KORRA
ENERGI

Sustainable **Green** Energy Guide For a Better Tomorrow

Your guide for sustainable energy solutions, terminologies and new trends

Developed by Korra Energi

Introduction

Korra Energi has embarked on a journey that focuses on environmental sustainability and green energy solutions for more than 20 years. We believe that there is an urgent need for companies to collectively tackle the challenges that are causing the extreme climate changes prevalent around the world.

Consequently, we have developed this guide to help raise awareness regarding these key environmental issues and to highlight some of our activities that contribute to their mitigation.

We sincerely hope that you enjoy this sustainability guide brought to you by Korra Energi and trust that it helps shed light on some of the popular green energy terms that are being discussed around the world these days.

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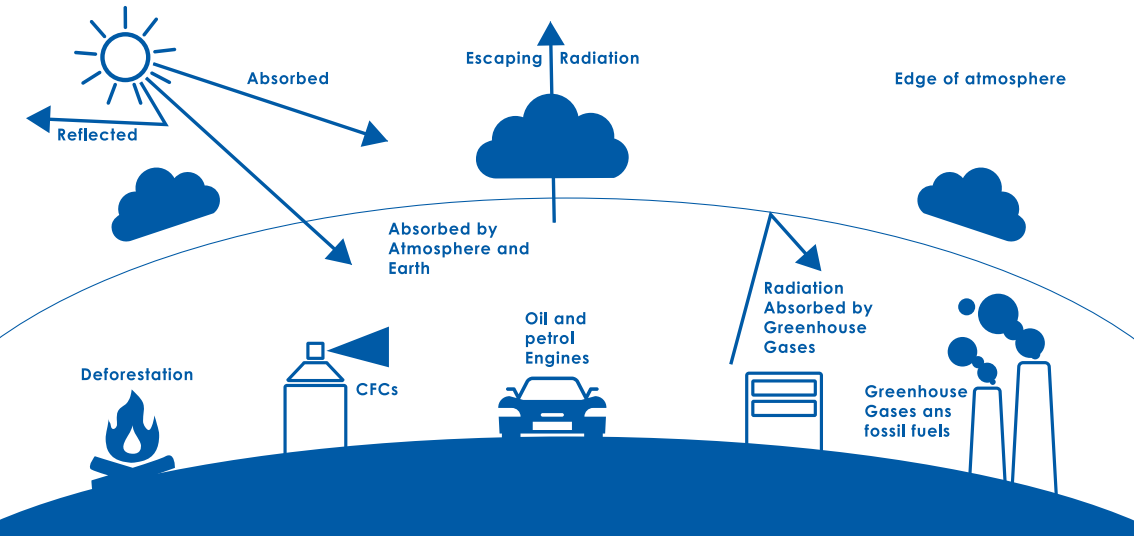
The World We Live In

Given the tremendous size and heat capacity of the world's oceans (more than 70%of the earth's surface is composed of water), it takes a massive amount of heat energy to raise Earth's annual surface temperature even by a small amount. Yet, there has been a 1.2˚C increase in the average surface temperature since the pre-industrial era (1880-1900). This might seem small, but it means a significant increase in accumulated heat.

The combustion of fossil fuels for energy is the biggest source of carbon dioxide (CO_2) emissions linked to human activity and a major cause of "global warming". This increase in temperature impacts the entire planet, but the regions closer to the poles are warming much faster than tropical regions. That is why the global sea level is rising due to thermal expansion (as the ocean gets warmer) and due to runoff from melting glaciers and ice caps at the poles, The sea levels around the world have risen approximately 21cm since 1900.
All this has and will continue to affect us all drastically if we don't take bold and concrete actions, all of us collectively – industries, businesses, governments & humans – must all work together towards decarbonization achieving net-zero.



Environmental Problems

(Terminologies & Definitions)

Climate Change

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through variations in the solar or lunar cycles. But since the 1800s human activities have been the main driver of climate change, primarily due to burning fossil fuels like coal, oil, and gas.

Air Pollution

Air pollution is the result of emissions from industries, manufacturing, transportation, and the overall increase in the use of fossil fuels. These gaseous emissions have added to an increase in the temperature of the earth, in addition to increased health risks to humans.

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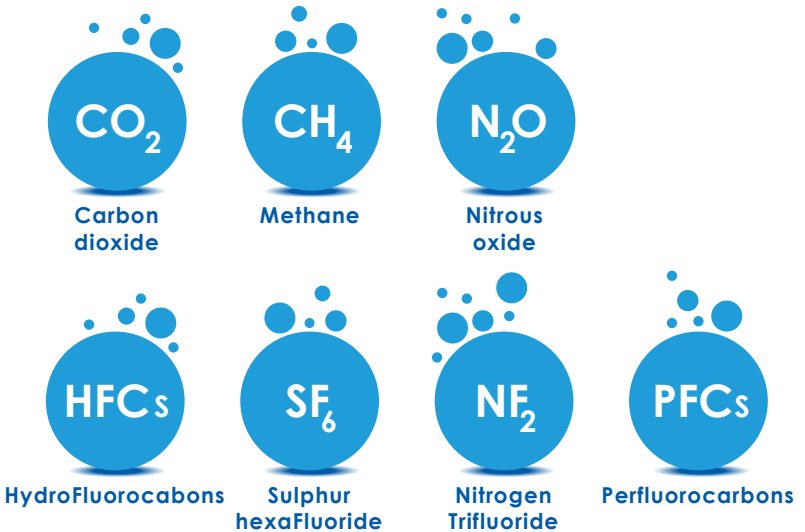
Global Warming (and Climate Change)

Global warming is the gradual increase in the earth's temperature due to general human activity (electricity and heat, transportation, agriculture, etc.). These activities cause emissions of various pollutants and "greenhouse gases". Generally, greenhouse gases are important for life on Earth as they act like a heat-trapping blanket over our planet, making it habitable for humans. However, thanks to increasing populations and a rise in human activities there are now higher emissions of greenhouse gases into the atmosphere beyond what the Earth can support, resulting in climate change.

Greenhouse Gases (GHG)

Gases emitted into the atmosphere due to human activity include carbon dioxide (CO2), methane (CH4), water vapor, nitrous oxide (N2O), and ozone (O3), in addition to fluorinated gases. Today's concentration of carbon dioxide was found to be 415 parts per million (ppm), or 0.0415%, and is approximately 30% higher than measurements taken in 1960. Carbon dioxide alone accounts for about 76% of total greenhouse gas emissions.



Ozone Layer Depletion

The ozone layer is the part of the stratosphere (at an altitude of approximately 15–30km above the earth's surface) that has the highest concentration of ozone gas. This layer of ozone covers the entire planet and protects life on earth by absorbing harmful, cancer-causing ultraviolet-B (UV-B) radiation from the sun. This critical protective layer is being depleted by CFCs (chlorofluorocarbons), which are used in industries and in everyday life (found in refrigerators, air conditioners, fire extinguishers, aerosol cans, etc…).

Water Pollution

The release of contaminants and pollutants into lakes, rivers, oceans, aquifers, reservoirs, or groundwater, resulting in changes to the physical, chemical, or biological characteristics of the water is called water pollution. These contaminants can include chemicals, organic and inorganic waste material, bacteria, and parasites. Water pollution is one of the biggest risks facing the planet as it endangers all living organisms.

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Main Causes
(Terminologies & Definitions)

Associated Petroleum Gas (APG)
This is a rich gas that is produced along with crude oil which is extracted from the same reservoir. APG is also known as flare gas or field gas. The utilization of APG as a fuel for a generator is an excellent way of reducing carbon dioxide emissions that might otherwise result from diesel fuel consumption.

Carbon dioxide (CO2)
Carbon dioxide, a naturally occurring gas, is a byproduct of respiration by living organisms and is released into the atmosphere as a colorless, odorless gas. Excessive CO2 is caused by burning fossil fuels, industry, and deforestation, and is the main contributor to the "greenhouse effect" (when greenhouse gases trap heat close to Earth's surface due to absorption of solar radiation, rather than allowing it to escape into space).

Carbon Monoxide
A colorless, odorless, toxic gas primarily caused by human activity (emissions from burning and incomplete combustion of carbon-containing fuels, such as gasoline, natural gas, oil, coal, and wood). It is also a byproduct of forest fires. Recent studies have shown that air pollution from fossil fuels is responsible for nearly one in every five deaths worldwide (more than HIV, tuberculosis, and malaria combined).

Deforestation
Deforestation is the intentional clearing of forest land for agricultural use, urbanization (building roads and cities), and obtaining wood for fuel or as raw material for industry. The most impactful deforestation activities are occurring in the tropical rain forests which are key to maintaining a balance of nature (i.e., oxygen being released into the atmosphere and biodiversity), and the livelihood of indigenous people. The systematic destruction of forests in general exacerbates the impact of environmental pollution and includes risks such as potential extinction of some animal species.

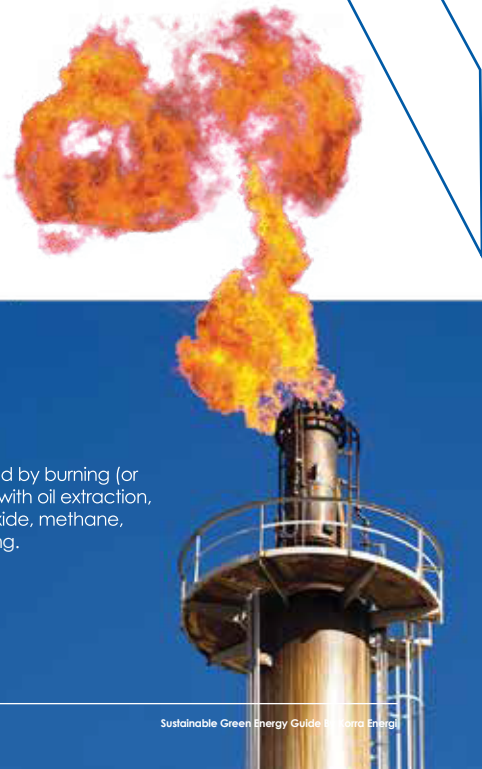
Fossil Fuels
When plants, animals, and other organic materials decompose over very long periods of time they accumulate in the earth's crust to form fossil fuels. The main fossil fuels are coal, crude oil, and natural gas which are all burned to produce energy, generate electricity, power internal combustion engines, etc…

Industrial Process Heat

The thermal energy that results from the industrial production, processing, or treatment of manufactured goods is called process heat. It makes up roughly 20% of global energy consumption and represents the most direct source of industrial CO2 emitted each year due to the burning of fossil fuels.

Municipal Solid Waste (MSW)

Municipal Solid Waste is simply the items that are disposed of every day by the public in the form of "garbage" or "trash", including both organic and inorganic waste. Moreover, this can include waste generated by residential, industrial, institutional, commercial, municipal, and construction and demolition waste. The name is derived from the fact that this material is collected by municipalities or discarded in municipal waste sites (i.e., into landfills or burning, or in some cases it is recycled). In general, the largest component of MSW is food followed by plastics, paper, rubber, leather, and textiles, etc.



Flare Gases

This is the burning of excessive flammable rich gas which is discarded by burning (or "flaring" into the atmosphere). This standard practice is associated with oil extraction, refining and production. Flared gases emit a mixture of carbon dioxide, methane, and black soot which pollute the air and accelerate global warming.

Green Concepts

(Terminologies & Definitions)

Carbon Capture & Storage

Carbon Capture and Storage (CCS) is a way of reducing carbon emissions by capturing and storing carbon dioxide (CO_2) before it is released into the atmosphere. The technology can capture up to 90% of CO_2 released from the burning of fossil fuels used in generating electricity and industries such as cement production.

Carbon Credit

A carbon credit is a generic term for any tradable certificate or permit that represents the right to emit a set amount of CO_2 or the equivalent amount of different greenhouse gases. Carbon credits were devised as a mechanism to reduce greenhouse gas emissions. Companies get a set number of credits, which decline over time, and they can be bought or sold. The carbon credit system was officially formalized in the **Kyoto Protocol** and the mechanisms that regulate the Carbon Credits market were established in the **Marrakech Accords.**
This system creates a monetary incentive for companies to reduce their carbon emissions.

Carbon Footprint

A carbon footprint, usually measured in tons, is the total greenhouse gas (GHG) emissions caused by an entity expressed as carbon dioxide equivalent (CO-2e). Carbon dioxide equivalent or CO_2e means the number of metric tons of CO_2 emissions with the same global warming potential as one metric ton of another greenhouse gas

Carbon Policy

Carbon Policy (also called Zero Carbon Policy or net zero), means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance.

Carbon Tax

A carbon tax is paid by businesses and industries that produce carbon emissions through their operations. The tax is designed to reduce the output of greenhouse gases and carbon dioxide, and to make visible the "hidden" social costs of carbon emissions.

C-BED (Community-Based Energy Development)

C-BED is an organization of individuals and businesses in a community that shares the objective of developing renewable energy resources in a way that optimizes local economic development.

CSV (Creating Shared Value)

Creating shared value is the practice of creating economic value in a way that also creates value for society by addressing its needs and challenges. There are 3 ways to create shared value: by reconceiving products and markets, by redefining productivity in the value chain, and by enabling local cluster development. Creating shared value (CSV) is an evolution in how companies view their role in society. It encompasses social license to operate, corporate social responsibility, and corporate philanthropy by tying these activities to core business activities. Companies can create economic value by creating societal value.

De-carbonization

Decarbonization is the removal (or reduction) of carbon dioxide (CO2) that is emitted, into the atmosphere. This is achieved by switching to low-carbon energy sources. To achieve deep decarbonization, we need to rethink how we produce and consume energy and operate a radical switch to renewables and low-carbon energy sources

Energy Conservation

Energy conservation is the reduction of energy consumption achieved by using less energy services. This can be achieved either by using energy more efficiently or by reducing the amount of a service used. Energy conservation is a part of the concept of "eco-sufficiency".
Energy can be conserved by reducing wastage, improving efficiency through technological upgrades, and improvements in operation and maintenance. On a global level, energy use can also be reduced by the stabilization of population growth.

Energy Efficiency

Energy efficiency is the use of less energy to perform the same task or produce the same result. Energy-efficient homes and buildings use less energy to heat, cool, and run appliances and electronics, and energy-efficient manufacturing facilities use less energy to produce goods.

Fuel Switching

Fuel switching involves the replacement of more pollutant fuels with cleaner and more economical alternatives, such as substituting coal or kerosene with natural gas or replacing high-sulfur fuels with low-sulfur alternatives.

Hybrid Power Plants

Hybrid power systems are those that generate electricity from two or more sources, usually renewable, sharing a single connection point. Examples of power producers used in hybrid power are photovoltaics, wind turbines, and various types of engine generators.
Hybrid systems, as the name implies, combine two or more modes of electricity generation together, usually using renewable technologies such as solar photovoltaic (PV) and wind turbines. Hybrid systems provide a high level of energy security through the mix of generation methods and often will incorporate a storage system (battery or fuel cell) or small fossil-fueled generators to ensure maximum supply reliability, stability, and security.

Hydrogen "color codes"

Hydrogen is a colorless gas, but it is commonly referred to by color to denote how clean it is. Sometimes other colors are used based on how it is produced. The electrolysis processes for red, pink, and violet hydrogens are driven by nuclear power. Yellow hydrogen is produced from a mixture of renewable energies and fossil fuels. Hydrogen that is merely a waste product of other chemical processes is referred to as white hydrogen. The use of coal as a fuel produces brown hydrogen.

Color	GREY HYDROGEN	BLUE HYDROGEN	TURQUOISE HYDROGEN	GREEN HYDROGEN
Process	SMR or gasification	SMR or gasification with carbon capture (85-95%)	Pyrolysis	Electrolysis

Blue Hydrogen

Blue hydrogen is generated from the steam reduction of natural gas. During this process, natural gas is split into hydrogen and CO2. The resulting CO2 is not emitted into the atmosphere but rather is stored using Carbon Capture and Storage (CSS) technology underground. While blue hydrogen does not cause CO2 as a final product, the long-term impacts of storage are uncertain and leakage can still negatively affect the environment and climate.

Green Hydrogen

Green hydrogen is produced through the electrolysis of water which splits it into its constituent elements of oxygen and hydrogen. The electricity used in this process is generated from renewable energy sources (i.e., wind energy, hydropower, or solar energy). Since neither the production process of green hydrogen nor the end products hydrogen and oxygen are harmful to the environment or the climate, green hydrogen is considered "climate-neutral".

Green hydrogen can be blended into existing natural gas pipelines, and also used to produce green ammonia, the main constituent of fertilizer production. It is suggested by hydrogen industry bodies that green ammonia will be cost-competitive with ammonia produced conventionally (gray ammonia) by 2030.

Grey Hydrogen

Grey hydrogen is the exact opposite of green hydrogen, as it is not climate neutral. Grey hydrogen is obtained by steam-reforming fossil fuels such as natural gas or coal. In this process, the waste product CO2 is released directly into the atmosphere.

Turquoise Hydrogen

Turquoise hydrogen is created by a thermal process in which natural gas is broken down with the help of methane pyrolysis into hydrogen and solid carbon. The extraction of this raw natural gas often produces emissions, and that is why turquoise hydrogen is not completely climate-neutral when it comes to the entire production process.

Net-Zero

This is a term that specifies a target of completely balancing greenhouse gases produced by human activity by reducing emissions and implementing methods of absorbing carbon dioxide from the atmosphere. In other words, it is a means of attempting to reach a state of "carbon neutrality" or net-zero carbon emissions.

New Energy

Also known as Alternative Energy, which is any unconventional energy system that aims to increase the overall system's efficiency or the utilization of unconventional resources to generate energy throughout advanced technologies and systems that can in role recover and recycle wasted energies or utilization of wasted resources to generate electrical or thermal energy or both

Photovoltaics (PV)

Photovoltaics (PV) is the conversion of light into electricity using semiconducting materials that exhibit the photovoltaic effect (i.e., a chemical and physical reaction that generates voltage and electric current in a material upon exposure to light). Photovoltaic systems employ solar modules, each comprising a number of solar cells, which generate electrical power.

Renewable Energy / Renewable Energy Sources (RES)

Renewable energy is energy that is collected from renewable resources that are naturally replenished in hours or days. It includes sources such as sunlight, wind, the movement of water, and geothermal heat. Renewable energy often provides energy for electricity generation to a network or power grid, air and water heating/cooling, and stand-alone power systems.

Solid Waste Management

Solid waste management is defined as the discipline associated with the collection, transfer storage, processing, and disposal of solid waste (i.e., municipal garbage, industrial and commercial waste, sewage sludge, wastes resulting from agricultural and animal husbandry operations, demolition wastes, and mining residues) in a manner that does not harm the environment.

Sustainability

Sustainability can be broadly defined as the fulfillment of the needs of current generations without compromising the needs of future generations while ensuring a balance between economic growth, environmental care, and social well-being.
Sustainability is embodied in the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015. This agenda provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are 17 "Sustainable Development Goals" (SDGs), which are an urgent call for action by all countries, developed and developing, in a global partnership. They recognize that ending poverty and other deprivations must go together with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

Wind Turbines

A wind turbine is a device that converts the kinetic energy of wind into electrical energy. Wind turbines are an increasingly important source of renewable energy, and are used in many countries to lower energy costs and reduce reliance on fossil fuels.

Zero-Waste

Zero waste is a set of principles focused on waste prevention that encourages redesigning resource lifecycles so that all products can be reused. The goal is to avoid sending trash to landfills, burning waste, and dumping waste in our oceans.

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Solutions - New Energy Applications

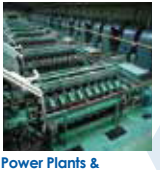
Alternative sources of energy can be either renewable or simply new. The following list is just a few of the new, modern, cost-effective, and economically productive energy solutions, that benefit society and result in a cleaner and healthier environment.

Sustainable Green Energy Applications by Korra Energi

Efficiency

CO/TRI-Generation

District Cooling/ Heating



Power Plants & Multi Utility Plants

Resource Utilization

Flare Gas Recovery

Waste Heat Recovery

Waste to Energy

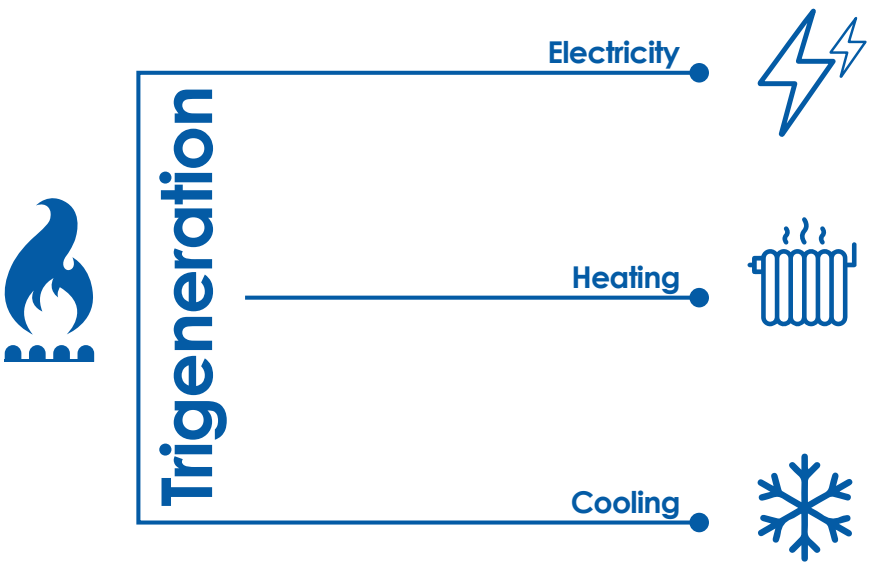
Carbon Capture

Hydrogen Recovery

Cogeneration and Trigeneration / Combined Heat & Power (CHP)

Cogeneration, or combined heat and power (CHP), is the use of a heat engine to simultaneously generate both electricity and useful heat. When, additionally, cooling energy is provided by this system, it is referred to as "trigeneration".

Thermal power plants and heat engines in general, do not convert all the available primary energy into electricity. In most heat engines, more than 50% of the primary energy is wasted as excess heat. By capturing the excess heat, CHP uses heat that would be wasted in a conventional power plant, potentially reaching electric and thermal efficiency of 95% -80%, compared to 40% for conventional plants. This means that less fuel is consumed to produce the same amount of useful energy (or less pollution is generated). It is this high potential in energy efficiency, that makes cogeneration an important economical and reliable contributor to climate change mitigation.



Carbon Capture & Storage / Carbon Sequestration

It is the process of capturing carbon before it enters into the atmosphere.
CCS involves the capture of carbon dioxide (CO2) emissions from industrial processes, such as steel and cement production, or from the burning of fossil fuels in power generation. This carbon is then transported from where it was produced, via ship or in a pipeline, and stored deep underground in geological formations.

The process needs the below three phases;

1. Capturing the carbon dioxide for storage
2. Transporting
3. Storing

Possible storage sites for carbon emissions include saline aquifers or depleted oil and gas reservoirs, which typically need to be 1km (0.62 miles) or more underground.

Australia, Canada, Denmark, UK and the United States remain the only nations with CCS-specific laws or existing laws that apply to most parts of the CCS project lifecycle.

District Cooling / Heating

District heating is a system for distributing heat generated in a centralized location through a system of insulated pipes for residential and commercial heating requirements such as space heating and water heating. District cooling is the cooling equivalent of district heating and works by delivering chilled water to buildings that need cooling.
New generation district heating and cooling systems (also called cold district heating networks) can provide both heating and cooling simultaneously. In these systems the waste heat from chillers can be recycled and used for space heating or hot water production.

Flare Gas Recovery

does this contribute to global warming, but flare gases also represent wasted energy. Some of the major advantages of recovering flare gases are that they can be used for power or heat generation, or they can be converted into marketable gases such as clean transportation fuel or LNG.

Hydrogen Recovery

Today's high cost of hydrogen has created a financial incentive for the petroleum industry to consider hydrogen recovery alternatives to reduce costs and improve the efficiency of operations. A hydrogen recovery and recycling device can efficiently and cost-effectively recover and recycle by-products or unconsumed hydrogen, creating an opportunity to return significant value. Instead of venting or burning by-product hydrogen, it is now possible to purify and recycle up to 90% of the hydrogen discharged from hydrogen-containing atmospheres.

Power Plants & Multi Utility Plants

Continuous heavy-duty Conventional Power Plants (Reciprocating Engines – Gas Turbine – Steam Turbine) based, fueled by any type of fossil fuel (Natural Gas – Diesel – Heavy Fuel), either in island operation or grid parallel.

Waste Heat Recovery (WHR)

Industrial waste heat is the energy that is generated in industrial processes, is not put into any practical use, and is lost, wasted and dumped into the environment. Recovering this waste heat is conducted through various waste heat recovery technologies to provide valuable energy sources and reduce overall energy consumption.

Waste to Energy (WtE)

Waste-to-energy (or energy-from-waste) is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste, or the processing of waste into a fuel source. WtE systems, are considered one of the most optimum sustainable solutions as it contributes to the effective waste utilization for electrical and thermal power generation, industrial, agricultural, and large-scale residential and commercial applications.

2- Renewable Energy Sources

Renewable energy, synonymous with clean or green energy, is the energy collected from natural inexhaustible sources which are naturally replenished. There are several sources such as solar, wind, geothermal, biomass, tidal, and others. Renewable energy is sustainable, efficient, and growing worldwide.

Biomass Energy

Biomass is plant-based material used as fuel to produce heat or electricity. Biomass continues to be an important fuel in many developing countries, especially for cooking and heating. Biomass sources include wood and wood processing waste, agricultural crops and waste materials, biogenic materials in municipal solid waste, and animal manure, in addition to human sewage.
Direct combustion is the most common method for converting biomass to useful energy. All biomass can be burned directly for heating buildings and water, for industrial process heat, and for generating electricity in steam turbines.

Thermochemical conversion of biomass includes pyrolysis and gasification. Both are thermal decomposition processes in which biomass feedstock materials are heated in closed, pressurized vessels called gasifiers, at high temperatures. They mainly differ in the process temperatures and amount of oxygen present during the conversion process. There are also biological and chemical processes for biomass conversion to energy.

Geothermal Energy

Geothermal energy is heat that is generated within the Earth's core leading to temperature increases at a rate of approximately **25°C** per 1 km as you go deeper from the surface. When underground rock formations are heated to about **700°C -1300°C** , they can become "magma". Magma is partly melted rock that is permeated by gas and gas bubbles, and works its way to the surface as lava. Magma also heats underground aquifers causing hot water to be released through geysers, hot springs, steam vents, and underwater hydrothermal vents.
These are all sources of geothermal energy. Their heat can be captured and used directly for heat, or their steam can be used to generate electricity.

Hydro Energy

Hydropower or hydroelectric energy is a form of renewable energy that uses the power of moving water (using run-of-the-river systems that take advantage of currents to apply pressure on a turbine, or dams/reservoirs that collect water and then release them through turbines) to generate electricity. More than 70% of the world's renewable electricity is generated by hydro energy.

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Solar Energy

technologies such as solar power to generate electricity. Geographical factors affect solar energy potential because areas that are closer to the equator have a higher amount of solar radiation.
Solar power is the conversion of energy from sunlight into electricity, either directly using photovoltaics (PV), indirectly using concentrated solar power, or a combination of the two. Photovoltaic cells convert light into an electric current using the "photovoltaic effect". Concentrated solar power systems use lenses or mirrors and solar tracking systems to focus a large area of sunlight on a hot spot, often to drive a steam turbine.
The International Energy Agency stated that in 2021, under its "Net Zero by 2050" scenario, solar power would contribute about 20% of worldwide energy consumption, and solar would be the world's largest source of electricity.

Wind Energy

Wind is used to produce electricity using kinetic energy created by moving air. Wind power or wind energy is mostly the use of wind turbines to generate electricity, and is a popular, sustainable, renewable energy source that has a much smaller impact on the environment than burning fossil fuels.

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3-Hybrid Power Plants

Hybrid power plants utilize combinations of different technologies to produce power. They often contain a renewable energy component (such as PV) that is balanced via a second form of generation or storage such as a diesel generator set, fuel cell, or battery storage system.

Measuring Units

Electric Energy Unit: Watt

- Kilowatt (kW)
- Kilowatt-Hour (kWh)
- Megawatt (MW)
- Megawatt-Hour (MWh)
- Gigawatt-Hour (GWh)

Cooling Capacity Unit: US Refrigeration Ton - USRT or RT
Thermal Heating Unit: MMBTU
Measurement for Gases: MMSCFD (stands for: million standard cubic feet per day)
Carbon Dioxide Emission Unit: Kiloton (kt) (include gases from the burning of fossil fuels and cement manufacture, but excludes emissions from land use such as deforestation)
Measurement Unit in Liquefied Natural Gas (LNG): TPA (tpa, Tons per Annum) or MTPA (Mtpa, Million Tons per Annum)

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Global & Local Initiatives

COP

Conference of the Parties, or COP, is a series of United Nations climate change conferences, which have been running since 1995. The goal of these conferences is to review progress made by members of the United Nations Framework Convention on Climate Change (UNFCCC) to limit climate change.

We are proud that COP27 will be hosted by Egypt in November 2022 whereby all parties of the UNFCCC will build on previous successes and pave the way for tackling the global challenges of climate change.

This year's international gathering will be held in Sharm El Sheikh, Egypt, and aims to establish legally binding commitments for developed countries to reduce greenhouse gas emissions.

Egypt focuses priority issues in the African continent in particular, and in developing countries in general, such as adaptation and climate finance. Egypt continues to scale-up it's solid actions towards a greener environment with active participation in several global initiatives.

Fifty Percent by 2050 – Egyptian Initiative

Egypt is leading an initiative to recycle 50% of Africa's waste by 2050, which is an increase from an estimated 10% at present. The "50 by 2050" initiative will be introduced in conjunction with the UN's COP27 climate summit in Sharm El Sheikh during November 2022.

Global Gas Flaring Reduction Partnership (GGFR)

The World Bank's Global Gas Flaring Reduction Partnership (GGFR) is a multi-donor trust fund composed of governments, oil companies, and multilateral organizations committed to ending routine gas flaring at oil production sites across the world.

GGFR aims to achieve this by garnering commitments for the "Zero Routine Flaring" (ZRF) by 2030 initiative. Governments and companies that endorse ZRF commit to no routine flaring in any new oil field developments and to end routine flaring at existing (legacy) oil production sites as soon as possible and no later than 2030. The GGFR partnership is a catalyst for reducing wasteful and undesirable practices of gas flaring and venting through policy change, stakeholder facilitation and project implementation.

International Carbon Action Partnership (ICAP)

The International Carbon Action Partnership (ICAP) was founded in 2007 by more than 15 government representatives as an international cooperative forum, bringing together states and sub-national jurisdictions that have implemented or are planning to implement emissions trading systems (ETS).

ICAP provides the opportunity for member jurisdictions to share best practices and discuss ETS design elements with a view to creating a well-functioning global carbon market through linking ETS and highlighting the key role of emissions trading as an effective climate policy response. The work of ICAP focuses on the three pillars of technical dialogue, ETS knowledge sharing and capacity building activities.

Kyoto Protocol

The Kyoto Protocol is an international treaty which extended the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits state parties to reduce greenhouse gas emissions, based on the scientific consensus that global warming is occurring and that human-made CO_2 emissions are driving it.

Marrakech Accords

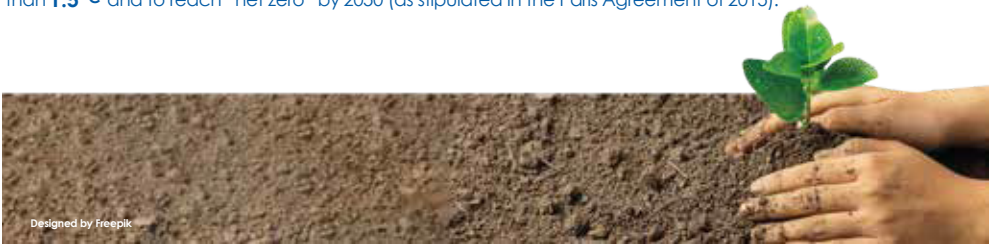
The Marrakech Accords is a set of agreements reached at the 7th Conference of the Parties (COP7) to the United Nations Framework Convention on Climate Change (UNFCCC), held in 2001, to set rules for implementing the more detailed provisions of the Kyoto Protocol.

Nationally Determined Contributions (NDCs)

An NDC, or Nationally Determined Contribution, is a climate action plan to cut emissions and adapt to climate impacts. Each party to the Paris Agreement (an international treaty on climate change, adopted in 2015 covering climate change mitigation, adaptation, and finance) is required to establish an NDC and update it every five years.

Net-Zero by 2050 Target

This is an international scientific consensus that undertakes the fact that Earth is currently **1.1°C –1.2°C** warmer than it was in the 1800s, and emissions that cause this global warming are continuing to rise. Consequently, it was determined that there is a global need to reduce emissions to 45% by 2030 to keep global warming to no more than **1.5°C** and to reach "net zero" by 2050 (as stipulated in the Paris Agreement of 2015).



Paris Agreement

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 parties at COP21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to **1.5°C**, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.

The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.

Sustainable Development Goals (SDGs)

The 2030 Agenda for Sustainable Development (also called the "2030 Agenda") is a set of international development goals for 2016 to 2030, which was adopted by the UN Sustainable Development Summit held in September 2015.

The 2030 Agenda listed "Sustainable Development Goals" (SDGs) consisting of 17 goals and 169 targets to eradicate poverty and realize a sustainable world. The SDGs are universal goals applicable, not only to developing countries but also developed countries, and pledge to "leave no one behind".

United Nations Framework Convention on Climate Change

The UNFCCC can best be described as a "treaty" or Convention that entered into force during March 1994. Today, it has a near-universal membership of 198 countries that have ratified the Convention (they are called "Parties to the Convention").

The ultimate objective of the Convention is to stabilize greenhouse gas concentrations at a level that would prevent dangerous interference with the global climate system. It states that such a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.

Green Tips – For Industries

It comes as no surprise to find that manufacturing is one of the biggest contributors to climate change through carbon emissions due to the sector's energy-intensive processes. While it might not be possible to fully eliminate those emissions, there are ways to reduce and balance them out to reach a point of carbon neutrality. We have identified some actions that can help your organization reduce its carbon footprint through the reduction of greenhouse gas emissions, while simultaneously cutting costs in the long run.

Consult Energy Companies

- To assess your current energy consumption in order to find and improve efficiencies through new methods and solutions.
- Adopt sustainable green energy solutions to increase efficiency and reduce fossil fuel use such as CO/Tri generation to help reduce your daily CO2 emissions.
- Implement renewable energy solutions throughout your facility, when and where possible, to reduce reliance on conventional energy sources.

Utilize Waste

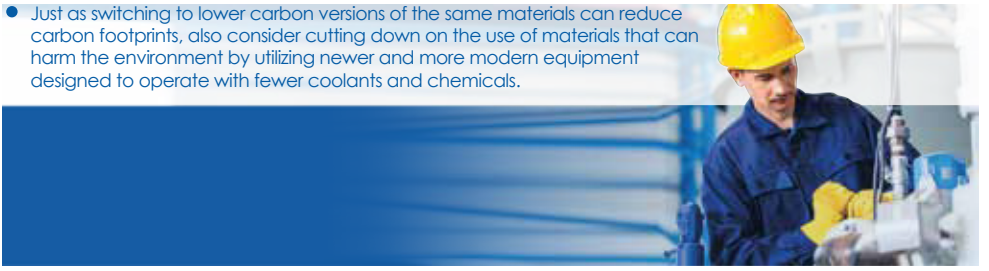
- Reduce waste generated and develop more robust methods of waste byproduct utilization and treatment. The waste byproducts of your factory can be turned into something useful such as electricity, heat or fuel. There are many methods that can capture industrial waste and turn it to power, such as waste heat recovery, waste-to-energy, and flare gas recovery
- Adapt workflows to cater to better waste management practices through sorting and recycling.

Prevent Energy-Wasting Leaks

- Ensure that equipment is operating at optimum levels to avoid energy leakage.

Substitute Materials

- Just as switching to lower carbon versions of the same materials can reduce carbon footprints, also consider cutting down on the use of materials that can harm the environment by utilizing newer and more modern equipment designed to operate with fewer coolants and chemicals.



Regulate Maintenance

- Cleaning and maintaining equipment is one of the best ways to ensure your commercial and industrial space is energy-efficient. Review your systems, equipment, machinery, lights, HVAC system and other important components are cleaned and maintained regularly. By keeping the system efficient, you can reduce energy waste, improve operational efficiency, and increase the lifespan of each component.

Use Multi-Tasking Equipment

- A key method that is ideal in helping you cut down on your energy costs (and therefore your carbon emissions), is to make use of multi-tasking equipment. These machines combine several processes, helping reduce setup and manufacturing time drastically by doing more in less time.

Implement Process Time Management

- Improve time management of technical processes by speeding up production cycles and reducing the number of machines in operation (also allows for more time to power off and save energy).
- Consume less resources and energy by constantly reviewing processes… focus on both big and small savings because it all adds up in the end.
- Implement procedures to reduce consumption through better operational practices and/or alternative energy sources when possible.

Encourage Green Practices

- Encourage active participation and engagement by everyone in your organization to find ways to improve practices and offer incentives when KPIs are met to achieve better environmental practices.
- Implement digital internal communications to save paper, electricity, etc.

Green Tips – Easy Tips On Energy Saving For Everyday

"Solutions to the climate crisis are within reach, but in order to capture them, we must take urgent action today across every level of society."

Al Gore, former US Vice President and Chairman of the Climate Reality Project

At its core, energy conservation is the practice of using less energy to lower costs and reduce environmental impact. This can mean using less electricity, gas, or any other form of energy that you get from your utility and pay for. There are many simple ways that you can save energy and save money such as:

Carpooling

Share cars with colleagues, family, and friends to reduce the number of cars on the road, hence reducing emissions, in addition to reducing travel costs, tolls and the stress of driving.

Reduce Plastic Use

limit your plastic use as much as possible, look for alternative materials such as carton, fabric, recycled paper, etc. A good start is taking a fabric bag when you go shopping instead taking plastic ones from the supermarket. Replace your straws and plastic cups with recycled ones. Use water dispensers or have your own metal portable bottles instead of using bottled water. There are many examples of small things that you can do to help protect the environment.

Increase the Usage of Motion Sensors

To save electricity consumption in areas that electricity isn't constantly utilized.

Managing Food Waste

Try to make the best use of food waste, it could be given out to people in need, used to create animal feed, or for composting.

Optimizing Resource Management

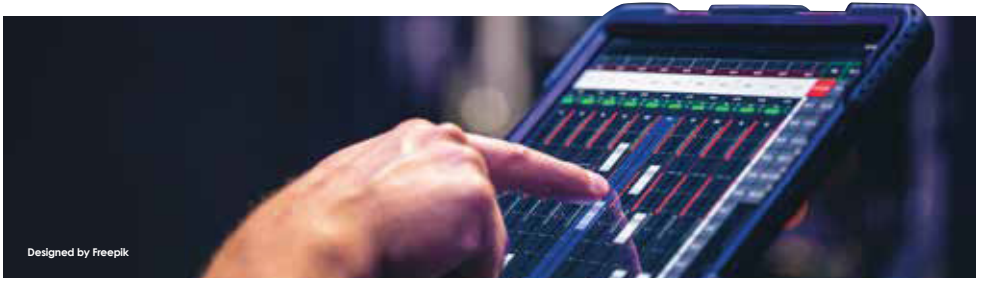
Small actions on a day-to-day basis will add up to bigger and more impactful efficiencies. For example, avoid keeping the water running while brushing your teeth, or while washing dishes. Other efficiencies include using dual-flush toilets which can save around %67 of water compared to regular toilets, avoid using hoses to wash cars, etc.

Planting

Planting the right trees in the right place can help you save energy. Trees can help keep the climate cool in the summer by both providing shade and cooling the air around them. Imagine if everyone did so.

Controlling Temperatures

In summer it is recommended to cool the ambient temperature down to **24°C** , and to heat up to **20°C** in winter. Every **1°C** decrease (cooling) in a thermostat setting during summer uses up to 10% more energy, while each **1°C** increase (heating) in a thermostat setting during winter uses up to 15% more energy. Avoid heating or cooling areas that are rarely used (i.e., storage rooms, cleaning rooms etc.). Ensure there are no significant air leaks by making sure that rooms are well-sealed and that windows and doors are closed.



Save Paper

Try to limit printing paper and do so when it is only necessary. Print on both sides of the paper when possible.

Use Power-Saving Equipment

use machines and equipment that have power-saving or standby features for low electricity consumption when it is not in use.

Turn off Home and Office Appliances

Switch off devices such as computers, monitors, etc. at the end of the work day or if you will leave them for extended periods of time, if possible.

Unplugging

From your computer to your toaster, all electronics generate heat. Even if it's switched off, just being plugged in generates a small amount of heat in the wiring. To keep things cool, unplug any electronics you're not using. This can save 10-5 % of your electricity bill.

The climate and the world are changing every day, and as indicated in this guide, there is growing concern and a key interest in taking green solutions and applications and turning them into real actions across all industries.

At Korra Energi, we have been creating successful and long-standing green and sustainable applications that proved not only eco-friendly but also have proven to be cost-efficient. We believe that there is a need for more collaborative efforts from all the different industries, experts, corporations, and countries to ensure that all green energy solutions are implemented at maximum effectiveness.

The time has come for us to build a better tomorrow for our nations and the generations to come.

Sources

https://www.enelgreenpower.com/learning-hub/glossary
https://www.cleanenergyresourceteams.org/glossary
https://www.sis.gov.eg/Story/160255/Egypt-and-Climate-Change?lang=en-us
https://www.energy.gov/eere/femp/office-energy-checklist#:~:text=Turn20%off20%your20%computer20%and,management20%feature20%and20%use20%it.
https://www.conserve-energy-future.com/-20energy-saving-tips-reduce-business-energy-costs.php
https://www.familyhandyman.com/article/heres-why-you-should-consider-installing-a-dual-flush-toilet/#:~:text=How20%much20%money20%does20%it,gallons20%per20%flush20%(gpf).
https://education.nationalgeographic.org/resource/fossil-fuels
https://www.talesbytrees.com/-10green-industry-terms-you-should-know/
https://pelacase.com/blogs/news/sustainability-words
https://www.sciencedirect.com/topics/engineering/industrial-heat-process#:~:text=ABSTRACT-,Industrial20%process20%heat20%is20%defined20%as20%thermal20%energy20%used20%directly,of20%total20%national20%energy20%consumption.
https://www.iea.org/commentaries/clean-and-efficient-heat-for-industry
https://www.sciencedirect.com/topics/engineering/municipal-solid-waste
https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials
https://www.csis.org/analysis/creating-shared-value-strategic-imperative-companies#:~:text=Creating20%shared20%value20%(CSV)20%is,activities20%to20%core20%business20%activities.
https://www.isc.hbs.edu/creating-shared-value/csv-explained/Pages/default.aspx
https://www.energy.gov/eere/water/how-hydropower-works
https://www.globalccsinstitute.com/archive/hub/publications/202108/ccs-readiness-index2018-global-ccs-institute2018-digital.pdf
https://www.nationalgrid.com/stories/energy-explained/what-is-ccs-how-does-it-work
https://www.ge.com/renewableenergy/wind-energy/what-is-wind-energy
https://www.energy.gov/eere/solar/how-does-solar-work
https://www.irena.org/geothermal
https://www.eia.gov/energyexplained/biomass/
https://www.globalccsinstitute.com/archive/hub/publications/202108/ccs-readiness-index2018-global-ccs-institute2018-digital.pdf
https://databank.worldbank.org/metadataglossary/world-development-indicators/series/EN.ATM.CO2E.KT#:~:text=Data20%for20%carbon20%dioxide20%emissions,and20%reported20%as20%elemental20%carbon.
https://interplasinsights.com/plastic-industry-insights/-6ways-the-manufacturing-sector-can-reduce-carbon-emissions/
https://matmatch.com/resources/blog/five-ways-manufacturers-can-reduce-carbon-emissions/
https://www.keiken-engineering.com/news/-6ways-industries-can-achieve-energy-efficiency

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