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WWF



SkyNRG

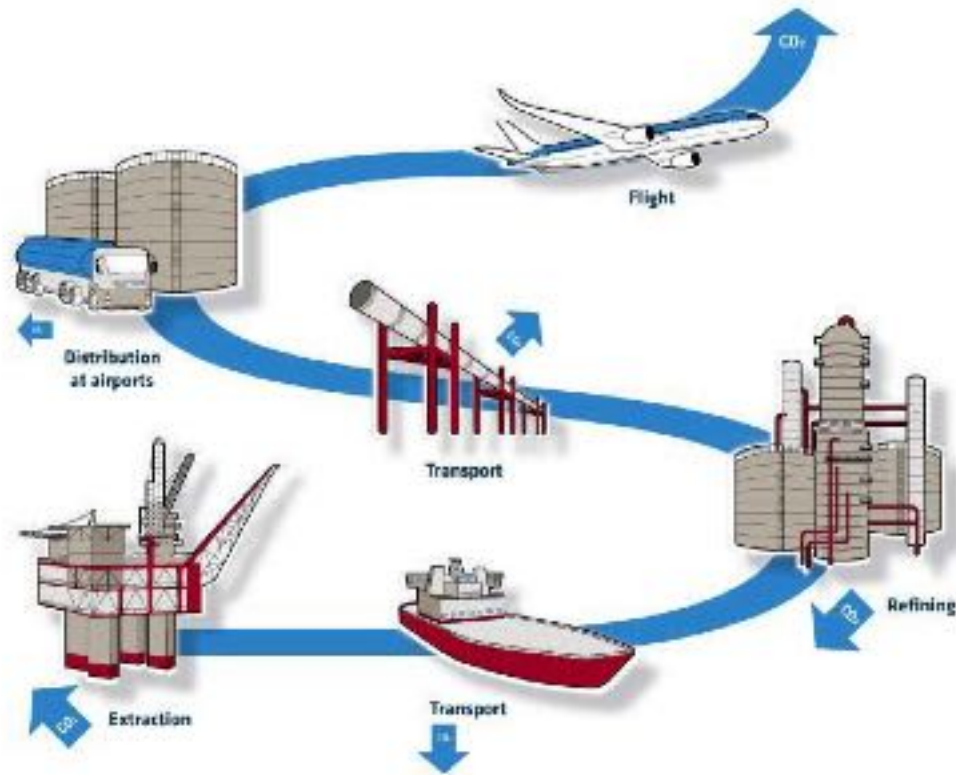


## ■ The Big Picture

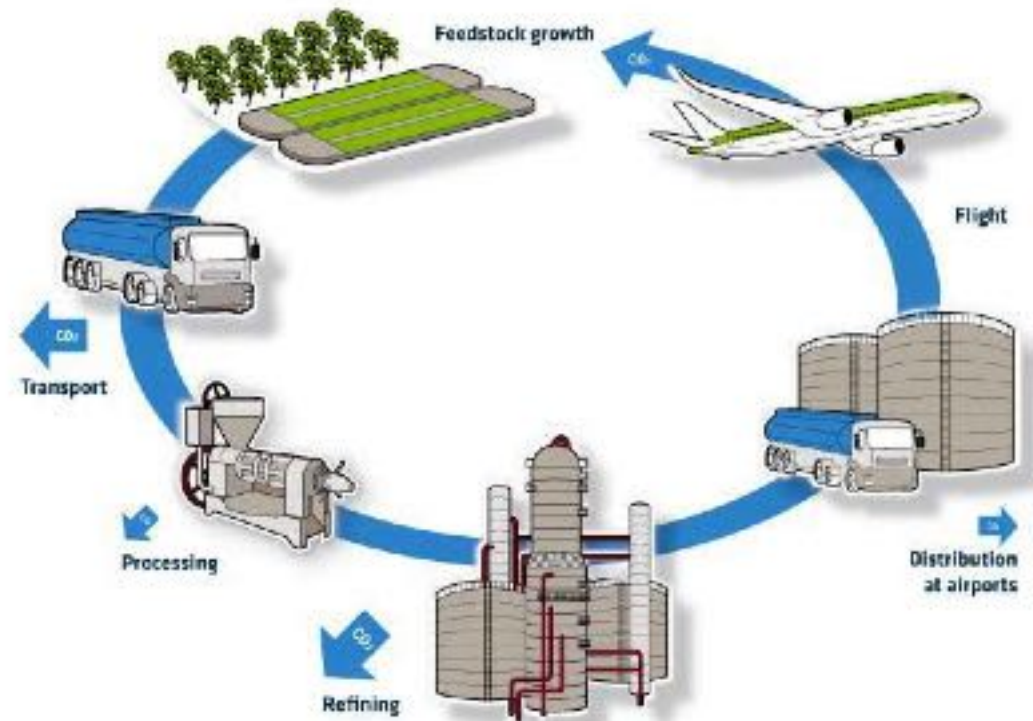
- Aviation is a major contributor to climate change, yet no alternative exist for air transport propulsion
- Sustainable Aviation Fuel (SAF) is one route to emission reduction
- In South Africa we have existing capability to manufacture SAF through Fischer–Tropsch technology, but supply chains of sufficient volumes of reliable feedstock are uncertain

# Sustainable Aviation Fuel

Fossil kerosene production  
a finite process



Bio-based kerosene production  
a renewable process



# Drop-in fuel used in existing infrastructure

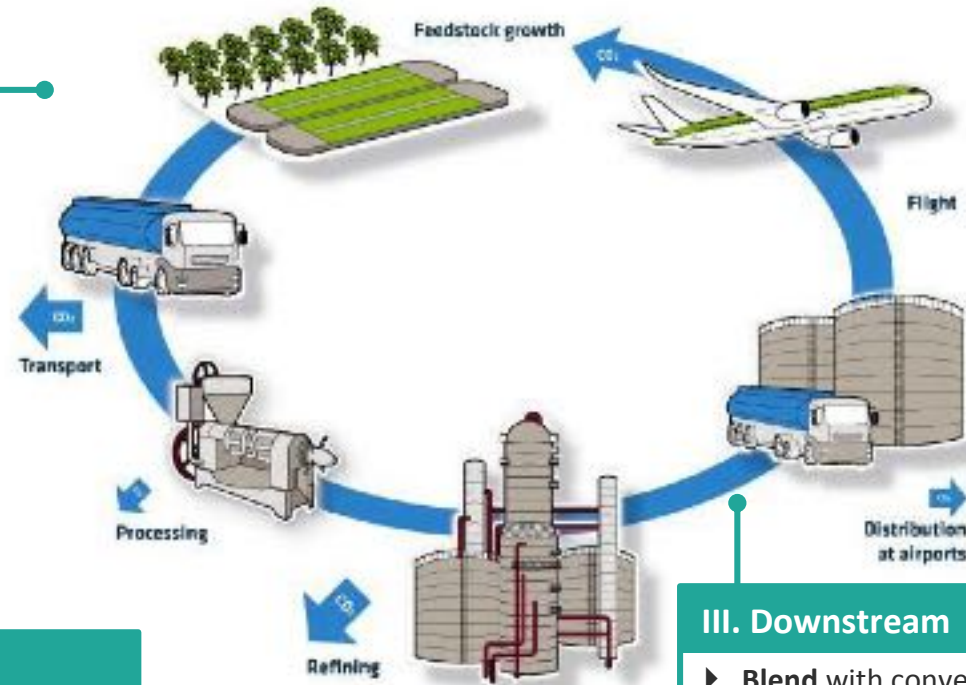
## I. Feedstock



- ▶ SAF can be produced from a wide variety of feedstocks
- ▶ From left to right: sugar cane, used cooking oil (UCO), jatropha, municipal solid waste, and forestry residues

## II. Conversion

- ▶ Refining of sustainable aviation fuel
- ▶ **5 technologies certified** to supply commercial aviation to date (2017)



## IV. End-use

- ▶ Fuel is a drop-in fuel and can be used in existing engines
- ▶ No infrastructure modification required

## III. Downstream

- ▶ **Blend** with conventional Aviation Fuel
- ▶ Max. 50% blend, depending on the conversion process

# Market and offtakes

Production capacity



30 kilo tonne biojet  
Produced from waste oils and fats



● Expected capacity

Airline off- takes

Current Future



SkyNRG/Altair – daily flight from LAX to Amsterdam for a three year period

United Airlines – regular flights from LAX on AltAir Fuels and involved in Fulcrum project

Gevo – 5 year off take signed for its AtJ fuel

Fulcrum – a waste based FT initiative backed by strategic stakeholders. Cathay signed off take for 10Y period

SG Preston – Refinery development project where Qantas and JetBlue signed future off takes

Identify optimal feedstock supply for a centralised processing plant (e.g. Secunda).

Proof of concept - local biomass waste to aviation biofuel production is feasible in South Africa

SMME growth and job creation, by enabling 25 SMMEs within a new Sustainable Aviation Fuel supply chain

The motivation for a more enabling environment for biofuel production and consumption in South Africa (and Africa)



# Switch Africa Green Programme

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1. Funded by the EU
2. Implemented by UN Environmental Programme together with UNOPS and UNDP in 7 countries in Africa.
3. Supported by a range of Government Departments who participate in the National Technical Coordination Committee -chaired by DEA.



## ■ Switch Africa Green Overall objectives

To support countries in Africa to achieve sustainable development by

- Stimulating transition towards an **inclusive green economy**
- **Enabling Private sector** led inclusive green growth

.....which has the potential to generate

- Sustainable **local economic growth, jobs and poverty reduction.**
- Green business entrepreneurship and Sustainable Consumption and Production (**SCP**) practices

## ■ **Funded by the EU for**

- **Environmental benefits**

GHG reduction related to using renewable feedstock, waste beneficiation, feedstock displacement etc.

- **Social impact potential**

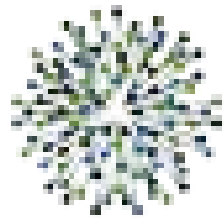
Employment, local economic impact, knock on impact for waste diversion etc.

- **Economic value**

Linked to the entire value chain

# The Consortium

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## Specialist contributors



# Overview of project activities



## WP1 - RESEARCH

- Review of available volumes and geographical distribution of waste biomass streams, including agricultural waste, invasive alien species, and residues from plantation forests
- Feedstock supply chain optimisation from waste source to processing plant, which will inform the project on the most cost- and carbon-efficient routes

Complete

## WP2 – CAPACITY BUILDING OF SUPPLY CHAIN

- Identify and support SMMEs to enter supply chains (i.e. alien clearing operations, residue collection and pre-treatment, etc.)

Lunching

## WP3 – PILOT PRODUCTION

- All feedstock technical pre-feasibility
- Pilot the production of waste-based aviation biofuel
- Implement social and environmental sustainability principles as per the Roundtable on Sustainable Biomaterials (RSB) standard

Future WP

# Overview of project activities



## WP4 – ENABLING ENVIRONMENT

- Stimulate demand for sustainable aviation biofuel in the region and with global airlines serviced by ORTIA
- Promote the project across global industry initiatives (IATA, ICAO)
- Develop cross-subsidisation models based on international experience
- Engage government for policy support
- Increase awareness of sustainable aviation biofuels among regional and global customers, policy makers and consumers

In progress

## WP5 – SHARED LESSONS

- Outreach to key regional markets (i.e. Kenya and Ethiopia) to share lessons learned and encourage replication

In progress

# WP 1- Potential supply chain

## Feedstock & pre-treatment

- Waste biomass from agriculture, forestry of municipal waste streams
- Pre-treatment to prepare for co-feeding at Sasol
- Transport to conversion locations



MSME's play a key role in this part of the supply chain

## Conversion

- Currently co-feeding at Sasol as a short term opportunity
- On the long term (+3 years) new technological pathways could be suitable for SAF production



## Use

- SAF uptake at O.R. TAMBO or JNB
- National and/or International Airlines



## ■ WP 1- Feedstock supply chain optimisation

- mapping of all suitable biomass waste streams -proved local biomass availability is not a constraint.
- sustainability risk assessment identified municipal organic waste in the form of garden waste has the lowest sustainability risk, followed by managed removal of IAPs and forestry waste from sustainable forestry operations.
- Pre-treatment options for biomass transportation and co-gasification i.e. simple chipping was identified as the most cost-effective.
- Transport options and waste biomass supply curves with optimally located densification centres was key.

## ■ WP1- Insights for SME development

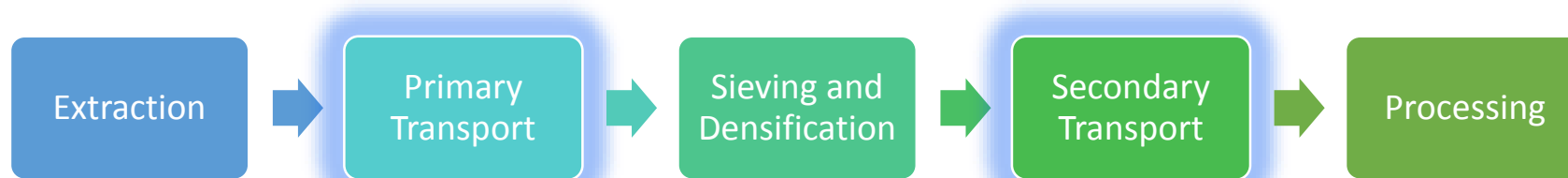
- Identified commercial opportunities for MSMEs along the optimised supply routes to harvest, collect, pre-treat and transport this waste feedstock to a central processing facility
- identified the most promising geographies for sourcing biomass and the most suitable pre-treatment technologies
- flagged possible sustainability risks
- came across possible SMEs and corporates running their own SME development programmes that could be interested partners (Imperial, Sappi)

....but Synergies with alternative biomass markets are still poorly understood – need stakeholder inputs



## WP 2-Building the upstream supply chain

- Based on recommendations of the technical workstream, aim to develop a sustainable supply chain comprised of SMEs who work in the waste biomass pipeline to the fuel producer ie CollectionS, Short haulage, Pre-treat / beneficiation, Longer haulage and transport & Ancillary services
- SME Cohort of 25 - Led by Fetola Foundation
- proven model (assess, train, mentor, off-site support) x 15 months.
- Plus: supplier readiness; SCP training and risk management. How we do business in the Green Economy...
- Work with existing businesses to encourage Market diversity & Supplier diversity



# Next steps



## **WP2 – CAPACITY BUILDING OF SUPPLY CHAIN**

- Identifying the SME cohort
- Where are the most practical feedstocks situated (in relation to existing infrastructure & the capacity to access)
- Where are the market opportunities
- What are the practicalities
- Launch June 2019

## **WP3 – PILOT PRODUCTION**

- All feedstock technical pre-feasibility
- Pilot the production of waste-based aviation biofuel
- Implement social and environmental sustainability principles as per the Roundtable on Sustainable Biomaterials (RSB) standard

## **WP4 – ENABLING ENVIRONMENT**

- Stimulate demand for sustainable aviation biofuel in the region and Promote the project across global industry initiatives Develop cross-subsidisation models based on international experience
- Engage government for policy support
- Increase awareness of sustainable aviation biofuels among regional and global customers, policy makers and consumers

## Get involved

For more information or to get involved fill in an expression of interest form online at: [http://bit.ly/Waste2Wing\\_Survey](http://bit.ly/Waste2Wing_Survey)

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