

Biomass Partnerships with Namibia

Development of Biomass Industrial Parks (BIP)

Identifying Potentials – Optimizing Processes – Creating Value

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Namibia
BIOMASS
INDUSTRIAL PARK



Trier University
of Applied Sciences

H O C H
S C H U L E
T R I E R



Travelling University



giz



Zero Emission Campus Concept

International Green Metric Ranking

In Germany Nr. 1
Worldwide Nr. 6



- 100% renewable heat supply based on waste wood, biogas (co-generation) and solar thermal
- 100% renewable electricity based on cogeneration & PV
- 100% renewable cooling supply based on geothermal, biomass and solar adsorption
- Maximised Energy Efficiency
 - ✓ Passive and Plus-Energy Buildings
 - ✓ Energy efficient lighting (indoor and street lighting)
 - ✓ Efficiency and building automation system (heating and lighting)

Bush Encroachment

Item	Encroached	Savannah	Delta
Carrying Capacity	300 cattle (<i>25ha/l su</i>)	600 cattle (<i>12.5 ha/l su</i>)	50%
Evapotranspiration	1.3 Mio. m ³ /d	0.34 Mio. m ³ /d	74%
Profit	N\$ 280,000 / year (€ 17,600)	N\$ 680,000 / year (€ 42,800)	59%

Farm Winnie, Outjo area

Okakarara area

Background Namibia

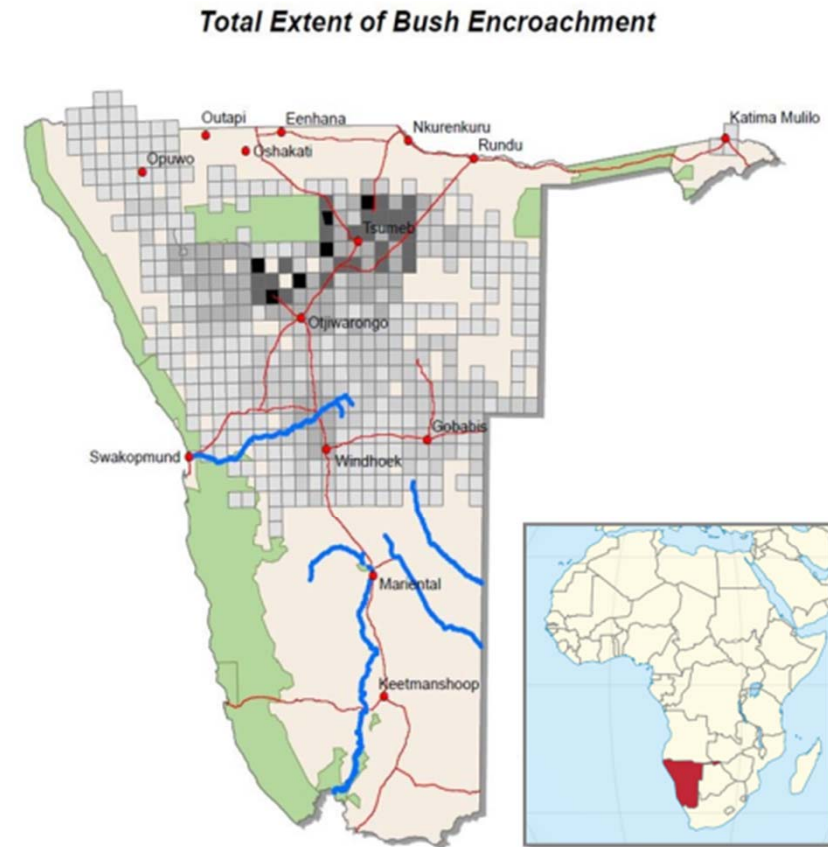
Bush Encroachment

Problem

- >30-45 million ha of productive rangeland bush encroached at an annual growth rate of 3-5%
- Severe impact on biodiversity, groundwater recharge and livestock productivity
- Annual agronomic losses of 100 million EUR due to reduced rangeland productivity (*2/3 of total productivity*)

Opportunity

- >300-450 million tons of standing “unwanted” but valuable biomass with annual growth of 9-18 million tons
- Increasing demand on regional and international markets
- Socio-economic benefits: rangeland restoration, climate change adaptation, employment, energy supply and transition



“Bush Encroachment is a National Disaster”

Hon. Min. MAWF, National Rangeland Policy 2012

Background Germany

Coal phase-out and CO₂ tax

Source: Agora Energiewende and Sandbag (2019): The European Power Sector in 2018. Up-to-date analysis on the electricity transition.

Current Elections, Press and Protest (2019)

- I. Landslide Victory of the Green Party in the European Parliament
- II. Critics of YouTuber “Rezo” pushed green movement among younger generation
- III. “Fridays for Future” Protests introduced to Germany



Coal Commission – German Parliament

- I. Renewable electricity share 2050 shall be 80% and the reduction of GHG shall amount to 80-95% in comparison to 1990.
- II. Shutdown of first coal power plants by 2022 (*Lignite = 146 TWh_{el} ca. 100 Mio. t*)
- III. Total coal phase-out by 2032 (*Hard Coal = 84 TWh_{el} ca. 28 Mio. t*)
- IV. **Carbon Dioxide Tax** (or Emission Trading Certificates)
 - I. UN-Climate Conference Estimate: 20-80 €/tCO₂ [2020] – 50-100 €/tCO₂ [2030]
 - II. Federal Environmental Agency (UBA): Environmental Damage 180€/tCO₂



Bilateral Talks (Namibia-Germany)

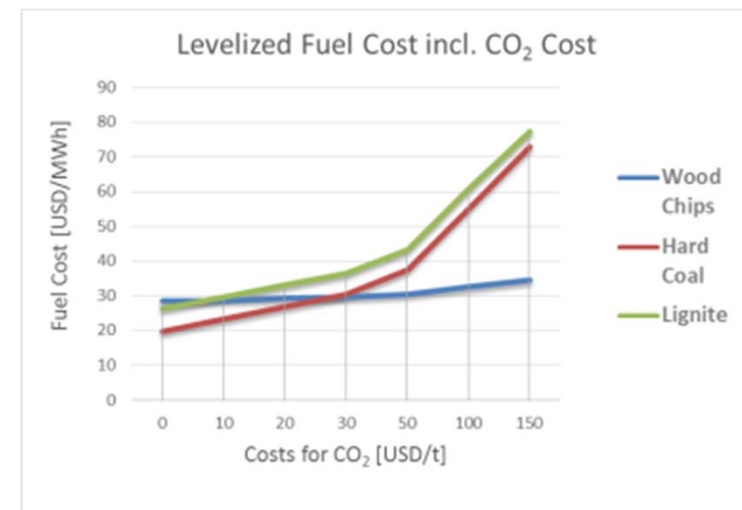
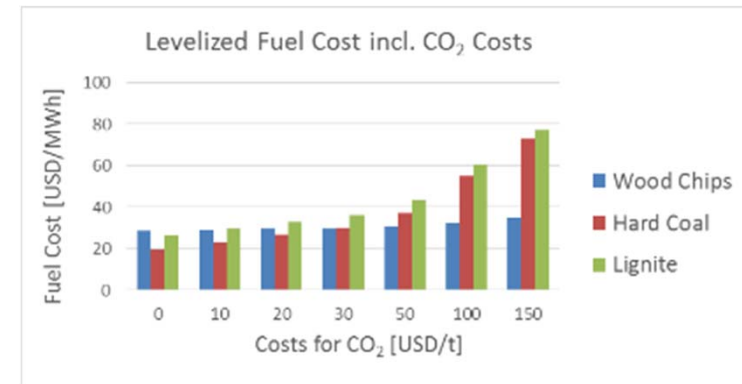
- I. National Planning Commission – Steering committee joins all affected ministries (*MAWF, MME, MET, MITSMED*) and institutions of Namibia (*N-BiG, GIZ, NamPower, NamPort, TransNamib, etc.*)
- II. September 2019 – De-bushing and BIP entered as a topic into the bilateral talks



De-bushing – Woodchips VS Hard Coal and Lignite

Export of Fuel (Woodchips [P30-P100])

Fuel	Wood Chips	Hard Coal	Lignite	Unit
Calorific Value	4.20	8.06	4.17	kWh/kg
GHG Emission	0.04	0.35	0.34	kg CO _{2eq} /kWh
GHG Price		35		USD/t CO _{2eq}
	0.2	2.9	1.4	kg CO _{2eq} /kg
GHG Cost	0.006	0.10	0.05	USD/kg
	0.001	0.012	0.012	USD/kWh
Price CIF	102	66	82	USD/t
Rotterdam	0.10	0.07	0.08	USD/kg
Price incl. GHG	0.11	0.17	0.13	USD/kg
	0.026	0.021	0.032	USD/kWh
Total Cost	25.69	20.57	31.54	USD/MWh
	108	166	132	USD/t

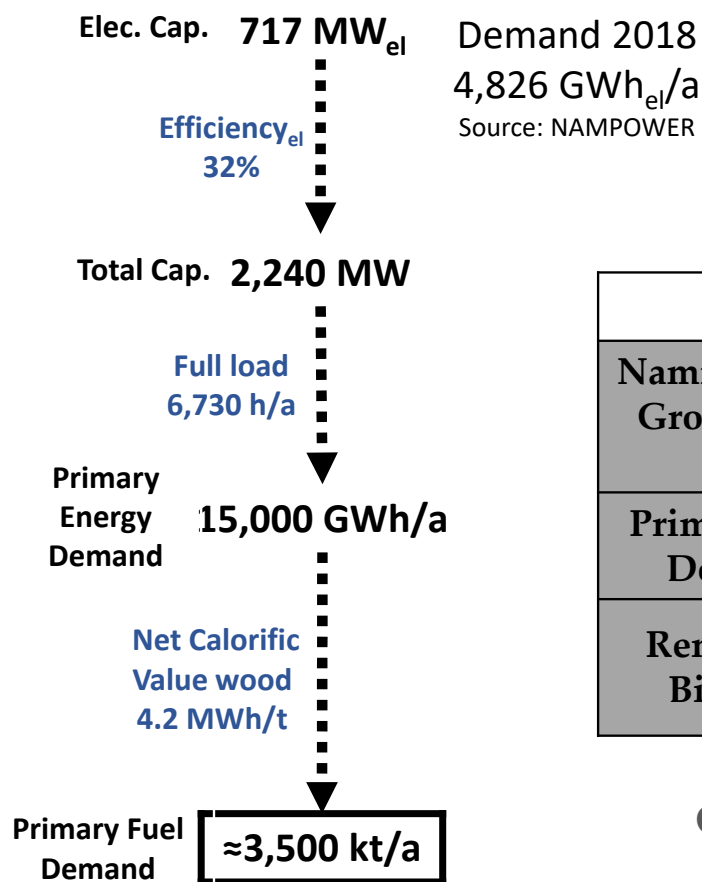


Electricity demand of Namibia

Electricity Portfolio Namibia

Energy Source (Plant)	Installed Capacity Namibia (MW _{el})	Operating Modus
Ruacana hydro-electric	347	Flexible - Depends on water level
Van eck coal-plant	80	Emergency Stand-by
Anixas Diesel	22	Emergency Stand-by
Solar + Wind (2019-2023)	110	Flexible
Highest Peak (2017)	717	100%
Local generation	193	27 %
	Import 73% 524MW	Local 27% 193MW

Example: 100% Elec. From Biomass



LCoE [USD_{cent}/kWh]

PV	3-6
Wind	3-8
Biomass	6-12

Fuel Demand VS Bush Stock

	2019	2029
Namibia Bush Growth rate 3 %	9,000 kt/a	12,000 kt/a
Primary Fuel Demand	- 3,500 kt/a	
Remaining Biomass	~ 5,500 kt/a	~ 8,500 kt/a
	61%	71%

Consequence: Export needed!

International Biomass Partnerships (IBPS)

Biomass Partnership

Long-term bilateral partnership agreement aiming at:

- I. transfer of innovative technology to improve efficiency,
- II. advanced energy production from renewable sources,
- III. reaching GHG emission reduction targets,
- IV. up-grading infrastructure
- V. land restoration & adaptation and biodiversity safeguarding

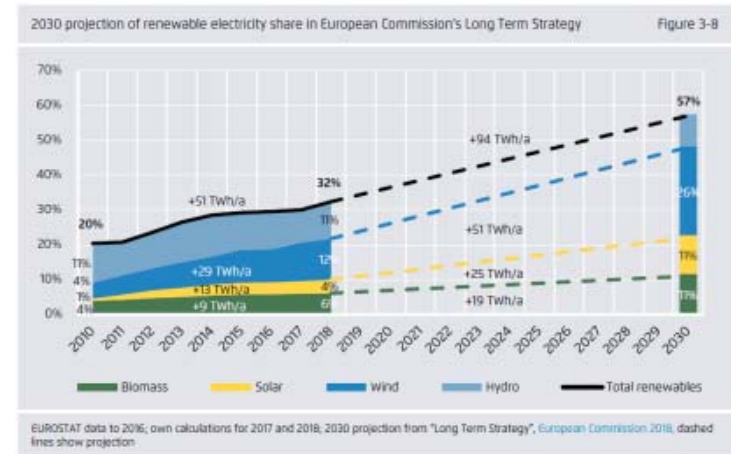
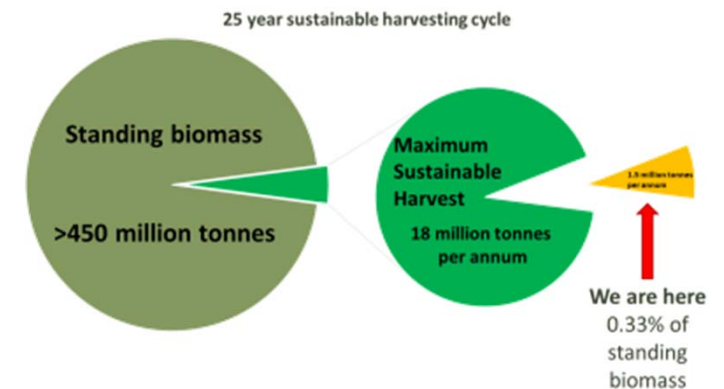
Objectives, Strategy and Benefits in Namibia

- I. Harvesting at least 9 Mio. t/a by 2024
- II. Stop encroachment by harvesting 18 Mio. t/a by 2030
- III. Development of Biomass Industrial Parks (BIPs) to leverage masses
- IV. Implement a job-creating bush-to-value industry

Objectives, Strategy and Benefits in Germany

- I. Supply Security for alternative fuels
- II. Pro-active development support for BIPs and technology transfer
- III. GHG mitigation and contribution to energy transition

Sustainability of Resource





Travelling University



Biomass Industry Park: Synergies



Harvested Material
250 000 t_{FM}/a



A: Manufacturing & Service Businesses

B: Residential Area

D: Academic and R&D Area

C: Energy, Water, and Waste Management.

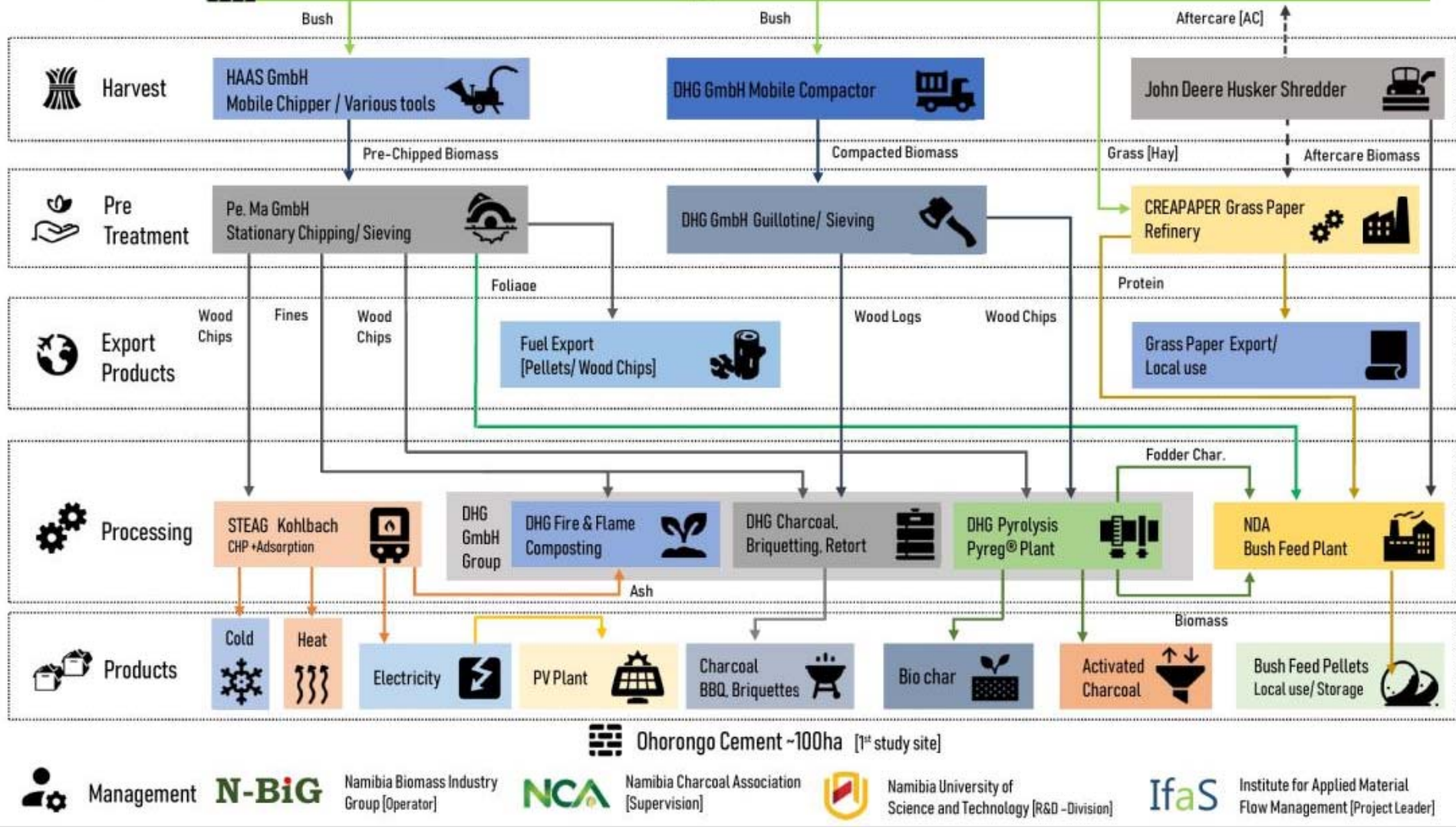
Biomass Industrial Park [BIP]



Primary Resources

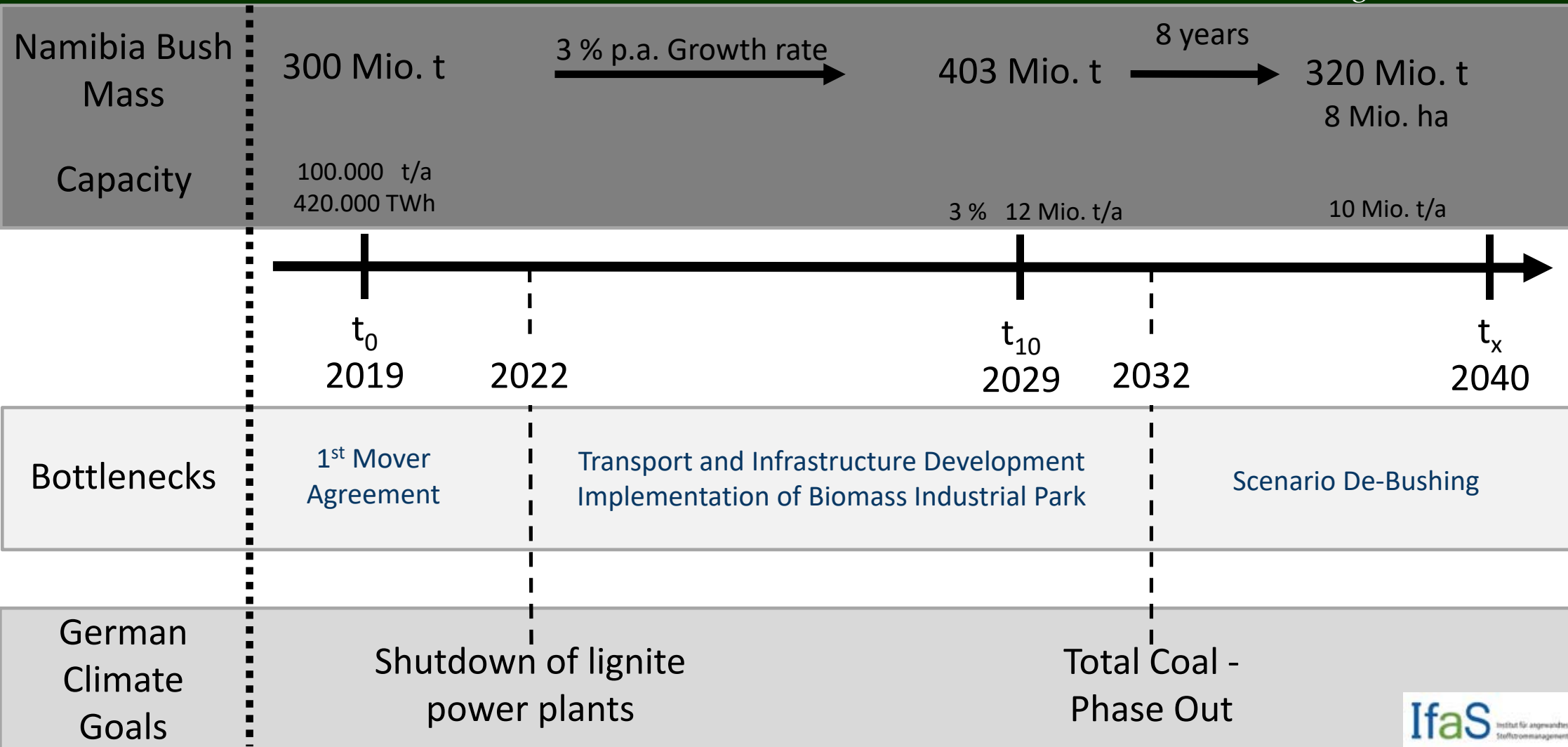


FARM[S] – Bush, Grass, AC Biomass



Namibia's Capacity vs. Germany's demand

Multiplication:
Outreach to Kuba,
Bostwana South Africa,
Angola, etc.



Petition – Way forward

What does Namibia need? What does the Biomass Industry strive for?

- a. Official **expression of interest** that the partners are ready to acknowledge biomass from Namibia as a potential resource. Comprising no concerns at the socio-ecological level. (*Catchwords: over-exploitation, over-felling, GHG balance, child labor, biodiversity, etc.*)
- b. Clear **commitment** that testifies the willingness to mutually work out (pro-actively think) solutions for large-scale biomass valorization (*from harvest via BIP to power plant*) with the overarching goal to guarantee supplies, lower unit costs and built-up a new biomass industry in Namibia strengthening local economy.
- c. Design of a **draft contract** to illustrate how a 10 year contract shall look like, incl. obligations and requirements. Goal is to generate a Bankable Off-take Agreement.

Thank you very much for your attention

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