## GLOBAL CHANGE GRAND CHALLENGE ENVIRONMENTAL INNOVATION







## **Presentation Outline**

- Water RDI Roadmap
- Waste RDI Roadmap
- NDE-RSA
- Climate Change and the Green Economy



## **Environmental Services and Technologies**

- Strategic Objective
  - To identify, grow and sustain a portfolio of high-potential science, technology and innovation capabilities for sustainable development and the greening of society and the economy
- ILO identified Water and Waste sectors as the quick wins in developing green jobs
- IDC / DBSA Green Jobs report identified Natural Resource Management as having the most potential for green jobs





## South Africa's Water Research, Development, and Innovation (RDI) Roadmap: 2015-2025

Water Research Commission

Department of Science and Technology

Department of Water and Sanitation

WRC Report No. 2305/1/15 ISBN 978-1-4312-0683-4

July 2015









DD: ET D: EST appointed appointed (Sept) MoU with WRC signed DD: ES appointed (Oct) Implementation at Invited to WRC present to DWS **Water PMU** PPC proposal approved Sector engagements to **DWS integrate Roadmap** Jointly funded by develop Water into response plan for **DST and WRC NWRS2** RDI Roadmap Discussion with **WRC integrate Roadmap** Completed joint sector on into corporate strategy WADER project on Gaps establishment established in **Water RDI** Analysis of innovation partnership with Roadmap instrument WRC approved Agreed to develop an MoU **Engaged Private and Absorbed ACQUEAU** Discussion with **Public sector** programme WRC on partnership Established EST Sept 2011 2012 2013 2014 2015 Water RDI Roadmap

## Strategically directing water RDI in support of impact

**Problem** Means How **Opportunities Opportunities: Better coordination** and improved **Problem Human Capital** Use of sources Increase ability to make use of more sources of decision making Statement: **Development** water, including alternatives. supported by the (HCD) translation of 98% of all research into water (Skills) Improve governance, planning and management of Govern, plan & practise resources supply and delivery. manage already allocated Supply Improve adequacy of performance of supply More products and Non-revenue infrastructure infrastructure. services to reach Research and water is 36% the market through **Development** on average a better coordinated **Operational** Run water as a financially sustainable business by (R&D) ~R7 billion / water innovation performance improving operational performance. yr (Evidence) pipeline By 2030 Govern, plan & Improve governance, planning and management of demand will manage demand and use. outstrip **National savings** through targeted supply by Innovation Reduce losses and increase efficiency of **Efficiency RDI** investments 17% (technological productive use. (e.g. By reducing and nonwater losses to 15%. technological) Improve performance of pricing, monitoring, through innovation **Monitoring and** metering, billing and collection. (Technology) interventions, an collection approximate R3.5 bil would become available for investment in other needs/areas)



## Example: Cluster on Sources (Increase ability to make use of more sources of water, including alternatives)

	Immediate 2015	Short Term 2016-2018	Medium Term 2019-2021	Long term 2022 – 2024
Focus	<b>Explore:</b> Develop RP – defined research streams, objectives, plan. Aligned with NWRS2 and desalination strategy	Research Programme	<b>Centre of Excellence</b> for technologies associated with water recycling	Two Professional Service Centres
Objective	Scope the whole opportunity with customers and stakeholders  Customers: Users  Mix and target mix over time – sources that are not waste	<ul> <li>Target particular sources that have higher potential</li> <li>Accelerate process of making operational impact</li> <li>Change the mix towards the ideal</li> </ul>		<ul> <li>Provide effective technical assistance for regional water boards, WSAs and WSPs in decision-making about water sources and resource planning, technology selection, etc.</li> <li>Support strategic supply-side decision-making (link to Supply GPM)</li> </ul>
Need	Quantify Need     From the Reconciliation Strategy, frame requirement to identify and make use of alternative supplies for agriculture and public supply: management, technology     Define objective and requirement to increase use of treated effluent: management, technology     Define objective and requirement to increase and sustain levels of rainwater harvesting and efficiency of conservation methods.	<ul> <li>Need</li> <li>Produce up to date maps of rainfall and allocations - 2016</li> <li>Develop Opportunities Map for each alternative source – precipitation, ground, waste and link to Planning and Management in Supply GPM</li> <li>Assess industrial ecology of (7) industrial urban centres</li> </ul>	<ul> <li>Need</li> <li>▶ Continue monitoring for emerging pollutants and changes in sources of supply</li> </ul>	Professional Service Centre provides technical assistance to municipalities (specifications, technical and professional advice, support with tender evaluation)



## Water RDI Roadmap: Partnership

- Department of Water and Sanitation
  - Integrated into Ch14 of the NWRS2 (RDI Chapter)
  - Invited to the Water Sector Leadership Group presented the Water RDI Roadmap
- Department of Environmental Affairs
  - Ntabelanga Catchment Ecological Infrastructure
  - Joint planning on coordinating the Environmental Services area of research in South Africa DEA NRM Chief Directorate
- Water Research Commission
  - Integrated Water RDI Roadmap into Corporate Strategy
  - Partnered on the WRC RDI Symposium Water Tech Summit
  - Partnered on piloting WADER
- SALGA
  - Technology Accelerator Programme WADER
- Randwater
  - Currently drafting a 3-way MoU between Randwater, WRC and DST
- EUREKA ACQUEAU (EU Platform)
  - WRC has partnered with the DST to manage the South African contribution to projects that win the EUREKA label
  - 3 projects approved 1 co-funded with Europe
  - All projects concern AMD treatment



## **Human Capital Development**

- Human Capital Development (Masters, Doctoral)
  - Water RDI Students

Total students	Male		Black (broad definition)	White
14	5	9	7	7



Established Biomicry Platform with Biomimicry SA in March 2015



Projected to grow to 35 students in 2016/17







## Looking ahead 2016/17

- Establishment of the Water RDI PMU at the WRC
  - WRC will put in place the Water RDI PMU Manager
  - Develop a Water NSI partnership and tracking system
  - Prepare a joint MTEF bid to National Treasury with DWS
  - Set up collaborative RDI partnership with Australia
  - Develop a Consolidated Partnership and Co-funding Strategy



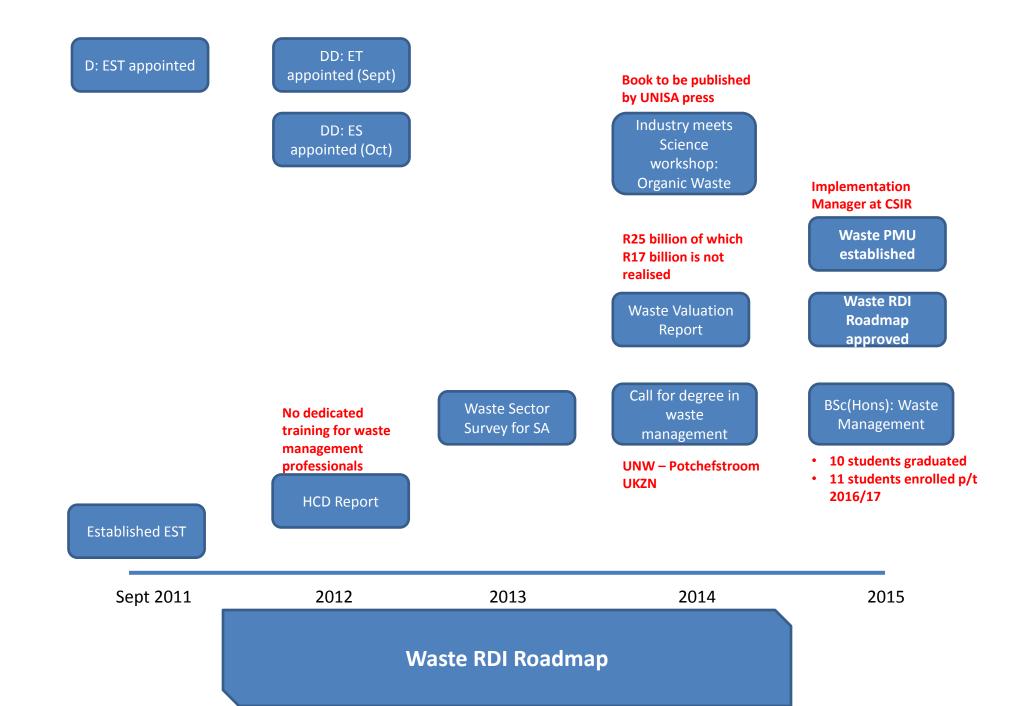














## The Need

- The correct management of waste and the diversion of waste away from landfill
  - Create opportunities to move secondary resources into a local secondary resources economy
  - And in so doing, create environmental, social and economic opportunities for South Africa
- In this lies significant opportunity and need for research, development and innovation (RDI) to –
  - Unlock new solutions for utilising "waste"
  - Inform policy development and implementation
  - Inform technology uptake
  - Inform decision-making through sound evidence







## The Need



- South Africa has embraced the principles of the waste hierarchy in policy and legislation
- But, it has been slow to transition up the waste hierarchy
  - South Africa landfills ~90% of all waste generated (2011)
  - A minimum of R17 billion worth of resources lost to the SA economy and a downstream manufacturing sector every year through disposal to landfill (2012)





## The approach

- The Waste RDI Roadmap is implemented in line with the DST's mandate "to use science and technology to improve the country's economy, create employment and improve the quality of life of all citizens" [Minister, 2014], and
- Is underpinned by the three pillars aligned with the mandate









## The approach







- Developing the Roadmap together with the waste and recycling sector through –
  - Regional stakeholder workshops to priortise the waste streams and goals
  - Industry expert working groups for each of the 5 priority waste streams
  - Academic expert working groups for each of the 6 clusters of the Roadmap







## Waste RDI Roadmap for South Africa

#### Problem Means Opportunities How Opportunities: Problem Strengthen skills and generate evidence to inform decision-Strategic making, planning and policy development by government and Statement: **Planning** Preventing waste industry 90% of South creates **Human Capital** Africa's waste opportunities for Development industry to increase goes to landfill (HCD) Strengthen skills in methods, tools, models and techniques and Modelling value-addition apply these to generate evidence to inform the Resulting in loss (Skills) and Analytics and management of waste of resources competitiveness to the economy Diverting waste Resulting in Develop, evaluate, demonstrate, localise and deploy from landfill creates Technology social (human technologies to support municipalities and industry in opportunities for Solutions Research and health) and diverting waste away from landfill towards value-add new direct and Development environmental indirect iobs and (R&D) impacts enterprises Waste (Evidence) Strengthen skills and generate evidence to optimise Municipalities Improved Logistics decision-making around the movement of waste across the face challenges management of Performance country (logistics, assets, resources) in delivering waste reduces services and risks to human diverting waste health and Innovation from landfill Waste and Strengthen skills, generate evidence, deploy technologies environment (technological Environment to reduce the impacts of waste on receiving environments Alternative and nonwaste treatment technological) typically more (Technology) Deepen understanding of the socio-economic expensive than Waste and opportunities provided by waste, but also the threats that landfilling Society





waste poses to human health



## Implementing the Waste Roadmap









- The Waste RDI Roadmap was approved by DST Executive in November 2014
- The CSIR was appointed by the DST to implement the Waste RDI Roadmap from April 2015
- To drive human capital development (HCD), research and development (R&D) and innovation
  - In partnership with Government, Industry and Academia, and
  - Actively engage opportunities (local and international) for waste RDI collaboration and co-investment







## Process: Priority RDI focus areas

#### **RDI Clusters defined**







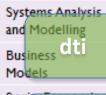








Governance





Analytics

Impact Assessment Process Performance Optimisation

Technology Development

Technology Evaluation and Dem Dem Etion

Technology Localisation Strategic Network Design DOT

Planning and Management Systems

CoGTA
Operational
Logistics
Processes

Aquatic
DEA
Land

Atmosphere

Climate Change

Jobs and Labour

Business Practices

Behaviour

Awar COCTA Communication

Human Health

#### Build a basis ar strategic

for the purposes of evidence-based decisionmaking to inform strategy formulation, planning and its execution and management frameworks for the analysis, monitoring and evaluation of technical, economic, social and environmental opportunities and impacts associated with secondary resources deployment of technologies – both local and inbound – for customer-driven performance improvement of logistics objectives, assets and resources

**Industry** 

environmental impacts of waste and its management, in order to inform better targeted and more effective responses to increase the success of influencing perception and practice positively

ng of







Human Capital Development (**HCD**)

Providing a pipeline of skilled post-graduates into the waste and secondary resources sector with the skills to drive alternative waste treatment and to unlock opportunities

Increasing the supervisory capacity to mentor postgraduate (Honours, Masters, Doctoral and Post-Doc students)

- Post-graduate degrees in waste management
  - BSc Honours (Environmental Sciences with specialisation in Waste Management) (NWU)
    - First class of 10 students completed (2015)
  - MSc Eng (Waste Management) (new degree) (UKZN)
    - Approved by University in 2015 and submitted to CHE for approval
    - Planned offering from 2017
- Post-graduate scholarships in waste management
  - Call for Open and Targeted Scholarships in 2015
  - Partnering with Plastics|SA on the targeted call







Human Capital Development (**HCD**)

Providing a pipeline of skilled post-graduates into the waste and secondary resources sector with the skills to drive alternative waste treatment and to unlock opportunities

Increasing the supervisory capacity to mentor postgraduate (Honours, Masters, Doctoral and Post-Doc students)

- Post-graduate scholarships in waste management
  - 28 Masters and 8 Doctoral Scholarship applications (36) were received
  - 9 Post-graduate Scholarships awarded for 2016
  - Number limited only by the funding available
  - Strong focus of planned studies on "Technology Solutions" (Cluster) and "Organic waste" (Priority waste)
  - Supporting transformation of the waste sector (black 56% of awarded scholarships) and (female 67% of awarded scholarships)







Waste Research & Development (R&D)

Supporting the generation of new scientific evidence, relevant to South Africa, that will inform policy, planning, decision-making

Supporting the development of new technology and of adapting technology to South Africa conditions through R&D

- Issued Open R&D Calls to Public Research Institutions in 2015
  - 22 Grant Applications received
  - 10 Projects awarded starting in 2016
  - Number limited only by the funding available
  - Strong focus of planned R&D on "Technology Solutions" (Cluster) and "Organic waste" (Priority waste)
- Consolidating existing R&D
  - Planned DST Academic book series
  - First book in process on the beneficiation of "biomass and organic waste" in South Africa







Waste
Innovation
(technological
and non-technological)

Driving technological and non-technological innovation to improve the management of waste in South Africa and to unlock the social, environmental and economic opportunities in resource recovery

Developing technological solutions unique to South African conditions

- Issued Open Innovation Calls for upscaling technologies from TRL 3
  - 5 Grant Applications received
  - 1 Project awarded starting in 2016
  - Number limited only by the funding available
- Targeted projects through RFPs
- Industry-meets-Science Workshop series
  - Strengthening collaboration between industry and academia
  - "Biomass and organic waste" (2014)
  - "Bioplastics" (2016)

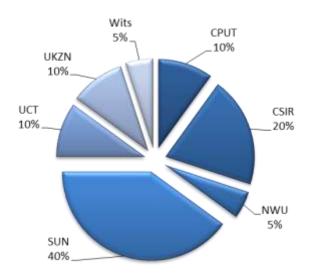




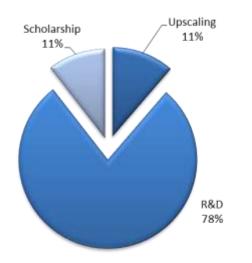
Human Capital Development (HCD) Waste Research & Development (R&D) Waste Innovation (technological and non-technological)

 Summary of all scholarships and grants awarded for 2016

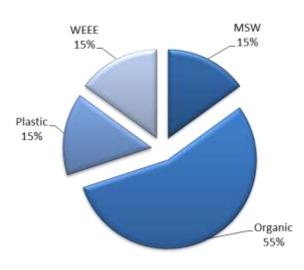
#### By institution



## Financial investment by funding instrument



#### By waste stream









## **Future activities**









- Strengthening the investment in local waste R&D and innovation through e.g. country-to-country bilaterals, industry partnerships
- Increasing national activity in waste RDI through industry and government partnerships
- Supporting local government in the evaluation and demonstration of waste technologies
- Ongoing Calls for post-graduate scholarships, R&D and Innovation projects
- Targeted RFPs to gather evidence to support future activity under the Roadmap, e.g. WEEE
- Increasing waste RDI collaboration between South Africa and Africa, and other key international partners



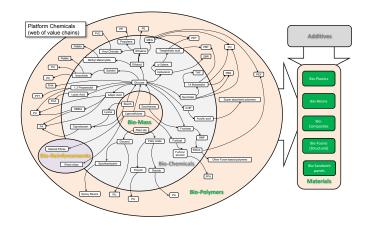




## **Future activities**



 Launch of the South African Bioplastics Forum by Plastics|SA in partnership with DST and the Waste RDI Roadmap Implementation Unit



 Launch of South African Biorefinery Research Platform by the DST in support of the Waste RDI Roadmap and Bio-Economy Strategy

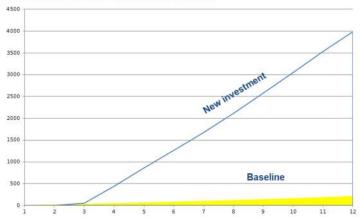




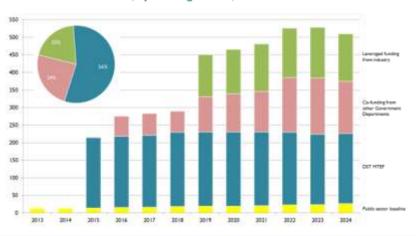


## Potential risks to implementation





#### Annual RDI Investment, by Funding Source, in ZARm



- Developing strategic partnerships with Industry,
   Government and Academia that recognise the value of waste R&D and innovation
- Leveraging local and international funding together with the DST seed funding to ramp up activities
- Current local academic capability







## Climate Change and the Green Economy







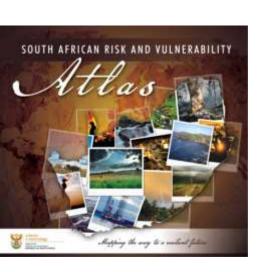
## Climate Change & Green Economy

- Represent DST on the IGCCC and NCCC
- Project managed on behalf of DEA the 'High Level Greenhouse Gas Mitigation Technology Implementation Plan'
- Together with the D: ESS contributed to the ToR for the update to the TNA with DEA
- NDE RSA for the CTCN
  - 3 provincial workshops
  - 4 requests evaluated and 2 submitted to CTCN end November 2015
  - 1 Approved
  - Also engaged with business on CTCN
  - Co-organised a panel for the WSSF2015 on the energy crisis in South Africa and how partnership can overcome it





# South African Risk & Vulnerabiity Atlas - SARVA

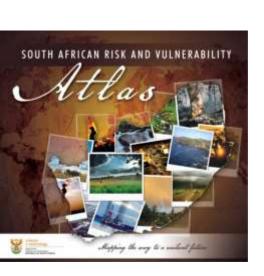


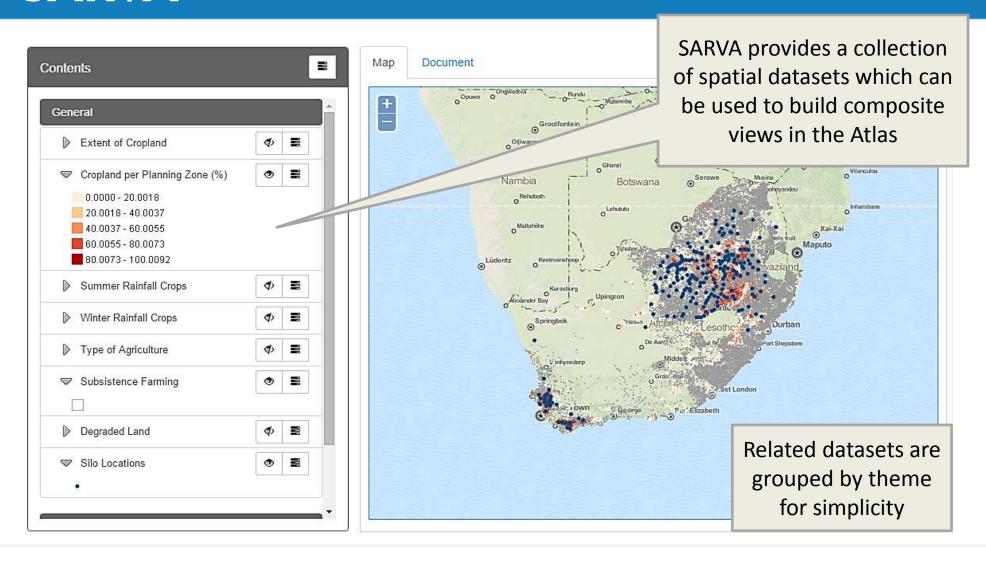
- The portal allows easy access through advanced search functionalities to data on other platforms from different research institutes, such as SAEON and other DST Initiatives.
- While the portal is open to all stakeholders, it aims to equip decision-makers at national, provincial and local government as well as the NGOs and the private sector with information on impact and risk associated with global change
- The data is essential in planning for current and projected global and climate change impacts and assists decision makers in implementing adaptation strategies.





# South African Risk & Vulnerabiity Atlas - SARVA



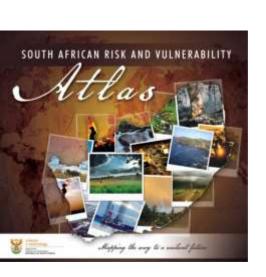


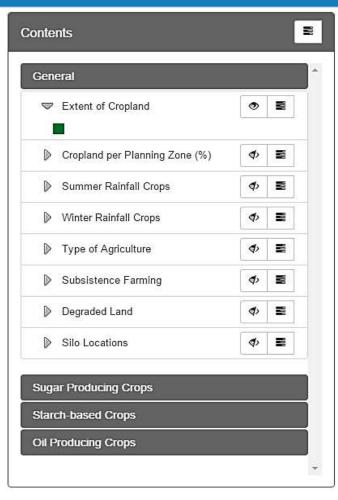


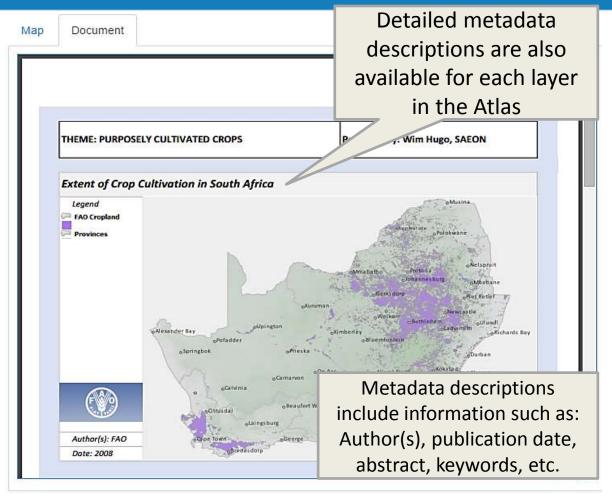




# South African Risk & Vulnerabiity Atlas - SARVA









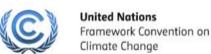


# Introduction to Services and the NDE - RSA

www.ctc-n.org









## **CTCN Mandate, Services and Structure**



The CTCN's mission is "Stimulating technology cooperation and enhancing the <u>development and</u> <u>transfer of technologies</u> to developing country Parties at their request"

#### **Services:**

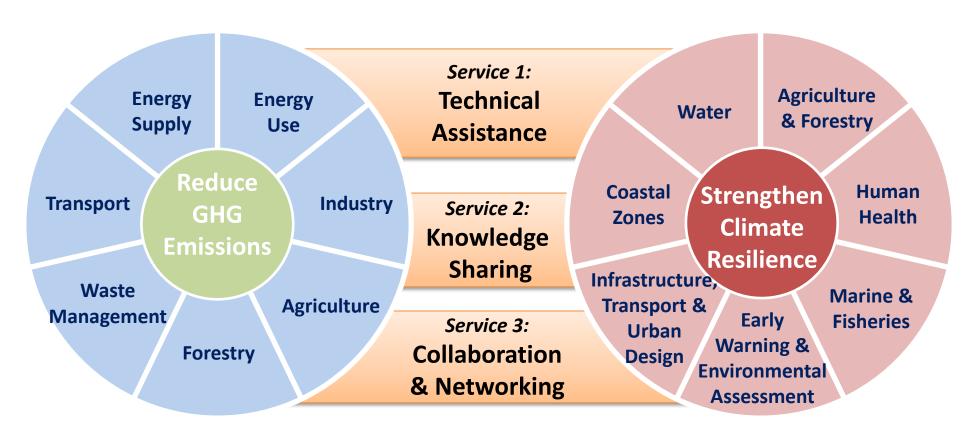
- 1. Technical assistance to developing countries
- 2. Knowledge sharing and training
- 3. Fostering collaboration on climate technologies (including linking climate technology projects with financing opportunities)

#### **Structure:**

CTCN is hosted by UNEP in collaboration with UNIDO and supported by 11 partner institutions with expertise in climate technologies



## **CTCN Services and Intended Impacts**

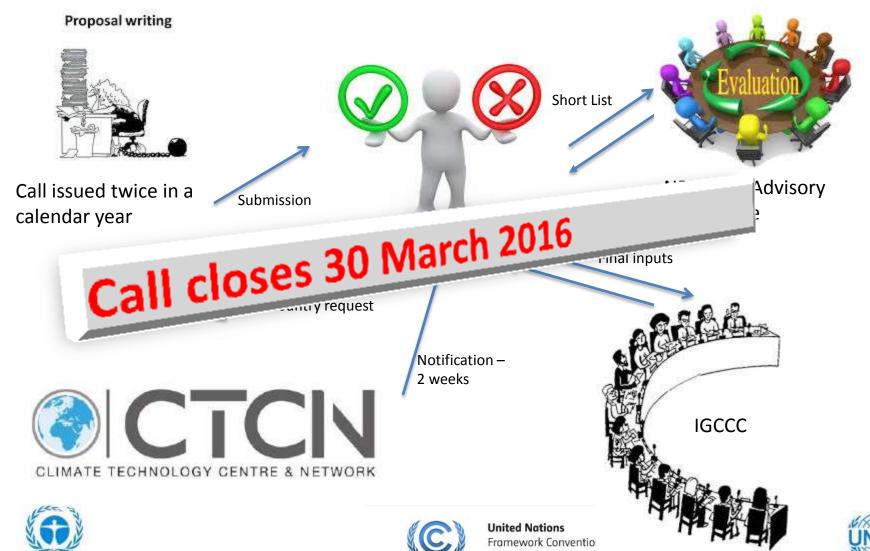








### **Submission Process**







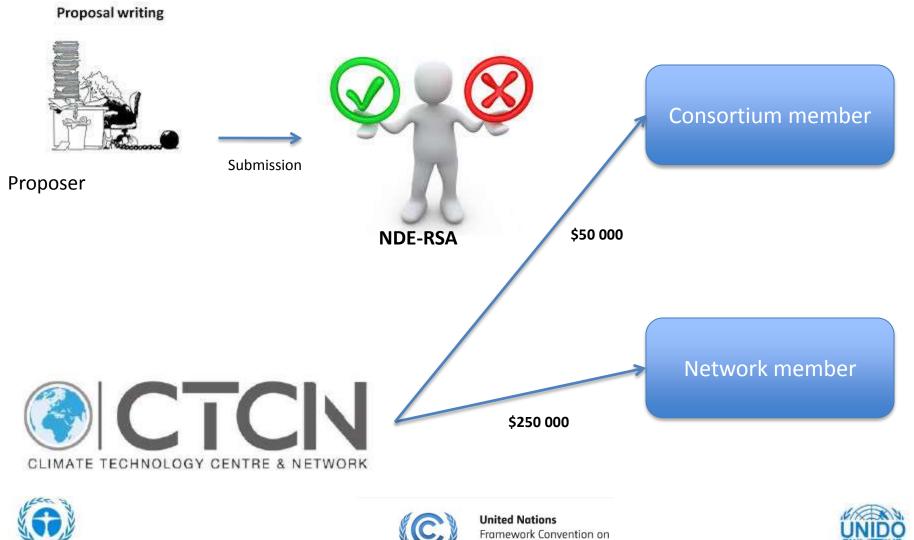


Climate Change





## Flow of money

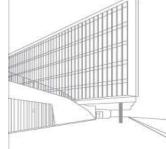
















NDE – RSA: Henry Roman Henry.roman@dst.gov.za 012 843 6434

Alternate

Magamase Mange
<a href="Magamase.mange@dst.gov.za">Magamase.mange@dst.gov.za</a>
012 843 6417

For more information, please visit:

http://ctc-n.org







# The State of Green Technologies Report for South Africa - ASSAf

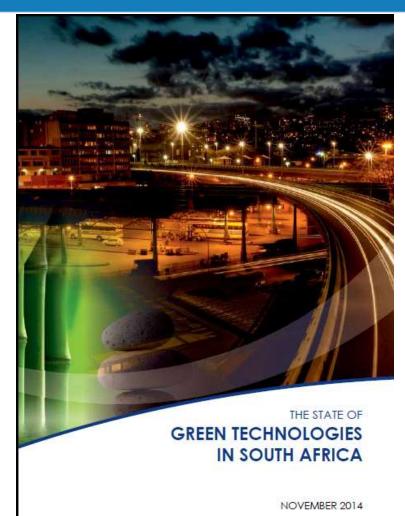
The aim of this study was to review green technologies available in South Africa, identify gaps in the availability of these technologies and to make recommendations to promote the growth of green technologies in the country.







# The State of Green Technologies Report for South Africa - ASSAf



- Key recommendations:
  - Policy Certainty & Policy coherence
  - Implementor and Developer Roles
  - Creation of an Entrepreneurial State
  - Skills transfer and innovation capacity
  - Focus on the Market
  - Alignment to SAs development needs
  - Development of Indicators
  - Green Technology Hubs
  - Systematic Evaluations of Failed or Discontinued Projects
- Report has been used in Japan by JICA and academics – requested copies to be sent





# Baseline for Green Economy R&D investments as of 2011 - Draft

ESTABLISHING A BASELINE FOR GREEN ECONOMY RESEARCH AND DEVELOPMENT INVESTMENTS AS OF JANUARY 2011 First of its kind in SA

- Used the annual R&D Survey data best data source available
- Base year 2010/11
  - Total expenditure = R4.8 R5.3 billion
  - 26% of GERD increased to 28% of GERD in 2012/13
- The project developed a rationale and methodological approach for working through the concept of Green R&D
  - No international benchmark could be found

Georgina Ryar Gaylor Montmasson-Clai Gillian Chigumire Thabani Madlak

February 2018









Deputy Director-General: SIP Mr Imraan Patel

Chief Director: SIGE Mr Isaac Maredi

Director: EST

Henry Roman Deputy Director: Environmental Technologies

> Magamase Mange

Deputy Director: Environmental Services

> Shanna Nienaber



