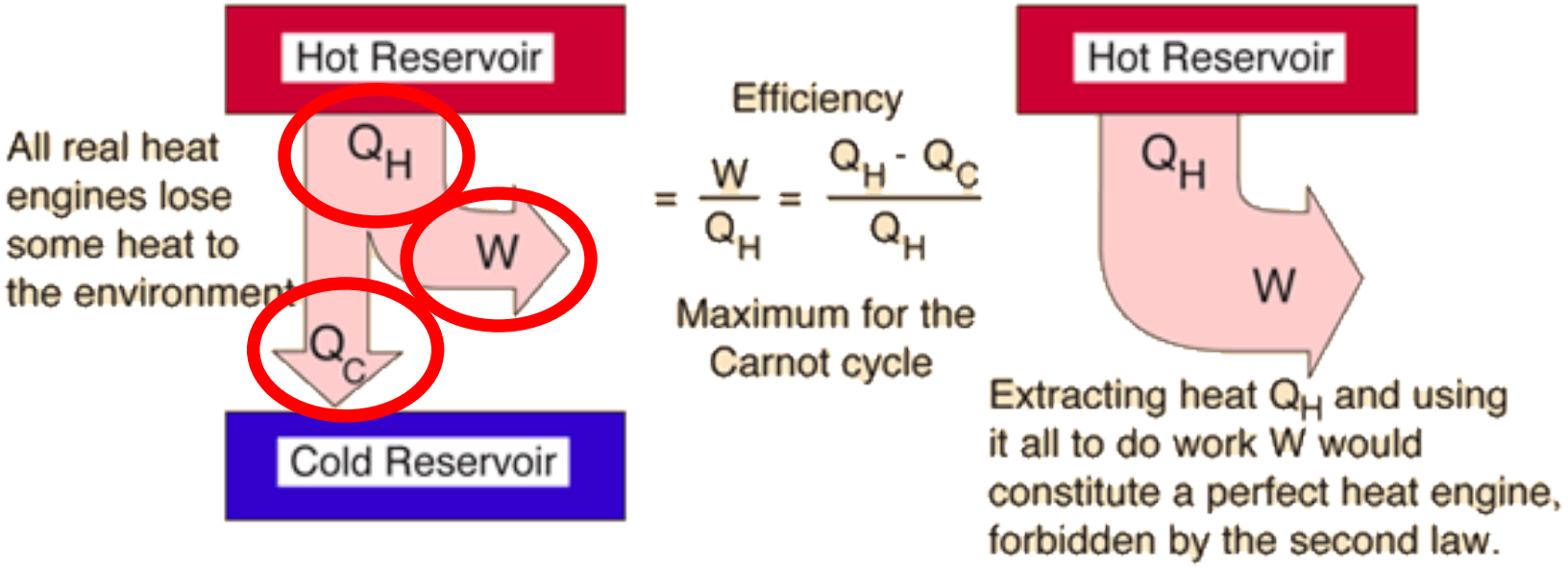


Second Law of Thermodynamics

Second Law: Heat Engines

Second Law of Thermodynamics: It is impossible to extract an amount of heat Q_H from a hot reservoir and use it all to do work W. Some amount of heat Q_C must be exhausted to a cold reservoir. This precludes a perfect heat engine.

This is sometimes called the "first form" of the second law, and is referred to as the Kelvin-Planck statement of the second law.



Conclusion

- Energy Efficiency is a matter rising concern.
- Energy Efficiency is a matter of individual behaviour.
- Energy Efficiency is a smart choice.
- Energy Efficiency is a feasible and an achievable noble feat.
- Energy Efficiency is about killing muda (muda = waste)
- Energy Efficiency is the medicine that your firm may be waiting for!
- Energy Efficiency pays off!

Thank you for your attention

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