



South African
BRICS Think Tank

Financing Renewable Energy in BRICS: A Comparison of South Africa, China and India

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University of Venda
Creating Future Leaders



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Background

- Renewable Energy Rollout in SA has been slow
- Considerable Market Uncertainty
- Difficulties securing an IPP License
- Smaller municipalities tended to avoid procurement entirely
- US\$12 Trillion made available as international Climate Finance, but access in developing/emerging world is difficult
- Notable Changes
 - Electricity Regulations Act amended – allows municipal procurement for < 100MW
 - Renewable Energy Generated Electricity is now cheaper than coal power
 - BRICS New Development Bank prioritising 'Clean Energy'
 - BRICS Launched the BRICS Energy Research Cooperation Platform



**GREEN
CLIMATE
FUND**

Previous Findings – Economic Development Opportunities

Promoting local industrialisation and manufacturing is key to create jobs

Special Economic Zones in SA mirror policy approach of China's High Tech Economic Development Zones

Opportunity to locate distributed Biomass Energy Generation facilities at the municipal level

Must promote Energy Storage – battery manufacturing

IPP Community Development has significant benefits

Reducing Investor Risk



Accurate data about
conditions



Expertise in construction
and manufacturing



Conducive Policy
Environment



Skilled workers

- Influence perceptions of investors and international finance sector



Barriers to Renewable Energy Financing



Limited long-term financing – investors interested in short term returns



Power Purchase Agreements results in low rates of return



Accessing Dollar Denominated Loans in the Developing & Emerging World



Rapid Technology Advancement



Finance sector's models are informed by outdated data



What is 'Green'?

Renewable Energy Financing Financiers and Instruments

Financiers

- International Climate Finance Providers
- Government
- Development Financing Institutions (DFIs)
- Commercial Banks
- Non-Bank Financial Institutions

Instruments

- Green Bonds
- Green Banks
- Subsidies
- Carbon Market Instruments

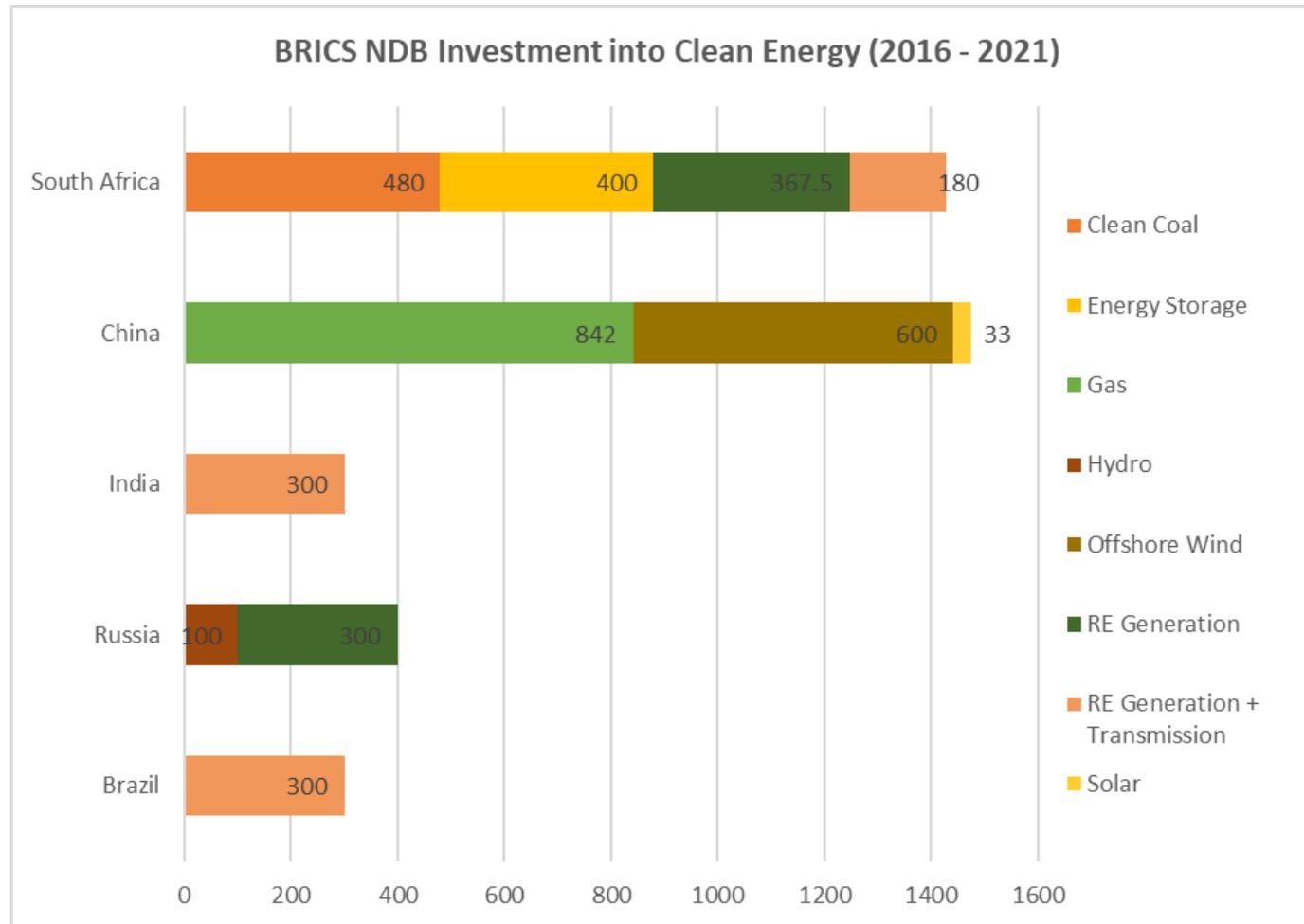


BRICS Policy Positions

- Principle of “Common but Differentiated Responsibilities and Respective Capabilities”
- Support for BRICS New Development Bank’s Clean Energy financing
- BRICS Interbank Cooperation Mechanism
- BRICS Energy Research Cooperation Platform



BRICS New Development Bank Financing



Approved 14 projects in 'Clean Energy' valued at US\$4 billion

China – US\$ 1.47 billion

South Africa – US\$ 1.43 billion

The South African Experience

- Need for a broad Climate Change Policy
- Must produce 2.8 GW of new power costing US\$ 2.4 billion annually to reach goal of 60.7GW by 2040
- However, IDC calculated ZAR 8.9 trillion to meet its NDC, annual investment of ZAR596 billion from 2015 to 2030
- RE IPP Procurement Programme – successful in building RE Generation Capacity with long term PPAs

REIPPPP BIDDING WINDOW	YEAR ANNOUNCED	POWER PROCURED
1	2011	1425MW
2	2012	1040MW
3	2013	1657MW
4	2015	2205MW
5	2021	2583MW
6	2022*	5200MW



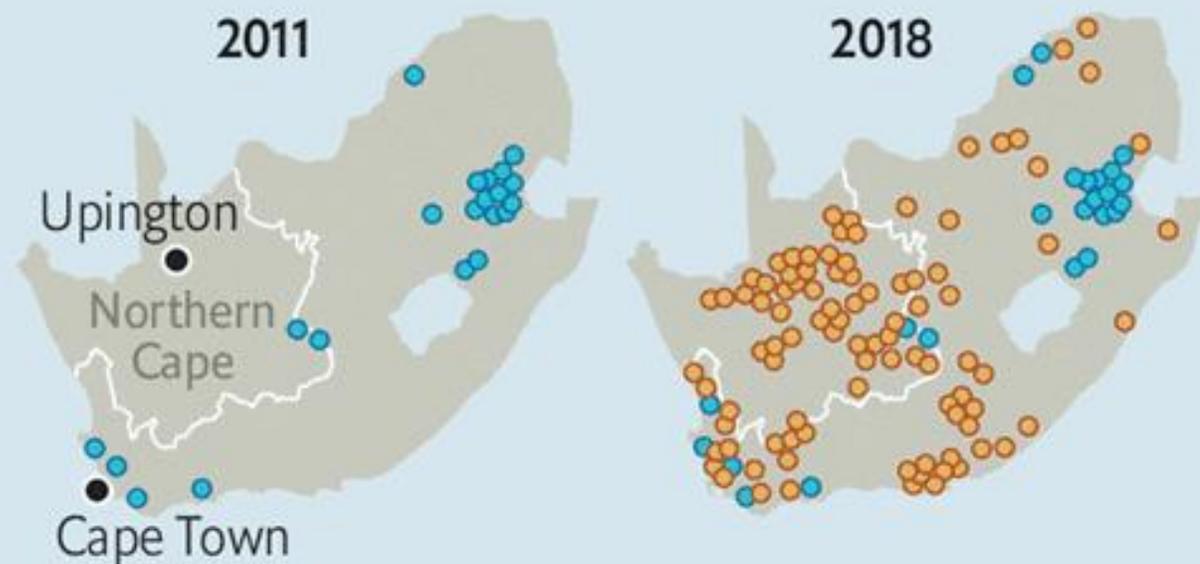
The South African Experience

- Policy Uncertainty amplifies investor risk perceptions
- Access to market depends on Transmission Infrastructure – need a Smart Grid with distribution of Substations in areas
- Need greater coordination between MDBs, DFIs and Commercial Banks
- Low skills base

Power to the people

South Africa, energy suppliers' power plants

● Eskom ● Independent power producer



Source: Power Futures Lab, UCT



Masala Bonds

Rupee Denominated Debt Instrument
Issue In Offshore Market To Investors
By Indian Companies

Settlement Happens In Dollars



The graphic features a background of power transmission towers and a city skyline. A green bar at the bottom contains the text 'Masala Bonds' in white, flanked by two white curved arrows pointing towards each other. Below this bar, the text 'Rupee Denominated Debt Instrument Issue In Offshore Market To Investors By Indian Companies' is on the left, and 'Settlement Happens In Dollars' is on the right. In the bottom right corner, there is a logo for ENERC with the tagline 'Your One Point of Contact'.

The Indian Experience

Challenges

- Size contributes to coordination challenges
- Attempted to promote local solar manufacturing by imposing tariffs on Chinese imports – costs transferred to Power Producers and Consumers – slowed growth
- Debt financing is more expensive – repayments are locked in with USD exchange rate volatility

Successes

- Green Masala Bonds
- Access more international climate finance than other developing countries.

The Chinese Experience

Challenges

- Struggles to secure International Climate Finance
- Smaller companies struggled to access Green Bonds

Successes

- Policy environment is stable and well coordinated
- Feed-in Tariff Guarantee / Subsidies promotes growth in young market
- Green Bond Market has boomed
- Green Panda Bonds
- Including incubators in Economic Development Zones built skills and expertise



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Creating the 14th Five Year Plan

2019

Research into the plan got underway

29 October

The proposals were approved at the Fifth Plenum

March 2021

The plan will be launched at the Two Sessions

March - October 2020

The Party drafted proposals for the plan

Nov 2020 - March 2021

The State Council is now drafting the plan

Post March 2021

Special sectoral and regional plans will follow

 中外对话
China Dialogue



Key Findings

- Promote policy certainty – like China
- Must expand grid infrastructure
- Improve data collection methods – invest in measurement infrastructure
- Subsidies for local manufacturers incentivises growth in a young market
- SA BBBEE policy is unique
- Own-currency Green Bonds promote international investment
- Need a definition of ‘Green’
- Non-Bank Financial Institutions specialise in ‘Green’ Finance with accurate financing models



Longyuan Mulilo De Aar Wind Farms

Dr Yul Derek Davids

Background

- 2 Wind Farms established in De Aar after 2 successful bids to the REIPPP
 - De Aar 1 – Produces 96.4MW – Runs 67 Turbines – REIPPP Bidding Window 1
 - De Aar 2 – Produces 140 MW– Runs 96 Turbines – REIPPP Bidding Window 3
- Opportunity arose from local electricity substation in De Aar
- First Chinese supported Wind Farm in Africa
- Acts as a model of China-Africa Energy cooperation





International Partnership with Longyuan Power China

- Guodian Group in China – 1 of 5 largest power producers in China – interested in African Market in 2009
- Guodian approached its subsidiary Longyuan China to investigate opportunities for Wind Energy
- Initially setup a partnership with Longyuan (51%), China-Africa Fund (16%) and Mulilo (33%)
 - After considering the 40% black ownership rule, the China-Africa Fund pulled out with a possible USD loan from the China Development Bank
- New Partnership Structure – 60% Longyuan, 20% Mulilo + 20% Consortium of Black Businesses
- Challenges
 - Configuring the Capital Contribution Shares
 - Understanding REIPPP BBBEE requirements
 - Figuring out Environmental impact Assessment Report
 - Language – De Aar Community didn't speak English
- Took 8 years from 2009 visit to get plant to operations state
- Longyuan praised in China for 1st successful development in Africa

Gaining Financial Support

- Initially planned to source a USD loan from China Development via China-Africa Fund
 - However, the 40% South African ownership clause made it difficult to source an international loan
 - USD to ZAR Volatility –loan repayments fluctuating was a major risk
- Opted to source a local ZAR-based loan from Nedbank and the Industrial Development Corporation
- Essential to install equipment on designated sites to measure wind strength to model Wind Farm profitability
- With withdrawal of China Africa Fund, Longyuan needed to build a consortium of local partners to co-invest in the project



Contribution to Socio-Economic Development

- Job Creation
 - 700 Construction Jobs
 - 100 Long term Operations and Maintenance Jobs
 - Provides internships to top-performing students from De Aar
- Longyuan provides training to local recruits
 - Subsidise studies of 40 university students
- Fund and Operate 4 ECD Centres
 - Support > 320 children
- Donates R1million to nursing homes annually
- Invested R28 million in social welfare
- Established the “Red line of Defence” Project providing R4 million in COVID protection equipment
- Operate a Medical Bus in the community providing COVID testing and other medical support

Longyuan funded students



Longyuan ECD Centre





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Case Studies of Renewable Energy Power Plants

Waainek Wind Farm

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Background

- The Waainek Wind Farm, located in Grahamstown, was built during Round 2 of the Renewable Energy Independent Power Producers' Procurement Program (REIPPPP) commissioned by the Department of Energy in 2012.
- The 24.6 MW Wind Farm comprising eight Vesta's turbines has been fully functional since January 2016.
- The facility is 60%-owned by InnoWind (an 80%-held subsidiary of EDF Energies Nouvelles, a French utility Group which specializes in renewable energy production), with the remaining 40%-owned by local partners, namely, the Industrial Development Corporation (IDC) and Makana Winds of Change.
- The energy produced by the Waainek Wind Farm is purchased by the grid operator under a 20-year Power Purchase Agreement and is estimated to supply over 16,000 South African homes.

Connected to the Makana Municipality

- This wind farm's most significant and unique attribute is that it is one of the few renewable energy projects in South Africa connected directly to a Municipal network.
- EDF Renewables (formerly InnoWind) and the Makana Municipality entered a Memorandum of Understanding to collaborate on the development of this Wind Farm.
- All the power generated by Waainek is wheeled through the Makana network to reach Eskom's Albany substation on the Eastern side of Makhanda.
- In Makana Municipality, Waainek Wind Farm acts as a capacitor bank, improving the municipal grid's power quality by reducing voltage fluctuations.
- It also mitigates the impact of load shedding on the municipality since there is an agreement with Eskom that when the wind farm generates above a certain threshold, the municipal grid connection to Eskom is maintained.

Waainek's Partnership with EDF Energies Nouvelles

- EDF Renewables is a subsidiary of the French Utility known as the EDF Group. It specializes in producing renewable energy by coordinating energy financing, construction, operations and maintenance activities.
- In 2011, in responding to the second REIPPPP bidding window, EDF Renewables partnered with InnoWind, a South African Company. The partnership bought 80% of the shares in the Waainek Wind Farm (Manzaratto, 2012).
- InnoWind initially acted as the local subsidiary of EDF New Energies. InnoWind was later reconfigured and renamed EDF Renewables [South Africa], further encapsulating the partnership with EDF.
- The new entity was entirely responsible for the generation, financing, owning and operating of the Waainek generation facility.
- Despite the strong partnership with 'EDF-Renouvelable' in France, EDF Renewables [South Africa] acts as a fully functional South African business entity.
- As of 2021, EDF Renewables operates four wind farms in South Africa, including Waainek. It expands its foothold in the county by participating in the various iterations of the REIPPPP, with its latest addition coming in the REIPPPP bidding window 5.

Socio-Economic Development

- In South Africa, it is estimated that wind energy produced a net savings of ZAR 1.8 billion in the first half of 2015 and was also cash-positive for Eskom by ZAR 300 million (Council for Scientific and Industrial Research (CSIR), 2015).
- Under the Grassroots Youth Development (GYD) Programme, the Waainek Wind Farm contributes up to 2.1 % of its revenue towards Socio-Economic and Enterprise Development initiatives located within a 50 km radius of the wind facility (EDF Renewables, n.d.-b).
- The development of such projects substantially impacts community development, including employment creation and skills advancement.
- EDF Renewables also redirects a portion of available revenue to funding qualifying small businesses in the vicinity of the power plant.
- The businesses are found in the renewable energy technical maintenance, wholesale & retail, security, textiles & manufacturing, professional services, vegetation management, agriculture and arts & crafts industries.
- Concerning skills development, EDF's outsourced operations company Vestas has established the Vestas Technician Pipeline training model, which takes South African trainees through a formalized training programme to become specialized turbine engineers.

Financing via EDF Renewables

- The Waainek Wind Farm is owned and financed by EDF Energies Nouvelles. The French parent company is responsible for raising the financing needed by its South African subsidiary.
- One of the innovative methods that EDF Energies Nouvelles has introduced is crowd-funding. EDF has developed an online platform to raise additional funding through crowd-funding. Through crowd-funding, EDF can co-finance the various projects it manages.
- However, to finance its larger projects, EDF Energies Nouvelles has entered into loan contracts with the European Investment Bank (EIB).
- For example, in 2009, EDF received EUR 500 million from the EIB to finance solar energy projects in France and Italy (LaTribune.Fr, 2009). Such reports perhaps highlight the comparative ease that European companies may have in accessing international climate finance compared to those in the developing and emerging world.

REIPPP Programme Implementation concerns at Waainek

- In conclusion, and from the EDF Energies Nouvelles perspective, while they are interested in promoting renewable energy expansion in South Africa, they have concerns related to the REIPPPP.
- The importance of long-term power purchase agreements is overemphasized by the investor, including the high risks, low returns on investment and the sustained benefits from long-term price security.
- Other concerns are negotiated price included in the contract for the sale of electricity, their obligations when following local regulations and potential changes to regulations that may affect the nature of the contract.
- Policy changes which are likely due to political conflicts which emerge during presidential elections are also highlighted.
- The central point of contention on the price issue relates to the agreement's underlying currency and the local currency's weakness.



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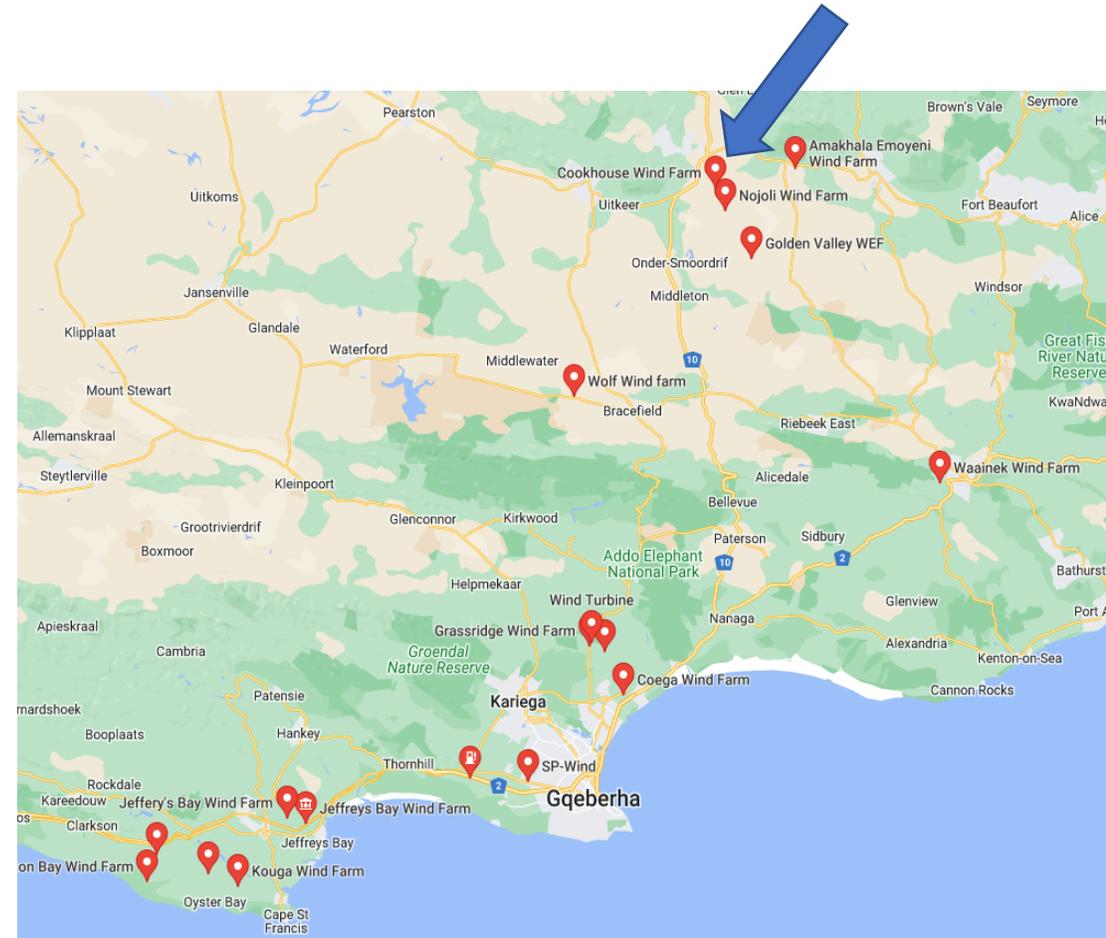
COOKHOUSE WINDFARM REIPPP CASE STUDY

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26 March 2022



BACKGROUND

- The Cookhouse Windfarm is situated approximately 166km from Gqeberha (Port Elizabeth), also known as the Windy City.
- The Cookhouse project was developed by African Clean Energy Developments (ACED), an African Infrastructure Investment Managers (AIIM) group company.
- Drove the establishment of the Cookhouse Community Trust aimed at strengthening host community ownership and sustainable socio-economic development.
- Cookhouse Windfarm was selected as the preferred bidder in the first round of the Renewable Energy Independent Power Producer Procurement Programme (REIPPP), in 2011.
- In its first round, the REIPPPP aimed to add 1,400MW of renewable energy to South Africa's energy mix.
- The Wind Farm was awarded a 20-year power purchase agreement with Eskom in 2011, as the first wind farm connecting to the national grid.



Wind farms in the Eastern Cape Province

INTERNATIONAL PARTNERSHIP WITH SUZLON ENERGY

- Suzlon Energy is the largest service provider, in India, of renewable energy with an extensive global footprint (6 continents, 17 countries) known for its innovation and competitive advantage in the renewable wind energy solutions.
- A joint venture between AIIM (Old Mutual), Macquarie (Australia) and African Power Corporation (AFPOC) enabled the supply of 76 Suzlon S88 2MW series turbines. With the option for ACED to secure a further 124 turbines.
- Suzlon Energy and African Clean Energy Developments (ACED) were one of 28 independent power producers (IPPs) contracted by the South African government in 2012.
- Suzlon's experienced technicians facilitated accelerated construction rollout program. With the first consignment of 16 turbines in 2012, followed by 66 turbines in 2013.
- By March 2014, the construction phase was completed and supplied its first electricity to the grid, contributing approximately 341,000 MWh per annum.



Cookhouse Windfarm



PRELIMINARY OBSERVATIONS

Cookhouse Windfarm (2014 - 2022)

ENERGY AND ENVIRONMENTAL IMPACTS:



Pastoral farming has continued on the 2600 hectares as before



Avoids 384,000 tons of carbon emission



Power 94,300 low income or 43,000 middle income households

EARLY CHILDHOOD DEVELOPMENT (ECD)



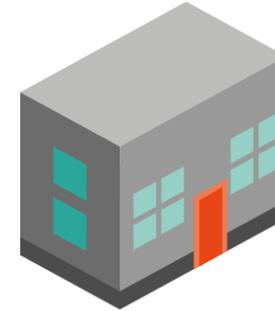
Reaches 2 200 children (0-6 years)



Trained 126 ECD practitioners and principals



700 parents across four beneficiary towns send their children to the 26 ECD Centres



26 ECD Centres have been established in the four beneficiary towns



Mobile clinic bringing healthcare to 46 farms (2235 patients since 2018)



Funds equipment, building, furniture, nutrition



Supports educator salaries, computer labs and equipment

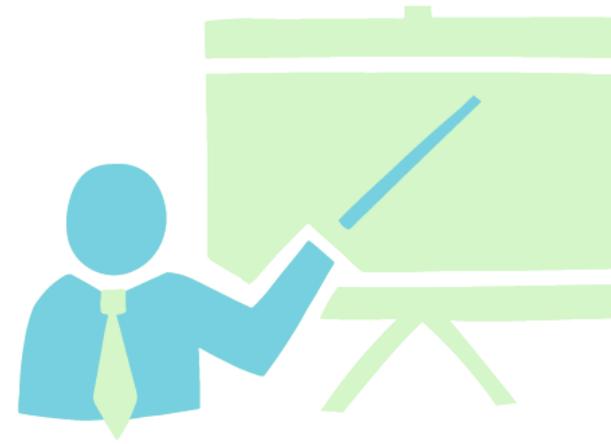


154 mentor moms graduated, linking parents to education

CAPACITY DEVELOPMENT: THE WIND TURBINE TECHNICIAN & JOINT YOUTH DEVELOPMENT PROGRAMMES (2014 - 2022)



Developed local technical capacity (7 Wind turbine technicians and 3 mechatronics students)



Learning approach is work integrated learning (Wil) (theoretical knowledge and practical skills developed)

REFLECTIONS

- In its 7 years, Cookhouse's and partners have surpassed expectations across many indicators:
 - Community-shareholding targeted at 8% - Cookhouse currently stands at 25% shareholding
 - Reduced carbon footprint- (384 000 tons)
 - Green electricity for urban and rural households is likely to contribute to improved quality of life (access to telecommunications, lighting, refrigeration)
 - Substantial investments in early childhood, basic and secondary education
 - Demonstrated contribution to national priorities: Skilled workforce and youth employment.
- Leveraging international investment and expertise
- Private sector investment projects can work if there are clear frameworks, governance structures and ongoing monitoring and evaluation

*Need for external evaluation to confirm findings.



Thank you

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