Sustainable Industrialization: Analysis of Methods for Carbon Dioxide Reduction in Brick Construction Industries

Universidad Tecnológica Nacional- Facultad Regional Paraná
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Class: English II
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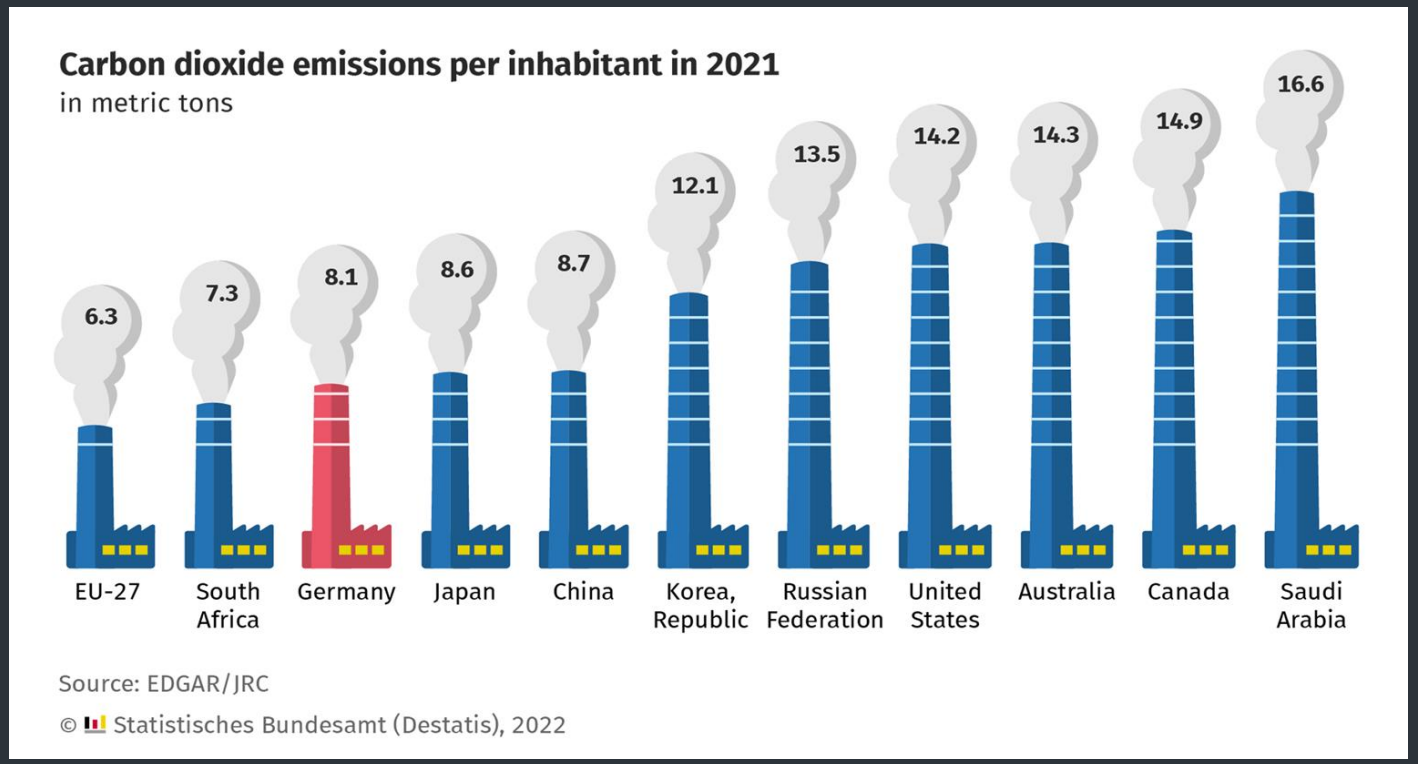
Introduction

- Currently, brick manufacturing is one of the most significant sources of carbon emissions.
- SDG 12 aims at Responsible Production and Consumption as well as the promotion of sustainable practices in manufacturing and consumption.

https://mma.gob.cl/finaliza-encuentro-internacional-para-reducir-la-contaminacion-del-aire-por-produccion-de-ladrillos/

https://www.scania.com/es/es/home/about-scania/sustainability/transport-and-the-agenda-2030.html



https://www.mdpi.com/1996-1073/16/5/2215

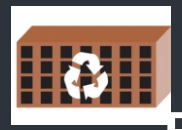
Central thesis of this presentation

By adopting more efficient methods, it is possible to significantly reduce the carbon footprint of the brick manufacturing industry.

https://www.bioeconomia.info/2021/10/27/nace-una-startup-argentina-para-mitigar-el-cambio-climatico/?amp

Map of the presentation

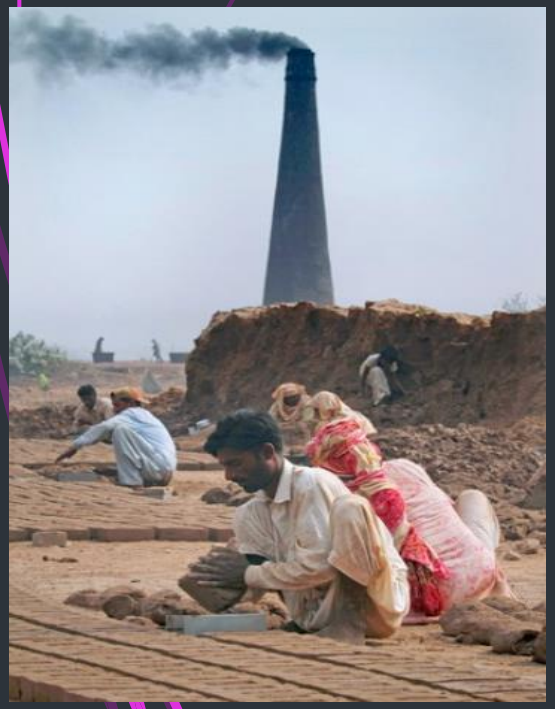
Carbon dioxide emissions in the brick manufacturing industry



Recycling with eco-bricks

Energy efficient reduction

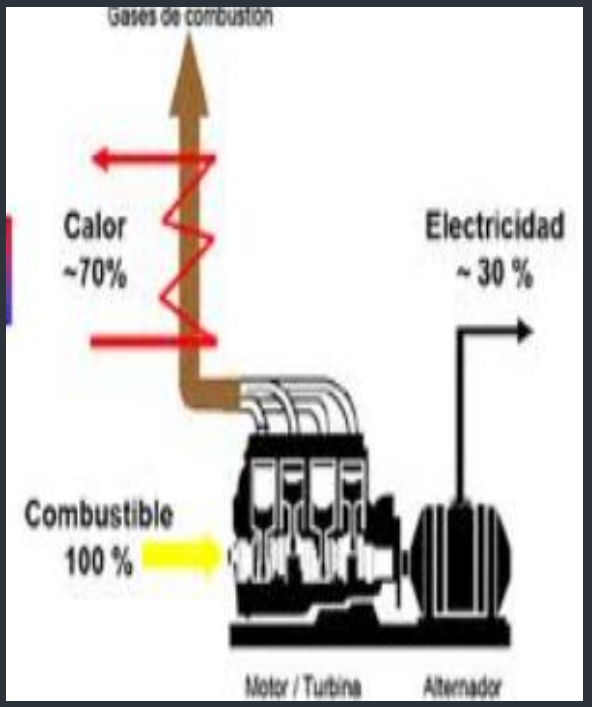
Co-generation



https://www.investigacionesfopea.com/hornos-ladrilleros/#4

https://www.informacion.es/medio-ambiente/2022/12/09/llegan-ladrillos-plastico-baratos-aislantes-75093352.html

https://www.freepik.es/fotos/ingeniero-ambiental



https://www.freepik.es/fotos/ingeniero-ambiental

Introduction

Contribution of a sustainable industrialization

- Reduction of the environmental footprint
- Conservation of natural resources
- Social development and equity
- Technological innovation
- Pollution reduction
- Sustainable economic growth
- Collaboration and corporate responsibility

https://idalsa.com/sostenibilidad/

Purposes of this presentation

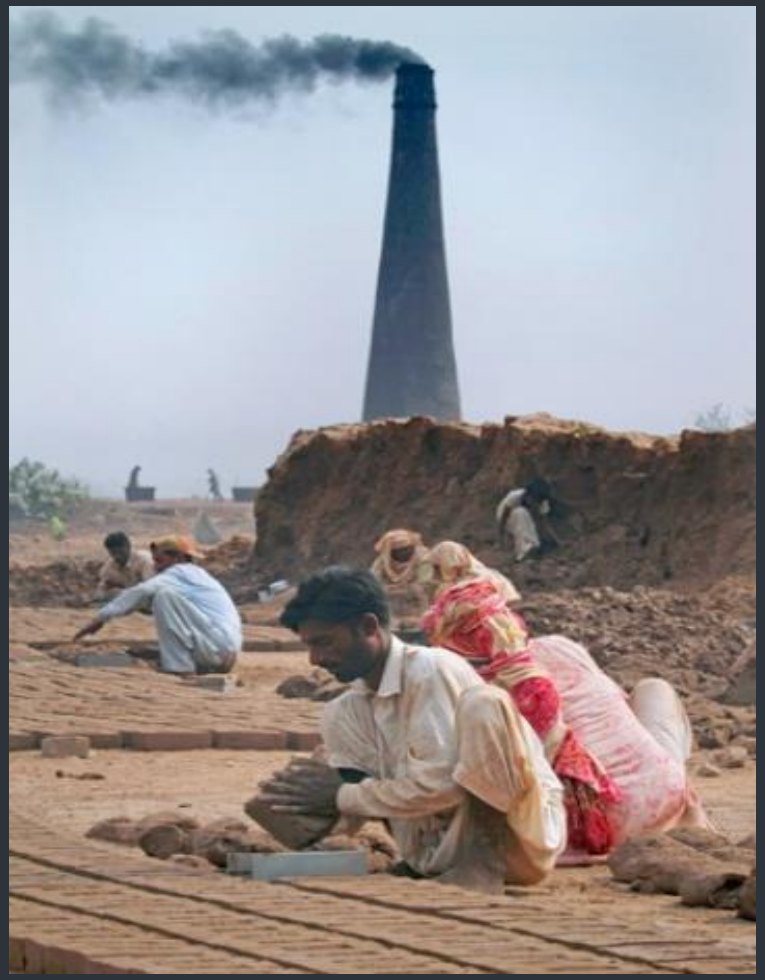
This work seeks to:

- **Identify and analyze specific methods that allow reducing the carbon dioxide emissions in brick manufacturing industries**
- **Promote more sustainable practices with the identification and analysis of specific methods in accordance with the global development goals**

Problem Description

Carbon dioxide emissions in the brick manufacturing industry

- Origin of carbon dioxide in manufacturing process of bricks
- Causes of carbon dioxide emissions
- Consequences of carbon dioxide emissions in the environment

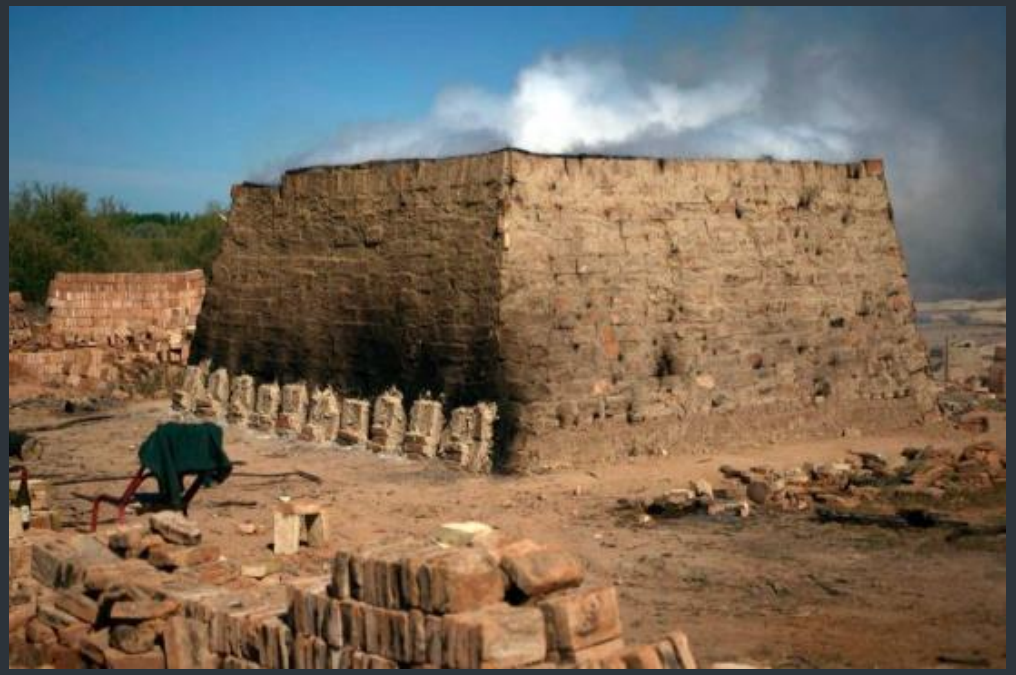


https://www.investigacionesfopea.com/hornos-ladrilleros/#4

Problem description

Origin of carbon dioxide in manufacturing process of bricks

- Clay Extraction
- Clay Preparation
- Mixing and Kneading
- Molding
- Drying and Firing



https://www.investigacionesfopea.com/hornos-ladrilleros/

Causes

Carbon dioxide emissions in brick manufacturing come from:

- **Fossil fuel combustion during firing**
- **Electricity consumption**
- **Extraction and processing of raw materials**

https://economiasustentable.com/noticias/preocupante-revelan-cuantas-muertes-causan-la-contaminacion-por-combustibles

Problem description

Consequences of carbon emissions

Changes in climate:

-Increased global temperature

-Extreme weather and disasters

-Precipitation extremes

Effects of climate change:

- Extreme heat
- Air and water pollution
- Increasing allergens

https://www.freepik.es/fotos-premium/concepto-globo-miniatura-que-muestra-medio-ambiente-arboles-hierba-fondo-cielo_26858148.htm

Recycling with Eco-bricks

https://lotesencordoba.com.ar/ladrillos-ecologicos-de-plastico-reciclado/

Characteristics of ecological bricks?

-Eco-bricks are made from plastic bottles

-They are an innovative and a sustainable option for the planet

Characteristics of Ecological Bottle Bricks

-Properties and characteristics

Characteristics	Traditional clay brick	Eco-bricks made from plastic bottles
endurance	high	moderate
durability	high	moderate
thermal isolation	low	moderate
acoustic isolation	low	moderate
environmental footprint	high	reduced
cost	moderate	varied

Fabrication Process

-Clean plastic bottles are selected and filed with non- biodegradable waste

-Studies are carried out on aspects such as costs, useful life, maintenance, among others are studied

-Analysis of advantages in its production is carried out and its use is studied

Ecobrick Considerations

One of the considerations is to guarantee the quality and resistance of the bottle eco bricks. It is important to carry out test to ensure:

- **resistance and durability**
- **requirement standards**

https://www.univision.com/explora/jovenes-estan-fabricando-ladrillos-con-botellas-de-plastico-y-son-un-ejemplo-a-seguir

It is crucial to educate community and professionals in brick making industries about the benefits and improvements that ecobricks provide

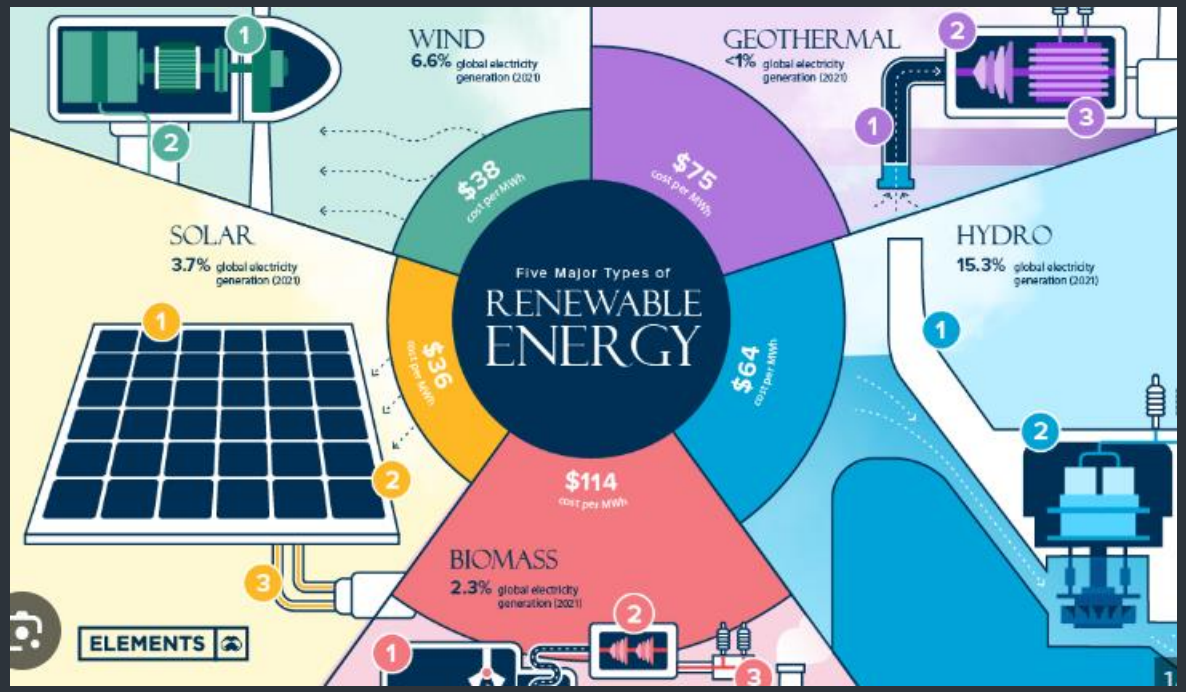
Reduce

Energy efficient reduction

What is renewable energy?

Renewable energy is energy obtained from virtually inexhaustible natural sources

The energy generated at clean electricity production facilities can be used to power various processes within the manufacturing plant



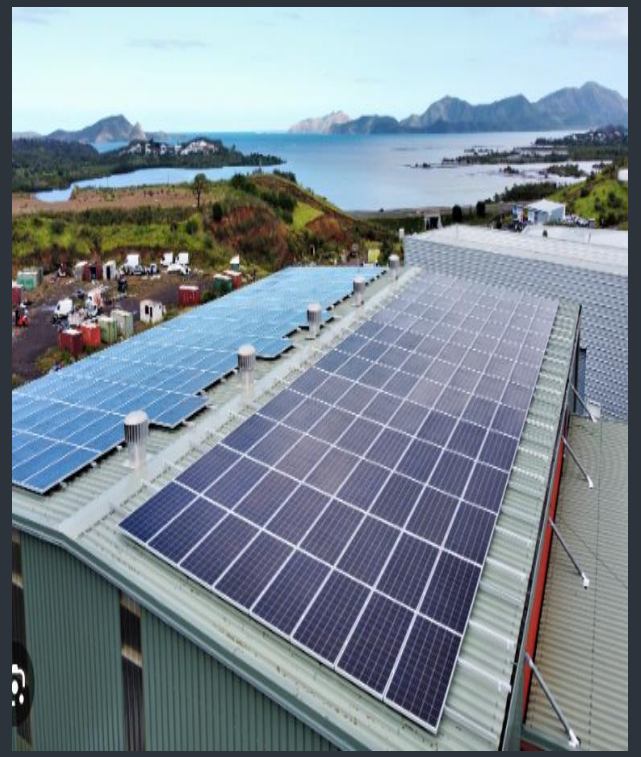
https://es.linkedin.com/in/francisco-javier-ballester-perez-68651b41

Reduce

Installing photovoltaic solar panels on rooftops or available open spaces

Brick manufacturing industries can:

- **Generate clean electricity**
- **Use this energy to drive various processes within the manufacturing plant**
- **Reduce the industry's carbon footprint**



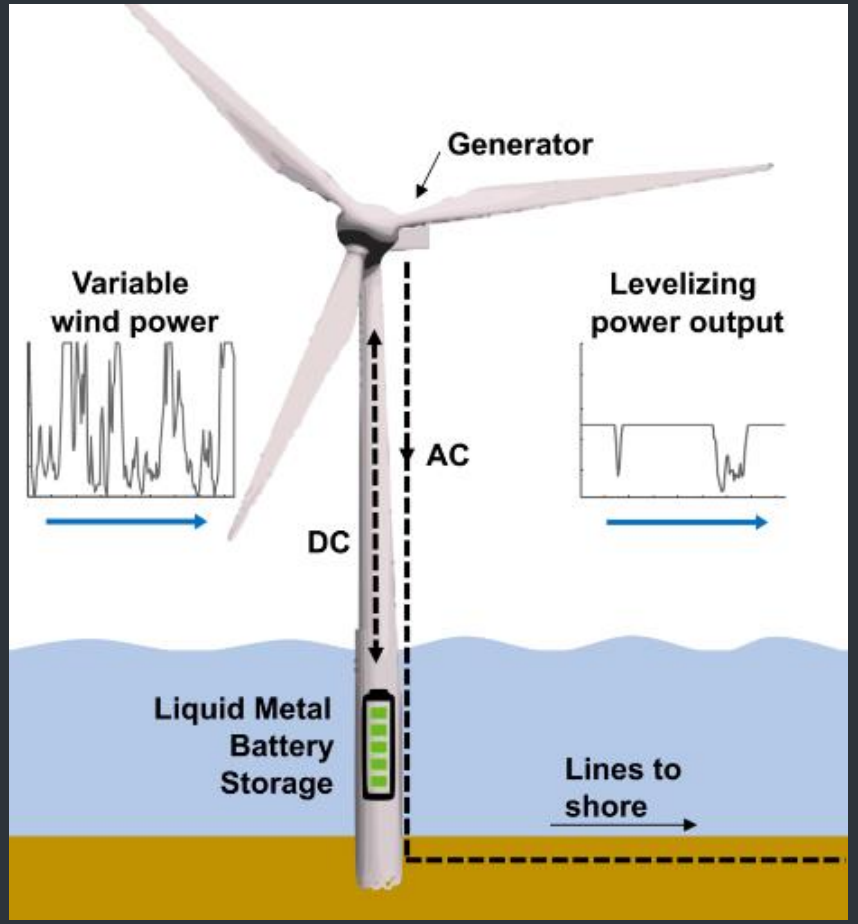
https://www.eco-greenenergy.com/es/ventajas-de-la-energia-solar-para-uso-industrial-fabrica-almacen/

Reduce

Wind energy in brick manufacturing industries

- Similar to solar energy, the integration of wind energy can help reduce greenhouse gas emissions and the carbon footprint of the brick manufacturing industry.

- Wind energy reduces the use of fossil fuels, therefore reducing carbon dioxide emissions



https://www.sciencedirect.com/science/article/abs/pii/S1364032121006729

Re-use

Advantages of cogeneration in brick manufacturing industries

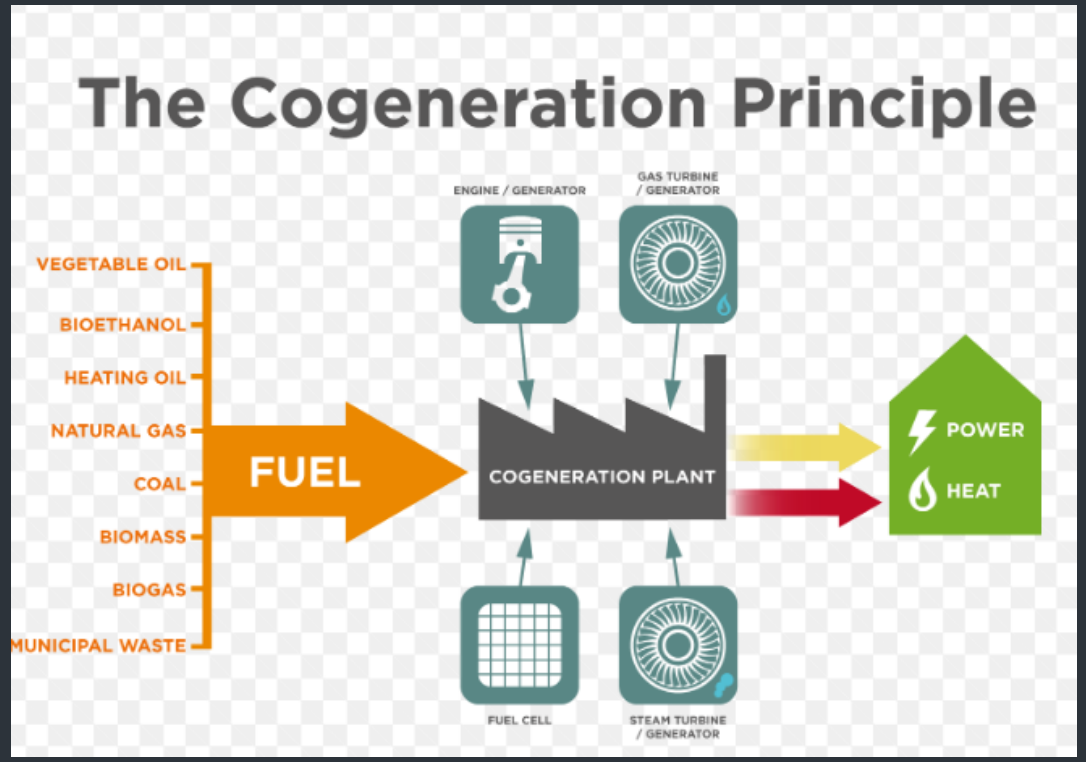
- Cogeneration can optimize the use of resources and obtain a more efficient use
- Brick manufacturing industries can achieve greater energy efficiency with separate methods of generating electricity and heat
- Captured waste heat can improve energy conversion rates

Re-use

Co-generation

-Cogeneration involves the simultaneous generation of electricity and heat from a single fuel source

-It is an innovative solution that takes advantage of carbon dioxide emissions and incorporates them into the brick production process



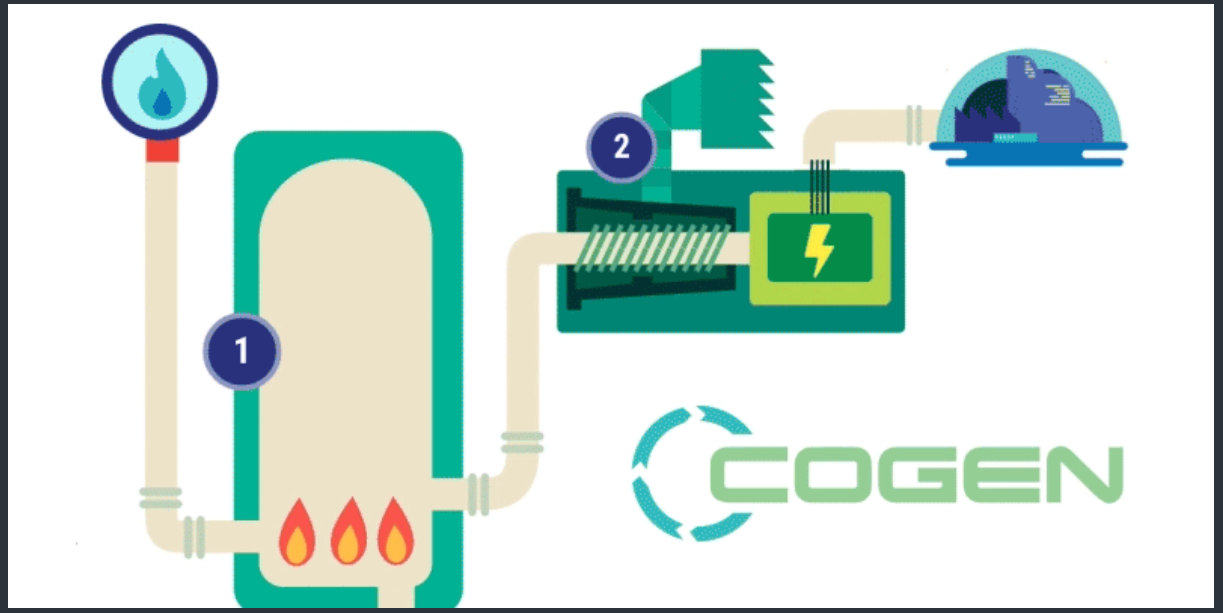
https://kojenturk.org/en/fuels-for-cogeneration-1285

Re-use

Advantages of cogeneration in brick manufacturing industries

Cogeneration systems reduce greenhouse gas emissions

Cogeneration uses the heat that would be released into the environment with sustainable practices and responsible management of resources



https://www.theglobeandmail.com/partners/paidpost/getechnology/3-reasons-why-energy-efficient-cogeneration-is-gaining-momentum/article33312441/

Conclusion

In conclusion, the pursuit of sustainable industrialization in brick manufacturing is essential to mitigate carbon dioxide emissions and reduce the environmental impact of this industry.

Thank you!

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