DESERT-VISION

SENEGAL-PROJECT

Sénégal 2050

OPTIMIZATION OF ENERGY & WATER SUPPLY
PLUS CONSTRUCTION OF A LARGE, MODERN
INDUSTRIAL - CENTRE

back

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Lions on move

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Introduction

Senegal is a fascinating country full of potential, with its natural resources, a young, growing population, and strategic geographic location providing ideal conditions for economic and societal transformation.

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The **DESERT-VISION** initiative aims to harness this potential fully and lead Senegal into a new era of economic and ecological prosperity.

The multifunctional thermo-solar power plants of **DESERT-VISION** are more than mere energy facilities:

they form the foundation for a comprehensive system of industrial and agricultural developments supported by sustainable, CO_2-free energy and large quantities of freshwater.

- **More than just energy generation: DESERT-VISION as a "Power Hub"**

DESERT-VISION's thermo-solar power plants serve not only as suppliers of environmentally friendly electricity but as "Power Hubs" that enable energy-intensive industries at low operating costs.

This creates the basis for a wide range of modern industrial facilities attracted by the affordable and sustainable energy supply.

Through the multifunctional design of these power plants, numerous production facilities can be supported, and new value chains established – from manufacturing to high-tech production to food processing.

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➢ Water and agriculture: A resource utilization system

One of the most remarkable features of **DESERT-VISION** power plants is their ability to provide large amounts of freshwater.

This water opens up unprecedented possibilities in agriculture, especially in regions previously struggling with water scarcity.

With access to freshwater, large agricultural areas can be developed and transformed into sustainable agricultural production sites.

These yields enable Senegal not only to achieve food self-sufficiency but also to create export potential.

This allows Senegal to achieve food autonomy and open up new export markets, providing additional economic stability and independence.

➢ Positive effects on employment and social development

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DESERT-VISION creates tens of thousands of jobs by establishing these new industries, not only in energy production but also in associated industrial and agricultural sectors.

The creation of new employment opportunities improves living standards in many parts of the country and reduces dependence on foreign labor markets.

Through training and qualification programs that accompany the introduction of new technologies, local workers can be prepared for modern industrial jobs, thereby sustainably raising education and skill levels in the population.

➢ A path to ecological and economic stability

By providing CO_2-free, environmentally friendly energy, **DESERT-VISION** makes a significant contribution to reducing environmental pollution and guiding Senegal into a more sustainable future.

The realization of this vision not only helps reduce dependence on fossil fuels but also lowers energy import costs, improving the trade balance and contributing to an overall more stable economy.

By reducing environmental impact and promoting sustainable economic development, a stable ecological and economic foundation is laid for future generations.

➢ Transformation into a leading economic power

With **DESERT-VISION**, Senegal can lay the groundwork to become a regional economic and industrial center.

The initiative provides all the conditions needed to set Senegal on a path to prosperity and political stability.

It strengthens economic independence and improves the quality of life for the population.

DESERT-VISION is more than just an energy project – it is a key to industrial revolution and sustainable development that can put Senegal on the global map as a leading economic power, with a model role worldwide.

This comprehensive reorientation shows that **DESERT-VISION** has the potential to lead Senegal not only into a bright future but also to secure the stability, prosperity, and well-being of the country and its people in the long term.

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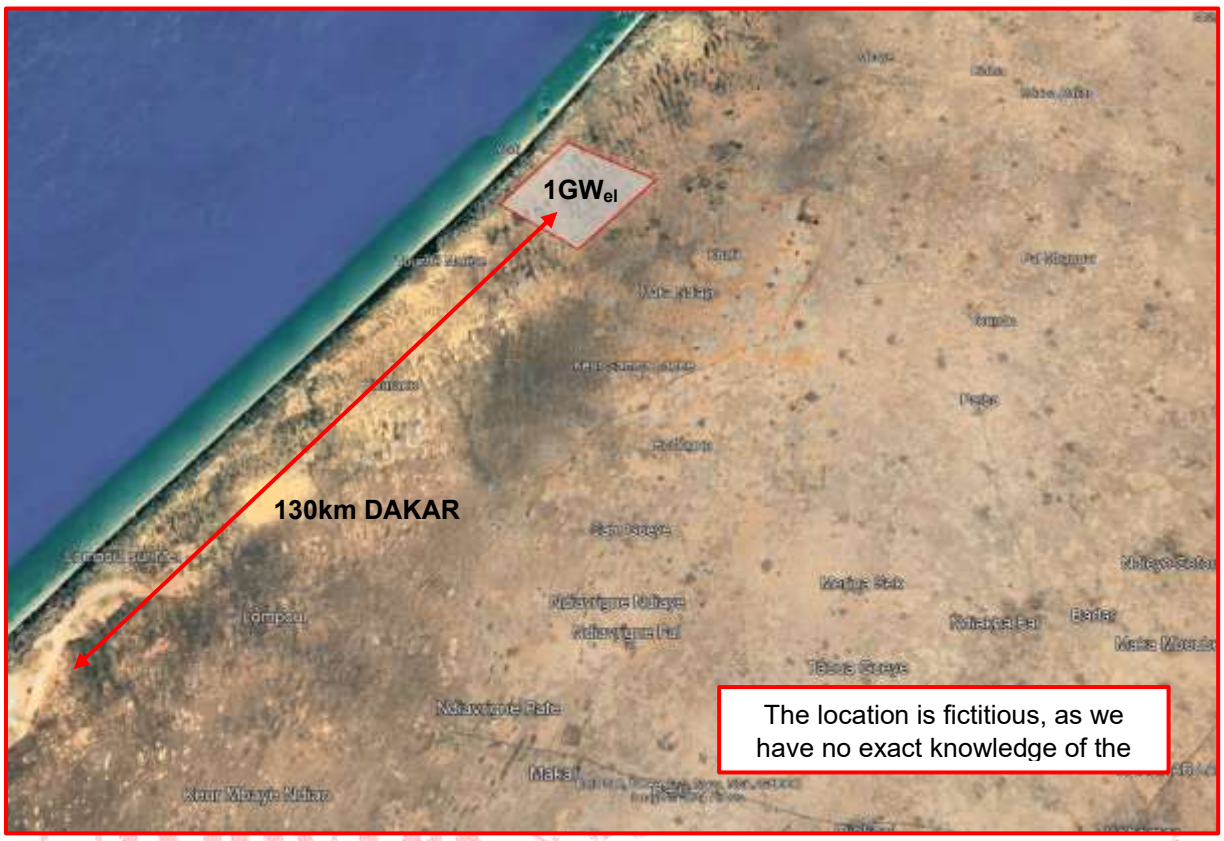
1GW$_{el}$ DESERT-VISION Kraftwerk



The first step in implementing this visionary project is the construction of a basic module with an electrical capacity of 1 gigawatt (GW).

This capacity is roughly equivalent to that of a medium-sized nuclear power plant, providing a stable and reliable energy source that sustainably strengthens the region's energy system.

In a country like Senegal, where current electricity consumption is around 4.8 terawatt-hours (TWh) per year, a **DESERT-VISION** power plant with a capacity of 1 GW could produce approximately 8 TWh per year.

This is nearly double the current national demand and could, therefore, make a substantial contribution to the country's energy supply.

A power plant of this magnitude could not only meet existing demand but also lay a crucial foundation for long-term energy independence.

The surplus energy production would enable Senegal to feed excess power into the West African power grid or use it for future export options and industrialization efforts.

This baseline supply from renewable energy sources can significantly reduce dependence on fossil fuels, leading the region towards a more sustainable energy future.

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The **DESERT-VISION** project focuses on renewable energy generation, which not only helps reduce greenhouse gas emissions but also creates jobs and strengthens the local economy.

A forward-looking goal is to establish a wide infrastructure for clean energy in West Africa and supply it with a stable, scalable energy mix.

By building renewable energy capacities and with a long-term perspective on a powerful energy supply, Senegal could also serve as a pioneer and energy hub for the entire West African region, promoting economic and social progress across the region.

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Performance data and dimensions of the 1GW Power-Plant

- 1 GW electrical capacity
- 8,000 operating hours per year
- Total output up to 8,000 GWh ≙ 8,000,000,000 kWh

- Base-load capability enabled by thermal energy storage that allows operation for up to 48 hours without sunlight.

- Seawater desalination using waste heat from the power plant, producing up to 5,000 m³/h at 8,000 operating hours per year = 40,000,000 m³ annually

- Power plant size: 4 km by 4 km in length ≙ 1,600 hectares
- Usable area under the sun-protected solar mirror field: 1,500 hectares
- With a three-story structure of halls under the mirror field, this provides an effective area of up to 4,500 hectares.

The **DESERT-VISION** power plants are specifically designed to produce up to 90% of the required components directly on-site.

This local production allows the power plants to be built not only more efficiently and cost-effectively but also to be sustainably expanded and scaled.

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Key products of local DESERT-VISION production:

- **Linear Mirrors:**

  The production of linear mirrors is central to the functionality and efficiency of the **DESERT-VISION** power plants.

  A power plant with a 1-gigawatt (GW) capacity requires a total of 3.84 million of these mirrors.

  To meet this demand, 40 production lines for linear mirrors are set up to operate in parallel.

  With this production capacity, the plant's output can be increased by 1 GW each year.

- **Thermal Solid-State Heat Storage:**

  The heat storage systems play a key role in **DESERT-VISION** infrastructure by efficiently storing thermal energy and ensuring continuous energy supply even during periods without sunlight.

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- **RO Filter Cartridges:**

  Special reverse osmosis (RO) filters are produced for desalination and seawater treatment.

  These are essential to continually expand desalination capacity and complement the thermal multi-stage desalination units.

Through this integrated on-site production, the **DESERT-VISION** power plants can develop independently.

Manufacturing essential components directly at the location reduces dependence on external supply chains, lowers costs, and strengthens the regional economy.

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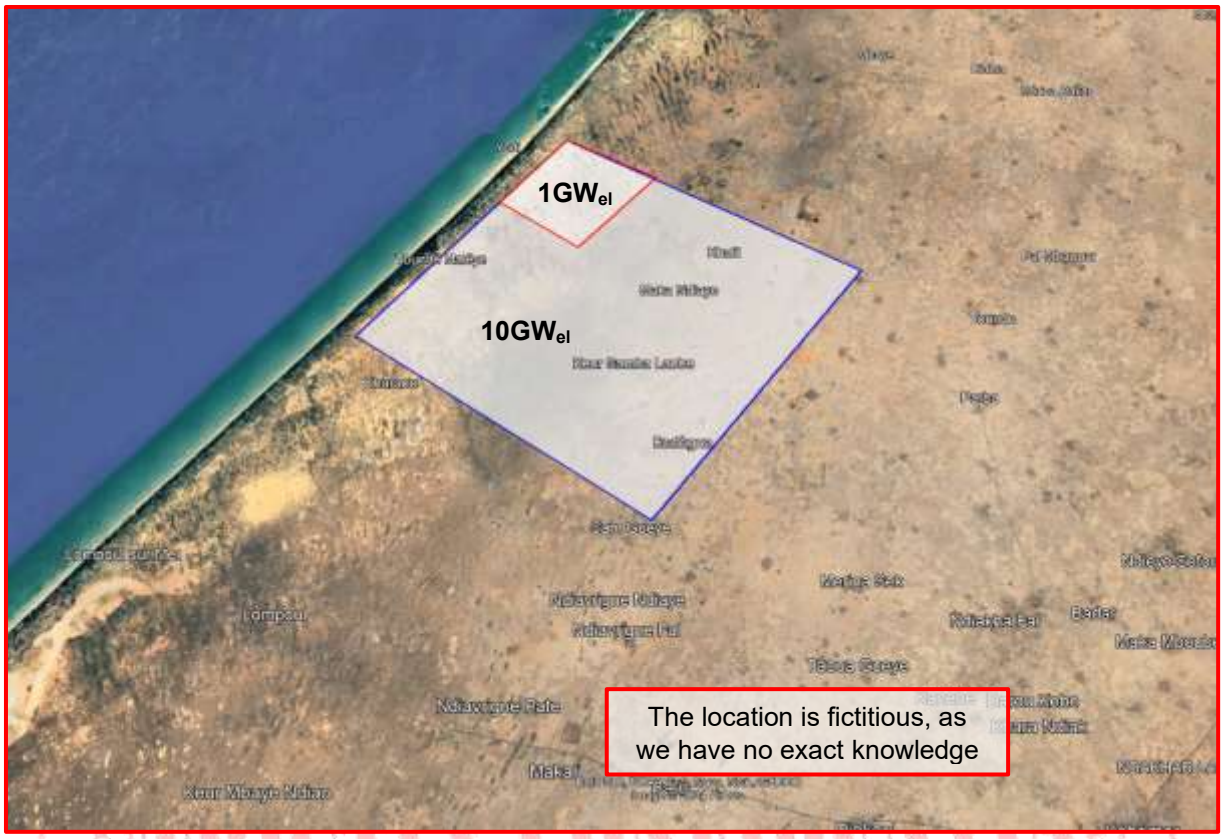
10GW$_{el}$ DESERT-VISION Power-Plant



After the successful construction and commissioning of the 1 GW base module, the power plant can expand its capacity by up to 1 gigawatt of electrical power (GWel) annually through its own production.

It is projected that, upon full expansion, the plant will reach a maximum output of up to 10 gigawatts (GW), equivalent to an impressive annual energy production of up to 80 terawatt-hours (TWh).

➢ **Comparison with Existing Power Plants**

To better understand the planned plant's capabilities, it's helpful to compare it to some of the world's most powerful power plants:

- **Kashiwazaki-Kariwa** Nuclear Power Plant in Japan:
  Operated by Tokyo Electric Power Company (TEPCO), this is considered the most powerful nuclear power plant globally, with an installed net capacity of about 8 gigawatts (GW).
  However, since the Fukushima incident in 2011, it has been largely offline, highlighting the inherent risks of nuclear power and the need for alternative energy sources.

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- **Three Gorges Dam in China**: The largest hydropower plant in the world, with an installed peak capacity of 22.5 gigawatts (GW).
  Despite this impressive capacity, it currently generates only around 85 terawatt-hours (TWh) annually due to low water levels and significant technical challenges.
  The dam's reservoir covers a vast area of approximately **1,084 square kilometers, extends around 600 kilometers in length**, **and is between 1.1 and 1.6 kilometers wide.**
  At its highest water level, the reservoir reaches a depth of up to 175 meters.
  The construction of the dam required the resettlement of up to 1.4 million people, as numerous cities and villages had to be abandoned or relocated.

➢ **Advantages of the DESERT-VISION Power Plant**

In comparison, a **DESERT-VISION** power plant with a capacity of 10 gigawatts (GW) could provide up to 80 terawatt-hours (TWh) of electricity annually.
This means it would be capable of producing a similar amount of energy as the **Three Gorges Dam**, but with significantly less land usage.
While the **Three Gorges Dam** requires around 1,084 square kilometers for its reservoir, the **DESERT-VISION** plant would occupy only about 170 square kilometers.
The potential annual generation of 80 TWh would increase current electricity production by nearly 60%, which not only represents a significant boost in energy supply but also reduces dependency on environmentally harmful energy sources.

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Conclusion

In summary, the planned expansion of the **DESERT-VISION** power plant could not only meet growing energy demands but also offer a sustainable and efficient alternative to existing methods of energy generation.

A comparison with existing nuclear and large-scale hydropower projects highlights the DESERT-VISION plant's advantages in terms of performance, land use, and potential environmental impact.

This could mark a crucial step toward a more sustainable and secure energy future.

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Performance Data and Dimensions of the 10 GW Power Plant

- 10 GW electrical capacity
- 8,000 operating hours per year
- Total output up to 80,000 GWh** ≙ **80 TWh ≙ 80,000,000,000 kWh**

- Base-load capability** supported by thermal energy storage, allowing operation for up to 48 hours without sunlight.

- Seawater desalination using waste heat from the power plant: up to 50,000 m³/h with 8,000 operating hours per year, **totaling 400 million m³ annually.**

- Power plant size: 13 km by 13 km in length ≙ 16,900 hectares
- Usable area** under the sun-protected solar mirror field: **16,000 hectares**
- With a **three-story structure** of halls beneath the mirror field, a calculated usable area of up to 48,000 hectares ≙ **480 million m² is achieved.**

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Seawater desalination potential due to power shift

Simultaneous electricity generation and freshwater production from seawater are essential components of modern energy and water management.

Given the increasing challenges posed by climate change and global water scarcity, innovative solutions are critical to address these needs. **DESERT-VISION** power plants are designed not only to provide sustainable energy but also to incorporate efficient seawater desalination methods.

Freshwater production is achieved through two primary processes:

- **Multiple-Effect Distillation (MVC):**
  This process utilizes waste steam generated during electricity production to support water desalination, significantly boosting the plant's overall efficiency by eliminating the need for additional energy input for desalination.

- **Reverse Osmosis (RO):**
  A well-established technology characterized by high efficiency and low energy consumption.
  RO desalination involves passing seawater through a semipermeable membrane, separating water from dissolved salts and impurities.
  On average, RO technology requires about 3 kWh of energy per cubic meter of desalinated water.

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A typical example illustrating energy distribution:

- If a 1-gigawatt plant experiences a reduced nighttime electricity demand of 50%, it could allocate 500 MWh over 8 hours for RO desalination.

This would result in:

- 500 MWh over 8 hours, equal to 4,000,000 kWh.

- With an energy consumption rate of 3 kWh per cubic meter, approximately 1.3 million cubic meters of freshwater can be produced within these 8 hours.

- Extrapolated over a year (365 days), this results in an additional capacity of around 486 million cubic meters of freshwater per year.

Applied to a 10 GW plant, the potential freshwater volumes are significantly higher.

This would not only enhance water supply in desert regions but also boost agricultural productivity.

A stable and sustainable water supply enables farmers to implement more efficient irrigation systems and increase crop yields, thereby contributing to food security. Additionally, industries dependent on water, such as food processing, textiles, and

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chemicals, would benefit from stable water availability, fostering diversified economic growth in these regions.

The integration of water and energy production in **DESERT-VISION** plants thus promotes both resource conservation and economic growth, contributing to social stability in arid areas.

In conclusion, by combining MVC and RO technologies, **DESERT-VISION** plants provide a promising solution to the growing demand for electricity and freshwater.

The substantial volumes of freshwater that a 10 GW plant can produce hold the potential to transform a desert nation into a hub for agriculture and industry.

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Modern Power-Transmission

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High-voltage direct current (HVDC) transmission offers several advantages, making it the preferred choice over traditional alternating current (AC) transmission in certain scenarios:

- **Reduced Transmission Losses:**
  HVDC allows for efficient long-distance energy transmission with significantly lower losses compared to AC transmission. Over a distance of 3,000 km, transmission losses are kept below 10%.

- **Large Capacity:**
  HVDC systems have substantial capacity, making them particularly attractive for large-scale energy transmission projects.
  A single modern HVDC line can currently transmit up to 6.4 gigawatts (GW), enough to power entire cities or regions. If power plant capacity were expanded to 10 GW and transmitted via an HVDC line, it could supply a vast area in Africa with stable and efficient power.

Senegal, which currently has a relatively limited energy infrastructure, could potentially become one of the continent's major energy hubs with a 10 GW HVDC project.

This 10 GW capacity is equivalent to about ten medium-sized nuclear power plants, meaning it could not only meet national demand but also provide substantial energy for export to neighboring countries.

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Such a project could place Senegal in a leading position in renewable energy and international energy supply by supporting regional energy needs in an environmentally friendly and sustainable way.

HVDC systems are particularly advantageous for transmitting power over long distances with minimal losses.

The lower heat generation and higher stability of HVDC technology make it especially suitable for transporting large amounts of energy from remote, often hard-to-access power generation sites, such as deserts or coastal areas, to densely populated urban centers.

The realization of such projects could also boost economic development. In addition to direct energy supply, neighboring African countries could be connected to a cross-border power grid, strengthening regional cooperation and energy security.

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Projects under the Solar-Field

Power Plant Construction

The construction of the **DESERT-VISION** power plant places a strong emphasis on developing the expansive solar field, with around 90% of this work conducted on-site and focused on employing local workers from Senegal.

To support this, **DESERT-VISION** is setting up an automated production facility for linear mirrors - the central component of the solar field.

To ensure smooth construction and high-quality work, **DESERT-VISION** is investing in extensive training programs.

These programs offer many Senegalese workers the opportunity to gain a comprehensive education, equipping them with essential technical skills and providing long-term career prospects.

In addition to specialized technical training, the program emphasizes hands-on practice, preparing workers effectively for their roles.

To further support these training efforts, **DESERT-VISION** will establish modern workshops that will serve not only during the construction phase but will remain available for future training programs.

These workshops form the foundation of technical education, helping to build a skilled and competent workforce that can operate and maintain the plant over the long term.

Upon completion of construction, trained employees will transition into permanent roles, handling both the ongoing maintenance of the solar field and the overall operation of the plant.

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This approach not only ensures the continuous functionality of the facility but also contributes to sustainable local employment.

By creating stable, long-term jobs, **DESERT-VISION** supports regional economic growth while providing local people with secure career paths.

A core commitment of **DESERT-VISION** is to provide extensive knowledge transfer, benefiting many locals.

In modern training centers, employees learn not only technical expertise but also multidisciplinary skills applicable to various projects under the solar field.

This cross-functional training prepares employees for a range of tasks and opens up numerous opportunities for advancement across different fields.

In summary, **DESERT-VISION's** initiatives aim not only to build an innovative power plant but also to strengthen the local community through education and employment, fostering lasting positive impacts.

By investing in workforce development and community support, the project creates both immediate and long-term benefits for the region.

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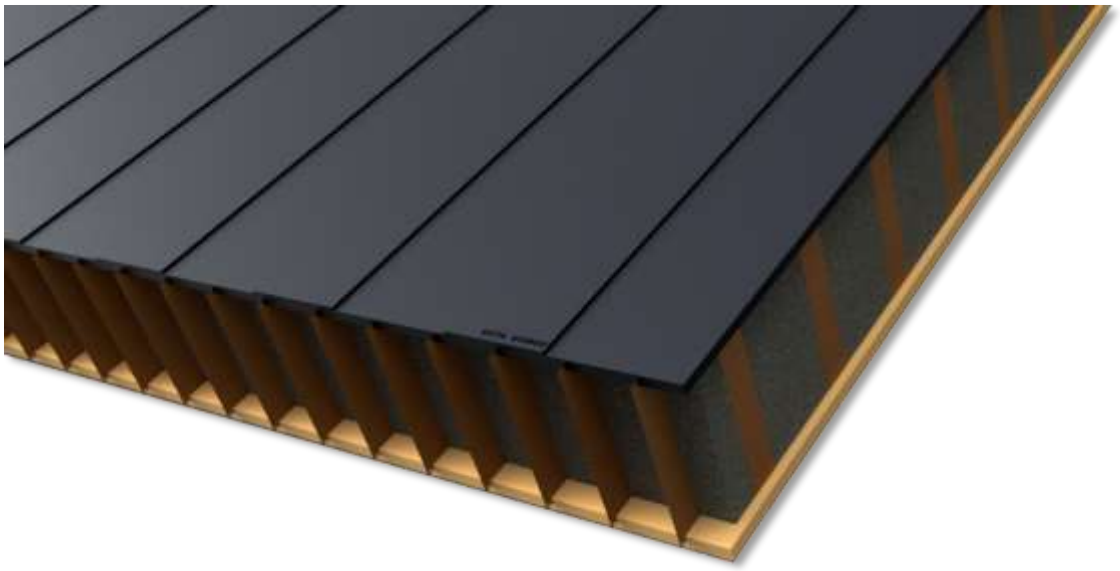
DESERT-VISION – House-Constuction



The foundational structure of the linear mirrors used in the **DESERT-VISION** projects is based on the innovative construction technology developed by **SOTA-DOMUS** Inc.

This technology stands out for its use of primarily renewable waste materials as building components, making it not only highly environmentally friendly but also extremely cost-effective.

In fact, the **SOTA-DOMUS** construction methods can be up to ten times cheaper than traditional building techniques, resulting in significant savings.

Another advantage of this construction approach is the drastically reduced construction time.

Thanks to efficient building methods, the setup time can be shortened by up to 90% compared to conventional construction processes.

Despite the low costs and rapid assembly, the quality of **SOTA-DOMUS** buildings is unquestionable.

The materials used provide exceptional construction quality, especially reflected in the durability of the exterior facades, which require no maintenance for decades, enhancing both economic viability and sustainability.

A central feature of **SOTA-DOMUS** construction technology is its integrated, non-combustible insulation, which achieves **"Passivhouse"** standards even with a wall thickness of just 150 mm.

This standard allows for energy savings of up to 95%, making the buildings particularly energy-efficient and environmentally friendly.

The combination of high energy efficiency, quick construction, and low maintenance needs positions **SOTA-DOMUS** technology as the fastest and most sustainable building method while ensuring maximum living comfort.

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This advanced construction technique is an essential part of the **DESERT-VISION** projects.

All buildings, including employee accommodations, will be constructed using **SOTA-DOMUS** panels.

This not only ensures an efficient and environmentally friendly construction process but also guarantees a high standard of living for the workers.

Our long-term goal is to utilize **SOTA-DOMUS** technology not only within the framework of the **DESERT-VISION** projects beneath the solar fields but to establish it throughout Senegal.

By introducing this technique nationwide, we aim to contribute to the creation of affordable, high-quality, and energy-efficient housing, thereby positively influencing the sustainable development of Senegal.

This approach not only enhances living conditions but also supports the broader economic and environmental objectives of the region.

You can find out more about this construction technique at: 

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Onshore- Fish-Farming

Onshore Fish Farms with Integrated Processing:

A Sustainable Solution for Aquaculture

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Onshore fish farms with integrated processing systems are increasingly essential to meet the growing demands for sustainable fish production, food safety, and environmental protection standards.

These innovative systems offer numerous advantages and address various challenges within the aquaculture industry.

Here are some key aspects that highlight the necessity of such facilities:

- **Sustainable Fish Production**

  Onshore fish farms allow for controlled and sustainable fish farming.

  By utilizing closed systems, conditions for fish can be optimized, resulting in reduced use of antibiotics and chemical additives.

  These farms minimize impacts on surrounding ecosystems since they do not rely on wild fish stocks, thus avoiding overfishing.

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- **Water and Resource Management**

  Onshore fish farms often employ recirculating aquaculture systems (RAS), which efficiently recycle and filter water.

  These systems significantly reduce water consumption and contribute to resource conservation. Moreover, they can be operated in conjunction with seawater desalination technologies, ensuring stable fish production even in water-scarce regions.

- **Quality Control and Food Safety**

  Integrated processing in onshore fish farms enables stringent quality control directly on-site.

  Fish can be processed fresh and immediately prepared for the market, minimizing transportation times and maximizing product freshness.

  This enhances food safety by reducing the risk of contamination during transport.

- **Integration of Value Chains**

  By incorporating processing facilities, onshore fish farms can cover the entire value chain within a single operation - from breeding to processing and marketing.

  This leads to cost savings by minimizing transportation and storage costs while keeping value creation local.

  Additionally, job creation in processing contributes to regional economic stability.

- **Environmental and Climate Protection**

  Onshore fish farms can be designed to operate using environmentally friendly technologies.

  This includes the use of renewable energy, implementation of waste management systems, and reduction of carbon footprints.

  This is especially important at a time when the aquaculture sector faces pressure to become more sustainable and climate-neutral.

- **Nutrition and Food Supply**

  With a growing population and increasing demand for animal proteins, onshore fish farms are a key resource for meeting global food needs.

  They provide an efficient and sustainable method of fish production that is both nutrient-rich and environmentally conscious.

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- **Adaptation to Market Needs**

  Onshore fish farms can respond more flexibly to market demands and consumer trends since production occurs closer to end consumers.

  This allows for the cultivation of new fish species or the development of specialized product lines to meet specific consumer preferences.

Conclusion

Onshore fish farms with integrated processing represent an innovative solution to the challenges faced by the modern fishing and aquaculture sectors.

They promote sustainable and efficient production, enhance food safety, and provide economic benefits to the regions where they operate.

In a time of resource scarcity and increasing environmental pressures, such systems are essential for ensuring responsible and future-oriented food production.

Calculation Example: Tilapia Farming

- **Yield:**
  Approximately 60 kg/m³/year.
- **Fish Farming Tanks:**
  Two stories, each 100,000 m², with 2 m deep tanks = **400,000 m³ of water**.
- **Annual Yield Calculation:**
  400,000 m³ × 60 kg/m³ = **24,000 tons/year**.

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Revenue Calculation:

- **European wholesale price: Approximately €10/kg**
- **Revenue: 24,000 tons × €10/kg = €240,000,000.**

This example illustrates the significant economic potential of onshore fish farms, highlighting their role in not only meeting food demand but also contributing to local economies.

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Fruit and Vegetable Cultivation under the Solar-Field

Sustainable Energy and Agricultural Innovation under the solar field.

The solar field being developed as part of the 1-gigawatt power plant not only provides a sustainable energy source but also presents innovative opportunities for agriculture.

The shaded area beneath the solar panels creates a cooling microclimate that lowers soil temperatures, making it an ideal environment for growing fruits and vegetables.

This unique combination of solar energy generation and agricultural use represents a forward-thinking model that offers both ecological and economic benefits.

Sustainable Agricultural Practices

The agricultural activities under the solar field will follow the latest principles of organic farming, optimizing sustainability and yield.

Our expert in this field, Mr. Roland Kästner, brings extensive experience from one of the largest fruit and vegetable growing regions in the world, Almería, Spain. Almería is renowned for its efficient resource utilization and its leading role in intensive yet sustainable agriculture.

This expertise will be directly integrated into the planning and implementation of the farming activities beneath the solar field.

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Scale of the Solar Field

The planned solar field will cover an impressive area of 16 square kilometers (4 km x 4 km), totaling **approximately 1,700 hectares**.

In our planning, half of this area - about 850 hectares - will be reserved for fruit and vegetable cultivation and state-of-the-art processing facilities.

The other half will be utilized for buildings, industrial facilities, and infrastructure projects, further strengthening the regional economy.

Economic Potential of Agricultural Production

To illustrate the potential of this agricultural utilization, let's consider a sample calculation:

- **Estimated yield:**
  Approximately 116 tons per hectare per year.

- **Total production for 850 hectares:**
  850 hectares × 116 tons/hectare = approximately 98,600 tons annually.

- **Estimated selling price:**
  Conservatively estimated at €1 per kilogram.

- **Annual revenue:**
  98,600 tons × €1/kg = €98.6 million.

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These figures highlight the enormous economic potential of this project.

Broader Impacts on Food Security and Employment

The advantages of this agricultural usage extend far beyond mere economic gain.

Cultivation would significantly improve the food situation in Pakistan by providing fresh, locally produced food in sufficient quantities.

This would not only enhance food security but also reduce dependence on imported foods, strengthening the country's self-sufficiency.

Additionally, part of the production could be earmarked for export, generating further income and integrating Uganda more deeply into global trade.

Another crucial aspect of this project is job creation.

Operating the agricultural fields, processing the products, and expanding the associated infrastructure will create numerous jobs, thereby making a valuable contribution to the region's economic development.

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Furthermore, the project serves as a model for integrating energy generation with agriculture and could act as a blueprint for similar initiatives in other parts of the world.

Conclusion

In summary, the solar field represents not only a technological innovation in energy generation but also an integral component of sustainable agricultural and economic development.

The synergies created by combining solar energy and organic farming establish a win-win situation for the environment, the economy, and the population.

Potential for Expansion

The production potential beneath a portion of the 10-gigawatt power plant could be significantly expanded, further enhancing the benefits of this ambitious project.

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PRE-FUEL the Future of Mobility

PRE-FUEL: An Innovative Plant Oil-Based Fuel

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PRE-FUEL is an innovative plant oil-based fuel with the potential to long-term replace fossil fuels while contributing to solutions for global climate challenges.

Unlike conventional biofuels, PRE-FUEL is not only CO_2-neutral but actively captures CO_2 from the atmosphere and stores it permanently. For every liter of PRE-FUEL produced, approximately **5 kg of CO_2 is removed from the air and stored in the form of biochar in soils**.

This process reduces atmospheric CO_2 levels, enhances soil fertility, and creates a long-term carbon sink.

- **Advantages and Functions of PRE-FUEL**
  - **CO_2 Binding and Soil Improvement:**

    The removal of CO_2 from the atmosphere is a standout feature of PRE-FUEL, going beyond neutrality and directly contributing to climate repair. The biochar stored in the soil improves water and nutrient retention and promotes soil life, which ultimately enhances soil fertility and agricultural productivity.
  - **Energy Plus Food:**

    The production of PRE-FUEL generates not only valuable plant oil but also provides approximately 3 kg of high-quality food products, such as grain flour or feed, for every liter produced. This synergy allows for the simultaneous assurance of both energy and food supply while intelligently combining both.

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This could significantly contribute to food security in rural areas while promoting access to clean fuel.

- Flexible Use:

  PRE-FUEL is suitable for all combustion engines and can be used in cars, trucks, and even aircraft turbines. This flexibility offers a significant advantage over fossil fuels and many other alternative fuels, making **PRE-FUEL** a versatile solution for various industries.

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PRE-FUEL Production 1st Expansion Stage

First Steps Toward Implementation

The first step toward implementation is the establishment of a large cultivation area of approximately 40,000 hectares dedicated to the production of **PRE-FUEL** as well as food cultivation. Such a farm could yield significant quantities of energy and food annually:

- **Over 680,000 Tons of Flour:**

  This amount could contribute to food security and reduce dependence on food imports, serving as either food or animal feed.

- **16,200 Tons of Honey:**

  In addition to honey production, this initiative would strengthen biodiversity.

- **88 Million Liters of PRE-FUEL:**

  This volume would be sufficient to fuel 148,000 cars for an entire year. It represents a significant reduction in fossil fuel consumption and a drastic decrease in CO_2 emissions within the transportation sector.

The production of **PRE-FUEL** can remove approximately 440,000 tons of CO_2 from the atmosphere each year, leading to an improved climate balance and healthier soils.

The stored amounts of CO_2 could be traded as "carbon credits," providing additional revenue and financially strengthening the project.

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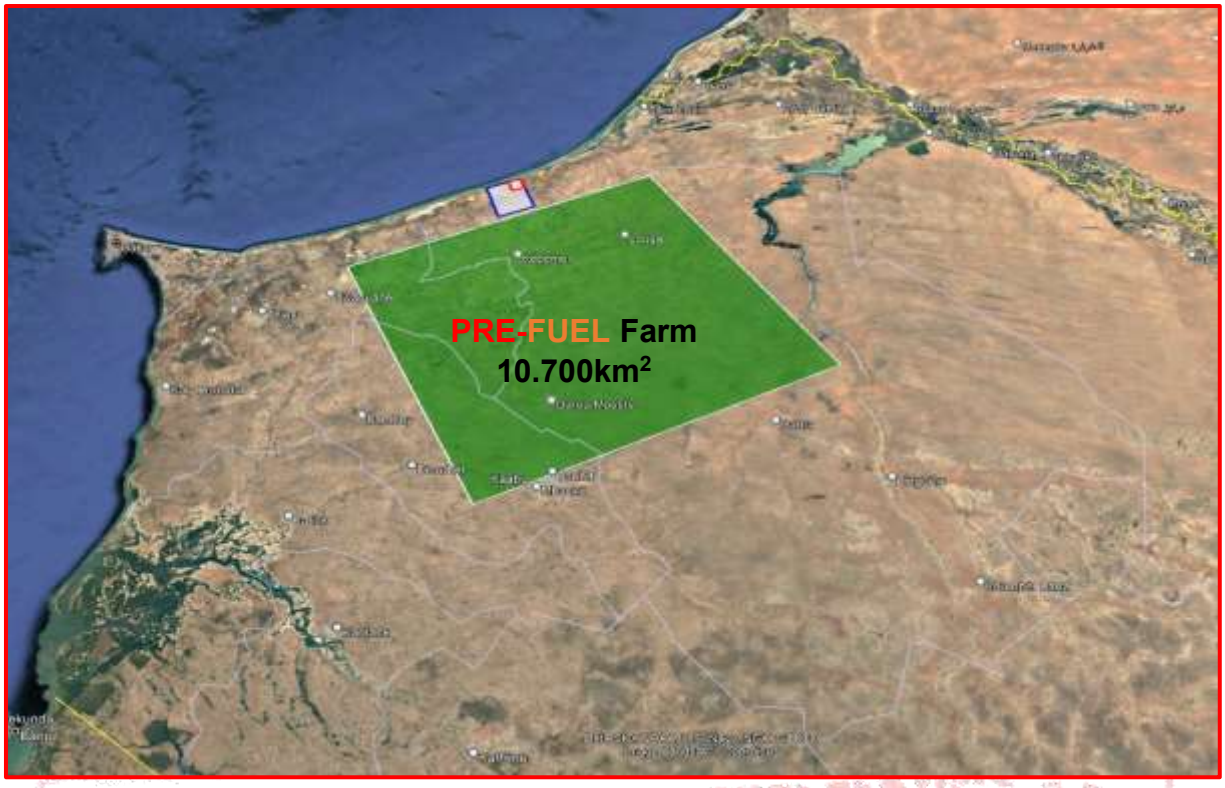
PRE-FUEL Production Final Expansion



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Final Development Plan

In the final phase, we aim to utilize 2 gigawatts (GW) of power for seawater desalination to irrigate our **PRE-FUEL** farm.

This capacity, operating for 8,000 hours a year, would generate 16,000,000,000 kilowatt-hours (kWh) or 16 terawatt-hours (TWh) of energy.

To desalinate 1 cubic meter (m^3) of water, approximately 3 kWh of electricity is required, which means:

16,000,000,000kWh ÷ 3kWh/m^3 = 5,300,000,000m^3 per year

Given that about 5,000 m^3 of water are needed per hectare per year, the total amount of 5,300,000,000 m^3 could irrigate approximately 1,070,000 hectares, equivalent to 10,700 square kilometers.

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Annual Yield

- Flour: 18,360,000 tons
- Honey: 438,000 tons
- **PRE-FUEL**: 2,622,857 tons, equivalent to 3 billion liters

With this quantity, 5 million mid-range vehicles could be operated for one year.

- **CO_2 Extraction from the Atmosphere: 9,000,000 tons per year**

Benefits for Senegal

- Significant Global Fuel Producer:

  The implementation of this technology could position Senegal as one of the world's leading producers of sustainable fuels in the medium term. With rich agricultural lands and state-of-the-art **PRE-FUEL** technologies, Senegal could produce substantial amounts of sustainable fuel.

- **Self-sufficiency and Exports:**

  Large-scale production of **PRE-FUEL** could make Senegal energy-independent and provide opportunities to export surplus fuel, creating new revenue streams.

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- **Promotion of Agriculture and Food Security:**

  The production of **PRE-FUEL** could supply large quantities of food and boost agricultural value creation in rural areas, enhancing food security and economic stability in these regions.

- **Improvement of Quality of Life:**

  By stabilizing soils and creating thousands of jobs in production and processing, the **PRE-FUEL** project could contribute to social and economic development in rural areas of Senegal.

  It would improve access to food and enhance living standards through new income sources.

- **Climate Leadership and Export of Environmental Solutions:**

  The successful implementation of **PRE-FUEL** would establish Senegal as an international player in climate protection.

  The technology could be exported and adapted in other countries, positioning Senegal as a leader in sustainable energy solutions.

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- **Ecological and Economic Gains:**

  PRE-FUEL is a groundbreaking solution that integrates fuel production, CO_2 reduction, and the enhancement of food security.

  The production of PRE-FUEL could herald a new era of sustainable development in Senegal, positioning the country as a crucial global fuel producer and a model for environmentally friendly energy.

  This approach would not only strengthen Senegal's economy but also make an active contribution to global climate protection.

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Senegal Silicon Valley

Technological Advancement and Innovation Hub

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Technological progress is advancing at a breathtaking pace, and it is essential that emerging nations not only keep up but actively shape the direction of this development.

Only through such commitment can these countries remain competitive in the long term and solidify their role in the global economy.

To meet this ambition, we aim to establish an innovation center that serves as a catalyst for entrepreneurial excellence and international collaboration.

This center will be specifically designed for startups, providing them with the opportunity to develop their ideas to market readiness in a dynamic and supportive environment.

Through close integration with international companies, they will benefit from global expertise while developing their own locally rooted solutions.

The proximity to the state-of-the-art mechanical workshops of **DESERT-VISION** gives these startups a significant advantage.

Here, ideas can be rapidly realized and efficiently advanced. Access to cutting-edge technology and expertise will enable these firms to create productive solutions in no time.

Focus Areas and Interdisciplinary Collaboration

A central focus of the center will be to promote projects that specifically address pressing challenges.

This includes innovative approaches in the fields of energy, water, agriculture, health, and education to develop sustainable and adaptable solutions for the continent.

Interdisciplinary collaboration is key to success, which is why there will be a strong emphasis on integrating the academic world.

All significant universities in the country and the region will have their own representatives in the center to foster the exchange of knowledge and ideas.

Regular conferences and workshops will provide a platform for dialogue among scientists, entrepreneurs, and innovators.

The specially designed conference center on the rooftop of the **DESERT-VISION** building will offer the ideal setting for these events.

These gatherings aim to help develop new, highly innovative technologies and solutions that address both local and global markets.

The Senegal Silicon Valley Center

The **"Senegal Silicon Valley Center"** will act as a melting pot for innovation across various disciplines.

Here, developments in medicine, artificial intelligence, robotics, renewable energies, and many other forward-looking fields will be advanced to market readiness.

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The goal is not only to promote technological innovation but also to enable its large-scale production within Senegal itself.

The mass production of goods developed at the center will take place on-site, creating thousands of new jobs.

This step will significantly increase the gross domestic product (GDP) while driving economic diversification.

In the long term, this should lead to a reduction in reliance on the export of agricultural products and pave the way for Senegal to become a modern, sustainable industrial nation.

A Comprehensive Approach to Progress

Our approach combines technological innovation with social and economic progress.

The **"Senegal Silicon Valley Center"** will not only be a hub for innovation but also a driving force for the transformation of the Senegalese economy.

It will contribute to positioning Senegal as a leader in sustainable industrialization, thereby strengthening its standing on the global stage.

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CO_2-free Server-Centren

Ideal Conditions for Cloud and Server Services

This location offers the ideal conditions for national and international cloud and server services.

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Access to cost-effective, sustainable energy makes it particularly attractive for a variety of IT service providers, ranging from cloud hosting and data center operations to energy-intensive crypto mining and blockchain technologies.

Competitive energy costs significantly reduce operating expenses, fostering the growth of companies that establish their digital infrastructures here.

With a connection to a stable, dedicated satellite link, the site is excellently networked, providing businesses with fast and reliable connections to customers and partners worldwide.

This global connectivity not only ensures low latency but also enables continuous, smooth data transfer and guarantees reliability.

Advantages of the Location for Digital and Cloud Services

- Sustainable Energy Supply:**

  The site utilizes a cost-effective, green energy source that meets the growing demand for environmentally friendly IT infrastructure. This makes it attractive to forward-thinking companies looking to minimize their CO_2 footprint.

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- **Cost Savings Through Low Energy Costs:**

  Electricity is one of the largest cost factors in operating data centers and crypto mining facilities.

  Access to affordable energy at this location helps significantly reduce operating costs, thereby enhancing competitiveness.

- **Global Connectivity and High Reliability:**

  With its own redundant satellite link, businesses at this location are not dependent on conventional network infrastructures.

  This guarantees high reliability and enables rapid connections to international markets and partners.

- **Attractiveness for Future Industries:**

  As digitalization increases, so does the demand for cloud services, IT infrastructure, and computing power.

  This location, with its favorable energy and connectivity conditions, is particularly interesting for companies in future industries such as cloud computing, artificial intelligence, machine learning, and blockchain.

- **Long-Term Location Advantages for the Digital Economy**

  The site provides ideal conditions for businesses reliant on growing IT and data demands.

  Specifically, sectors such as big data, artificial intelligence, and decentralized technologies like blockchain benefit from the availability of an energy-efficient, cost-effective, and environmentally friendly location.

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DESERT-VISION Industry-Park

Sustainable Industrial Area Beneath the Solar Field

A modern and sustainable industrial area will be established beneath the expansive solar field of the power plant - one of the most advanced in the world.

Access to sustainable energy and water supply makes this location particularly attractive for both domestic and foreign companies seeking new, sustainable production sites to reshape their supply chains in an environmentally conscious and resilient manner.

This site aims to serve as a lighthouse project for the future of industrial production, exemplifying how manufacturing can be resource-efficient and climate-friendly.

The innovative combination of renewable energy supply and efficient water treatment creates the foundation for an environmentally friendly and stable infrastructure.

Advantages of the Sustainable Industrial Area

- Energy-Self-Sufficient Production:

  With direct access to the emission-free energy supply of the power plant, companies can operate independently of fossil fuels.

  This not only reduces CO_2 emissions but also significantly enhances the sustainability profile of the businesses located here.

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Efficient Water Availability:

Integrated seawater desalination ensures a reliable and environmentally friendly fresh water supply, which is essential, especially in water-scarce regions.

The availability of water also opens up potential for industries that rely on stable water supplies, such as chemical and agricultural processing.

Attractiveness for Sustainable Investments:

The industrial area attracts companies that are committed to sustainability and aim to make their production processes climate-friendly in the long term.

This not only fosters regional growth but also enhances international competitiveness through modern, responsible supply chains.

A Beacon for Sustainable Industry

This industrial area symbolizes the possibility of harmonizing industry and environmental protection.

It serves as a vibrant example of how modern production can respond to the challenges of the climate crisis while simultaneously exerting a positive economic and social impact.

As a model for climate-neutral industry, this location will send a strong international message that sustainable business practices are both feasible and future-proof.

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Industry in the immediate Vicinity of the Power-Plant

Senegal is rich in natural resources that are currently mostly sold abroad without further processing.

However, with the opportunities provided by the **DESERT-VISION** power plant, this situation could fundamentally change.

Thanks to the enormous capacity of the 10-gigawatt plant, which generates completely CO_2-free electricity, raw materials such as iron, copper, and bauxite ore

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could be processed into semi-finished and finished products directly in the country at modern production facilities.

The processing of raw materials into end products is an energy-intensive industry, and this is where **DESERT-VISION** creates new possibilities through the availability of cost-effective and sustainable energy.

By utilizing **DESERT-VISION's** CO_2-free electricity, the entire production chain - from ore extraction to smelting to final manufacturing - can operate without fossil fuels.

The goal is to establish a completely emissions-free value chain, enabling Senegal to supply globally demanded products like **"green,"** sustainably produced steel, copper, and aluminum.

Sustainable Innovation Throughout the Production Chain

- **Sustainable Mining Operations:**

  Mining operations will be fully transitioned to sustainability.

  Mining vehicles and generators could be powered by the CO_2-neutral plant oil-based fuel PRE-FUEL, which is sustainably produced within the country.

- **Electric Smelting:**

  The blast furnaces required for metal processing would be powered exclusively by the emissions-free energy from the **DESERT-VISION** power plant, thus eliminating the need for fossil energy sources.

  This would make completely emissions-free production of steel, copper, and aluminum possible.

- **Focus on High-Quality Products:**

  It would be beneficial to concentrate on specialty products such as stainless steel, armor steel, and high-strength alloys, which are particularly in demand and lucrative.

  Such specialization would enhance the export value of the metals and support technological leadership.

- **Rare Earths and Eco-Friendly Processing:**

  Increased mining of rare earth elements—necessary for the production of high-tech products like electronics, batteries, and wind turbines—would be another forward-looking area. Modern, environmentally friendly processing on-site ensures the added value of these raw materials while reducing the environmental impact typically associated with conventional mining methods.

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- **International Partnerships and Technology Transfer:**

  DESERT-VISION plans to bring on board international cooperation partners who can provide modern know-how and capital for the development of highly innovative processing processes alongside the Senegal industry.

  These partnerships will help introduce cutting-edge technologies and quickly establish a powerful and sustainable metal processing industry in Senegal.

A Unique Opportunity for Senegal

By establishing a fully integrated and sustainable production chain in the country, Senegal could become a pioneer in the production of CO_2-free metals and high-tech materials.

This unique positioning would place Senegal internationally and lead the country into a new era of prosperity and sustainable growth.

The ability to produce emissions-free and value-added products offers Senegal the chance to take a leading role in sustainable raw material processing and to build a future-oriented economy.

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Summary

The establishment of the **DESERT-VISION** solar thermal power plant in Senegal will lay the foundation for the comprehensive transformation of the country, steadily turning it into a modern industrial nation.

This groundbreaking project will not only provide a sustainable energy source for Senegal but also serve as a driver for the country's economic and industrial development.

The phased expansion of the power plant will ensure that cutting-edge expertise in power plant construction and renewable energy utilization remains anchored within the country.

Almost the entire expansion will occur within the national economy, allowing 90% of the total value creation to remain in Senegal.

This means that the technical knowledge and financial returns will strengthen the Senegalese market, create jobs, and establish a solid foundation for sustainable innovations.

The **DESERT-VISION** complex will serve as a center for a new, ultra-modern industry.

It will develop technologies and facilities for the production of environmentally friendly PRE-FUEL, which, as a clean energy carrier of the future, will not only meet Senegal's needs but also position the country as an exporter of this innovative fuel.

Through this technology, Senegal will take a leading role in the production of emissions-free energy solutions and simultaneously achieve independence from fossil fuels.

In parallel, the **DESERT-VISION** project will lead to the country's self-sufficiency in food and fresh water.

By developing cutting-edge agricultural technologies and integrating advanced water treatment systems, Senegal will be able to increase its agricultural production and sustainably secure access to clean water.

This will not only reduce dependence on food imports and water resources but also significantly strengthen national food security and resilience against climate change.

The comprehensive transformation of the country through this project will turn Senegal into a prosperous showcase nation that can serve as a model for other countries with similar climatic and geographical conditions.

The benefits will extend far beyond the country's borders: Senegal will occupy a leading position in the use of renewable energy and industrial innovation, establishing itself internationally as a stable, sustainable, and technologically advanced partner.

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Through the successful implementation of the **DESERT-VISION** power plant project, the people of Senegal will benefit from growing prosperity and an improved quality of life.

The project will positively shape the national economy, labor markets, and ecological future of Senegal, while simultaneously transforming the country's image from an energy-dependent state to a shining example of sustainable industrialization and national independence.

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Consortium-Partners

Strategic Partnerships for the DESERT-VISION Solar Power Project

The successful implementation of a complex project like the **DESERT-VISION** solar thermal power plant in Senegal requires collaboration with experienced and reliable partners across various sectors.

Below is a brief overview of some of the key partners involved:

- **Deutsches Zentrum für Luft- und Raumfahrt (DLR)**
  - Germany's national center for aeronautics and space, energy, and transportation research.
  - **DLR** is engaged in both fundamental and applied research and development, positioning itself as one of the leading organizations globally in these areas.

- **Fraunhofer-Gesellschaft**
  - Europe's largest organization for applied research and a global leader in developing practical, innovative technologies for industry.
  - With over 70 institutes and research facilities in Germany, **Fraunhofer** covers a wide array of research focuses, from materials science to information and energy technologies.

- **Schott AG**
  - An internationally operating company specializing in the production of specialty glass and glass ceramics.
  - **Schott** is recognized as a leader in glass and glass ceramic technologies, providing specialized glass and coatings for solar thermal power plants.

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- **Siemens Energy**

  - A global player developing, producing, and marketing steam turbines for power generation and industrial applications.

  - **Siemens Energy** invests heavily in research and development to advance new technologies and improvements in steam turbine design.

- **Deutsche Meerwasser-Entsalzung (DME) GmbH**

  - A company focused on the development and implementation of desalination technologies.

  - **DME** invests in innovative solutions to enhance desalination technologies and reduce operational costs, which is crucial for ensuring a reliable freshwater supply in arid regions.

- **SOTA-DOMUS.Inc**

  - A company specializing in innovative construction solutions, particularly in energy-efficient and sustainable buildings.

  - **SOTA-DOMUS** provides the foundational material for the **DESERT-VISION** linear mirrors through its advanced panel technology, which allows for the construction of buildings situated under the solar mirrors.

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- **Additional Partners**

  - The project will also involve various other stakeholders, including local businesses, government entities, and international experts, all contributing to the successful execution and sustainability of the **DESERT-VISION** initiative.

Conclusion

These strategic partnerships are essential to ensure that the DESERT-VISION solar power plant benefits from cutting-edge technologies, innovative solutions, and industry best practices.

By leveraging the expertise of these organizations, the project is positioned to achieve its goals of sustainability, energy independence, and economic growth in Senegal.

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Links

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DESERT-VISION Projekte

DESERT-VISION Fragen und Antworten

SOTA-DOMUS

PRE-FUEL

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