VIRTUAL EDITION

IRENA INNOVATION WEEK 2020

Growing the bio-economy: solutions for the sustainable supply of biomass & biofuels

Organised in Partnership with Global Bioenergy Partnership

TUESDAY, 06 OCTOBER 2020 • 05:00-08:00 pm CEST

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GBEP Global Bioenergy Partnership

IRENA International Renewable Energy Agency

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Welcoming remarks

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Welcoming remarks

Dolf Gielen

Director – Innovation and Technology Centre
IRENA

Ministerial perspectives on the way ahead

H.E. Arifin Tasrif
Minister of Energy and Mineral Resources
Indonesia

H.E. Arifin Tasrif | Minister of Energy and Mineral Resources, Indonesia

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Please make sure to **mute** yourself during the session to avoid background noise

If you have **questions for** our **panelists**, please use **Q&A**

The session is **livestreamed** & **recorded**. Recording will be available in a public domain. No Chatham House rules apply

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Agenda

17:00 – 17:15	**Scene setting**
17:15 – 18:30	**Panel I: Scaling up biomass feedstock production for the transport & industry sectors**
18:30 – 18:40	Digital break
18:40 – 19:55	**Panel II: Innovative solutions for maximizing biomass value streams**
19:55 – 20:00	**Closing remarks**

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Setting the scene

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Scene Setting

Dr. Maria Michela Morese

Executive Secretary
GBEP/FAO

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Growing the bio-economy: solutions for the sustainable supply of biomass & biofuels

Maria Michela Morese

Executive Secretary

Global Bioenergy Partnership (GBEP)

Office of Climate Change, Biodiversity and Environment

Food and Agriculture Organization of the United Nations

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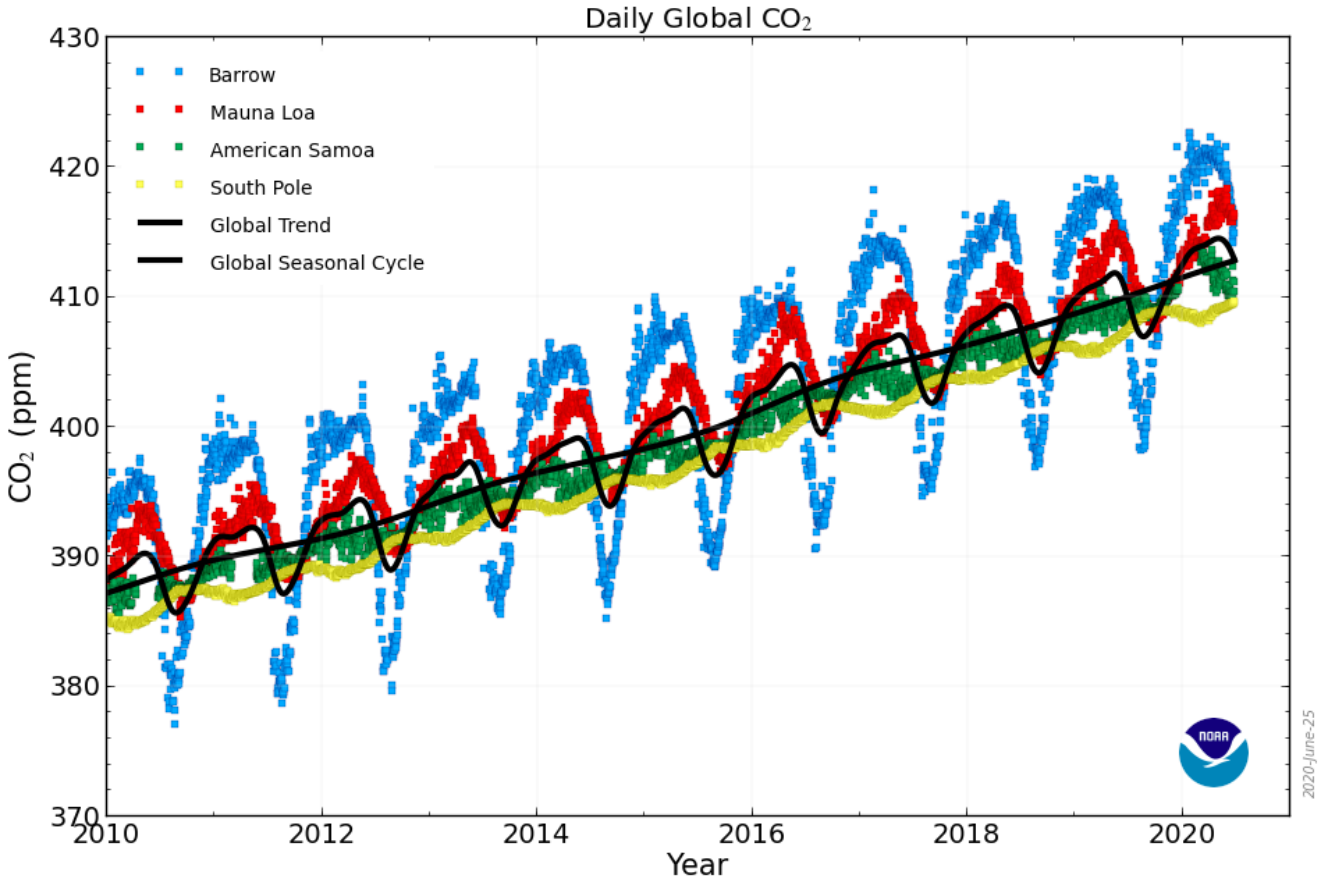
Global carbon emissions continue to grow



Daily averaged CO_2 from four observatories:

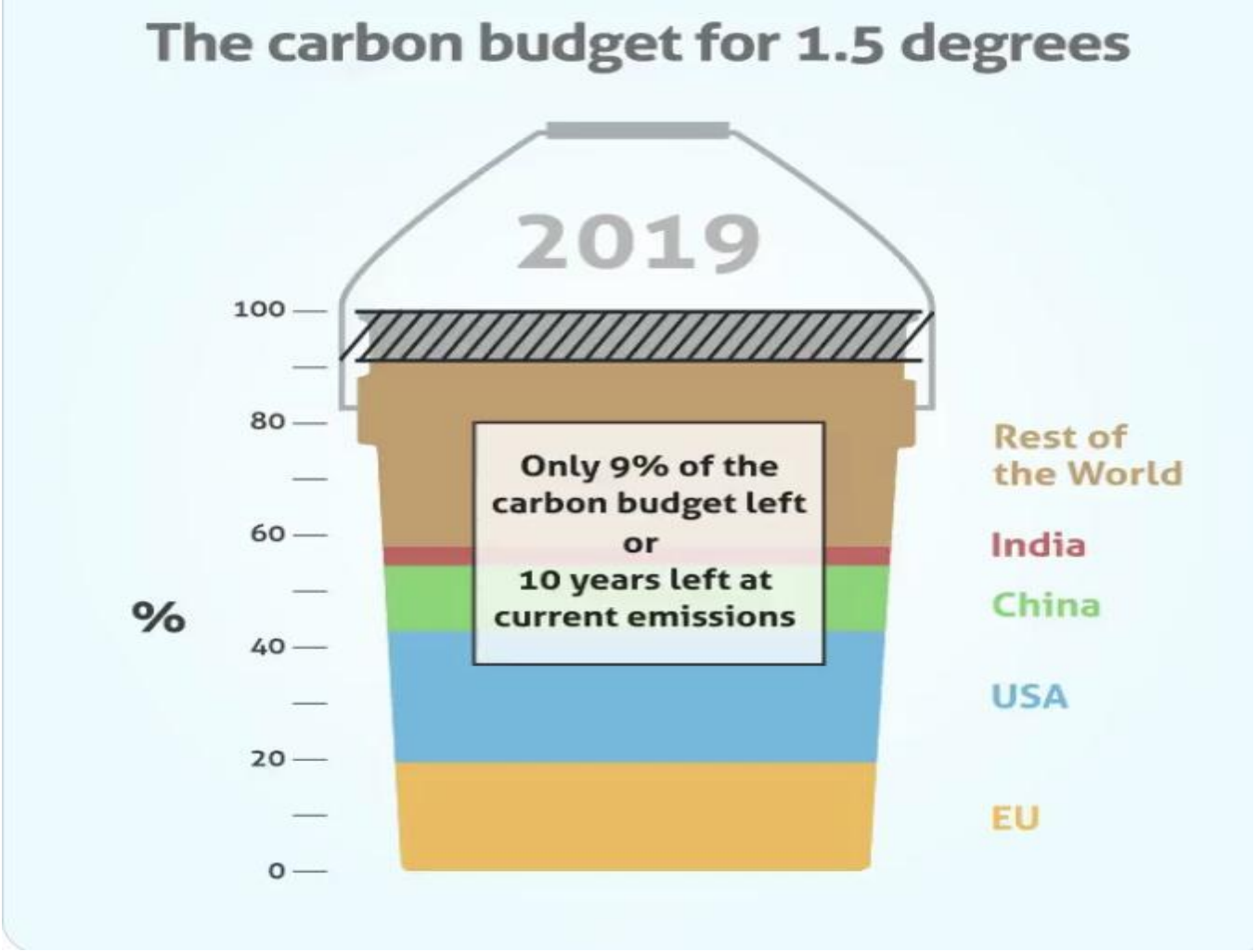
- Barrow, Alaska (blue)
- Mauna Loa, Hawaii (red)
- American Samoa (green)
- South Pole, Antarctica (y)

The black line represents the average of the de-seasonalized curves for each of the records.

On 30 September 2020 the atmospheric concentrations of CO2 reached 410.94 parts per million, compared with a pre-industrial baseline of 280 parts per million.

Source: National Oceanic and Atmospheric Administration (NOAA), Earth System Research Laboratory, Global Monitoring Division (www.esrl.noaa.gov)

Carbon budget for 1.5˚C



Source: Glen Peters, 2020

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The global challenge of decarbonization

CO2 emissions and concentration are not on trajectory to meet the Paris Agreement → a long way from the 1.5˚C objective.

… this means that the decarbonization of the global economy should be accelerated, but the trend of investments in exploitation and uses of coal and oil shows that we are going in the opposite direction…

The international community will need to act to **reverse the trend** → More emphasis on renewables, including modern bioenergy

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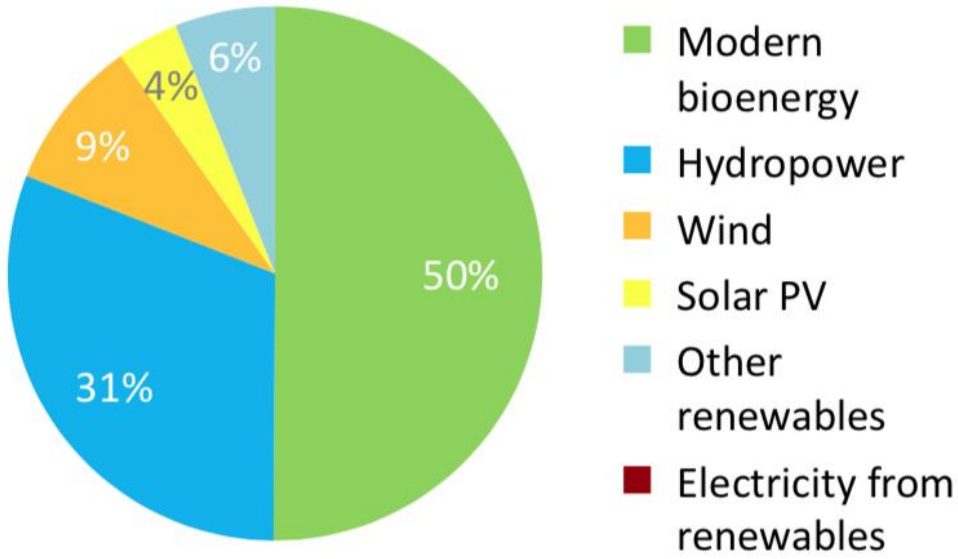
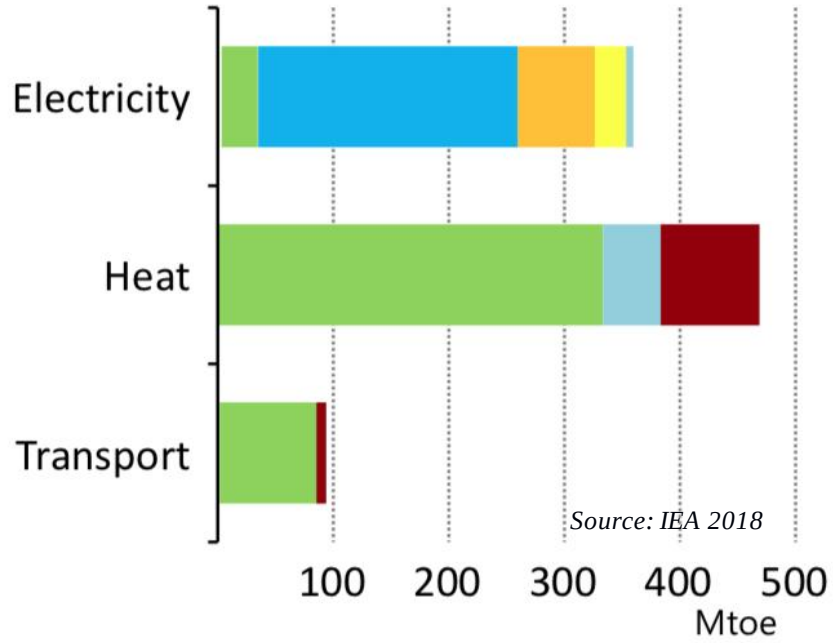
Modern bioenergy: the overlooked giant amongst renewables

Total final energy consumption from renewables, 2017



Total final energy consumption from renewables by sector, 2017



Source: IEA 2018

Modern bioenergy is the only renewable source that can provide **electricity**, **direct heat** and **transport fuels**.

Source: IEA 2018

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SUSTAINABILITY is key

Modern bioenergy presents excellent OPPORTUNITIES

but not without CHALLENGES.

Focusing on SUSTAINABILITY IS KEY to take out the best of opportunities.

The Global Bioenergy Partnership (GBEP)

80 Members between Partners and Observers (Governments and International Organizations)

working together to promote bioenergy for sustainable development since 2006

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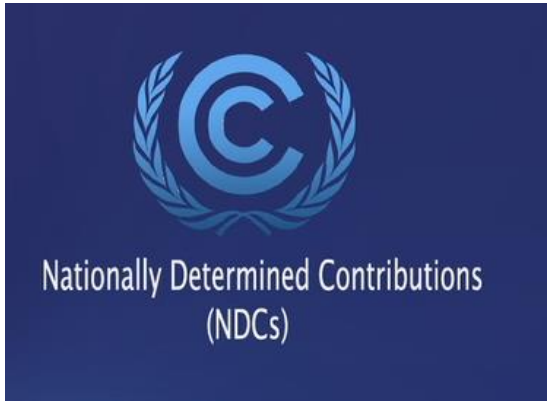
GBEP Sustainability Indicators for all types of bioenergy

ENVIRONMENTAL	SOCIAL	ECONOMIC
1. Lifecycle GHG emissions	9. Allocation and tenure of land for new bioenergy production	17. Productivity
2. Soil quality	10. Price and supply of a national food basket	18. Net energy balance
3. Harvest levels of wood resources	11. Change in income	19. Gross value added
4. Emissions of non-GHG air pollutants, including air toxics	12. Jobs in the bioenergy sector	20. Change in consumption of fossil fuels and traditional use of biomass
5. Water use and efficiency	13. Change in unpaid time spent by women and children collecting biomass	21. Training and re-qualification of the workforce
6. Water quality	14. Bioenergy used to expand access to modern energy services	22. Energy diversity
7. Biological diversity in the landscape	15. Change in mortality and burden of disease attributable to indoor smoke	23. Infrastructure and logistics for distribution of bioenergy
8. Land use and land-use change related to bioenergy feedstock production	16. Incidence of occupational injury, illness and fatalities	24. Capacity and flexibility of use of bioenergy

GSI – MNV Tool

Tool to Measure, Notify and Verify (MNV) the achievement of:

- Nationally Determined Contributions (NDCs)



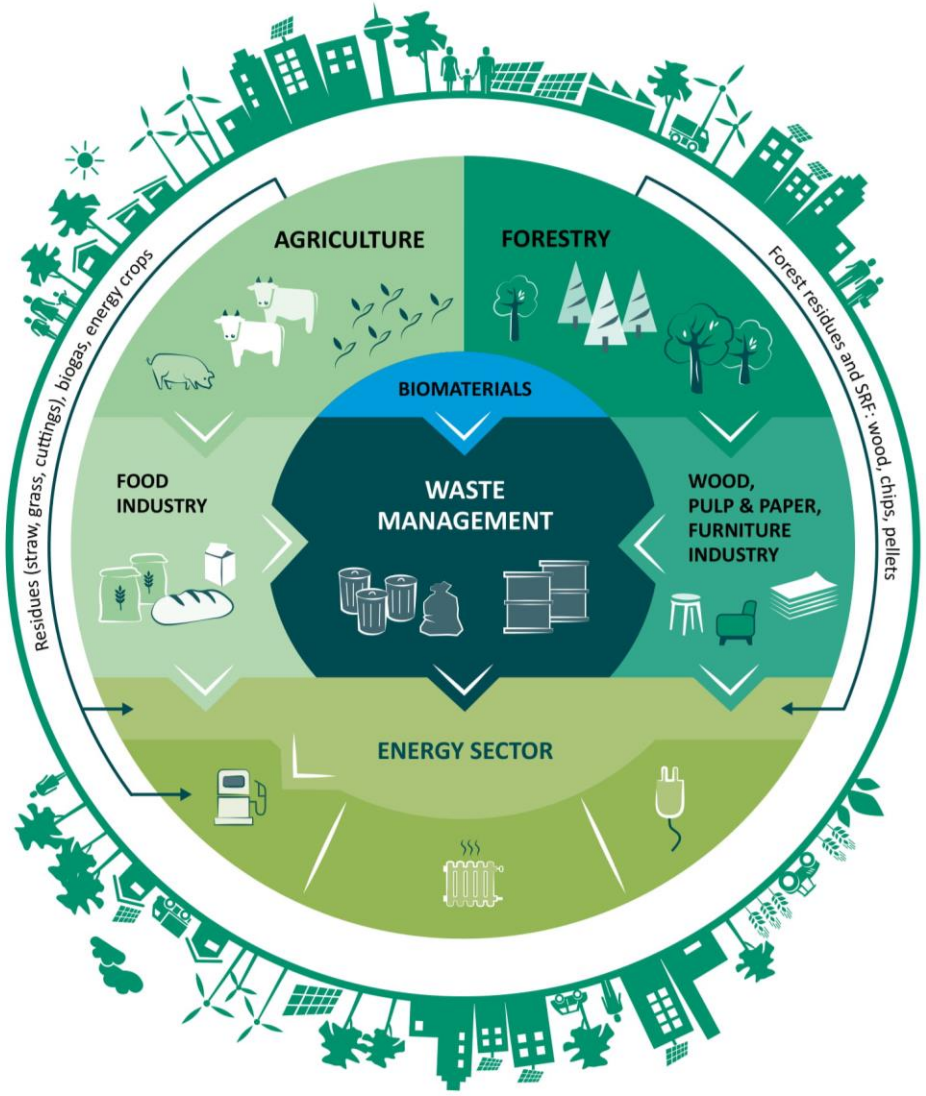
- Sustainable Development Goals (SDGs)

We cannot look at bioenergy in isolation…

- Overall demand for biomass is growing – for food, feed, fuel, fibre and biochemicals
- As demand increases, so too do the pressures on the natural resource base and ecosystem services

→ **Sustainable bioenergy** has the potential to contribute to sustainable development but only when considered as part of the **broader bioeconomy**

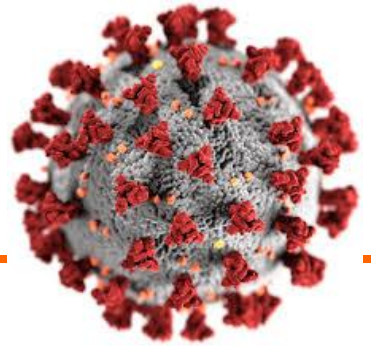
Bioenergy within the bioeconomy



- We have to take into account the trade-offs and synergies between **different demands on biomass** to contribute to the overall sustainable bioeconomy

- Integrating biomass conversion for multiple purposes using **innovative approaches** can have synergistic effects

Indirect effects of COVID-19



- The pandemic has provided compelling arguments for the need to **decarbonize the transport and industry sectors,** on one side considering the coincidence of high COVID-19 cases in polluted areas, and on the other side because we have been able to visibly see the effects of fewer cars on the road and lower industrial emissions.
- UN Secretary General recent interview - the reboot after COVID-19 has to be green!

Sustainable bioenergy is part of the solution!

#IVIW2020 GBEP Global Bioenergy Partnership

Food for thoughts …

- **BIOENERGY HAS A RECOGNIZED ROLE TO PLAY** - Bioenergy offers many opportunities to decarbonize the global economy
- **SUSTAINABILITY** is key and **MONITORING** sustainability is a necessary step in order to understand, evaluate and improve the performances of the sector
- Bioenergy has to be considered into the broader context of **BIOECONOMY → Innovative solutions to maximize benefits**
- **CLEAR and STABLE POLICIES** are essential to stimulate investments and contribute to change people perception - GBEP has been contributing to facilitate informed policy decisions.

Thank you

GBEP-Secretariat@fao.org

http://www.globalbioenergy.org

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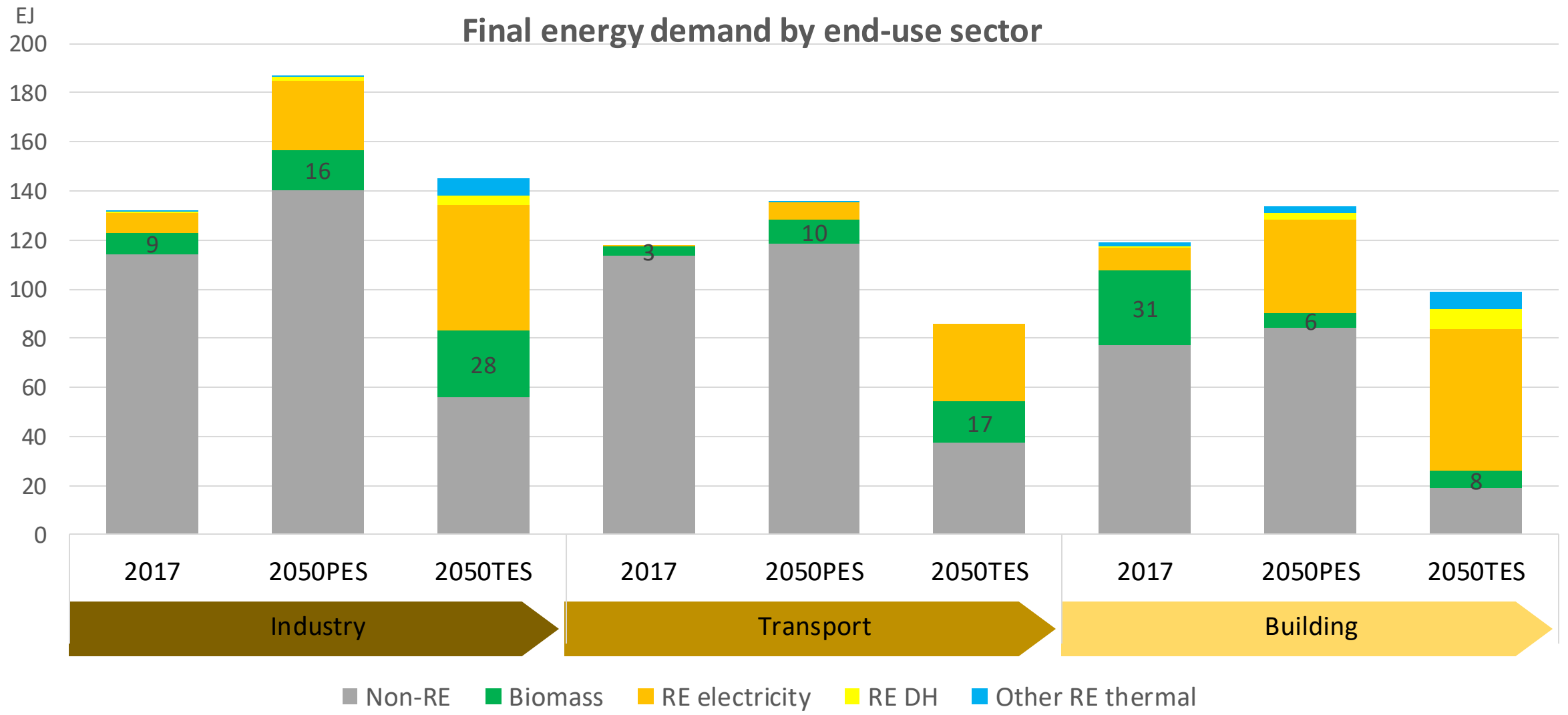
Scene Setting

Mr. Toshimasa Masuyama

Bioenergy analyst
IRENA

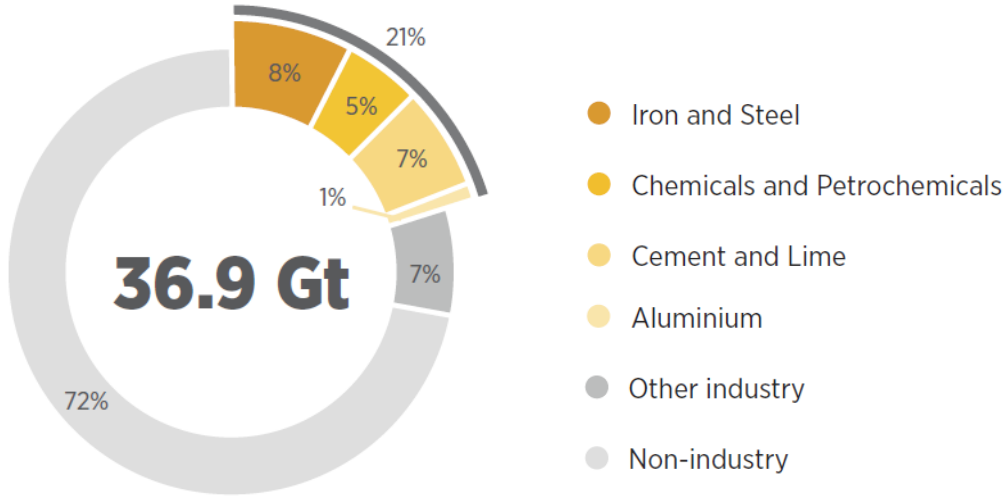
Bioenergy should play essential roles in decarbonizing industry & transport



PES: Planned Energy Scenario TES: Transforming Energy Scenario

Industry & Transport – Shares of Energy & Process Emissions

Industry

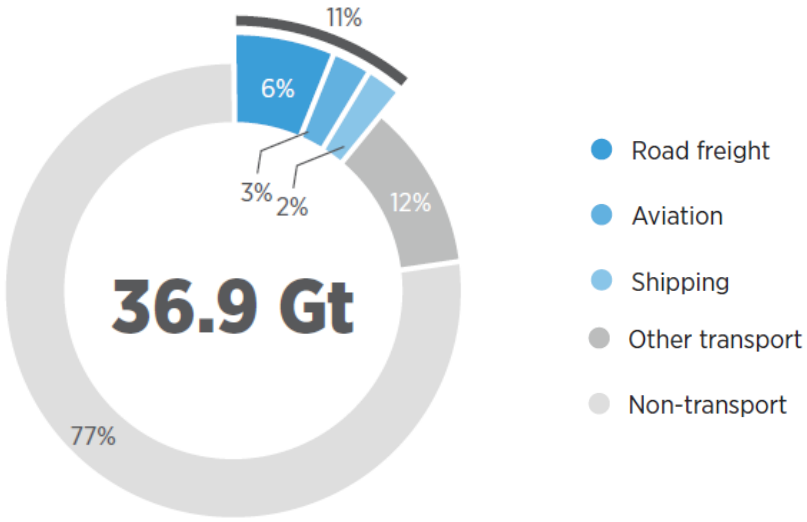


2017

Annual emissions in Industry increase by 1 GT/yr from 2017 to 2050 PES

Emissions of 11.4 GT/yr remain in 2050

Transport

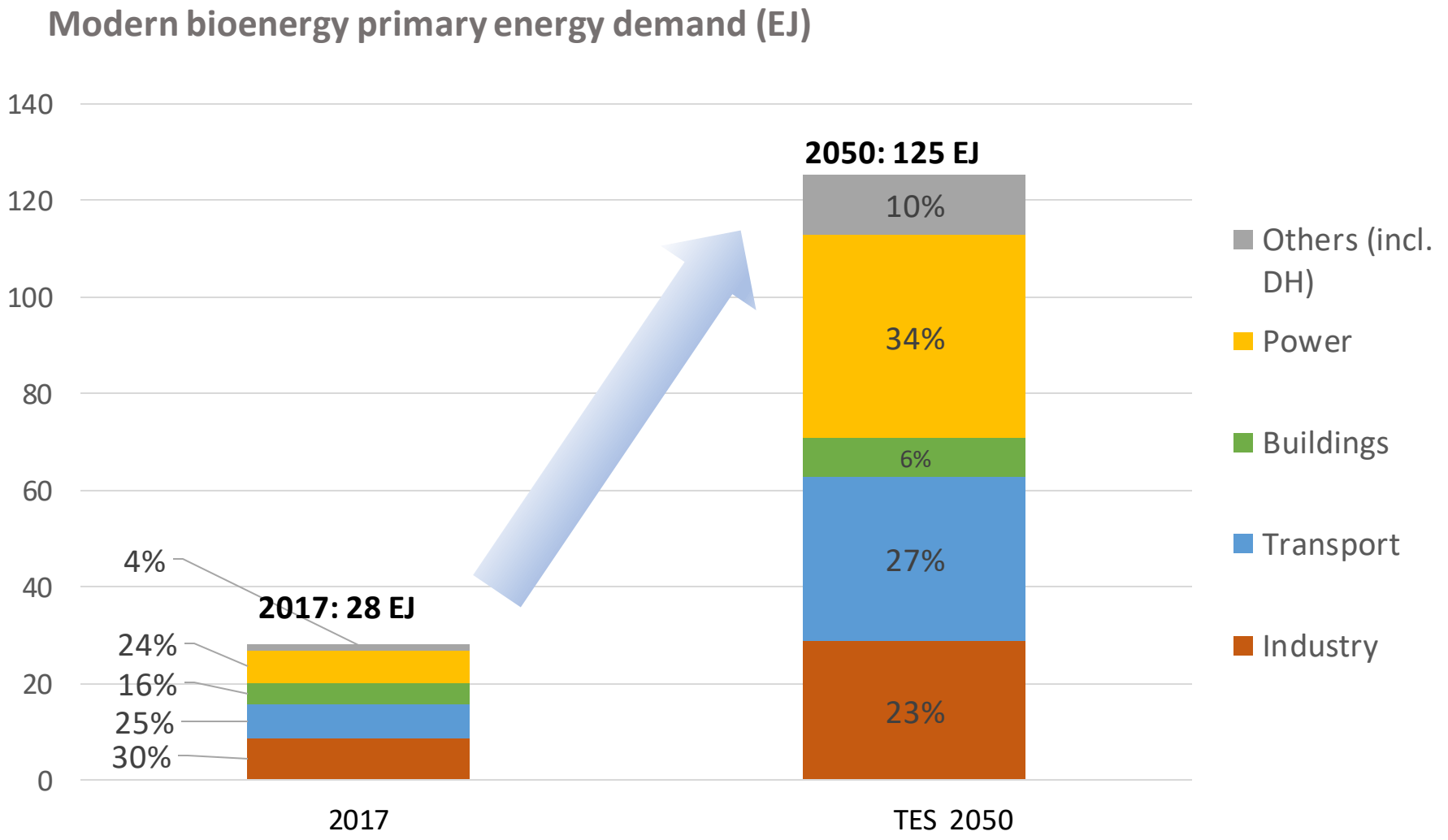


2017

Annual emissions in Transport increase by 0.1 GT/yr from 2017 to 2050 PES

Emissions of 8.6 GT/yr remain in 2050

Modern bioenergy use needs 4+ times expansion



Key consideration for the biofuels session

- **Drastic expansion (4X) of biomass feedstock supply** required for the climate-safe future
- **Startups + business expansion** indispensable for the expanded uptake of feedstocks for end-use applications
- **Enabling environment for investment** in bioenergy must be created
- **Best biomass mix** needs to be redesigned to take advantage of different biomass properties for different applications (fuels for industry heat and transport + feedstock for materials/chemicals)
- **Sustainability governance** needs to be in place to make sure biomass value chains create positive socioeconomic + environmental benefits

- Panel 1: Scaling up biomass feedstock production for transport and industry sectors
- Panel 2: Innovative solutions for maximising biomass value streams

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Panel I
Scaling-up biomass feedstock production for transport and industry sectors

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Panel I: Scaling up biomass feedstock production for transport and industry sectors

Moderator

Dr Gerard J Ostheimer

Chief Sustainability Officer
Global Biofuture Solutions

Panellists

Dr Rainer Janssen

Managing Director Projects
WIP Renewable Energies

Dr Phosiso Sola

Scientist
World Agroforestry Centre (ICRAF)

Dr Carolina Grassi

Business Development Lead - Latin America & Sector Lead - Ground Transport
Roundtable on Sustainable Biomaterials

Keith Kline

Distinguished Researcher in Environmental Sciences
Oak Ridge National Lab
US DoE

Panel I: Scaling up biomass feedstock production for transport and industry sectors

Dr. Rainer Janssen

Managing Director-Projects
WIP Renewable Energies

SUSTAINABLE BIOMASS FOR TRANSPORT AND INDUSTRY ON MUC (MARGINAL, UNDERUTILIZED, CONTAMINATED) LANDS IN EUROPE

IRENA INNOVATION WEEK – SESSION 4

6 October 2020 (virtual event)

Rainer Janssen, Cosette Khawaja, Rita Mergner, Dominik Rutz

WIP Renewable Energies
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www.wip-munich.de

Projects have received funding from the European Union's H2020 research and innovation programme.

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FORBIO

Fostering sustainable feedstock production for advanced biofuels on underutilised land in Europe – 01/2016-12/2018 – https://forbio-project.eu

Objectives

- ✓ Evaluate the **agronomic and techno-economic potential** of three case studies in Italy, Ukraine and Germany (**feasibility studies**)
- ✓ Identify social, economic, environmental and governance-related **opportunities and challenges**
- ✓ Assess environmental, social and economic **sustainability**
- ✓ Analyse economic and non-economic **barriers to the market uptake**
- ✓ **Encourage** European **farmers** to produce sustainable biomass feedstock
- ✓ **Build capacity** of stakeholders for setting up sustainable bioenergy supply chains

CASE 1	CASE 2	CASE 3
ITALY Sulcis, Portoscuso	**UKRAINE** Kyiv oblast, Ivankiv region	**GERMANY** Metropolis region Berlin & Brandenburg
Contaminated land from industrial activities	Underutilised marginal agricultural land	Sewage irrigation fields & lignite mining
22,000 ha	Over 20,000 ha	1,140-3,917 ha and 7,295-11,795 ha
		

Food and Agriculture Organization of the United Nations

GEONARDO STATE OF THE ART AND BEYOND

crea Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria

BIOMASS

FIB

WIP RENEWABLE ENERGIES

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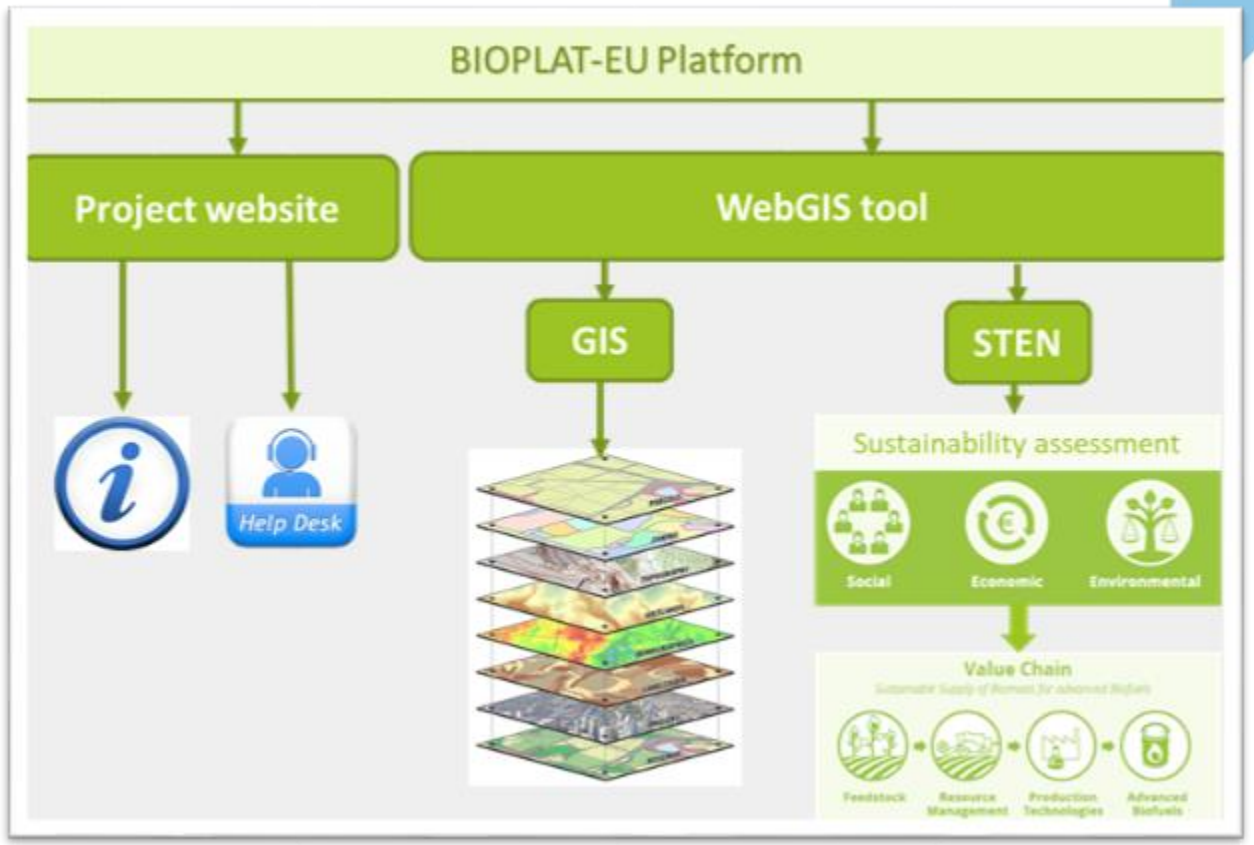
Promoting sustainable use of underutilised lands for bioenergy production through a web-based Platform for Europe – 11/2018-10/2021 – https://bioplat.eu

Objectives

- ✓ Creation of a **database of maps on MUC lands** (marginal, underutilised and contaminated) in Europe generated based on **high resolution data and their attributes (GIS)**
- ✓ Development of a **public user-friendly tool (STEN) to assess environmental, social and techno-economic sustainability** aspects of bioenergy value chains on MUC lands.
- ✓ Development of a **web-based platform** that will include the webGIS tool (GIS + STEN) + project website
- ✓ Mobilisation and **involvement of stakeholders** to encourage the launch of bioenergy projects on MUC lands
- ✓ Communication with local and regional authorities to help removing legal or political market uptake barriers
- ✓ Provision of **technical and financial structuring support** => business models and bankable projects



Food and Agriculture Organization of the United Nations

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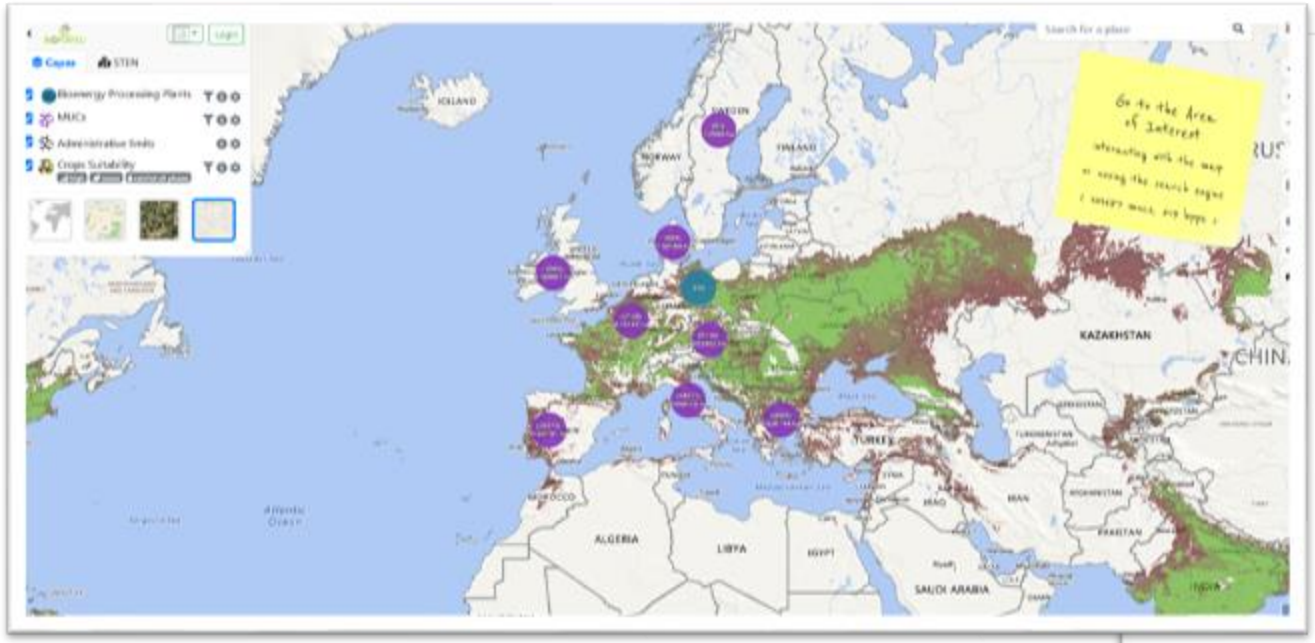
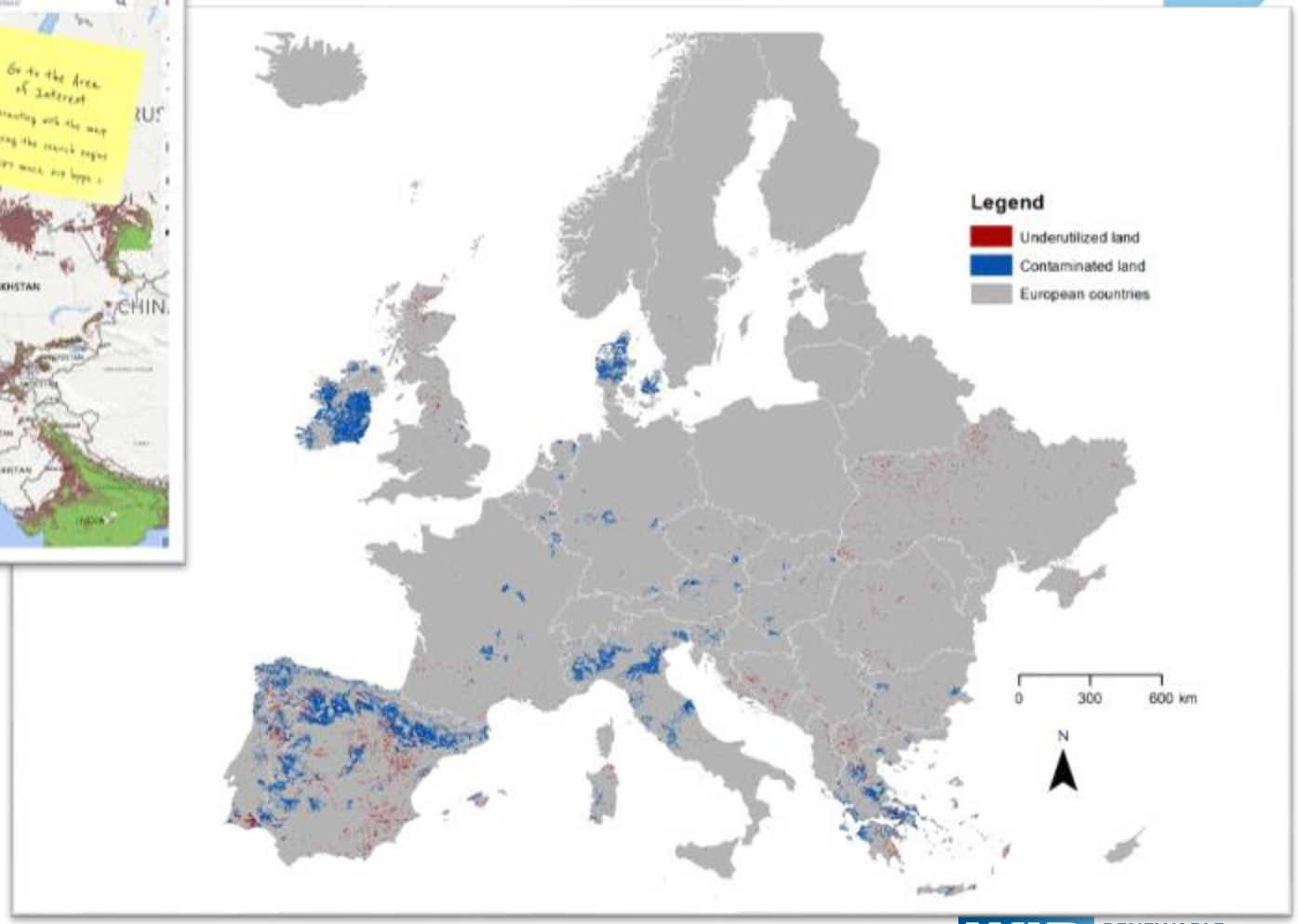
BIOPLAT-EU

Promoting sustainable use of underutilised lands for bioenergy production through a web-based Platform for Europe – 11/2018-10/2021 – https://bioplat.eu

Maps of MUC Land



Web-based Platform
(under development)



WIP RENEWABLE ENERGIES

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Panel I: Scaling up biomass feedstock production for transport and industry sectors

Dr. Phosiso Sola

Scientist

World Agroforestry Centre (ICRAF)

Invasive *Prosopis juliflora* -untapped bioenergy feedstock in Kenya

Phosiso Sola, Erick Otieno, Mieke Bourne, Lalisa Duguma, Mary Njenga

IRENA Innovation Week: Session 4
6th October, 2020

GOVERNING MULTIFUNCTIONAL LANDSCAPES

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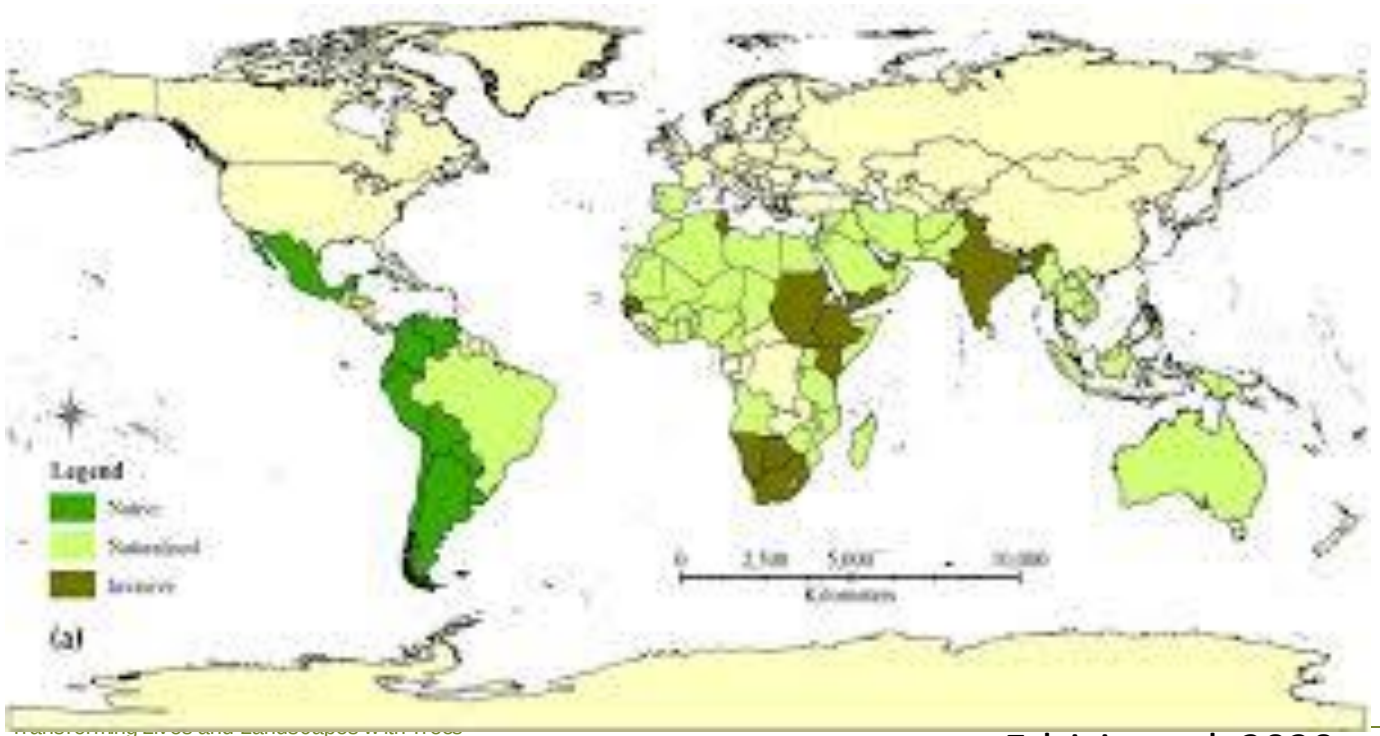
Invasive *Prosopis juliflora*

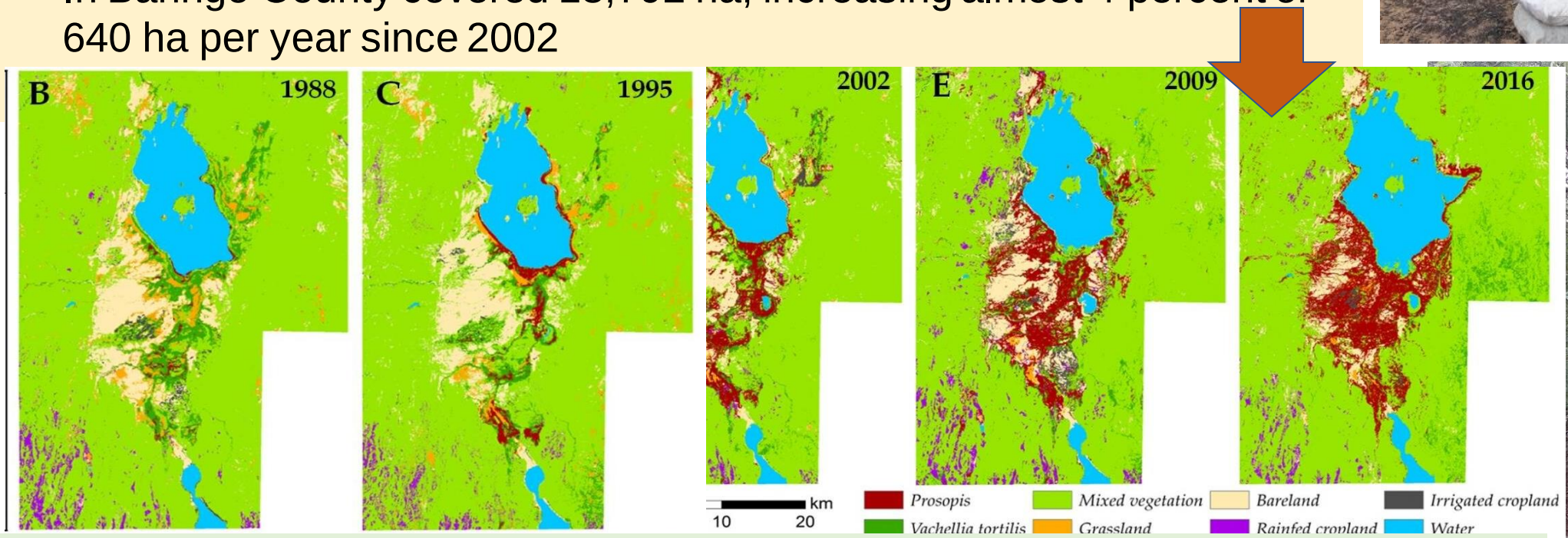
- Introduced from Brazil, in 1973 through the 1980s in arid regions of Kenya to arrest erosion, mitigate desertification and address fuel wood shortages (Pimentel *et al*., 2000; Masakha & Wagulo, 2015).
- Preferred for its resilience, drought tolerance and fast growth (Meyerhoff, 1991).
- Kenya is now faced with a great challenge of managing the spread to save environment and livelihoods in the agro pastoral drylands and still meeting the original objectives
- The Prosopis juliflora tree has successfully been used as feedstock at energy generation plants in India.

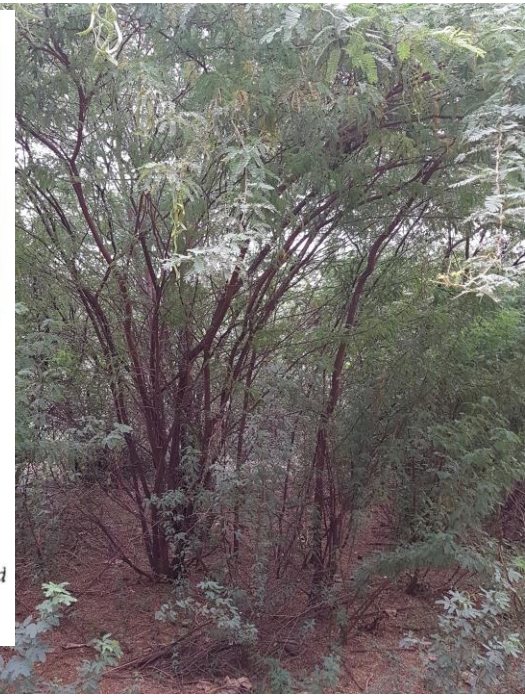


Edrisi, et al, 2020

Prosopis invasion

- Aggressively invading about 500-1300 ha per year, covering 2% of the land; biomass reaching 37 million tonnes by 2016
- Suitable for charcoal production and potential cogeneration feedstock with a calorific value of 33mJ/kg
- Ready for harvest within two to three years. Grows back to its original size in 16 to 18 months after harvest
- In Baringo County covered 18,792 ha; increasing almost 4 percent or 640 ha per year since 2002





(Mbaabu *et al*., 2019; Choge *et al*., 2011; Oduor and Githiomi, 2013).

Potential of *Prosopis juliflora* in Baringo explored

- **2013** A multimillion dollar power production venture with annual production potential of 8-12MW of power for 20 years mooted - for US$22 million
- **2014** company produced 2.4 megawatts

2017 company stopped operations

- Prosopis wood produced a lot of tar due to its high moisture content
- Resultant gas (methane) impure and not usable
- Prosopis incompatible with the gasification technology
- Resource use conflicts with the community

2018 Public outcry (news headlines)

- **No power is being generated and Mathenge plant - *Prosopis juliflora* - continues to wreak havoc**
- Kenya faces devastating Prosopis invasion: What can be done?
- **Baringo residents' hopes for income fade as Sh2.2bn 'Mathenge' factory stalls**
- Calls to eliminate 'mathenge,' *Prosopis juliflora* as control strategies fail in Kenya
- **Prosopis, a friend or a foe plant**?

The future

- Several research and knowledge gaps; debates/ conflicting views on effectiveness of the various approaches used to manage Prosopis
- Great opportunity to devise bioenergy ventures that drastically decrease impact and further encroachment

P. juliflora is an aggressive invader leading to socio-ecological impacts with long-term implications on the agroecosystem and livelihoods in the region : Can this be turned arc

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Thank you!

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World Agroforestry

CGIAR

Science for a food-secure future

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Panel I: Scaling up biomass feedstock production for transport and industry sectors

Dr Carolina Grassi

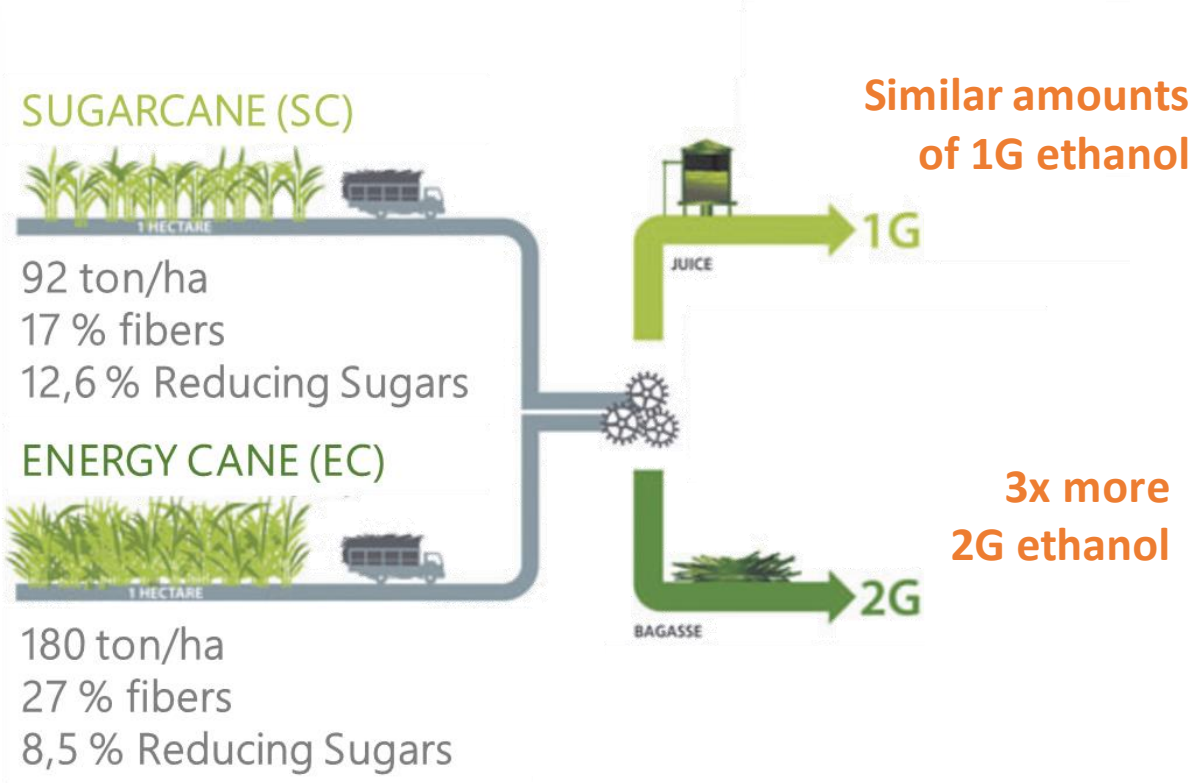
Business Development Lead -
Latin America & Sector Lead - Ground Transport
Roundtable on Sustainable Biomaterials

Biomass Production

Carolina Grassi | Sector Lead – Ground Transport
Business Development Lead - Latin America

Energy Density

Energy Cane



Source: *GranBio; Vignis*

Rewarding efficiency

RenovaBio – Brazilian Biofuels Policy

Life Cycle Analysis (Well to wheel)
- Agricultural
- Industrial
- Distribution

Fossil fuel emission

−

Biofuel emission

=

Score (g CO2/MJ)

Certification

✖

Elegibility criteria

Sustainable Land Use

=

Efficiency incentives to sustainable expansion

CBIO

1 CBIO = 1 ton CO2eq avoided

⬇

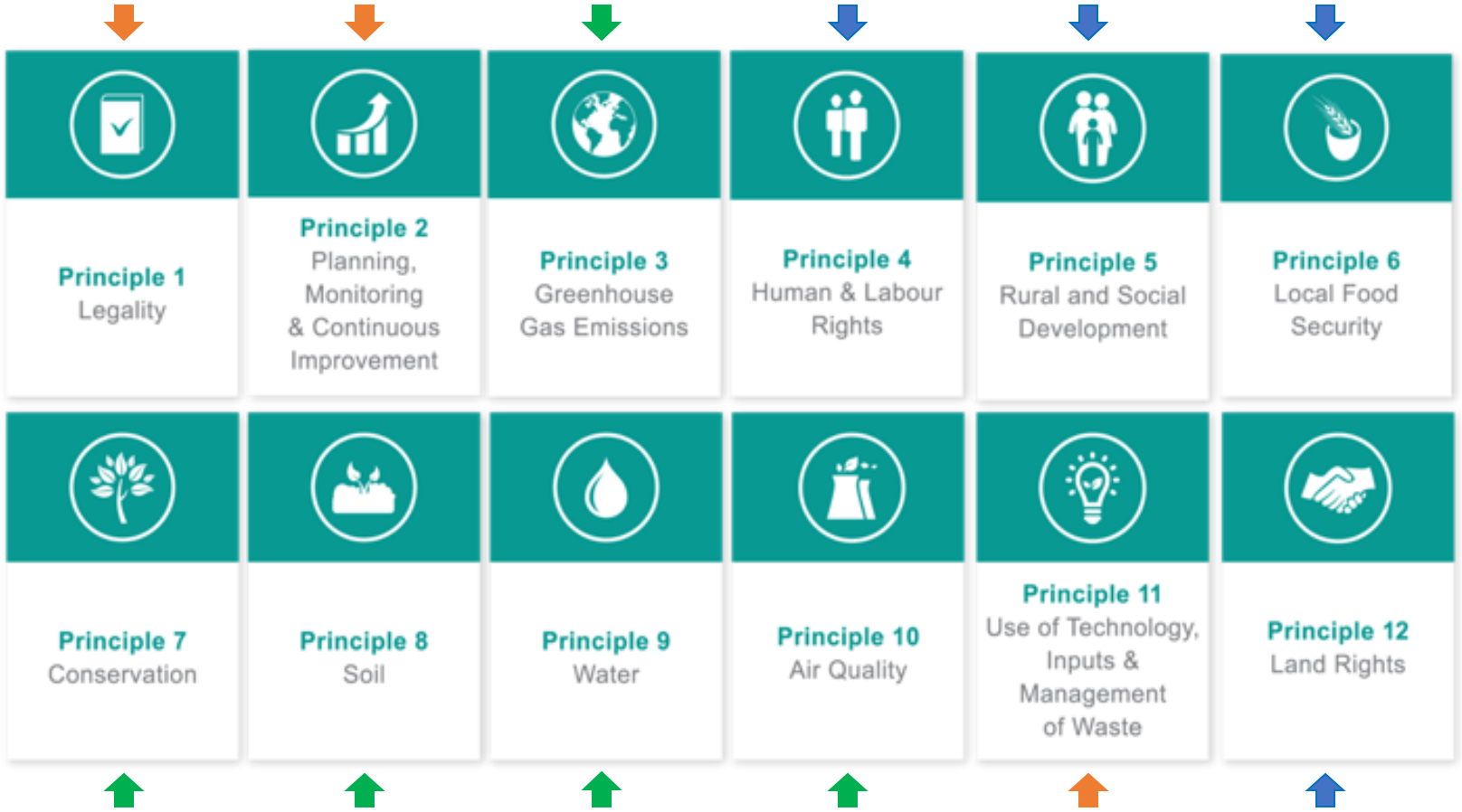
Stock exchange

Brazil NDC

Source: *Adapted from Embrapa Meio Ambiente; Grassi & Pereira, 2019*

Sustainable Production

RSB Certification System



Economic Management

Environment

Social

Low Indirect Land Use Change Risk
ROUNDTABLE ON SUSTAINABLE BIOMATERIALS

Yield Increase

Unused/Degraded Land

Wastes and residues

Panel I: Scaling up biomass feedstock production for transport and industry sectors

Mr. Keith Kline

Distinguished Researcher in Environmental Sciences

Oak Ridge National Lab, US DoE

OAK RIDGE National Laboratory

Presentation for International Renewable Energy Association (IRENA) Innovation Week, October 2020

Three big challenges to scaling-up biomass feedstock production

Keith L. Kline
klinekl@ornl.gov
Environmental Sciences, Oak Ridge National Laboratory, Tennessee, USA

06 October 2020

Climate Change Science Institute
AT OAK RIDGE NATIONAL LABORATORY

CBES
Center for BioEnergy Sustainability

ORNL is managed by UT-Battelle, LLC for the US Department of Energy

U.S. DEPARTMENT OF ENERGY

For my grandchildren and future generations.

Acknowledgements: U.S. Department of Energy (DOE) Bioenergy Technologies Office (BETO), IEA Bioenergy, and Oak Ridge National Laboratory (ORNL). ORNL is managed by UT-Battelle for DOE under contract number DE-AC05-00OR22725. The views expressed in this presentation do not necessarily represent the views of the United States Government or any agency thereof. For more information on recent research, see https://cbes.ornl.gov/

#IVIW2020

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- Improve management of previously disturbed lands
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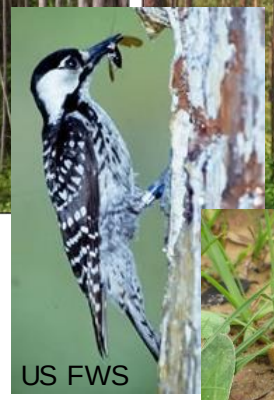
  - Bioenergy investments can help identify viable options
  - Management for endangered species



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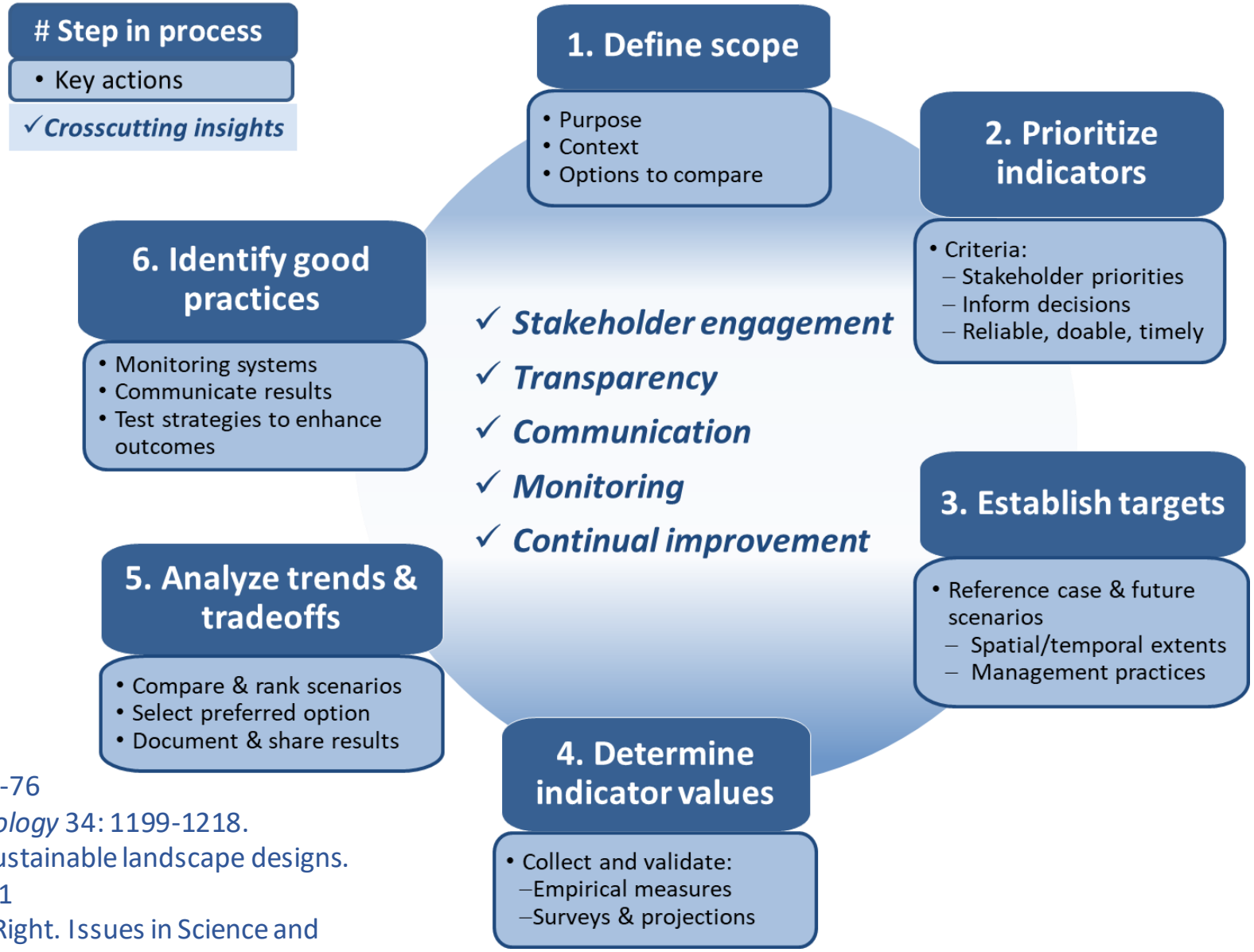

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3. How to create markets (?) when we have 'biomass to BURN!'

- **>500 million hectares burn every year** *(Randerson et. al., 2012; Giglio et al. 2010; Doerr and Santin 2016)*
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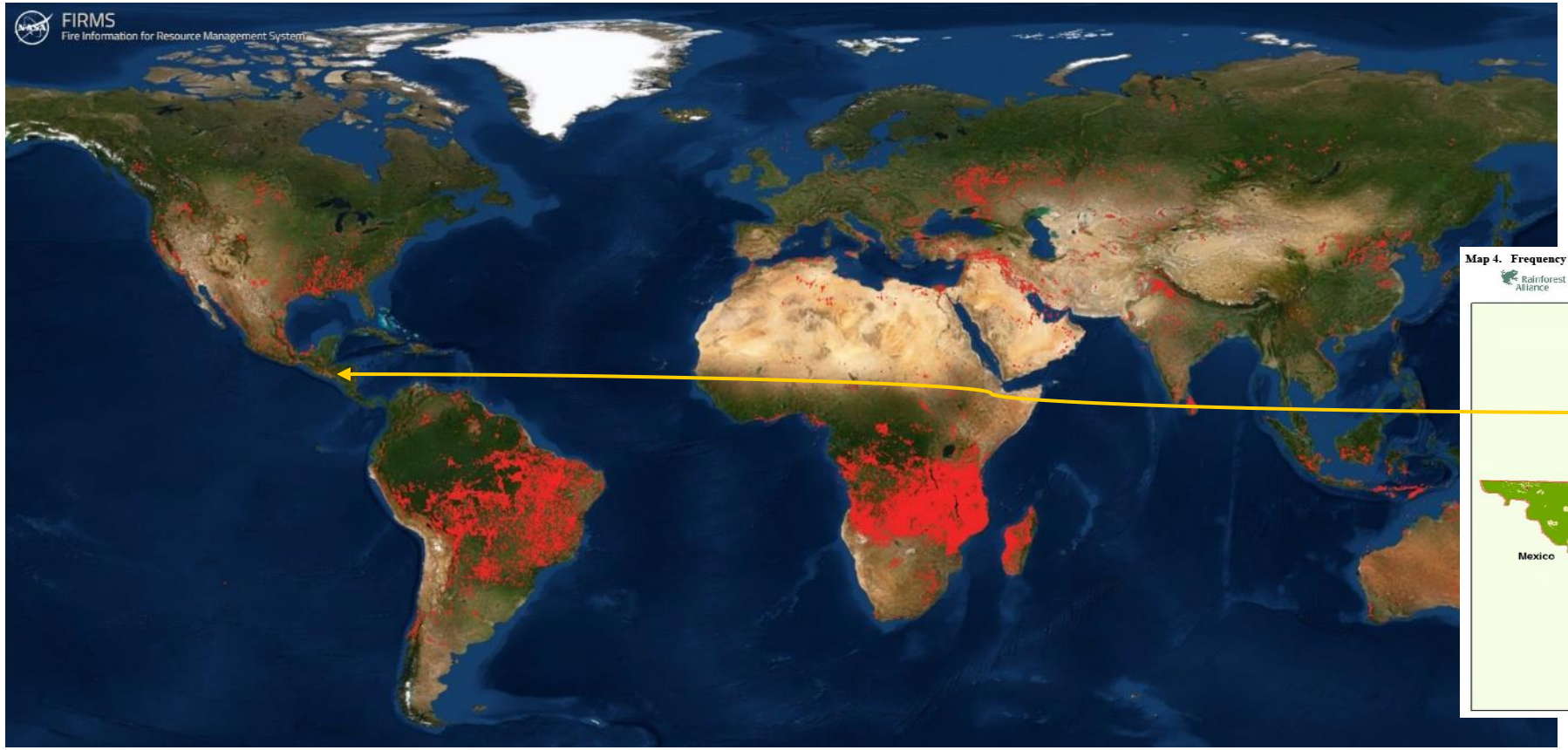
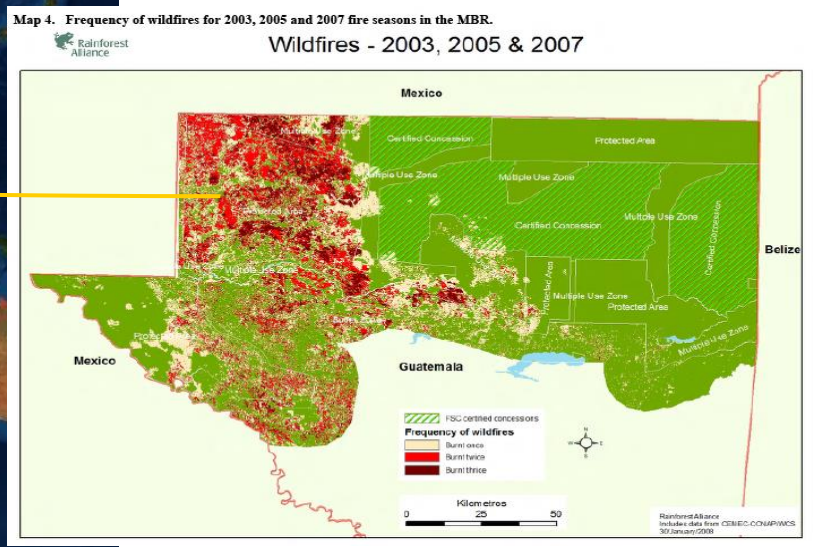


6th October, 2020: Fires in past 24 hours. NASA https://firms.modaps.eosdis.nasa.gov/map

Community forest concessions for multiple use: Peten, Guatemala.



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Thank you!

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This material is based upon work supported by the US Department of Energy under the Bioenergy Technologies Office (BETO) and performed at Oak Ridge National Laboratory under contract number DE-AC05-00OR22725.

OAK RIDGE National Laboratory

Presentation for International Renewable Energy Association (IRENA) Innovation Week, October 2020

Three big challenges to scaling-up biomass feedstock production

Keith L. Kline

klinekl@ornl.gov

Environmental Sciences, Oak Ridge National Laboratory, Tennessee, USA

06 October 2020

Climate Change Science Institute
AT OAK RIDGE NATIONAL LABORATORY

CBES
Center for BioEnergy Sustainability

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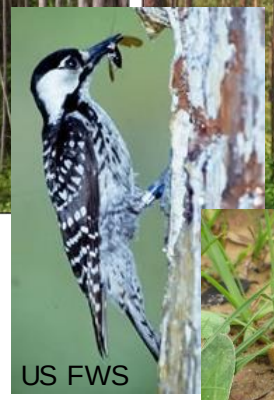

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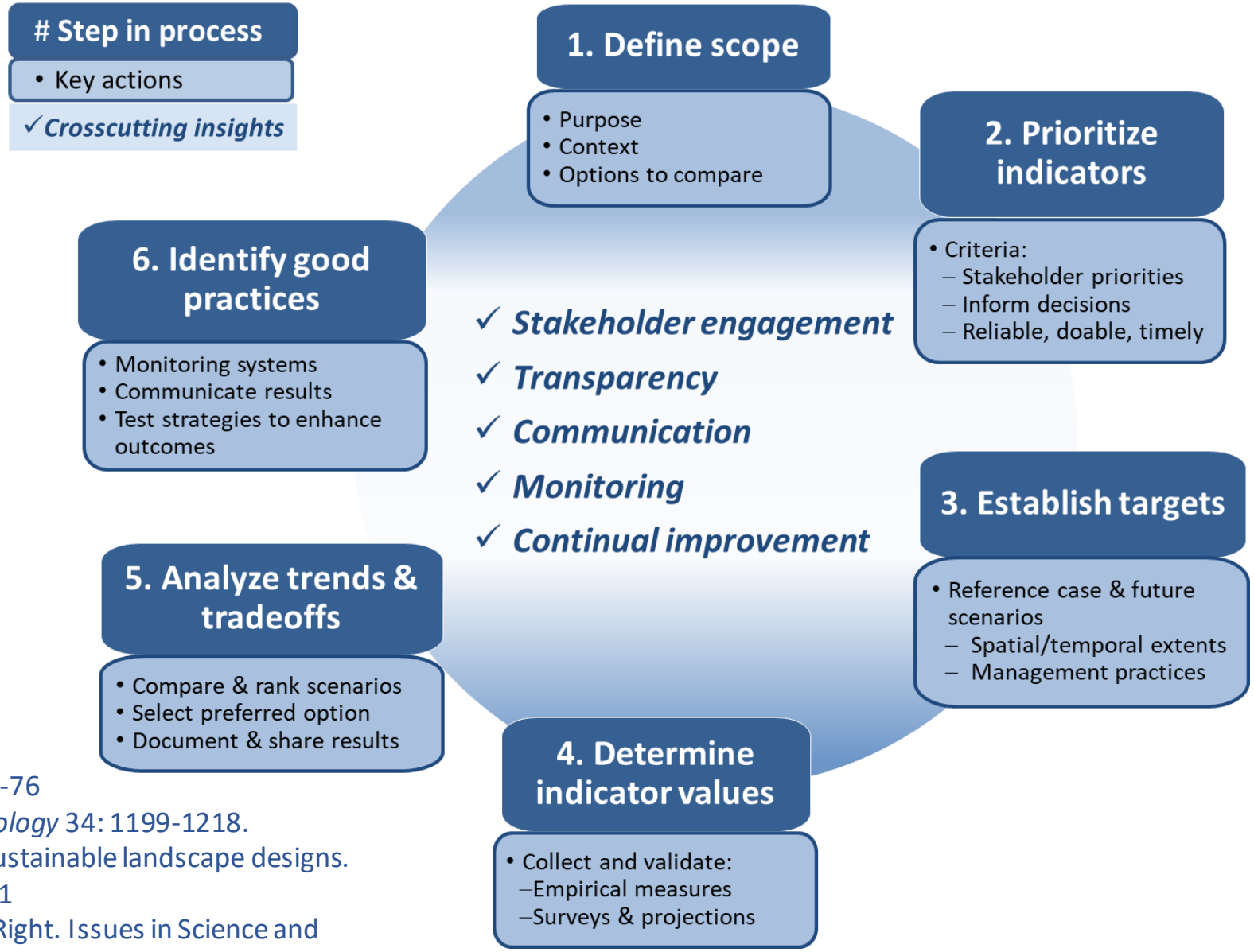

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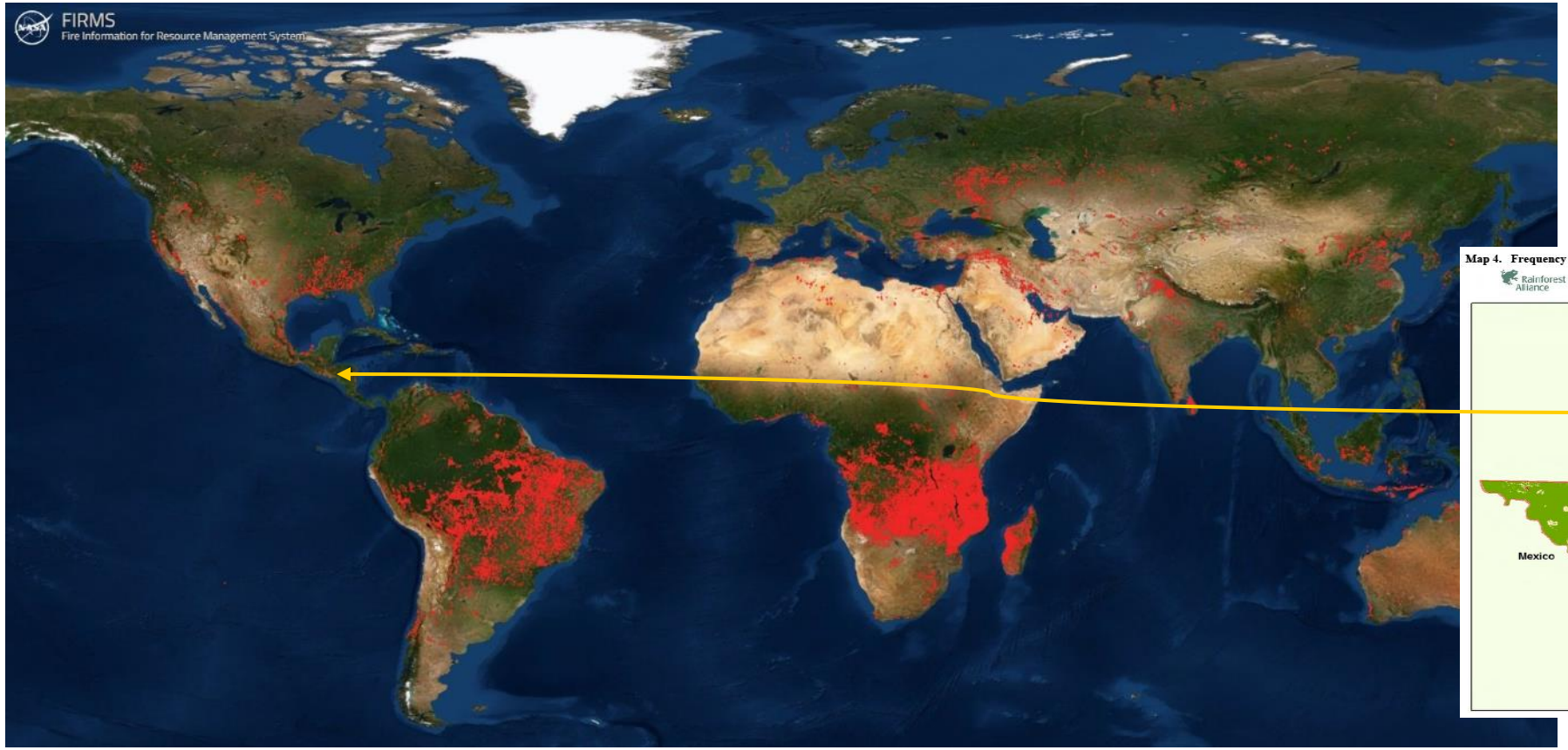

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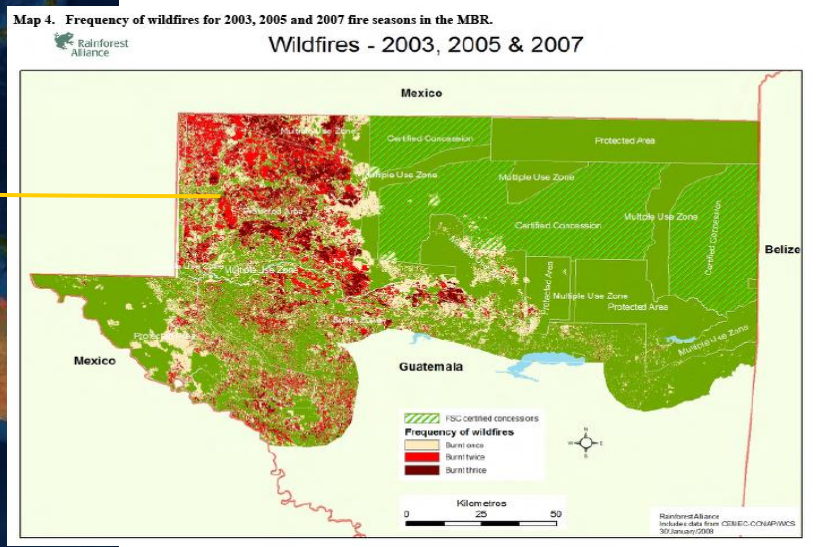

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Thank you!

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IRENA INNOVATION WEEK 2020

Digital Break

Coming up next:

Panel II:

Innovative Solutions for Maximising Biomass Value Streams

#IVIW2020

IRENA
International Renewable Energy Agency

Panel II: Innovative Solutions for Maximizing Biomass Value Streams

Moderator

Bharadwaj Kummamuru

Executive Director
World Bioenergy Association

Panellists

Henrik Brodin

Strategic Business Development Manager
Södra

Timothy Ong

Senior Vice-President
Agensi Inovasi Malaysia

Geoffrey Bell

CEO
Microbiogen

James Spaeth

Programme Manager, U.S. Department of Energy-Bioenergy Technologies Office

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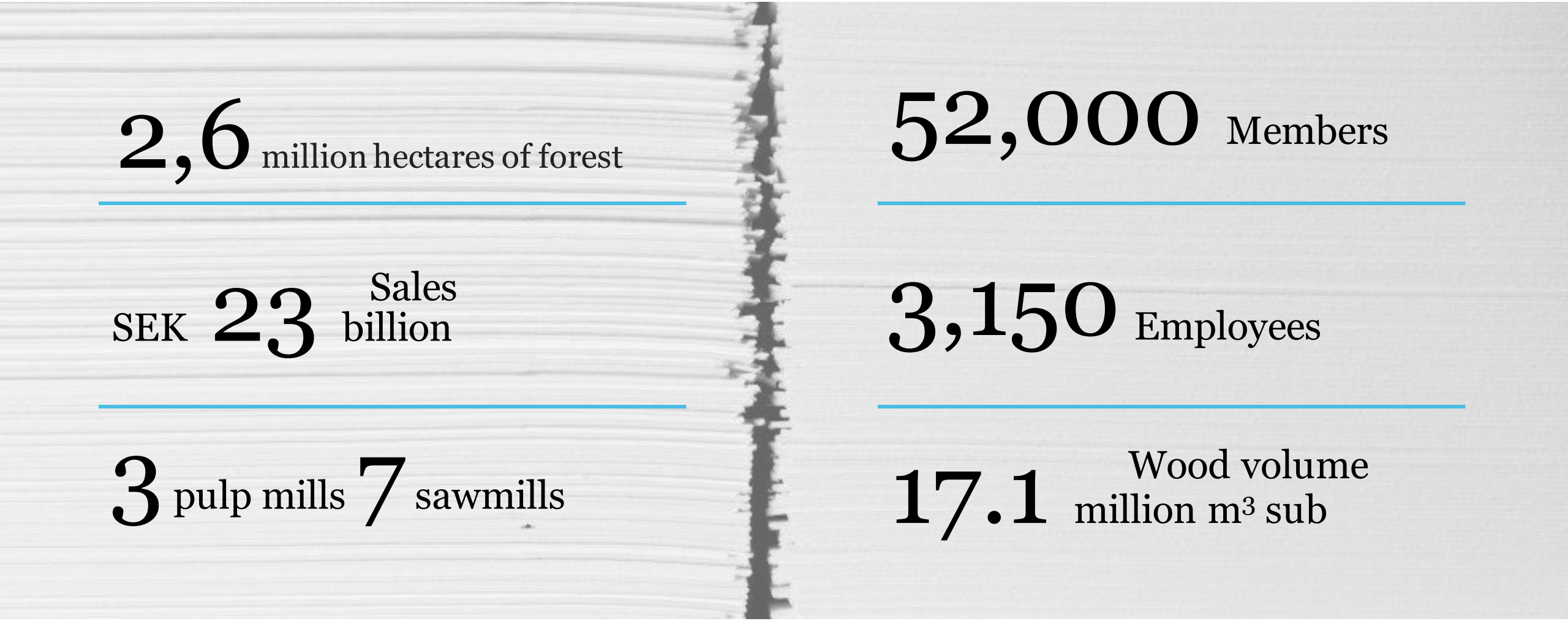
Panel II: Innovative Solutions for Maximizing Biomass Value Streams

Mr. Henrik Brodin

Strategic Business Development Manager
Södra

Södra in figures



2,6 million hectares of forest

52,000 Members

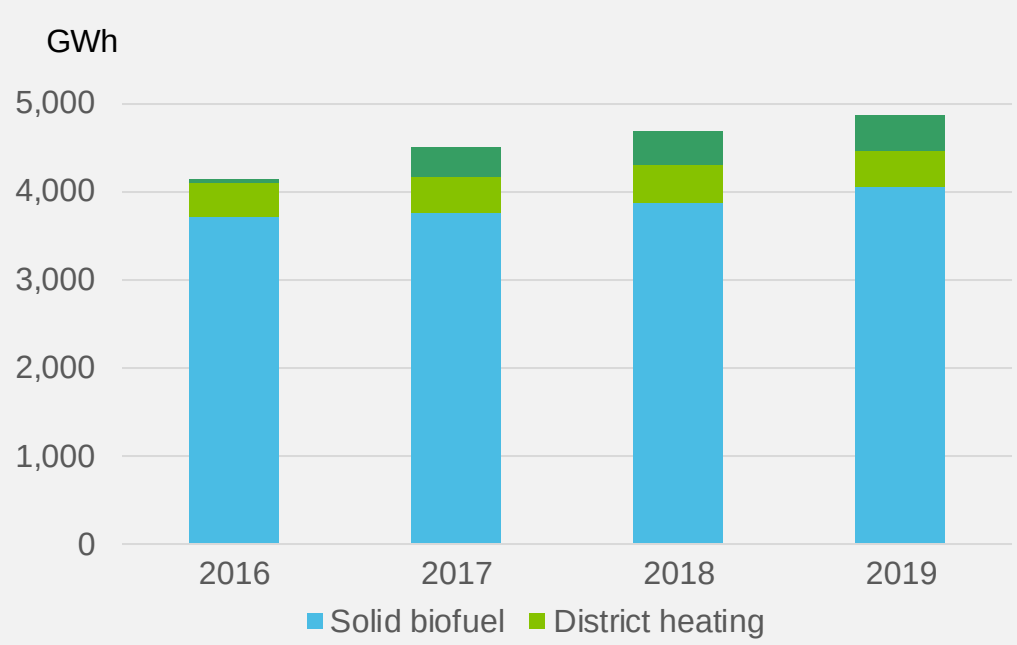
SEK **23** Sales billion

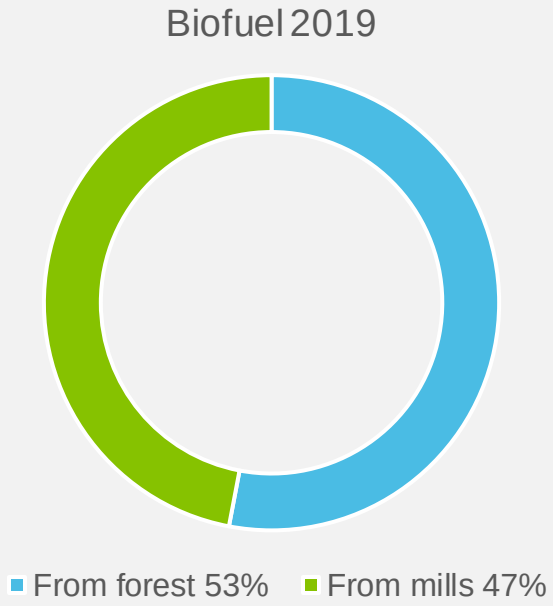
3,150 Employees

3 pulp mills **7** sawmills

17.1 Wood volume million m³ sub

External energy deliveries – 4,900 GWh





Biofuels by Södra

SUNPINE

Produces biodiesel
from tall oil

Liquid forest Biomethanol

World's first biomethanol
from forest biomass

Silva Green Fuel

Advanced technology
for biofuels

Panel II: Innovative Solutions for Maximizing Biomass Value Streams

Mr. Timothy Ong

Senior Vice-President
Agensi Inovasi Malaysia

BioHub Port and Industrial Area Development In Sarawak Showcase

Transforming Malaysia into a Regional BioHub

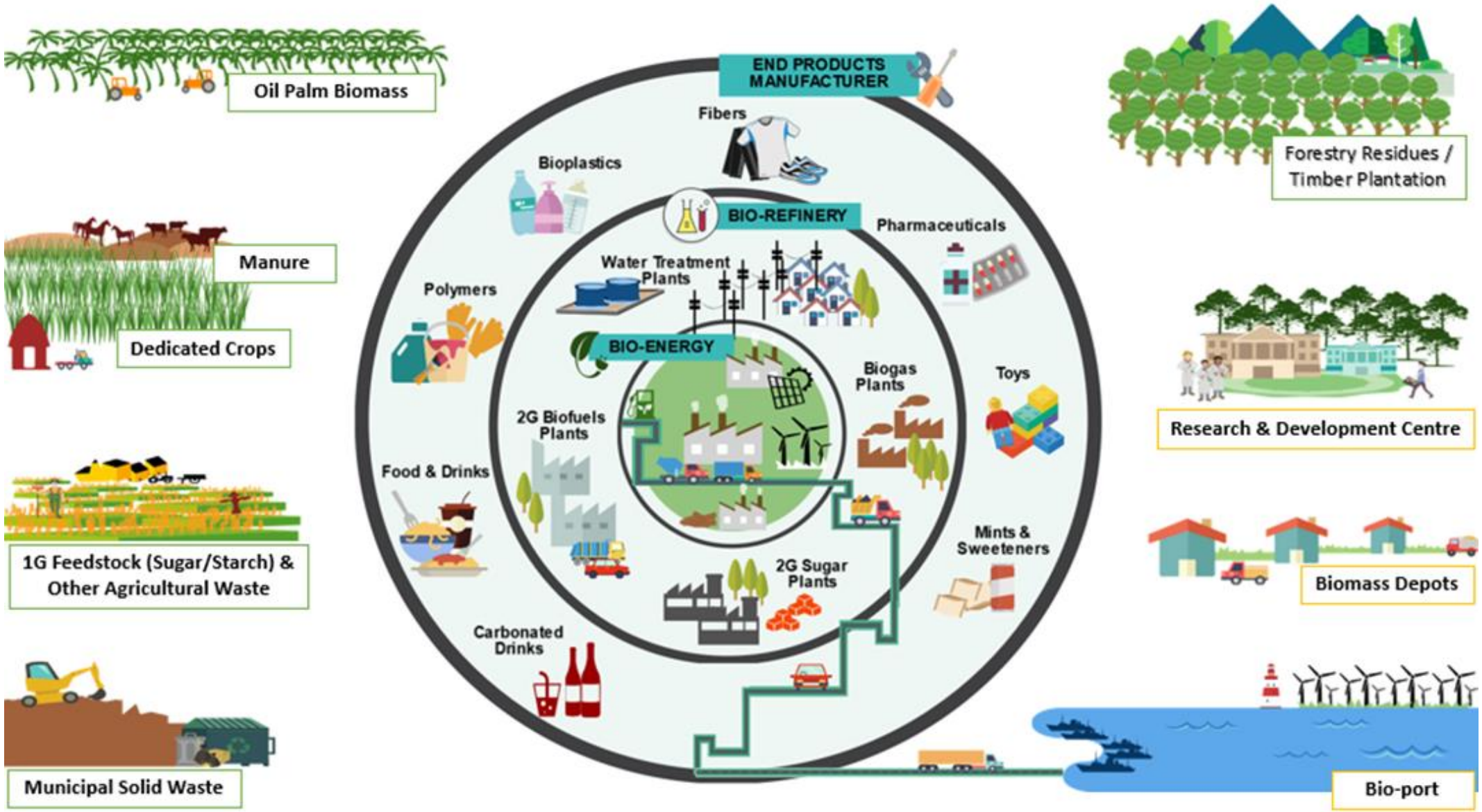
SESSION 4 - GROWING THE BIOECONOMY: SOLUTIONS FOR SUSTAINABLE SUPPLY OF BIOMASS AND BIOFUELS

IRENA
International Renewable Energy Agency

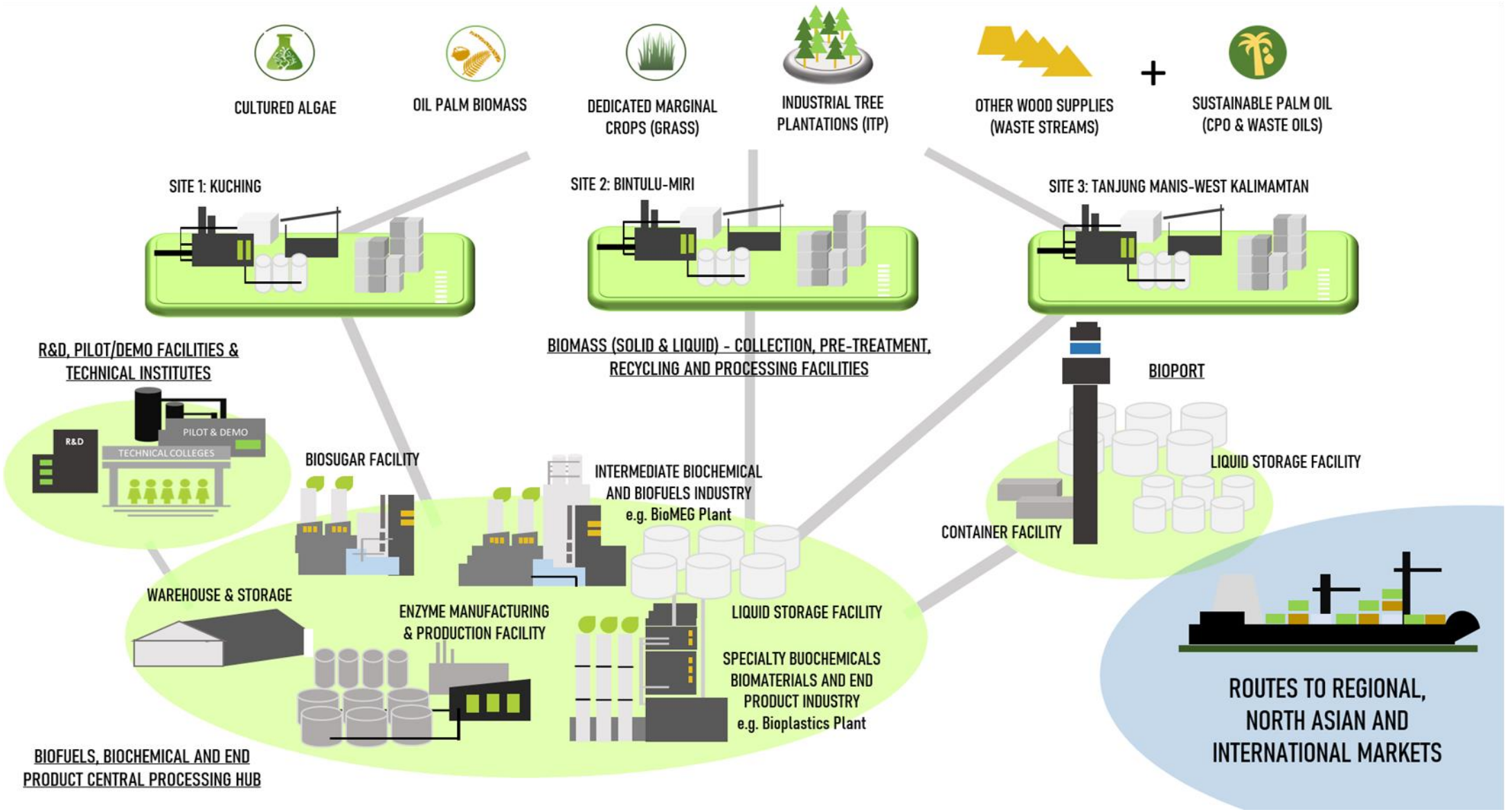
INNOVATION WEEK 2020
Renewable solutions for transport and industry

IEA Bioenergy
Task 42 Biorefining

BIOHUB IS A MULTI BIORESOURCE PLATFORM
Starts with Biomass but Ability to Scale with Different BioResources

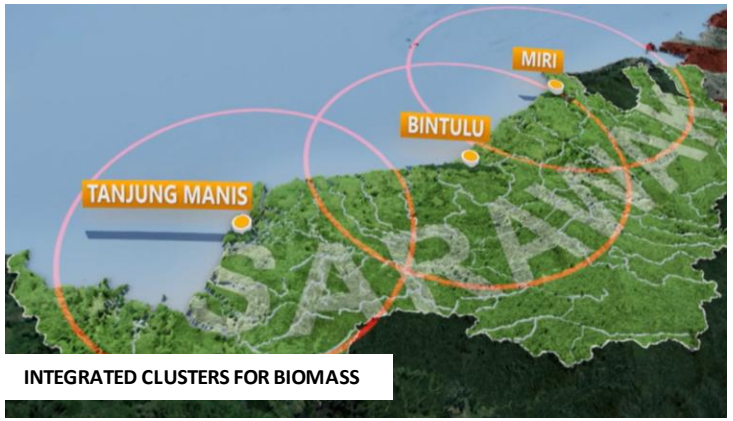


CENTRAL FACILITY WITH 3 AGGREGATION SITES



BioHub Port and Industrial Area Development in Sarawak, Malaysia

(Partners: Port of Rotterdam, Bintulu Port Holdings, Regal Lands and Agensi Inovasi Malaysia)



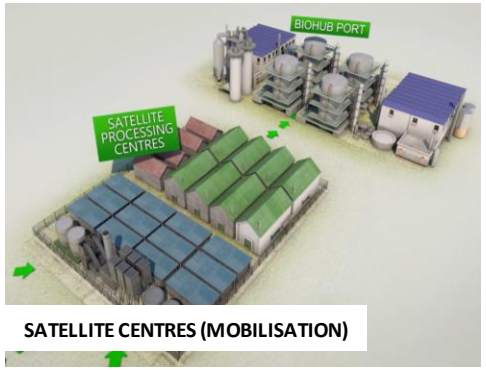
INTEGRATED CLUSTERS FOR BIOMASS

MULTI BIOMASS FEEDSTOCK OPTIONS

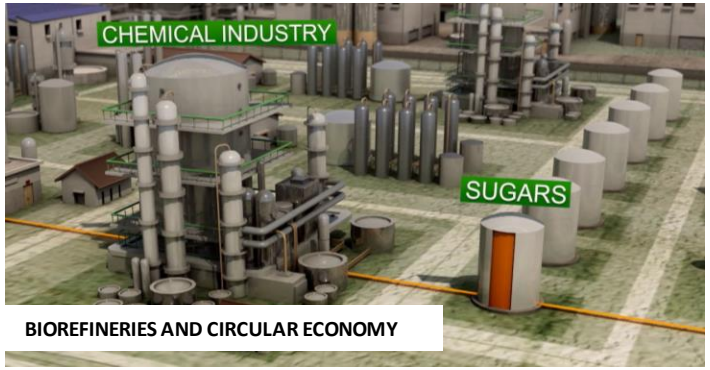
PLAY VIDEO

PLAY VIDEO (Full)

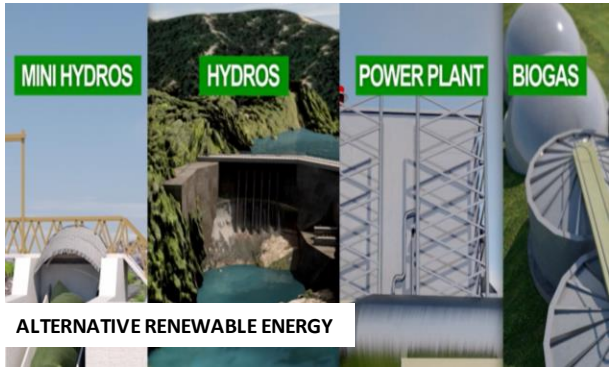
STATE OF THE ART DIGITAL AND BIOTECHNOLOGY (BIOFUELS, BIOCHEMICAL AND END PRODUCTS)



SATELLITE CENTRES (MOBILISATION)



BIOREFINERIES AND CIRCULAR ECONOMY



ALTERNATIVE RENEWABLE ENERGY

Thank You

TIMOTHY ONG
Senior Vice President – Strategic Impact Projects
Head of National Biomass Strategy Delivery Unit
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Jalan Teknokrat 5
63000 Cyberjaya
Selangor Darul Ehsan
Malaysia

T : +603 8319 3116
F : +603 8319 3499
M : +6012 675 7586
W: www.innovation.my

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Panel II: Innovative Solutions for Maximizing Biomass Value Streams

Mr. Geoffrey Bell

CEO

Microbiogen

#IVIW2020

Introduction

Microbiogen

- World leader in yeast biocatalyst development. Much of Gen I biofuels use MBG developed yeast
- Gen II biofuels biocatalysts – completing 3 year $8M optimisation supported by ARENA

Two innovative solutions that maximise biomass value

- Utilise the next generation of biocatalysts optimised by Microbiogen for “food and fuel” biorefinery
- Utilise lignin as a metallurgical coal replacement

SmaRT@UNSW

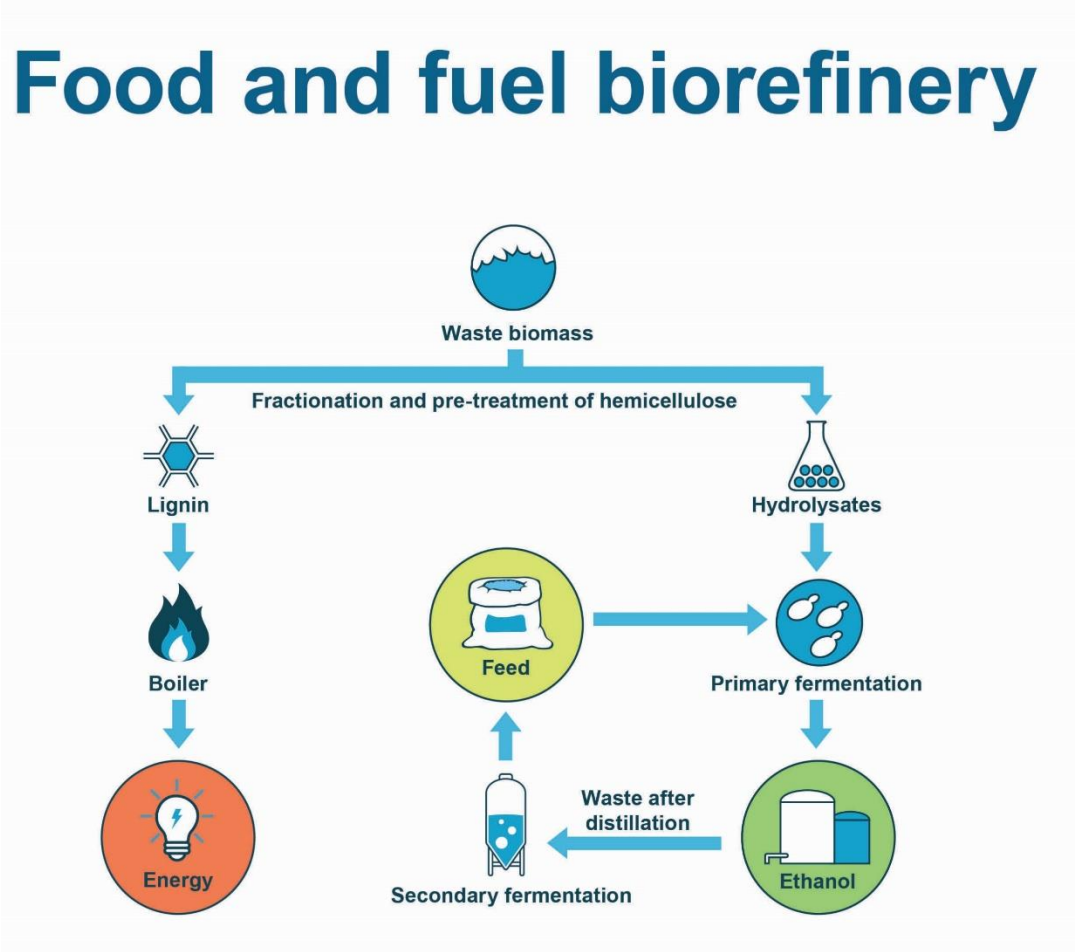
- Headed by Professor Veena Sahajwalla and already successfully commercialised Polymer Injection Technology
- The technology has so far been used in over 84,000 heats and utilised 2.4 million recycles tyres

- Optimised yeast for C6 and C5 sugar fermentation to ethanol
- The unique biocatalyst does two jobs:
  - Converts all major sugars to ethanol efficiently
  - Grows on its own waste stream
- A significant, high value, high protein by-product is produced
- Greater water recycle, more efficient sugar conversions

Innovation impact:

Lifts revenues – 10% to 20%

Turns a Gen II ethanol facility into a ‘food and fuel” biorefinery



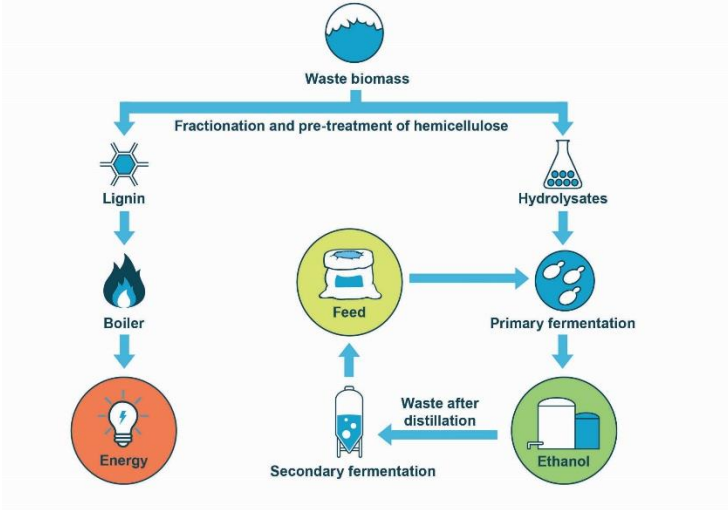
Lignin as a met coal replacement

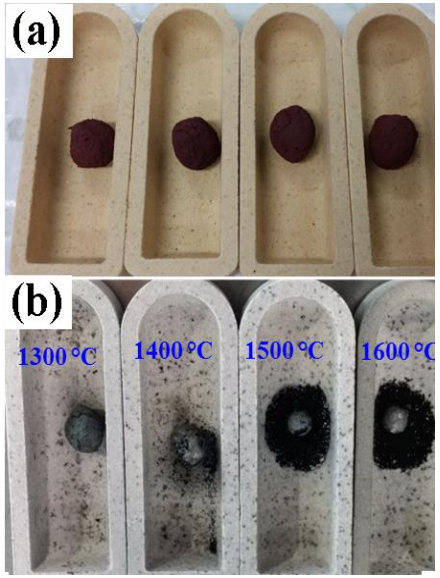
- Lignin currently burnt for power. Works, but is a low value option
- Utilise renewables for power such as wind, solar or even fossil gas if necessary
- Utilise lignin as a metallurgical coal replacement
- UNSW trials demonstrate it is an effective substitute – especially blast furnaces
- Met coal typically sells at twice the value of thermal coal

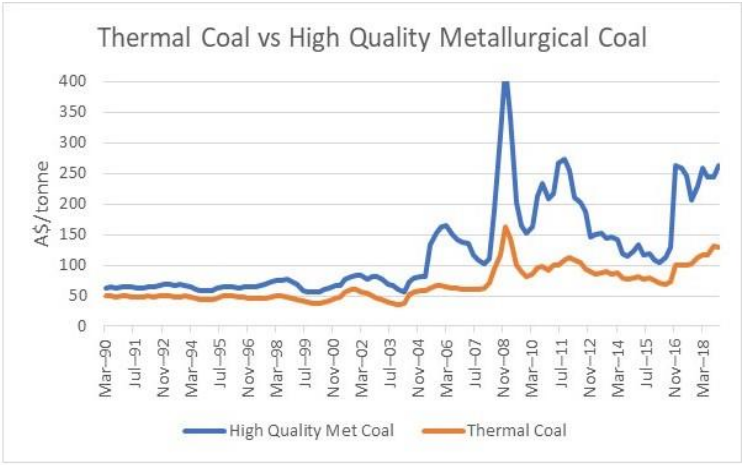
Innovation impact:

About 10% lift in biorefinery revenues

More sustainable steel production







Source Data: Resources and Energy Quarterly – March 2019

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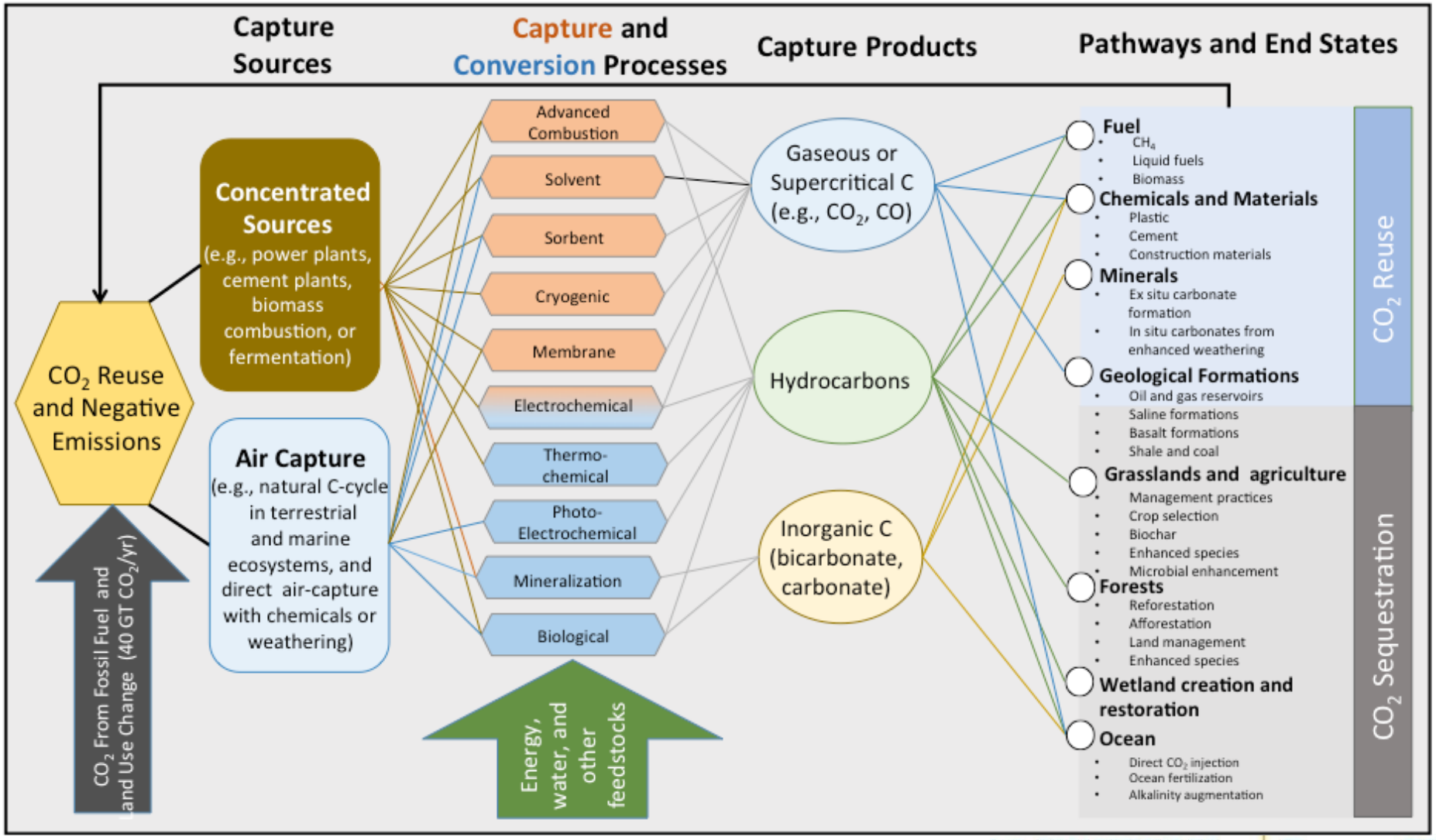
Panel II: Innovative Solutions for Maximizing Biomass Value Streams

Mr. James Spaeth
Programme Manager
U.S. Department of Energy- Bioenergy Technologies Office

Expanding Opportunities of Biomass and Carbon Resources

Negative Emission and CO_2 Utilization Landscape



(SEAB CO_2 Task Force Report, 2016)

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IRENA INNOVATION WEEK 2020

Closing Remarks

#IVIW2020

IRENA
International Renewable Energy Agency

Closing remarks

Dr. Paul Durrant

Head of End-use sectors and Bioenergy
IRENA

IRENA Innovation Week 2020: Programme

Day & Time	Session	Partners
Monday 5th October 09:30 – 11:30 CEST	**High-level opening session**	
Monday 5th October 17:00 – 20:00 CEST	**Session 2: Smart electrification of end-use sectors:** implications for the power system	EPRI ELECTRIC POWER RESEARCH INSTITUTE
Tuesday 6th October 08:00 – 11:00 CEST	**Session 3: Scaling up green hydrogen and green e-fuels production** to decarbonise industry & transport	Hydrogen Council
Tuesday 6th October 17:00 – 20:00 CEST	**Session 4: Growing the bio-economy:** solutions for the sustainable supply of biomass & biofuels	GBEP Global Bioenergy Partnership
Wed 7th October 08:00 – 11:00 CESR	**Session 5: Renewable solutions for industry transformation**	MISSION POSSIBLE PLATFORM
Wed 7th October 17:00 – 20:00 CEST	**Session 6: Transforming Transport:** Innovative renewable-based solutions in road freight, shipping & aviation	International Transport Forum
Thursday 8th October 10:00 – 12:30 CEST	**Session 7: IRENA Youth Talk:** Entrepreneurship and Innovation for the green energy agenda	Initiate! SDG7 YOUTH CONSTITUENCY YOUTH IN SUSTAINABLE ENERGY
Thursday 8th October 14:00 – 16:00 CEST	**Session 8: The Way Forward**	

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IRENA INNOVATION WEEK 2020

Thank you for your attention!

Coming up next

Session 5: Renewable Solutions for Industry Sector Transformation
tomorrow 7 October at 08:00am CEST

Register at
https://innovationweek.irena.org/

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