

Reducing Energy Consumption in Cooling Systems

Optimizing the thickness of insulation to reduce energy consumption in cooling systems



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How we can Save Energy?

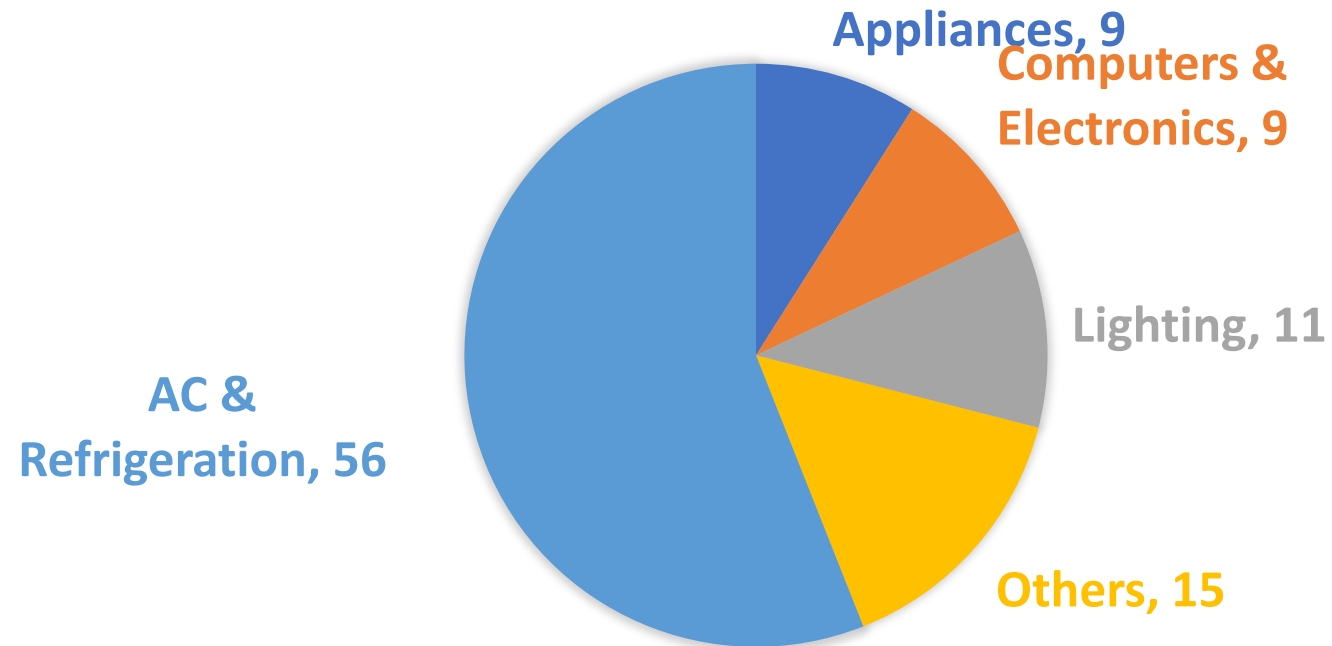
- LED Lighting
- High Efficiency Appliances & Equipments
- Preventive Maintenance of AC & Refrigeration Systems
- Smart Homes

What about Insulation?



Case of Study (Example)

ENERGY CONSUMPTION RETAIL BUILDING



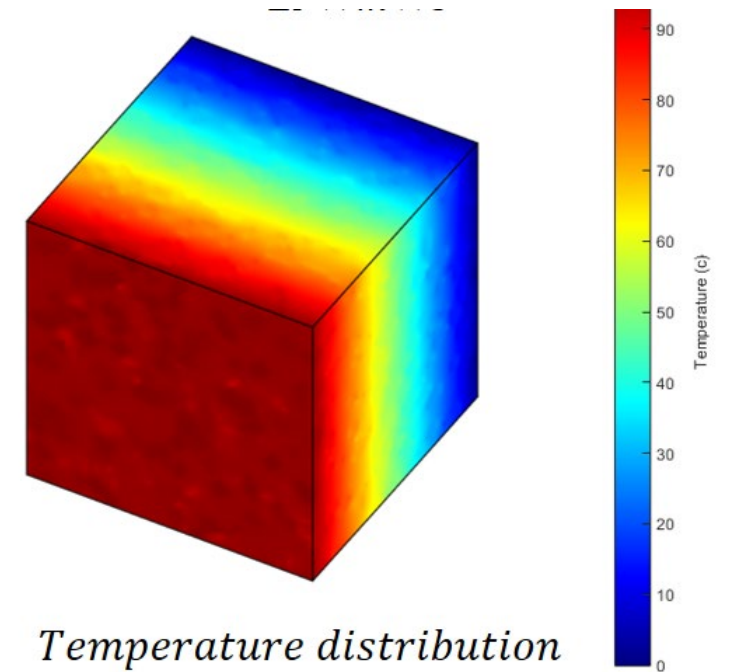
Discussion Points

- 1. Can consumption in cooling systems be reduced?
- 2. Initial cost and expected ROI time
- 3. Lifetime of the insulation products
- 4. Lifetime and replacement costs of the insulation on the system

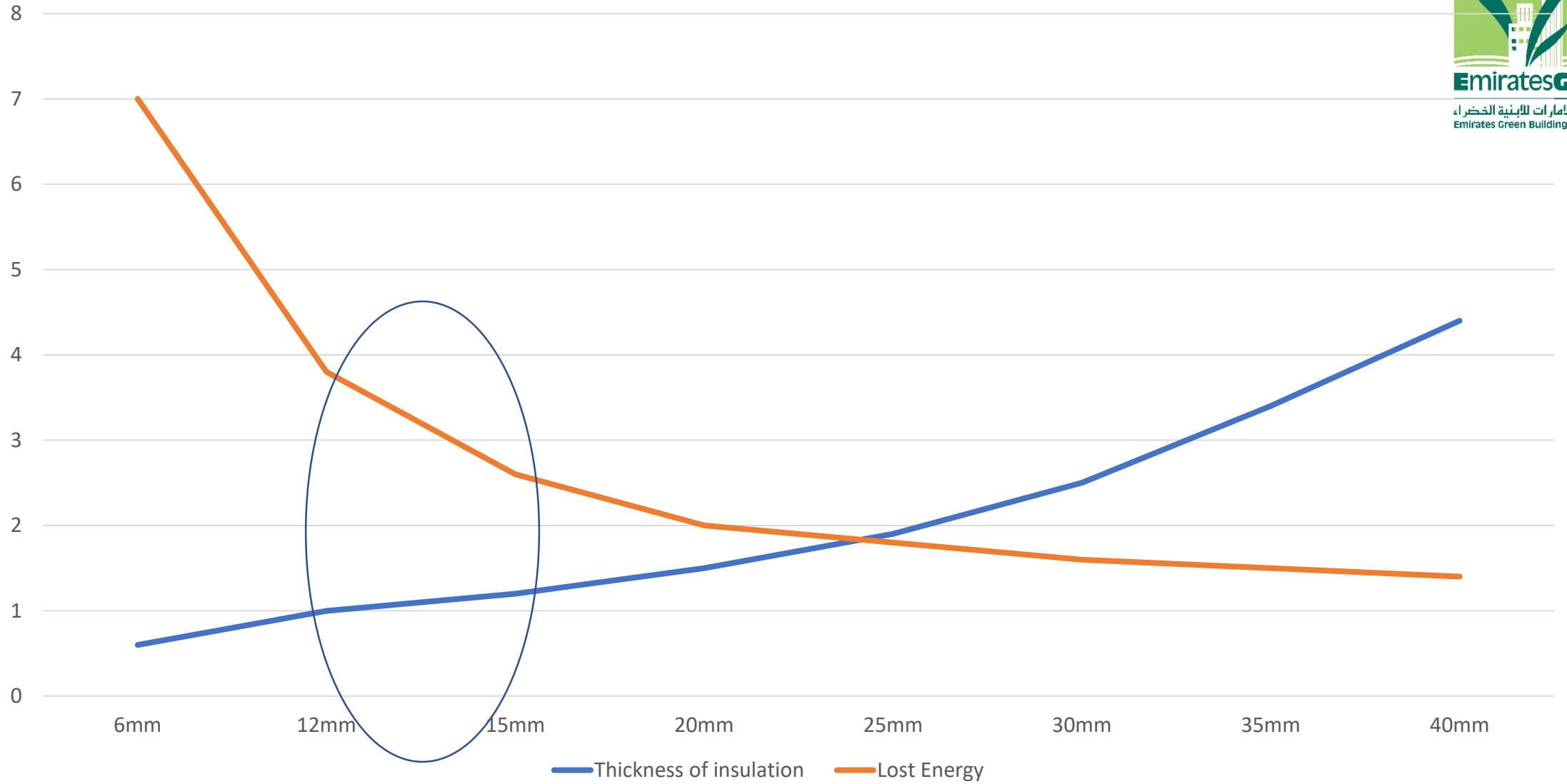


What thickness of thermal insulation is correct in AC systems?

- Lowest possible to avoid condensation ?
- Matching budget of the project ?
- Matching local practice ?
- Securing certain temperature of the surface ?
- Giving high energy savings ? (what level :30,50,80%)
- Securing performance drop over the period of time ?



Lost energy level vs cost of thermal insulation



If energy savings can cover higher insulation ? thickness



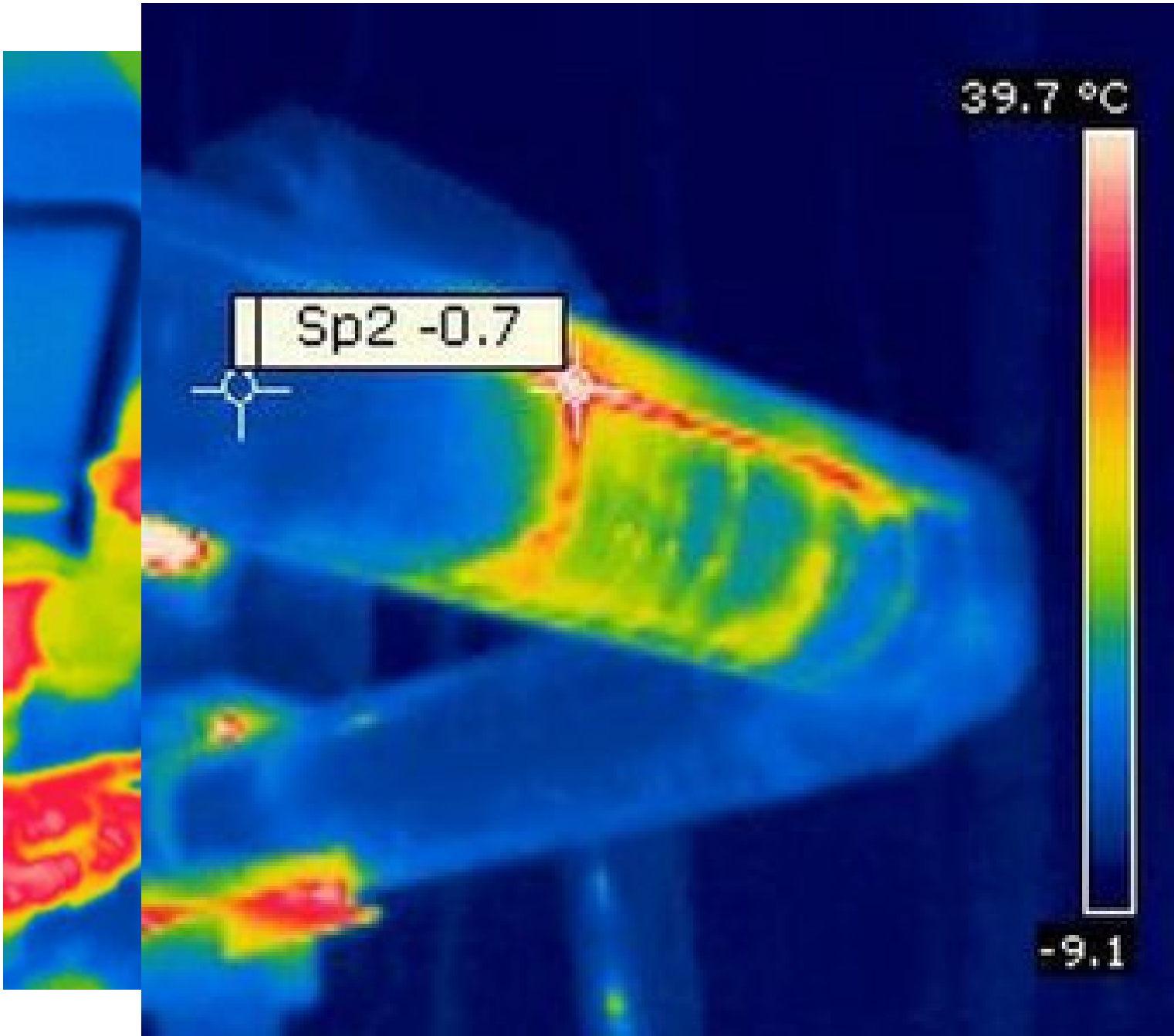
- Yes - example:
- if we can save lets say 1.5 kWh energy than it means we are saving 1.5kWh x 24h x 365 days = 13140 kWh which is approximately 3942 AED per year
- Of course system is not running 24/7 so please use correction factor 0.7 Even then is 2759 AED per year
- 200m x 18 AED (15mm) = 3600 AED
- 200m x 31 AED (30mm) = 6200 AED
- 2600 AED

So conclusion is following: increasing thickness for about 100% we are getting savings within a year equal to investments. Rest of the time we are having pure savings.

If energy savings can cover higher insulation ? thickness



- So what to do to achieve 1.5kWh or more ?
- Please see the example calculation(software)



Technical life of the thermal insulation products

- How often we are considering lifetime of the product or when it can be a factor for selection ?
- What is a lifetime of thermal insulation product ? (thickness stability, λ –thermal conductivity lower then: 0.08 - 0.09 W/mK
- Products can work fine as thermal insulation for certain period of time – after this period it need to be replaced. (2, 5, 8, 10 or more then 15-20 years)
- Pipelines/ducts and thermal protection designed for it - should work properly at least similar period of time.

Technical life of the thermal insulation products

cost of replacement of insulation:

- Removing of old material
- Transport + utilization
- New insulation material
- Labor cost and accessories
- Limited access to some areas
- Longer installation then during new construction

Thank you

