



برنامج استدامة الطلب على البترول
Oil Sustainability Program

OSP Introduction

Opportunities Overview

2023

OSP



برنامج استدامة الطلب على البترول
Oil Sustainability Program

Overview

Overview of Program Governance

Supreme Committee for Hydrocarbon Materials



Chaired by HRH
Crown Prince
Mohammed Bin Salman



Chaired by HRH
Minister of Energy

Prince Abdulaziz bin Salman



برنامج استدامة الطلب على البترول
Oil Sustainability Program



Supervisory Committee

OSP aims to sustain hydrocarbons as a competitive source of energy from an environmental and economic standpoint

Extensive study was conducted with local and international stakeholders

100+

Global external experts, scientists and researchers

10

international universities and research entities

20+

Research labs

20+

High impact research topics



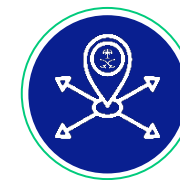
Program has 3 objectives



Better understand the implications of global trends on energy Ecosystem



Identify opportunities to support the global energy landscape evolution



Position Saudi Arabia to drive a reliable energy mix

46 opportunities prioritized across three sectors (materials, transportation, utilities) and different geographies

Three strategic pillars formed the basis of the program

Development:

Unlock demand in emerging markets by removing barriers to energy access through **infrastructure investments**; grow **under-developed industries** by providing investments & expertise



Sustainability:

Meet global energy needs with a secure energy mix that is both **environmentally & economically efficient**, including hydrocarbons

Innovation:

Accelerate **technology advancements** to provide new forms of energy and applications for hydrocarbons and **unlock product supply and demand**

46 of 80+ opportunities prioritized

80+ identified opportunities across 3 sectors



Transportation
(45 opportunities)



Utilities
(15 opportunities)



Materials
(25 opportunities)

Prioritization criteria

Incremental demand potential

Financing need

Associated risks

Kingdom ability to implement

46 prioritized opportunities across 3 sectors



Transportation
(15 opportunities)



Utilities
(8 opportunities)



Materials
(23 opportunities)

OSP identified ~50 opportunities across 3 sectors, with 23 opportunities in the materials sector



Material



Transport



Utilities

| Construction material | Plastic & recycling | Infrastructure | Agri. & industry |
|--------------------------------|-----------------------------------|-------------------------------|---------------------------------------|
| Polymer concrete (road, water) | ExPR scheme | Roads Infrastructure | Petcoke in cement |
| Polymer concrete (bendable) | Plastic waste product application | Airports infrastructure | CO ₂ enhanced oil recovery |
| Polymer tiles | Plastic advocacy | Seaport infrastructure | LPG for cooking |
| Glass, wood, aluminum sub. | Recycling complex | Cargo terminal infrastructure | Agriculture mechanization |
| FRP and epoxy coated rebar | Marine waste clean-up | | |
| Foamed plastic for insulation | Crude to chemical | | |
| Transport. Material | | Road | Power |
| Road transport | | ICE competitiveness | Marine powerships |
| Marine & other | | Low-cost ICE cars | Oil based DG |
| | | Ride-hailing | Oil based cogeneration |
| | | Bus Transportation | Oil to gas technology |
| Durable, consum. & industrial. | Packaging | Aviation | |
| GFRP / HDPE for steel | Plastic pallets | Supersonic aviation | |
| GFRP utility poles | Industrial packaging | Low cost carriers | |
| GFRP, PP and PBT | Metal food packaging | | |
| Synthetic paper | E-commerce packaging | Marine | |
| | PET bottles | HFO Scrubbers | |
| | | Refinery HFO upgrades | |

Five key enablers identified and to be developed for effective implementation



- Identify **business opportunities** and develop **business plans**
- Facilitate **equity financing** locally or internationally

Business Investments



- **Identify and plan implementation** of infrastructure projects
- **Facilitate financing** locally or through international partners

Infrastructure Investments



- Upgrade **Saudi standards & regulations** to promote the program's opportunities
- **Promote fair policies** and track policy changes
- **Shape viewpoint** for local and international policymakers

Regulatory Advocacy



- **Create awareness and promote fair discussion** on relevant topics (e.g., ICE sustainability, plastics sustainability) based on a transparent and fact-based communication
- **Ensure Kingdom's view is represented** in relevant forums globally

Awareness & Communication



- **Fund and promote research** in strategic areas identified
- Invest in **targeted technologies**
- **Align Kingdom R&D activities** and external relationships

Innovation & Technology Management

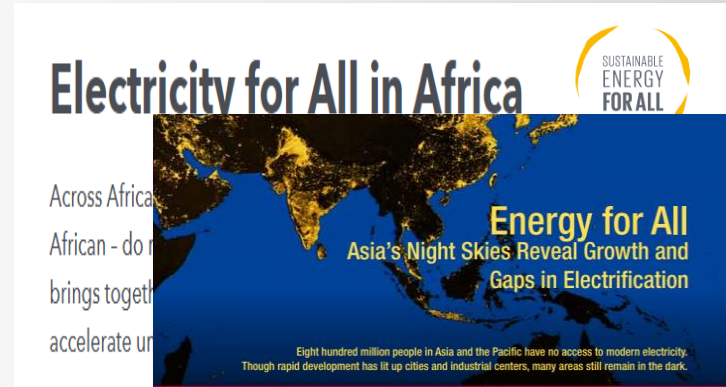


Utilities



Opportunity overview: OSP wants to foster investment in new floating power plants in underserved countries

Situation



- Several African and Asian countries face frequent electricity shortages and have unmet electricity demand



- Generally, they have **limited ability to expand capacity** through capital projects



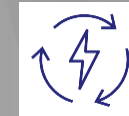
- **Power generation systems mounted on ships** are a short/mid-term solution to bridge power gap

OSP Opportunity objective



- Invest in **marine powerships in Sub-Saharan Africa and South Asia** to accelerate electrification efforts in target countries with shortages

Advantages to end user



- Enhances quality of life through **sustainable energy access**



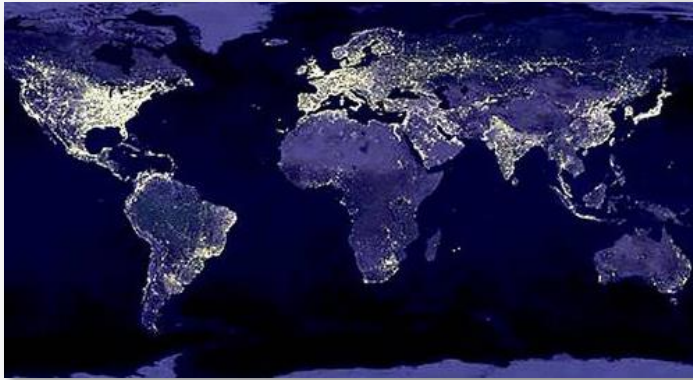
- Improves **productivity** through ending electricity shortages





- Potential to be upgraded with **mobile desalination for clean water**

Opportunity overview: OSP wants to support new power distributed generation and mini grids projects

Situation



-  Several regions and rural areas in Africa lack electricity access or face shortages due to lack of grid connection
-  Insufficient energy access diminishes quality of life, and even causes many deaths annually (e.g. use of traditional biomass cooking)

• Source: Lit. search


OSP Opportunity objective



- Accelerate electrification efforts through investments in **oil-powered mini-grids and off-grid power generation** and associated infrastructure in emerging markets

Advantages to end user



- Enhances quality of life through **sustainable energy access** (e.g., uninterrupted services such as healthcare and related emergency services)
-  Increases productivity and income (e.g., decreases cost of doing business)

Opportunity overview: OSP is interested in Agricultural Productivity in Africa

Situation



- There is very significant potential to **increase agricultural productivity** in Africa through **use of tractors**



- **Several factors** have historically hindered the advancement of mechanization in agriculture:
 - Relatively low availability of tractors and tractor rental opportunities
 - Affordability of owning tractors for farmers
 - Low access to financing

OSP Opportunity objective



- **The Opportunity:** Increase the agriculture productivity in Africa through **increasing the availability and affordability of tractors**



- Mechanization in Africa would generate significant **uplift in productivity**

Advantages to end user



- Enables **improved agricultural yields / productivity and efficiency**



- Enhances **farmer income**



- Improves **nutrition quality**



- Enhances **food security/ domestic self-sufficiency** through import substitution

Opportunity overview: OSP is leading the efforts to implement “clean fuels solutions for cooking” in Asia and Africa

Situation



- 65+% of the world population has access to clean cooking, while **Africa is lagging behind** (29%)



- Traditional biomass has **several burdens on households** (Incl. health and time) and **the environment**



- **Investment gap:** estimated annual finance gap of **~100x** required

• Source: Lit. search

OSP Opportunity objective



- Reduce **CO2 emissions** caused by traditional cooking methods through **providing access to clean cooking solutions** (LPG & Renewables)



- **Boost the economy** & create opportunities in target countries (e.g., job opportunities)



- Drive & **accelerate infrastructure development** in target countries



- **Scaling up international cooperation** to prevent and mitigate the impacts of climate change and support creating a sustainable future

Advantages to end user



- Enhances quality of life through **sustainable energy access**



- **Improves wellbeing and health** of household members



- **Increases cooking efficiency** by reducing amount of fuel used



- **Mitigates environmental impact**



Transportation



Program opportunities

Transportation Sector

| | | | | |
|---|--|--|--|---|
|  <p>Infrastructure</p> |  <p>Roads Infrastructure</p> |  <p>Airports Infrastructure</p> |  <p>Seaports Infrastructure</p> |  <p>Air cargo terminals infrastructure</p> |
|  <p>Road</p> |  <p>ICE Competitiveness</p> |  <p>Low-cost ICE</p> |  <p>Ride-Hailing</p> |  <p>Bus Transportation</p> |
|  <p>Aviation</p> |  <p>Low-cost Carriers</p>  <p>Jet Fuel Competitiveness</p>  <p>Supersonic Aviation</p> | | | |
|  <p>Marine</p> |  <p>HFO Scrubbers</p>  <p>HFO Refinery Upgrades</p> | | | |

Infrastructure Opportunities: OSP's transportation sector includes four infrastructure development opportunities targeting emerging markets

UN's Sustainable Development Goals



Decent work and economic growth



Industry, innovation and infrastructure

Seaport infrastructure



Facilitate investment in **seaport infrastructure** (terminals, operation systems, cargo-handling facilities, etc.) in emerging markets (e.g., **Africa** and **Asia**)

Advantages for end-user



Access to well established **seaport infrastructure** to meet increasing demand.



Increases **globalization and development** and **facilitates trade**.

Road infrastructure



Facilitate investment in **developing road infrastructure** (mainly highways) in emerging markets (e.g., **Africa** and **Asia**).



Increases **connectivity and mobility** (urban and intercity).



Provides **businesses fast and reliable freight transport**, and reduces cost.

Airport infrastructure



Facilitate investment in **airport infrastructure (incl. new airports and expansions)** in emerging markets (e.g., **Africa** and **Asia**).



Access to **airport infrastructure** to meet increasing aviation demand



Increases **globalization** and **development** and **facilitates trade**, tourism, and business

Air cargo terminals infrastructure



Facilitate investment in developing **air cargo infrastructure** such as terminals, warehouses, and truck gates in **Asian** countries.



Unlocks **air cargo growth**.



Decreases infrastructural bottlenecks and low connectivity.

ICE competitiveness: Accelerate and enhance the impact and adoption of Internal Combustion Engine technological optimizations

Situation



EVs are receiving material **subsidies/ regulatory advantages** that are boosting their penetration irrespective of their **actual economic/ environmental competitiveness vs. ICE vehicles**.



Global emissions regulations can be met with **development of improved ICEVs and fair regulations** (*i.e., Well to Wheel*).

Opportunity



Increase **technology adoptions** through increased credibility and Kingdom relations.

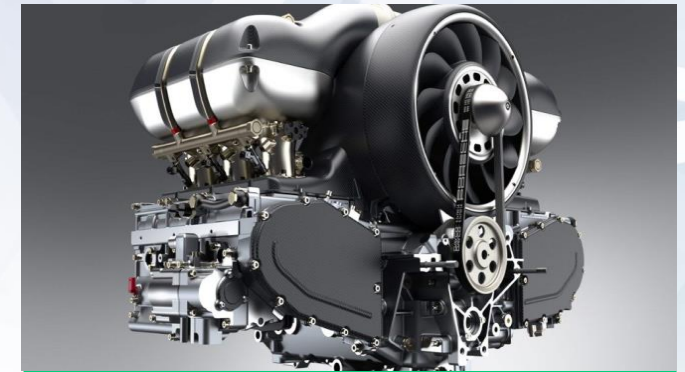


Work with industry and regulators to **promote of ICEV technologies** through science and **fair policies**.



Invest in **R&D for ICE competitiveness** to further **increase fuel efficiency (FE)**.

Advantages



Maintain a **low TCO for ICE vehicles**, making them more **desirable to most customers**.



Cleaner and more efficient ICE engines.



Compliance with **fuel efficiency regulations**.

Low-cost ICE: Increase availability and adoption of low-cost cars in emerging markets

Situation



Many countries have put restrictions on used-car imports. **Regulations** are **increasingly supporting sales of new, fuel-efficient cars.**



As income level increases in emerging markets, the **low-cost car segment is expected to grow significantly**



Car OEMs with a limited low-cost car portfolio can invest in **development** and production of a **highly competitive model**

Opportunity



The Kingdom can partner with a **car OEM in form of a JV** and facilitate investment in the **development and production of a highly competitive low-cost car.**

Advantages



Enable people in target markets to **get access to affordable and competitive car models.**



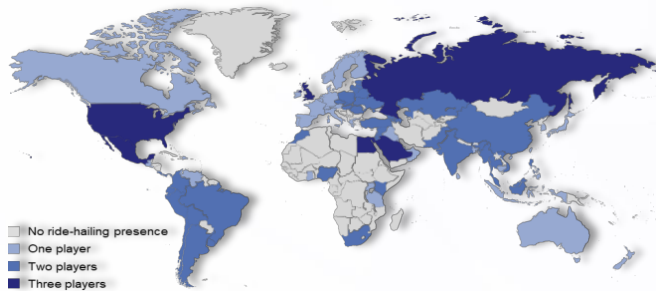
Increase **environmental performance/ Fuel Efficiency** vs. used/ older cars.



Potential to establish facilities to locally produce or assemble low-cost ICE car or ICE car parts **which will have an oil uplift for the kingdom.**

Accelerate deployment of **Ride-hailing & Last-mile delivery** in underserved markets and ensure the deployment of an ICE-fleet

Situation



Multiple ride-hailing platforms exist in most geographies – **Africa currently has lowest penetration rate of 74%**



Ride-hailing in **Africa** have a **high** forecasted **growth** compared to other regions, with **1.4% CAGR between 2022 and 2026.**

Opportunity



Facilitate **investment** in the **expansion** of existing ride-hailing and last-mile delivery companies or **launch** a new company.



OSP's goal is to support the deployment of ICE fleets across developing countries to capture the increasing gasoline/diesel demand.

Advantages



Increases **mobility demand** in developing countries.



Supports **rapid urbanization** and population growth.



Support **travel, tourism & business.**



Creates jobs in underdeveloped markets.

Launch intracity and intercity **bus transportation** services in underserved markets & ensure the deployment of an ICE-fleet

Situation



Rising population and urbanization are increasing the **demand for mobility services** in Africa.



Bus represents the **preferred mobility solution** in major Sub-Saharan African cities.

Opportunity



Facilitate **investment** in bus **transportation** services through **partnership/ acquisition or launching a subsidiary**.



OSP's goal is to support the deployment of bus transportation across developing countries to **capture the increasing diesel demand**.

Advantages



Increase connectivity and mobility in Africa.



Reduce traffic congestion.



Support **rapid urbanization** and population growth.



Benefit communities financially.



Increases safety.

Facilitate investments in (acquire or launch) a **low-cost carrier (LCC)**

Situation



Many **emerging markets** are witnessing **high economic growth** (e.g., Africa and Asia; GDP per capita growth ~4-6% p.a. by 2030).



Middle class is expanding and hence the **demand for aviation** is increasing by 4.3% per annum.



Low-cost carriers are a key enabler to **capture** and **stimulate latent demand** due to their low-price offerings.

Opportunity



Facilitate **investment** in (acquire or launch) a **low-cost carrier (LCC)** in **emerging markets** (Africa and Asia).



Facilitate investment in existing low-cost carriers with potential for expansion to fund growth through the acquisition of new aircraft and routes, **and create partnerships between local LCCs** to enable expertise/ knowledge sharing to accelerate growth.

Advantages



Increase affordability to meet the increasing aviation demand of cost-sensitive customers.



Increases **globalization and development**.



Facilitates trade, tourism, and business.

Support the adoption of **HFO scrubber** technology through innovative financing solutions

Situation



The International Maritime Organization (IMO) announced a **0.5% sulfur cap for marine fuels by 2020**.



Three solutions are available for ship owners to comply:

- Use low sulfur fuels
- Use HFO in combination with scrubbers
- Switch to alternatives (e.g., LNG, biofuels)



Installing **scrubbers is an attractive solution** for ship owners but **require a high CAPEX**

Opportunity



R&D: Support R&D efforts to optimize CAPEX and operational performance of HFO scrubber technology.



Regulatory: Promote and adopt **regulations that support the use and installation of HFO scrubbers**.



Investment: Support the adoption of scrubber technology through **innovative financing solutions for scrubbers**.

Advantages



Enable ship owners to run on **cheaper HFO**



Enhance charter rates for scrubber installed ships



Offer long-term fuel compliance through a **future-proof technology**

Jet fuel competitiveness: Propose/ develop optimized jet fuel (cleaner, less pollutant, and with higher energy content)

Situation



Opportunity



Investment: facilitate **Investment** in developing an **optimized jet fuel** that is cleaner, less pollutant, and with higher energy content.



Regulatory: Support regulations that support R&D in **oil-based jet fuel** to make it cleaner.



LCAF: Adopt low-carbon aviation fuel that will offer a minimum 10% GHG emissions reduction compared to conventional jet fuel.

Advantages



Reduced **emissions**



Increased **energy security.**



Increased **energy efficiency**

Fast-track development of commercial **supersonic aviation** technology

Situation

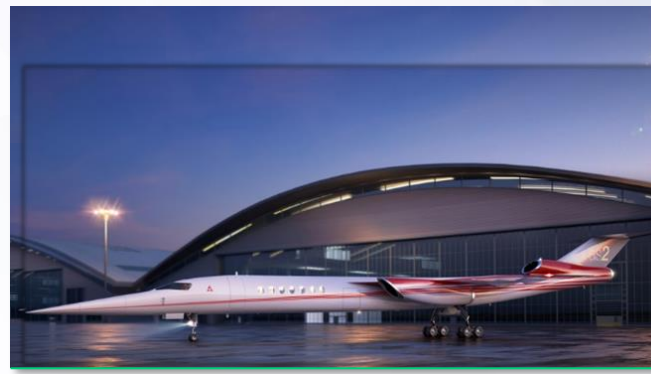


Supersonic aviation consumes more energy per seat-km (**3x of subsonic commercial aircraft**), and there is significant **potential demand** for supersonic travel due to **reduced travel times on long flights**.



The **supersonic jet market size** is expected to grow to \$27.53 billion in 2027 at a CAGR of 4.0%. The **increase in air passenger traffic** is expected to propel the growth of the supersonic jet market going forward.

Opportunity



Facilitate **investment in supersonic aircraft companies** to accelerate the growth and development of **supersonic technologies**.

Advantages



The most obvious advantage of supersonic transport is that it is **supersonic**.



A plane that can break the sound barrier **can cut travel times drastically**, as once you've passed the sound barrier there is no reason why it can't go Mach 2, Mach 3, or even faster.

The background consists of a complex, abstract pattern of overlapping, semi-transparent geometric shapes in various shades of blue and green. The shapes are irregular and layered, creating a sense of depth and movement. The colors range from deep, dark blues to lighter, teal and greenish blues. The overall effect is a textured, modern aesthetic.

THANK YOU