



RENEWABLE ENERGY-BASED MINI-GRIDS

THE UNIDO EXPERIENCE

4th IEF-OFID Symposium on Energy Poverty | 2-3 May 2019 |
Cape Town

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Department of Energy





UNIDO in Brief

UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability.



ISID INCLUSIVE AND
SUSTAINABLE
INDUSTRIAL
DEVELOPMENT

UNIDO's Energy Programme:

Providing Integrated Energy Solutions for ISID



Industrial Energy Efficiency

- Energy Management Standards and systems optimization
- Sub-sector, process and product specific



Renewable Energy

- Off-Grid, Mini-grids and On-Grid
- RE Applications in SMEs



Low Carbon Emission Technologies

- Multifocal and Integrated Projects
- Global Cleantech Innovation Programme
- Sustainable Cities

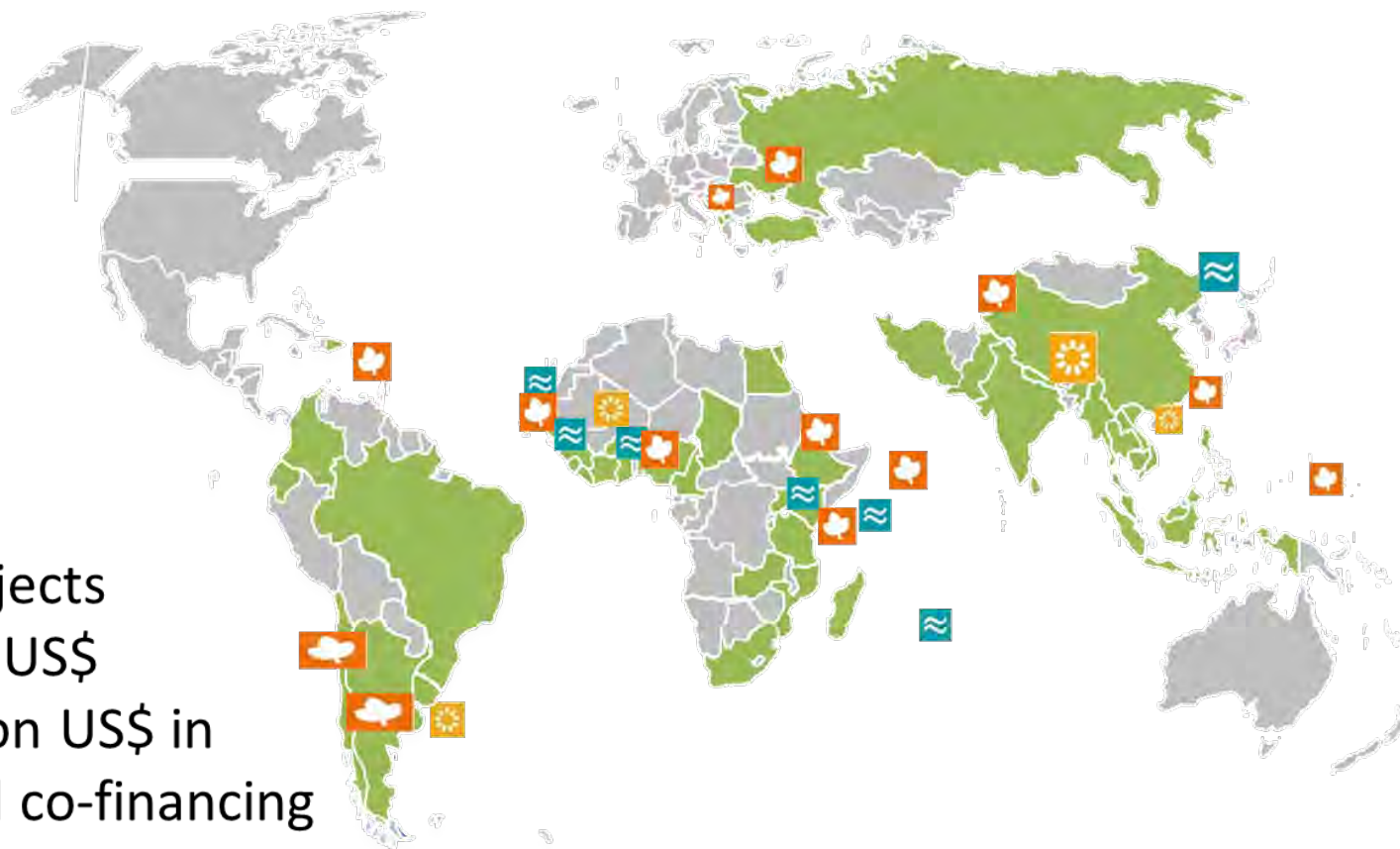


Global Forums and Partnerships

- CTCN & PFAN
- Regional Centres for RE and EE
- Vienna Energy Forum
- SE4ALL and UN Energy

UNIDO's Energy Project Portfolio (Jan 2019)

- **120** projects
- **280 mil US\$**
- 1.6 billion US\$ in planned co-financing
- **60** countries





UNIDO Mini-Grid Programme – Grounding Pillars

- Providing energy access in rural areas
- Use of locally available renewable energy sources improving the local economy, environment and public health
- **Promotion of renewable energy technologies as a means of fueling value addition to local products in rural areas**
- Development of mini-grids using local resources, labour and manufacturing
- Increasing community participation and addressing local needs
- Fostering private sector involvement and technology innovation



UNIDO Experience

China

* Under Sustainable City Development

Country Project Period

- Technology
- Actual size of installed mini-grids (w/ Total Installed Capacity)
- Ownership
- Key UNIDO's function

Cambodia

2012-

- Solar based
- 2 sites / 250 kW
- Community & Private Sector
- TC

India

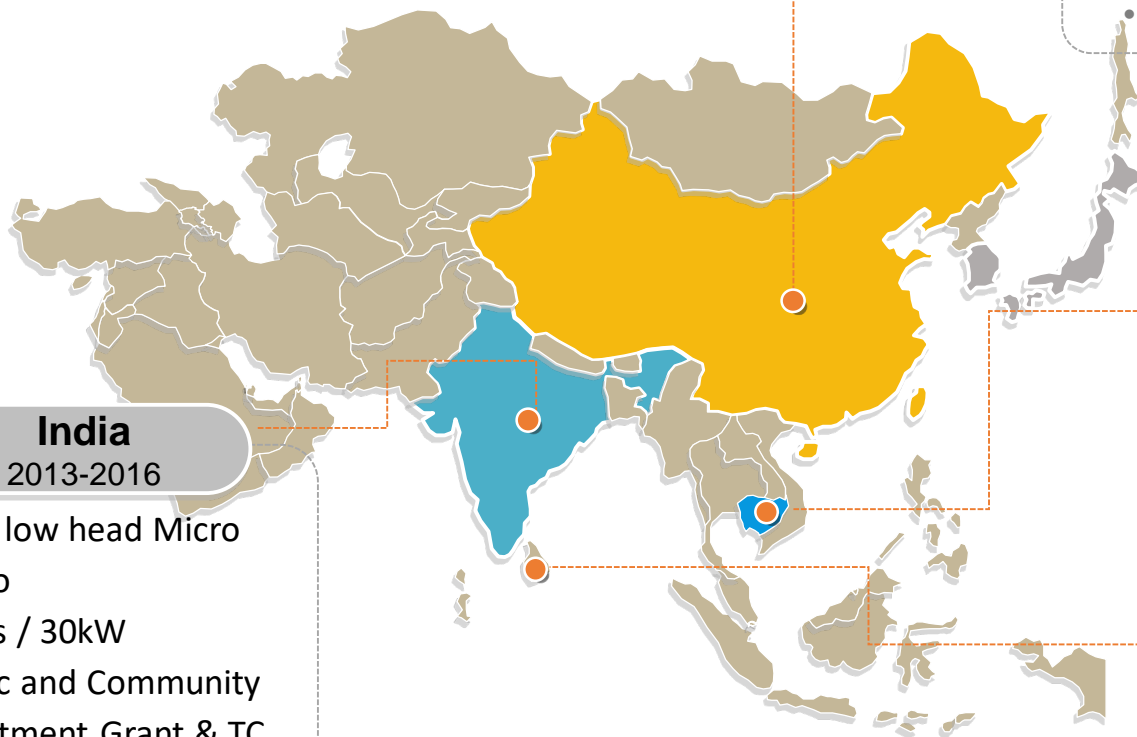
2013-2016

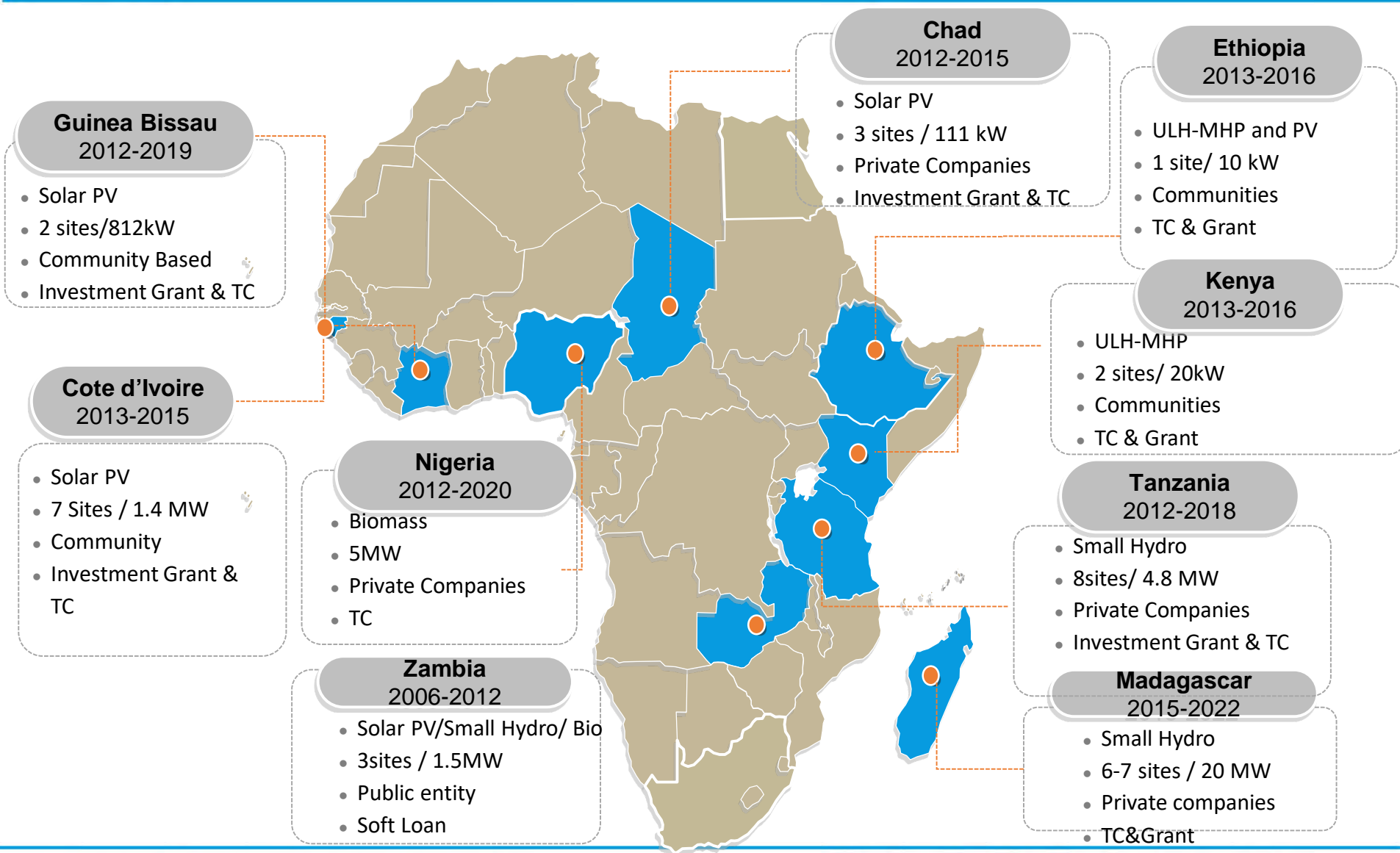
- Ultra low head Micro Hydro
- 3sites / 30kW
- Public and Community
- Investment Grant & TC

Sri Lanka

2005-2014

- Small Hydro/ Biomass
- 1 site
- Community
- Investment Grant & TC







Observed Mini-Grid Benefits:

- Affordability (technology and vs diesel generators etc)
- Energy access and efficient consumption (smart metering, user-friendly model)
- Development of institutional capacity and regulatory tools for local authorities
- Enhanced income through productive use such as agro-processing and small service businesses
- Empowered local community members through additional competences and skills in operating and maintaining the ULH-MHP plant
- Improved health through access to energy generated by ULH-MHP (i.e. decreased indoor air pollution, cold storage of medicine)



Observed Challenges:

- Technology choices and technical capacity (adapt to local context)
- Policy & Regulatory framework
- Financing and risk management (economy of scale, investment climate, long payback times, low returns and limited availability)
- Maintenance and remote monitoring
- Demand management strategies such as smart metering and awareness of energy consumption to stabilize network
- Resource availability (in case of biomass) through a close relationship with supplier (benefitting from electricity)

Observed Factors for Sustainable Impact:

- Business models and Community participation (local capacity to manage and maintain mini-grids, manage tariff setting and collection, solve technical problems)
- Capacity of national regulator/utility/renewable energy agency to support and promote such projects
- Private sector incentives through regulatory/financing framework and transfer of technical knowledge to design and conceive future projects
- Transformative impacts by linking renewable energy with productive uses, value chain and jobs creation for local community.
- Financing for upscaling/technology innovation

Stand-Alone - A Deeper Look: Women and Youth Entrepreneurship Fund under the Gambia Renewable Energy Fund

Objective of Project: To blend Solar Power with direct economic activities ranging from Horticulture to Solar powered refrigeration for Video Shops through linking energy to business micro-finance.



A Deeper Look: Women and Youth Entrepreneurship Fund to be administered under the Gambia Renewable Energy Fund

Pilot Type	Grant Funding	Total Installed PV (W)
Horticulture	Solar water pumping	750
Women's Garden	Solar water pumping	2000
Banana Papaya mini plantation	Solar water pumping	750
Gardening	Solar water pumping	1000
Video Club / Ice vending	Solar powered refrigeration	1620
Women's Garden	Solar water pumping	1000
Biomass Briquettes	Hydraulic biomass press	0
Poultry	PV refrigeration and lighting	450
Poultry	Solar water pumping & lighting	1000

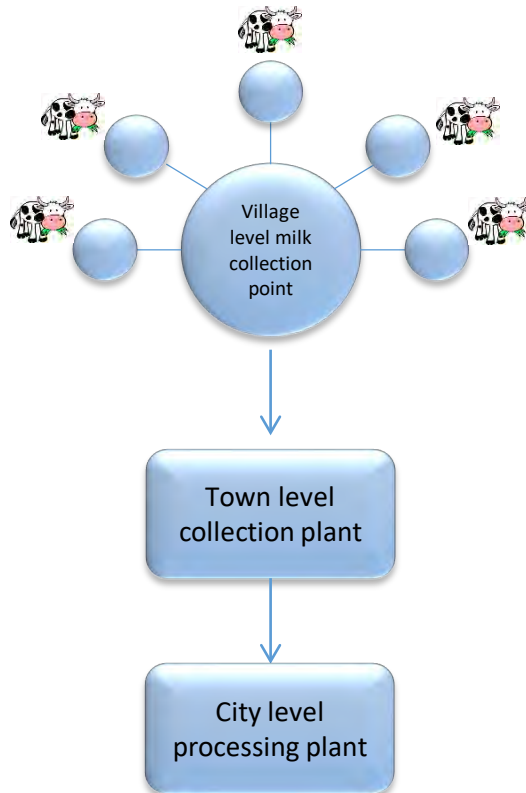


Large–Scale RE Deployment: Dairy Hub and Academy Development (DHAD) - Bangladesh

- **Objectives of DHAD:** To introduce international best practices and knowledge in efficient dairy farming to poor, small scale dairy farmers in Bangladesh as well as establishing a milk collection system allowing collection and preservation of growing volumes of high quality raw milk.
 - Increase milk production from the present 1.75 billion litres per year to exceed 3.5 billion litres by 2025 by increasing cow yields, (not the number of cows) thereby replacing milk powder imports in Bangladesh with locally produced milk;
 - Establish a milk collection system allowing for the collection and preservation of growing volumes of high-quality raw milk utilizing Solar Power.
 - Create value for farmers and suppliers across the entire milk production/dairy sector value chain;
 - Train farmers and experts on local small holder milk production climate change resilience.

DHAB Results to date:

Milk Collection Hub



- Average milk production per cow has increased by 36.61%;
- 34.72% reduction of microbiological contamination;
- Monthly incomes have grown by an average of 33.06%;
- Milk production has become the main source of income for an additional 300 farmers
- Project has directly impacted more than 500 women (a figure that is still expected to grow) through among others, employment opportunities.
- Milk collection hub electrified with solar power – establishing a cold chain network.
- National programme replication with ITC Loan of US\$ 150 Million. ITC loans will pass to the main dairy companies directly.

Global Impact Programme - Clean Energy Systems in Developing Countries & Economies in Transition

UNIDO'S 3 TIER APPROACH



DEVELOPMENT GOALS AND IMPACT

Main expected outcomes and deliverables:

- Improved technical capacity for clean energy systems;
- Strengthened policy and regulatory environment;
- Facilitation of regional dialogues about the uptake of clean energy systems;
- Promotion and development of smart mini-grids and renewable energy sources in underdeveloped rural areas;
- Promotion and development of sustainable urban infrastructure systems.



Global Impact Programme - Clean Energy Systems in Developing Countries & Economies in Transition

- Duration: 5years
- Budget: US\$ 40 million (2020-21)
- Counterpart agency and implementing partners: Energy Regulators, Renewable Energy Agencies, Government and Municipal Authorities, Private Sector, Financial Institutions, Development Institutions
- Target High Impact Countries: Small Island Developing States and Least Developed Countries
- Beneficiaries: Local industries and SMEs



UNIDO - Alliance for Rural Electrification (ARE)

Initiative Description - Policy dialogue events in Africa, with a view to foster political and business dialogue on decentralised renewables for energy access

- January 2019 – UNIDO & ARE sign MoU
- **Overall Objective:** To contribute to the global efforts to up-scale private sector and innovation capacities in Africa to make SDG-7 and particularly universal access to energy services a reality by 2030.
- Proposed policy dialogues to be **interlinked with international initiatives** to boost clean energy access, such as: SEforALL (esp. Electrification Accelerator and Mini-Grid Partnership); EU-Africa high-level platform on sustainable energy investments in Africa; and Africa-EU Energy Partnership (AEEP)

UNIDO - Alliance for Rural Electrification (ARE)

The objectives of the events are three-fold:

- Deepen development cooperation to provide public sector stakeholders with first-hand insights of operations on the ground of the renewable energy transition;
 - Contribute to the creation of more favorable business conditions to present key ideas and recommendations for the public sector from start-ups, SMEs and other off-grid practitioners working on the ground in order to leverage and mobilise more business and finance engagements.
 - Aid in the uptake of renewable energy business opportunities and technology markets to increase sub-regional cooperation, policies and standards (e.g. quality infrastructure).
- ❖ Develop a **Regulatory Toolkit**, which acknowledges the priorities of both sides and proposes solutions to policymakers on how these diverging interests may be overcome.

GEF/UNIDO CLEANTECH SMEs Accelerator Programme

- Global clean tech industry > 6.4 trillion US\$ over the next decade
- Over 1,7 trillion US\$ accessible to SMEs and start-ups in developing countries.
- SMEs are key engines of growth in the cleantech sector in the developed world but the size of the opportunity for SMEs is not well understood in developing countries
- Cleantech SMEs and start-ups contribute to green growth, creation of new revenue streams, innovation and job creation
- SMEs and start-ups bring new products, technologies and business models opportunities arising from re-design of systems



Renewables



Water



Waste



Climate smart
agriculture



Energy efficiency



Improved building
design

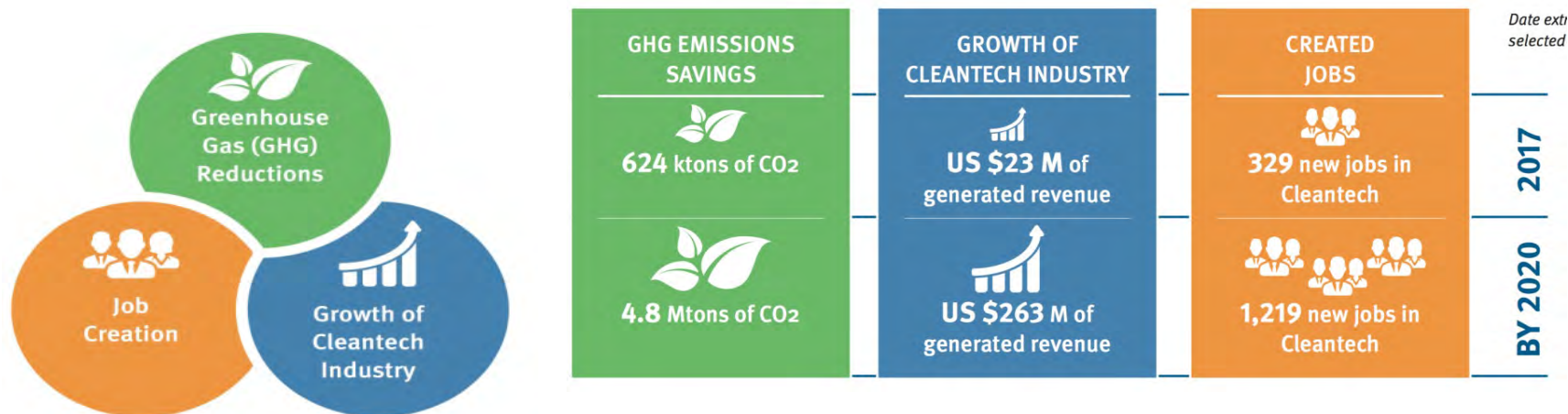


Transport

GCIP Impact

>865 start-ups/SMEs accelerated/4years/8 countries

Data from 14 randomly selected GCIP supported startups



GCIP SME Examples



VEHS (Vehicle Energy Harvesting Systems)

Gauteng, South Africa
GCIP-SA 2017 Finalist

Harvesting energy from traffic

30kW pilot under development at Tshwane
Metro



tarla.io

Istanbul, Turkey

GCIP-Turkey 2016 Finalist

Agricultural business intelligence for small farmers

Online service available free for small farmers with
commissions on transactions
100,000 farmers in Turkey have used the platform



Kodeco

Izmir, Turkey

GCIP-Turkey 2015 Finalist

Solar-powered electric vehicles



THANK YOU!

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