Inclusive Green Growth

Findings from community outreach through the Climate Innovation Center in South Africa

Prepared by *info*Dev for the Innovation, Technology & Entrenpreneurship Global Practice at the World Bank

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Cover photo (Charlene Coyukiat)

Students observe a solar cooker at Central Johannesburg College. June 30, 2012.

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Acknowledgments

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Abbreviations and Acronyms

B2B	Business to business
BoP	Base of the Pyramid
CDKN	Climate and Development Knowledge Network
CIC	Climate Innovation Center
CMU	Country Management Unit
COP-17	17th session of the Conference of the Parties to the UNPCCC
CTP	Climate Technology Program
GGGI	Global Green Growth Initiative
HSBC	HSBC Holding PLC, a multinational bank
ICT	Information and Communications Technology
IRENA	International Renewable Energy Agency
LAC	Latin America and Caribbean
M&E	Monitoring and evaluation
MCA4	Multi-Criteria Analysis for Climate Change
OECD	Organisation for Economic Co-operation and Development
PoC	Proof of Concept
R&D	Research and development
SeTAR	University of Johannesburg Sustainable Energy and Research Centre
SMEs	Small- and medium-scale enterprises
TIH	The Innovation Hub
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WBG	World Bank Group
WIPO	World Intellectual Property Organization

All dollar amounts are U.S. dollars unless otherwise indicated.

Executive Summary

Green growth has attracted increasing attention from both government and the private sector as a strategy that drives sustainable development. Green growth does not replace more traditional pro-growth policies but complements them as a way to achieve both economic and environmental impact. *Inclusive* green growth ensures that resulting benefits are shared by the poor, whose needs and vulnerability are the most acute, in both developed and developing nations. Such an inclusive scope is consistent with overall development strategies. At the 2013 Spring Meetings, the World Bank Group (WBG) through the Development Committee's paper, "A Common Vision for the World Bank Group," stated its goal to end extreme poverty and to promote "shared prosperity," defining this as "economic growth matched with a strong concern for equity." It was also acknowledged that these two goals cannot be achieved without ensuring environmental sustainability.[1]

The findings from the community outreach conducted for this report do not present a one-size-fits-all solution to implement inclusive green growth strategies across all developing countries. Hence, these findings are observed in light of the Gauteng CIC, which aims to facilitate and foster innovative clean technology entrepreneurship within the context of the surrounding township communities.

1.1 Development Context

Climate change represents a tremendous opportunity for economic growth. The increasing pressure to address global climate change fuels demand and profit prospects for effective climate technology solutions. The resulting cleantech revolution is occurring not only in the specific technologies produced, but also in the processes, areas and channels through which they are scaled and deployed. Identifying and monetizing such opportunities, i.e., "greening" growth, is becoming integral to many economies' long-term sustainability strategies and policy frameworks.

Historically, disadvantaged groups have not always fully participated in the development of innovative climate technology solutions. The majority of environmentally friendly development to date has been pursued and realized by wealthier countries, or by higher-income socioeconomic groups. The poor and marginalized can also share in and contribute to the benefits of green growth, such as improved environmental quality and human welfare; enhanced efficiency and quality of resources; increased resiliency to climate shocks; and sustained job and enterprise creation.

Promoting innovation in climate technologies and business models will accelerate the delivery of green growth where it is most needed. The base of the economic pyramid (BoP), which is most vulnerable to climate change and continues to face basic challenges such as energy access, water supply, food security, and transport, represents a valuable market in which to pilot and commercialize new approaches. Innovation will enable countries and companies to: 1) develop inclusive, effective, scalable, and marketable responses to climate change; and 2) increase the involvement of the poor in growing climate technology sectors.

> *"At the 2013 Spring Meetings, the World Bank Group (WBG) stated its goal to end extreme poverty and to promote "shared prosperity".*

[1] "A Common Vision for the World Bank Group," *April 20, 2013 Development Committee meeting, http://web.worldbank.org/WBSITE/EXTERNAL/DEVCOMMEXT/0,,pagePK:64000837~piPK:64001152~theSitePK:277473~contentMDK:23384016,00.html*

1.2 South African Climate Innovation Center (CIC)

***info*Dev's Climate Technology Program (CTP), in partnership with The Innovation Hub (TIH)[2] of the Gauteng provincial government, has developed a business plan for a Climate Innovation Center (CIC).** The CIC is part of *info*Dev's global CTP. It will provide financing, technical assistance, international linkages and other services to help South African innovators develop profitable solutions to local climate challenges. The CIC will accelerate the growth of innovative climate technology enterprises, which will in turn contribute to South Africa's goals in carbon mitigation, access to energy, access to water, and increased agricultural efficiency. Inclusivity will be a special focus of the CIC, to ensure that these benefits are equitably spread among all citizens and that the growth of supported companies also contributes to poverty alleviation.

In order to ensure that the CIC properly meets the needs of South Africa's marginalized and low-income constituencies, four workshops were held to better understand the needs and barriers in these communities. The workshops were designed to learn about the needs of poor South Africans and refine the CIC design to serve the BoP. They also promoted awareness of climate technologies among consumers in these target groups. In preparation for the upcoming CIC launch, the workshops increased awareness about the center's services, catalyzing interaction and exchange on inclusivity among current actors in the climate innovation ecosystem.

[2] The Innovation Hub was established by the Gauteng Department of Economic Development (DED). It is Africa's first internationally accredited Science and Technology Park and the country's leading knowledge-intensive business cluster. It is a regional center of innovation where high-tech entrepreneurs, businesses, academics, researchers and venture capitalists can network and prosper.

1.3 Findings on Inclusive Green Growth through Innovation

The community workshops yielded valuable and actionable findings, summarized below, on how to maximize inclusive green growth and climate technology innovation. These strategies will inform the further design and implementation of both the Gauteng CIC and the global Climate Technology Program. They also have wider applicability for inclusive growth projects in other sectors that use innovation to provide community-based solutions for disadvantaged and marginalized groups.

- **Improve the quality, timeliness and flow of information on climate-friendly solutions to end users at the BoP.** Poor consumers require active guidance in understanding and evaluating options before they are driven to purchase. The CIC should help clean technology solution providers quantify their solutions based on direct-to-consumer benefits such as savings, health, safety, security, and quality of life. This can be communicated through low-cost, two-way channels, such as mobile telephony and word of mouth. Traditional media and the Internet have lower exposure rates among the poor, and can become costly to customize in multilingual countries.

Location	Attendees	Representation
Alexandria township, Gauteng	140	Central Johannesburg College, Greater Alexandra Chamber of Commerce, students, researchers, educators, residents, entrepreneurs
Melani village, Eastern Cape	100	University of Fort Hare, Eastern Cape provincial government, CSIR South Africa, CSIRO Australia, TNO-Netherlands, residents, entrepreneurs
Ivory Park township, Gauteng	40	Green Life Style youth leaders, students, educators, residents, entrepreneurs
Soweto township, Gauteng	80	Eskom (Sustainable Development & Small Business group), University of Johannesburg, students, researchers, entrepreneurs

> *"Advanced clean cook stoves are an example of a clean technology development that demonstrate profitable innovative enterprise and enhance the well-being of the most vulnerable segments of society."*

- **Match financing to end user capability and stream of benefits, thereby reducing upfront costs of switching or adoption.** The scarcity of disposable income means that the poor are more careful and critical not only about the purchase price, but also follow-on ownership costs such as fuel, upkeep, and repair. This is exacerbated by the fact that the direct benefits of adopting a technology are often spread out over time. The CIC can connect end users to microfinance or crowdfunding institutions that can help to match the timing and size of payments more closely to the resulting savings. It can also promote community-based sharing and social enterprise models for technologies that are too expensive for household or individual use.
- **Partner with locally established actors in the social economy to extend the community-level presence of institutional apparatus.** To a certain extent, the interventions required to fully mainstream inclusive green growth may lie beyond the scope of the CIC's capabilities. This constitutes a valuable opportunity to leverage institutional linkages with the public sector, academe, industry and civil society. Institutional partners will also be valuable in building a human capital base of knowledge, skills and entrepreneurial appetite that will sustain the climate innovation system. The CIC should collaborate with these entities to deliver effective, holistic, and sustainable green economy interventions. The center should also establish satellite offices in urban and rural poor communities that can deliver CIC expertise and assistance on a micro scale.
- **Offer assistance and incentives that motivate firms to innovate solutions that can be scaled at the BoP.** To facilitate the mainstreaming of an inclusive mindset, the CIC must actively encourage larger small- and medium-scale enterprises (SMEs) to consider incorporating social development into their business plans and related milestones. The Center can provide entrepreneurs with product development assistance and specific insight into community needs. It will consider social benefit and poverty alleviation when evaluating proposals for seed investments and proof-of-concept funding. It will also advise firms on how to tailor processes and business models to poor and disadvantaged markets.

The Development of Frameworks for Inclusive Green Growth

2.1 The Promise

An HSBC report estimates that the low-carbon energy sector will triple to $2.2 trillion by 2020. This figure does not take into consideration projected growth in other sectors of the broader climate economy, covering mitigation, adaptation, and climate finance.[3] Increasing pressures on the environment and natural resources offer employment and trade benefits for those countries that can take a lead in climate-related industries. The mindset of inclusive green growth enables all countries, and all segments of society, to participate in this growth revolution.

Figure 1—Three Aspects of Sustainability

Inclusive green growth can be defined as development that creates synergies among the three aspects of sustainability—social, economic and environmental 4 (Figure 1). This represents a new way of thinking vis-à-vis the traditional mindset that trade-offs are unavoidable in pursuit of development priorities. Transitioning to an inclusive green economy would address multiple climate, food and economic challenges with "an alternative paradigm that offers the promise of growth while protecting the earth's ecosystems and, in turn, contributing to poverty alleviation."[5]

According to a 2012 World Bank report[6], the most tenuous link is between economic and environmental sustainability; i.e., green growth is not inherently inclusive. This indicates that specific interventions will be required to make the benefits of sustainable development accessible to all. These benefits include:

- **Improved environmental quality:** Spanning a range of benefits from basic human welfare (e.g., air quality, sanitation, food security, access to energy, etc.) up to higher-order needs such as conservation and biodiversity
- **Enhanced efficiency and quality of resources:** Repurposing materials, redesigning processes, and investing in the base of natural, physical and human capital
- **Increased resiliency to supply/demand shocks:** Preventing or mitigating climate-related price volatility across industries (e.g., food, water, transport, energy)
- **Sustained job creation and enterprise development:** Profiting from the development, deployment, transfer and trade of climate-friendly products, services and business models.

Recent successes have demonstrated that inclusive green growth is not only feasible, but potentially profitable as a market opportunity. Throughout this report, examples of successful inclusive green growth initiatives will be highlighted to illustrate the concept as well as the growing global momentum behind it. These will include social enterprise models, supportive government and international policies, targeted financing and business assistance.

[3] HSBC Global Research. September 2010. *Sizing the Climate Economy.*

[4] Due to the focus of the Gauteng Climate Innovation Center on climate technology innovation, this report will focus largely on environmental sustainability and its relationship with the economic and social aspects, and to a lesser extent on the relationship between social and economic sustainability.

[5] United Nations Conference on Sustainable Development, 2012. *The Transition to a Green Economy: Benefits, Challenges and Risks from a Sustainable Development Perspective.*

[6] World Bank, 2012. *Inclusive Green Growth: The Pathway to Sustainable Development.*

Ecofiltro: Providing clean, affordable drinking water

A typical family in Guatemala spends about $200 per year on filtered water. Using a clay filter from Ecofiltro effectively reduces this amount to $35 per year for a family of six, freeing valuable household income for other expenditures. The company has tied up with a Guatemalan bank and designed its distribution schemes to ensure that even the poorest customers are able to purchase the filter. The product is portable, requires no electricity, and can be produced in any developing country. It curbs the transmission of infectious diseases and eliminates the waste associated with consuming bottled water. Moreover, the company addresses gender equality by composing its part-time workforce entirely of women.

Ecofiltro closed 2011 with revenues upwards of $1 million. It has since opened a new production plant that will employ more than 100 people and support its international expansion.

Source: Ecofiltro and *info*Dev websites

There is growing consensus that "all countries, rich and poor, have opportunities to make their growth greener and more inclusive without slowing it."[7] Economic development should serve to lift people out of poverty rather than exacerbating inequality between the rich and the poor. At the same time, it should preserve and promote environmental stewardship, ensuring plentiful natural resources for future generations.

2.2 Overview of Supporting Frameworks

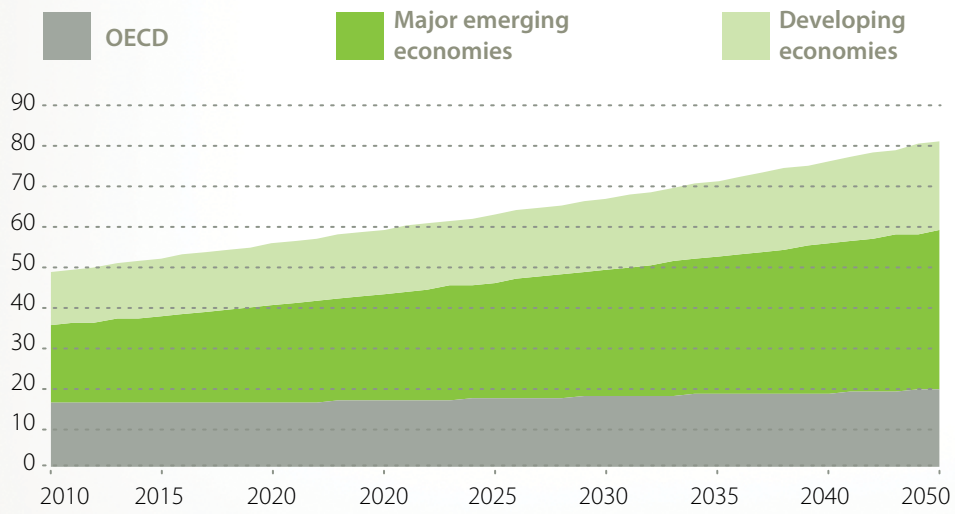
Developing countries have the opportunity to play a critical role in achieving inclusive green growth on a global scale. Compared to industrialized economies, countries in the developing world are more vulnerable to climate change. They also rely more heavily on natural resources. Thus, their growth is undermined by energy, food and water insecurity, extreme weather risks, death, disease, and other threats posed by climate change. In addition, there is less fixed carbon-based infrastructure in the developing world, which facilitates the introduction of new climate-friendly technologies.

Today, most developing countries contribute only minor shares to global greenhouse gas (GHG) emissions compared to the Organisation for Economic Co-operation and Development (OECD), and major emerging economies. However, as shown in Figure 2, they are expected to increase their emissions if they follow conventional economic growth patterns. This illustrates the opportunity to "green" emerging economies' growth paths by decreasing their dependence on and intensity of carbon use.

Various international organizations have developed analytical frameworks to assist developing countries with their green growth objectives. This section outlines the salient points of three examples from the World Bank, United Nations, and the OECD.

[7] World Bank, 2012. *Inclusive Green Growth: The Pathway to Sustainable Development.*

Figure 2—GHG Emissions by Region, Baseline 2010-2050



GtCO2e = Gigatonnes of CO2 equivalent.
Source: *OECD Environmental Outlook Baseline; output from ENV-Linkages.*

2.2.1 World Bank: Crafting a green growth strategy[8]

The increased interest and activity in green growth sectors underscores the need for otherwise isolated projects to be united under a cohesive national strategy. The World Bank suggests a systematic approach towards crafting such a strategy:

- **Identify key sustainable development objectives.** Articulate the country's desired outcomes and/or improvements with respect to social, environmental and economic sustainability.
- **Map objectives to issues.** Determine the market and institutional obstacles that are currently hindering progress, as well as the risks of irreversibility inherent in the current growth path.
- **Evaluate alternatives.** Select among possible policy interventions and identify synergies among available options. The report proposes six categories: pricing/fiscal policies; institutional or norm/behavior-based regulation; policies promoting industrial innovation; policies governing education and labor markets; natural capital, agriculture and ecosystem services management; and infrastructure, building, urbanism, transport and energy.
- **Define priorities:** Establish the urgency of various policy options due to inertia and lock-in risk, as well as the immediacy and localization of potential benefits (Figure 3). It must be noted that the use of "short," "medium," and "long-term" to differentiate priorities refers to the total time frame for planning and implementation, and not when these must commence; i.e., preparatory actions must be presently taken in order to implement the medium- and long-term priorities in their respective time frames.
- **Define success:** Conduct a systematic, multi-criteria analysis of the policies and projects that will comprise the green growth strategy, and specify the indicators that will quantify each one's success or failure.

[8] World Bank, 2012. *Inclusive Green Growth: The Pathway to Sustainable Development*

Figure 3—Illustrative Example: Policy Prioritization Matrix

	Trade-offs between local/global or immediate/long-term benefits	**Local and immediate benefits**
Lower inertia and/or risk of lock-in	**Long-term priorities** Examples: Lower-carbon, higher-cost energy supply Carbon pricing Stricter wastewater regulation	**Medium-term priorities** Examples: Drinking water and sanitation, solid waste management Lower-carbon, lower-cost energy supply Loss reduction in electricity supply Energy demand management Small-scale, multipurpose water reservoirs
Higher inertia and/ or risk of lock-in	**Medium-term priorities** Examples: Reduced deforestation Coastal zone and natural area protection Fisheries catch management	**Short-term priorities** Examples: Land use planning Public urban transport Family planning Sustainable intensification in agriculture Large-scale, multipurpose water reservoirs

2.2.2 United Nations: MCA4Climate Framework[9]

Multi-Criteria Analysis for climate change (MCA4climate) is a major initiative by the United Nations Environment Programme (UNEP) that offers practical assistance to governments preparing strategies for climate change mitigation and adaptation. It is designed to help identify policies and measures that are low-cost, environmentally effective, and consistent with national development goals.

[9] MCA4Climate website (http://www.mca4climate.info)

Figure 4—MCA4Climate Policy Areas

Mitigation	Adaptation
Improving Energy Efficiency and Conserving Energy	Improving Coastal Zone Management
Improving Land Use Management Practices	Reducing Human Health Impacts and Risks
Increasing the Share of Low-Carbon Energy Sources in the Fuel Mix	Reducing Agricultural Output Losses
Encouraging Carbon Dioxide Capture and Storage	Increasing Infrastructure Resilience
	Improving Water Resource Management
	Increasing Terrestrial Ecosystems Resilience
	Increasing Marine Ecosystems Resilience
	Reducing Extreme Weather Event Impacts

MCA4Climate experts have developed a guide to possible climate policy options and measures across twelve areas of climate policy (Figure 4). The impact of these policies and actions can be monitored through a general multi-criteria analytical evaluation framework. This consists of a systematic and hierarchical decision tree that is applicable across all themes, allowing policymakers to weigh the outcomes of various development objectives.

The program further provides guiding principles for a robust climate policy analysis on critical issues such as dealing with the economics of climate change; developing coherent baselines; considering the fiscal implications of climate policies; accounting for risk and uncertainty; and undertaking systematic monitoring, reporting and verification of climate actions.

2.2.3 OECD: A policy framework for greening growth in developing countries[10]

The OECD and the Global Green Growth Institute jointly organized a consultation event after the May 2012 Global Green Growth Summit to present the initial draft of a policy framework for developing countries. This report was again presented to developing country stakeholders at the Rio+20 summit and released in full in June 2012.

[10] OECD. 2012. Green Growth and Developing Countries: A Summary for Policy Makers.

Africa after Rio+20

In June 2012, Mohammad Yunus and Michel Camdessus noted that the UN Conference on Sustainable Development (Rio+20) showed support for the importance of green growth strategies for eradicating poverty, reducing inequalities and upholding human rights. However, questions remain unanswered around specific timetables and outcomes from the international community. This uncertainty will disproportionately affect Africa, which is forecast to be the continent worst hit by climate change. It needs international cooperation to manage issues around food security, water scarcity, land acquisition, and persistent poverty.

While new efforts to meet the Millennium Development Goals (MDGs) and to extend them beyond 2015 are vital, they must be complemented by practical commitments to address the combined demands of rapid population growth, increased consumption of scarce natural resources, climate change and environmental degradation.

Figure 5—OECD Green Growth Framework for Developing Countries

Source: OECD 2012.

Currently, the framework identifies three dimensions that developing countries must consider in crafting their national strategies: enabling conditions, mainstreaming mechanisms and specific policy instruments. A menu of options is provided for each component (Figure 5). The goal of the report is not to prescribe one ideal policy set, but to promote process alignment for refinement and consensus building. Although it promotes the use of the OECD measurement framework as an evaluation tool, it also recognizes that case studies are popular among stakeholders as a pragmatic way of disseminating effective practices.

The report summary acknowledges an absence of extensive and conclusive developing country experience, as well as the evidence that this would provide. Feedback on the report thus far has emphasized the need for green growth to speak more clearly on near- to medium-term poverty reduction and socioeconomic development, which indicates that the final draft of the report may incorporate a stronger focus on inclusivity.

2.3 The Challenges

Environmental damages are reaching a scale at which they are beginning to threaten growth prospects and progress made on social welfare. Moreover, the growth that has been achieved has not been inclusive enough; a majority of green growth to date has been pursued and realized by wealthier countries, or by higher income socioeconomic groups. As recently as 2008, 96 percent of first (priority) applications for patents in environment-related technologies came from OECD member countries.[11] Technology innovation and diffusion for the base of the pyramid (BoP) remains very low.[12] In spite of the gains and advancements in climate technology, the fact remains that 1.3 billion people do not have access to electricity, 2.6 billion have no access to sanitation, and 900 million lack safe, clean drinking water.[13] An IFC report estimates that the poor spend $37 billion each year on traditional household lighting and heating such as kerosene lamps and biomass cook stoves, even though approximately 90 percent of them can afford safer and cleaner alternative technologies.[14]

The following factors represent barriers to the mainstreaming of inclusivity into green growth initiatives.

2.3.1 Lack of private sector incentives and capabilities to pursue inclusive green innovation

Although greening growth is becoming increasingly affordable, it still requires higher upfront investments as well as switching costs. These costs will generally be recouped later, but access to capital remains a significant constraint. Countries may also lack technical skills, market information, or municipal and/or private sector capability to deploy new technology solutions.

These constraints are exacerbated when considering inclusivity, which requires companies to provide products and services available at ultra-low cost. This in turn entails further innovation in manufacturing, marketing and delivery models. Private-public partnerships and increased access to financing for small-and medium-scale enterprises (SMEs) can bring about the necessary conditions for promoting private sector involvement in greening the BoP.

2.3.2 Need to revisit and adapt existing economic and policy structures

Inclusive green growth strategies pursue economic growth and poverty alleviation combined with significant improvements in environmental quality and sustainable resource use. Such holistic policies will require shifts in production and consumption patterns, which is potentially costly for established production sectors or even entire economies. Given the scarcity of fiscal resources, governments must work urgently to create a favorable environment wherein inclusive green growth can be sustained over the long term. In addition to seeding companies and supporting private sector activity, countries must be willing to invest time, effort and resources into implementing a "whole-government" approach to innovation system reform.

2.3.3 Lack of consensus on the definition and measurement of inclusivity

There are numerous ways to segment societies, particularly in developing countries, with the objective of pinpointing marginalized groups. Global discussion is gravitating towards income and poverty reduction as the principal criterion for the inclusiveness of growth. However, race, age, gender or sexual orientation, religion, geography (rural/urban), and other criteria can also be used separately or in combination. The target or priority groups will likely vary from country to country, and this will in turn determine what constitutes inclusive green growth in that context. Comparability of programs at a global level therefore becomes a challenge, which suggests that monitoring and evaluation (M&E) should focus on identifying transferable practices and principles.

[11] Using data from OECD.StatExtracts patent database. (Extracted August 6, 2012).

[12] The Brookings Institution, May 2012. *Green Growth Innovation: Toward A New Architecture for Developing Countries*

[13] Rio+20 United Nations Conference on Sustainable Development, 2012

[14] IFC, 2012. *From Gap to Opportunity: Business Models for Scaling Up Energy Access.*

Adopting clear and definitive criteria for inclusivity

D-Rev is a non-profit technology incubator focusing on inclusive innovations for health and livelihood. The organization screens high-impact opportunities, which must be able to improve the health and incomes of **at least 1 million people living on at most $4 per day.** Only projects that meet the criteria are funneled into design, delivery and commercialization. The company has successfully implemented entrepreneurial solutions to poverty, which include rural solar power, newborn jaundice treatment, and prosthetic knee joints, among others.

Measurement and comparability issues are compounded by the need to refine and assimilate new metrics that incorporate sustainability dimensions. Conventional measures such as GDP do not sufficiently indicate whether growth is sustainable when they ignore underlying assets. In response to this issue, the relatively new concept of natural capital accounting aims to measure all assets that provide income to households, firms, and governments. It not only accounts for well-understood resources like land, forests, minerals, and energy, but also valuates non-marketized assets inherent to ecosystems and the services they provide.

2.3.4 Sensitivity surrounding socio-political dynamics

There is a risk that target audiences will view inclusive green growth efforts as an imposition or intrusion on their way of life. Intra- and international politics may play a role in the willingness of the target constituencies to participate in the sustainable development agenda. Even at the global level, this is evident in some developing countries' resistance to what they perceive as unfair North-South dynamics in the climate change debate. There is a need for heightened outreach to promote understanding and instill a sense of ownership among the desired stakeholders.

2.4 The Role of Climate Innovation

Innovation—both in climate technologies and related business models—has contributed to the rise in and acceptance of inclusive green growth approaches. Cross-border and cross-sector knowledge sharing, improvements in manufacturing and transport, and the rise of social entrepreneurship have made it possible and popular to profit from climate-friendly, low-cost products and services. Continued climate innovation, therefore, is needed to accelerate the transition of countries on sustainable growth paths.

Innovation is understood here to be a new and better product or service, or a new and more efficient, or less costly, way of producing, delivering, or using that product or service. Innovation may be new to the world as a whole, new to a country, new to a sector, or new to an individual. These distinctions are important, particularly from the perspective of developing countries, because there is a tremendous amount of localized knowledge that they may not be using. If countries or firms devise better policies to acquire and exploit that knowledge and technology effectively in their local context, they can greatly improve their inclusive growth and welfare.[15]

- The following characterize the types of innovations which will deliver inclusive green growth:
- Demonstrably support the three pillars of sustainable development: financial viability, social welfare and climate resiliency
- Combine readily available renewable resources with indigenous knowledge and skills
- Begin as a locally targeted solution, but can quickly be scaled across other BoP markets

Green technologies are frequently "disruptive" in character; i.e., they threaten incumbents in established markets. The BoP, where basic questions such as energy access, energy efficiency, financing and transport remain unanswered, may therefore serve as a promising target for piloting and commercializing such innovations. Coupling this market opportunity with the profit motive of private enterprise may drive impact more than the traditional notions of corporate social responsibility and sustainability.

As emerging economies establish their infrastructure and manufacturing systems, there is a clear opportunity to innovate towards greener and more inclusive solutions. Inculcating a green mindset in these markets can help developing countries avoid the unsustainable paths that their industrialized counterparts have previously traveled. Furthermore, innovations that are indigenous to these markets are more likely to be applicable to other developing economies, creating opportunity for South-South knowledge transfer and trade.

[15] World Bank Institute. 2011. *Innovation Policy for Inclusive Growth.*

The CTP's Experience in South Africa

3.1 About *info*Dev's Climate Technology Program

The Climate Technology Program (CTP) accelerates climate technology innovation and entrepreneurship in developing countries. By helping the private sector seize opportunities in the rapidly expanding cleantech industry, the CTP reduces emissions, increases climate resiliency and, importantly, creates jobs, driving economic development.

The Climate Technology Program's flagship initiative is a network of Climate Innovation Centers (CICs), which will accelerate the development, deployment, and transfer of locally relevant climate technologies. At the country level, CICs build capacity and address barriers to innovation by offering a tailored suite of financing and services that support domestic companies. The first eight CICs will be launched in Kenya, Ethiopia, India, Ghana, South Africa, Vietnam, Morocco and the Caribbean. Figure 6 lists the progress to date and the key background information on each center. For additional information on the Climate Technology Program, please refer to Annex 1.

Figure 6—Status of First 8 CICs

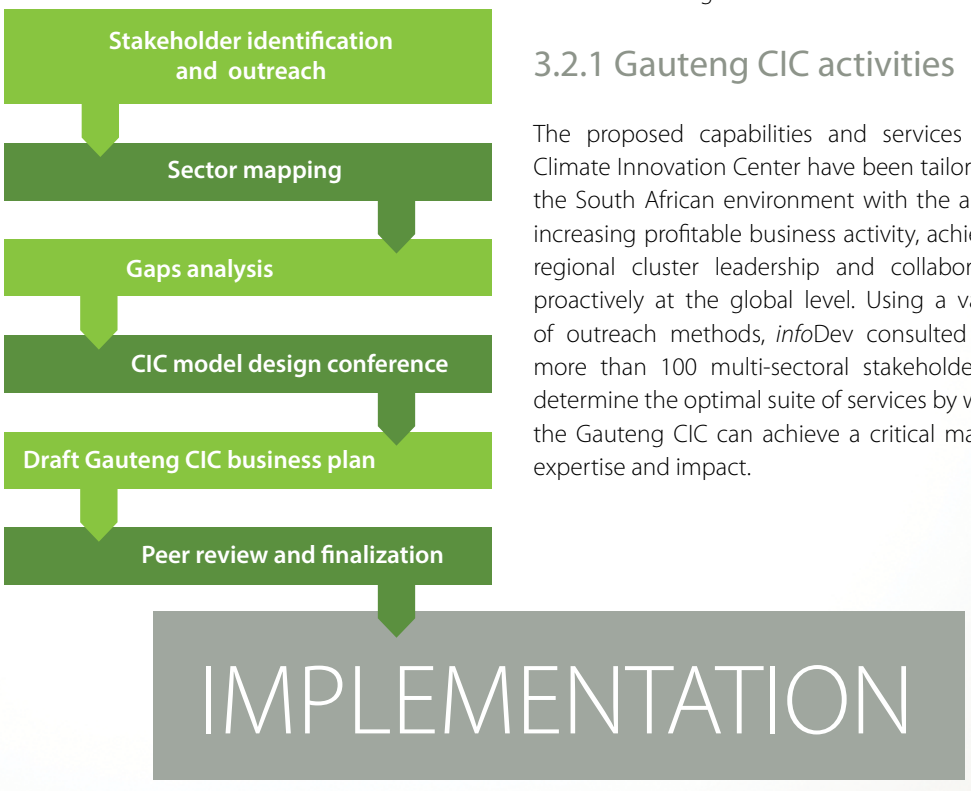
Country	Status	Background
Kenya	Launch Sept 2012	• Part of "Greening Kenya" initiative • Seed capital fund with VC investors • Hub for East African Climate Innovation Network (EACIN)
South Africa		• Government and donor financed • Part of the Innovation Hub (TIH) • One of the Top 10 national projects at COP 17
India	Launch 2013	• Government and donor financed • Seed capital fund with VC investors
Ethiopia	Launch Q2 2013	• Specializing in agribusiness and women's empowerment • Multiple donor support
Vietnam	Launch Q2 2014	• Very strong government support • Multiple donor funding being negotiated
Caribbean	Launch Q4 2013	• Very strong donor interest secured and negotiated • Hub for Caribbean Climate Innovation Network (CCIN)
Morocco	Launch Q2 2014	• Hub for Middle East & North Africa Climate Innovation Network
Ghana	Development of Business Plan launched in Q1 2013	

3.2 Designing a South African Climate Innovation Center

*info*Dev, in partnership with The Innovation Hub,[16] engaged South African stakeholders to assess the climate innovation landscape and examine the feasibility of a Climate Innovation Center (CIC) as a mechanism to maximize innovation in the country. This Center would be based in Gauteng but would also serve as a nexus for clients and partners in other provinces, with a long-term view towards engaging neighboring countries in the Southern Africa region. At COP-17 in Durban, the CIC was showcased at the South African pavilion as one of the top 10 projects in the country.

[16] The Innovation Hub in Pretoria is Africa's first internationally accredited Science and Technology Park. It is South Africa's leading knowledge-intensive business cluster and Park and a full member of the International Association of Science Parks (IASP). The Innovation Hub Management Company (Pty) Ltd (TIHMC) is a subsidiary of the Gauteng Growth and Development Agency (GGDA—previously known as Blue IQ and GEDA) under the Gauteng Provincial Government's Department of Economic Development (DED).

Figure 7—Business Planning and Stakeholder Engagement Process



Based on a careful analysis of current capacity and market gaps, a business plan has been proposed that outlines the focus, implementation strategy, investment requirements and impact of a CIC in South Africa. An overview of this process, which spanned approximately six months, can be found in Figure 10.

Overall, over 100-multi-sectoral stakeholders concluded that the Gauteng CIC will fill a number of market gaps by:

1. Ensuring access to flexible risk capital and funders with diverse risk profiles
2. Building a pipeline of knowledge, talent and infrastructure that will fuel commercialization
3. Informing, transforming and catalyzing relevant policy mechanisms
4. Empowering all citizens, especially those who have been historically disadvantaged, to take part in profitable climate technology businesses
5. Acting as a conduit for international partnerships that can facilitate technology diffusion, collaborative R&D, and business-to-business linkages

3.2.1 Gauteng CIC activities

The proposed capabilities and services of a Climate Innovation Center have been tailored to the South African environment with the aim of increasing profitable business activity, achieving regional cluster leadership and collaborating proactively at the global level. Using a variety of outreach methods, *info*Dev consulted with more than 100 multi-sectoral stakeholders to determine the optimal suite of services by which the Gauteng CIC can achieve a critical mass of expertise and impact.

The Center will serve the needs of South African climate technology entrepreneurs through the following:

Access to Finance	Business Advisory and Access to Information
• Providing highly flexible, stage-appropriate risk capital: proof-of-concept grants (<$125k), inclusivity grants (<$12.5k) and seed funding (average $300k). • Facilitating investments for companies requiring more than $1 million.	• Providing technical and business expertise through training and networking. • Allowing access to international information on climate technology market trends, products, etc. • Undertaking original market research assessments in line with South Africa's climate priorities.
Access to Policy Support	**Access to Facilities**
• Facilitating dialogue between policy-makers, private sector and civil society to improve frameworks around climate, innovation, private-sector development, and inclusive growth. • Researching policy standards to apply global best practice in the South African context.	• Providing space, facilities and services for start-ups that need offices, prototyping and manufacturing. • Connecting SMEs to research institutes, universities and other laboratories in South Africa with technical equipment for testing and production.
Regional and International Linkages	
Seminar series, policy roundtables, business plan competitions, networking with other CICs. Collaboration, knowledge exchange and business linkages with global companies and organizations.	

In an online survey of Gauteng CIC stakeholders, 93 percent agreed that SMEs can play an important role in alleviating poverty, which indicates the degree to which inclusivity has been promoted in the country. Criteria for social inclusiveness will be mainstreamed into all of the CIC's activities; Marginalized groups will have access to all types of financing offered at the center. As an added measure to counteract the historic under-representation of certain subgroups in South Africa's economy, 12 grants of South African rand R 100,000 ($12,500) will be set aside exclusively for SMEs owned and managed by women, youth, urban and rural poor, the disabled, and other critical constituencies.

A review group will be established for screening and evaluating inclusivity grantees, which will include representatives from selected community-based organizations, municipality service delivery staff, and other representatives who are more directly involved with the day-to-day support of marginalized communities. This group will be able to assess the effectiveness of CIC services and make recommendations to better deliver on the inclusive growth agenda.

3.2.2 Gauteng CIC Results and Impact

With a proposed budget of $21.2 million (R 170 million[17]), the CIC projects to create more than 100 sustainable climate technology ventures, generating close to 2,500 direct and indirect jobs Using ILO data on South Africa's labor participation rates, it is anticipated that 32.5 percent (802) of these jobs will be taken by women and 63.6 percent (2,6181,571) will be for youth of both genders between the ages of 20–29.

The cost per direct job is South African rand R 206,209, which compares favorably to the IDC threshold of R 450,000 for the national jobs fund.[18] Local stakeholders indicated that the ratio of indirect to direct job creation in South Africa can be conservatively estimated at 2:1, but noted that data from high-growth technology sectors in comparable countries indicates possible outcomes as high as 4:1.

[17] An exchange rate of $1= R 8 is used throughout the document

[18] David McGluwa, regional manager for the IDC in North West Province, quoted in http://www.northwestbusiness.co.za.

The CIC will accelerate the growth of innovative climate technology enterprises, which will in turn contribute to South Africa's goals in carbon mitigation, access to energy, access to water, and increased agricultural efficiency (Figure 13[19]). The Center will aim to support innovations across a spectrum of risk and sophistication, depending on the market opportunity and deal flow.

In addition to the measurable parameters outlined above, the CIC's programs and activities will have qualitative spillover effects, to the overall benefit of South Africa's climate technology innovation ecosystem. It is envisioned that the CIC's example will encourage increased innovative activity in universities and communities. This can lead to higher commercialization rates of domestic R&D, better access to the infrastructure necessary for technology development, and increased workforce capacity in the form of greater business and technical skills.

The direct and indirect creation of higher-paying, sustainable jobs by CIC-supported companies will boost economic output in surrounding communities and provide more South African citizens with access to innovative products and services. This more active market will be further accelerated by the wider availability of information, which will include new products launched, companies created, industrial activity and trade sales. In parallel, the CIC will facilitate the creation of new investor networks, enabling South Africa to capitalize on increased investment opportunities and access to follow-on funding.

[19] The model assumes that 60 percent of the products/services sold by CIC ventures are related to energy, 20 percent to water and 20 percent to agriculture.

Figure 8—Gauteng CIC Projected Impact

Impacts based on 5 years of funding					
Technology Impacts					
Scenarios	**Worst (1x multiple)**	**Base (2x multiple)**	**Best (3x multiple)**	**Metric**	**Assumptions**
Energy					
Offgrid kWh produced	1,712,752,622	3,425,505,244.29	5,138,257,866.44	0.33	Cost per kwh
MW	391.04	782.08	1,173.12	4380	Assumes yearly energy production at 50% capacity per day
Off-grid access # households	359,898	719,795.18	1,079,692.76	3.9	People per household
Off-grid access # of people	1,403,601	2,807,201.19	4,210,801.78	4759	Kwh consumption per capita
Water					
Water access kL	147,260,477	294,520,953.54	441,781,430.32	$1.26	Avg water cost per kL
Access # households	76,150	152,299.71	228,449.57	3.9	Water usage per household
Access # of people	296,984	593,968.88	890,953.32	$495.85	Water usage per person over 5 years
Decreased deaths from diarrhoea	24.35	48.70	73.06	0.008%	Expected deaths from diarrhoea over 5 years, as % of current population
Agriculture					
Farms with increased yield	100.067	200.134	300.201		Average farm size 3459.4 acres, 60% yield increaseses with 8000 INR per acre irrigation
Number of households with access to cheaper/ better quality food	183,144	366,289	549,433	$1,013	Food expenditure per household
Mitigation/Adaptation					
No. of persons less vulnerable to the effects of climate change	2,414,848	4,829,697	7,244,545		Addition of the above
Value of forest assets protected / losses avoided	242,091	484,182	726,273	2.6	Based on acre of forest required to offset carbon by 2.6 tons PER YEAR
CO2 Mitigated*	3,147,182.94	6,294,365.89	9,441,548.83		Based on coal CO2 emissions at 1.47 kg/kWh
Carbon Price	67.82	33.91	22.61		Based on ton of CO2 mitigated per donor contribution

*Includes +25% from water and agricultural products that also mitigate CO2

To counteract the Valley of Death phenomenon, the CIC will reinforce global R&D and B2B industry linkages. This will ensure greater transfer of knowledge, know-how and experience among South African climate technology companies, in addition to their increased internationalization and competitiveness. Mentorship and advisory activities provided by the CIC will also boost entrepreneurial opportunity and the success rates of invested companies.

Marketing and outreach for the CIC's products and services will not only increase awareness of the Center itself, but also of the climate technology industry as a whole. This will be supported by the long-term benefits of policy design and advocacy in support of innovation, entrepreneurship and the accelerated scale-up of new technologies.

3.3 Inclusivity as a Priority in South Africa

South Africa is a middle-income country, yet it ranks 123rd out of 167 countries in the UN's Human Development Index. The country's Gini coefficient ranks consistently among the world's highest, and has hovered between 60–70 percent since the mid-1990s.

Much of South Africa's citizenry is composed of populations that are among the most vulnerable to climate change. For many disadvantaged South Africans, ecological issues are a matter of livelihood and survival. Ironically, these stakeholders are also the least likely to enjoy the benefits of the green economy in terms of high-skills jobs or industrialization.

The CIC supports small- and medium-scale enterprises to deliver the benefits of climate innovation to all South Africans. This favors firms and activities with a view to long-term financial sustainability, including public-private partnerships for enterprise development support and innovation. This lends itself to a true empowerment effect, as opposed to perpetuating dependency on donors and subsidies.

The Gauteng CIC community outreach is designed to refine the Center's inclusive growth component and increase its responsiveness to end user needs. It focuses specifically on the urban and rural poor, women, and youth. In addition to supporting technologies and businesses that serve their needs, the Center will engage and catalyze the untapped entrepreneurial and innovative capacity found in these groups.

3.3.1 Urban and Rural Poor

World Bank data shows that 36 percent of South Africa's population lives below the poverty line. This amounts to approximately 18 million people throughout the country. The concentration of poverty lies predominantly with black Africans, women, rural dwellers and black youth.[20] In 2007,

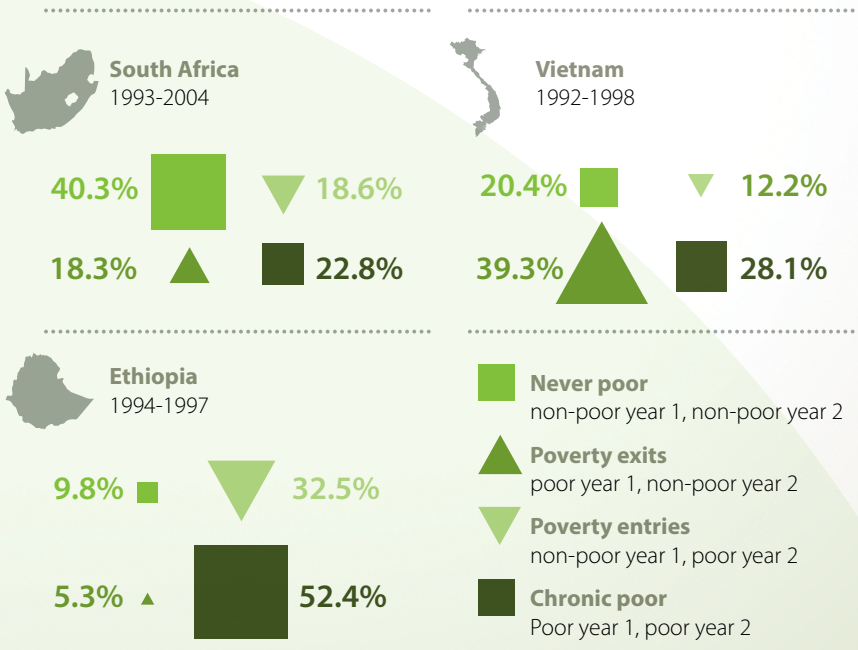
[20] Development Bank of South Africa. *Poverty and inequality in South Africa: Policy considerations in an emerging democracy.* (Triegaart)

"The poor" in flux

South Africa was part of a worldwide study by the International Fund for Agricultural Development (IFAD), which tracked the dynamics of rural poverty. The surveys were conducted with the same rural households in each country, and were between five and ten years apart.

The survey in South Africa was taken first in 1993 and again in 2004. IFAD found that 52.5 percent of the households were "chronically poor," and 9.8 percent were "never poor." Strikingly, 32.5 percent had entered into poverty, while only 5.3 percent had exited. The original graphic is at left, in addition to data for two other CIC countries (Ethiopia and Vietnam).

Source: *2011 Rural Poverty Report, IFAD.*



Statistics South Africa found that almost 50 percent of the non-white population lives below the national poverty line. In the 20 years since the end of apartheid, various measures, such as Broad-Based Black Economic Empowerment, have been put in place to address this gap.

Beyond the racial delineations, the characteristics of poverty vary between urban and rural areas. In cities, issues such as overcrowding, unhygienic conditions, pollution, crime and violence are more dominant.

In rural areas, however, poverty tends to manifest itself less in environmental quality and more in access to education, health and other services. Forty-six percent of the rural population is poor, and rural areas contain 79 percent of those members of the total population who are poor.[21] However, urban-rural migration, urban sprawl, and other phenomena contribute to a constantly shifting definition.

3.3.2 Women[22]

Women make up 52 percent of the population in South Africa. The country's constitutional and legislative framework gives due importance to gender equality. In spite of this, women in business face a number of barriers:

- **Access to finance:** Although women have better credit repayment records than men, it is more difficult for them to raise financing. Only 38 percent of black women are formally banked against 44 percent of black men, and 94 percent and 91 percent, respectively, of white men and women. Of the main commercial banks, only two have clear strategies to target the women's market, and of these only one is targeting women in the SME sector.
- **Unemployment:** In the period 2001–2005, about 30 percent of economically active women were unemployed, consistently 5–10 percentage points higher than the rate for men.
- **Income inequality:** Seventy percent of male workers earn more than R 1,000 a month, compared to 53 percent of female workers.
- **Business development support:** Women comprise the majority of entrepreneurs in the country, but are not proportionately represented among business development and enterprise incubation programs that provide training and mentorship. A majority of women-owned enterprises belong to black women; however, only 6 percent of self-employed women operate businesses in the formal sector.

3.3.3 Youth

South Africa has a high rate of youth unemployment. According to the Quarterly Labour Force Survey for the third quarter of 2010 published by Statistics South Africa, about 42 percent of young people under the age of 30 are unemployed, compared to less than 17 percent of adults over 30. One in eight working-age adults under 25 has a job, compared with 40 percent in most emerging economies. Employment of 18–24 year olds has fallen by more than 20 percent since December 2008.

Youth represent an exciting opportunity for climate change challenges, due to their entrepreneurial ability, intellectual curiosity, and interest in technology. Unfortunately, considerable evidence suggests that young people are disadvantaged in the South African labor market. The shortfalls in the education system constrain the prospects of young people, leaving them ill-equipped for the workplace, in many cases without basic competencies. They also lack work experience, which provides critical on-the-job learning and training, contact with the job market, and the potential for networking.

[21] University of Cape Town, 2007. *Poverty and Inequality Dynamics in South Africa.*

[22] IFC, 2006. *Access to finance for women entrepreneurs in South Africa: challenges and opportunities.*

CTP Community Outreach Workshops

infoDev, through the support of the Innovation, Technology and Entrepreneurship Global Practice, and in partnership with The Innovation Hub (TIH), conducted a series of inclusive green growth workshops in South Africa. The project team was composed of Jonathan Coony and Charlene Coyukiat (infoDev), Simi Siwisa (Pretoria CMU), Phelisa Nkomo (local consultant) and Niveshen Govender (The Innovation Hub). In total, the team engaged almost 400 individuals in a dialogue about how infoDev's Climate Innovation Center (CIC) can foster indigenous innovation and deliver green growth to all levels of society.

Each workshop had the following objectives:

1. **Promote awareness of climate technologies that serve the BoP and other marginalized groups.**

In addition to a multimedia presentation on inclusive green innovations, several South African exhibitors who are actively developing and marketing affordable clean energy solutions presented their products to the attendees for their information and evaluation. For more information on the exhibitors and their products, please refer to Section 5.5.

2. **Promote awareness of the CIC and how it will support small- and medium-scale enterprises to generate inclusive green growth.**

Participants were introduced to *info*Dev's Climate Technology Program and The Innovation Hub. A brief overview was also provided about the Gauteng CIC and its planned suite of services.

3. **Facilitate interaction and exchange among current and existing players in the climate innovation ecosystem.**

Each workshop culminated in an open forum where the following issues were discussed:

- What are the community's most pressing needs? In what areas would climate technology be of greatest impact?
- What are the barriers or issues hindering adoption of climate technology solutions in the community?
- How can the CIC better serve the needs of South Africa's communities and encourage local climate innovation?

4. **Gather information on stakeholder needs to further refine CIC activities towards inclusive growth and serving the marginalized.**

Participants shared their entrepreneurial experiences and ideas, which provided more detail on the gaps in the innovation system within this demographic. This allowed for a deeper review of the CIC's planned activities, most notably the inclusivity grants, technical assistance, and business advisory services.

Date: June 20, 2012

Audience: 140, mainly students, researchers/ educators, and community residents

Notable Organizations Present: Central Johannesburg College, Greater Alexandra Chamber of Commerce

Exhibitors: EcoVest SA, EnerGCare, Sunfire Systems

4.1 Alexandra township, Gauteng

4.1.1 Local Context

Alexandra township, commonly known as Alex, was established in 1912 as an interim residential area for African labor. Despite its location five minutes from the affluent Sandton area, poverty is prevalent in the community and about a third of residents are believed to be unemployed.

In a 2012 survey, 22 percent of residents identified day-to-day service delivery as the community's greatest need. This was followed by housing (21 percent) and improved education (19 percent).[23] Alexandra's infrastructure was designed for a population of about 70,000;[24] however, the current population is estimated at 400,000 and investment has not kept pace with its growth. As a result, water pressure is low and the sewer system is frequently overloaded. The majority of Alexandra community members live in tin-roof structures with poor ventilation. Heavy rains cause flooding, property damage, and loss of life. Moreover, there is inadequate power supply and distribution in the community.

Unsafe and illegal practices are commonly employed by residents to address the gaps described above. Bridging, for example, refers to the unsanctioned connection of homes to the grid. These illegal connections are a means for residents to enjoy benefits of electricity without incurring costs. They often use unsafe and exposed cabling, creating the risk of shack fires.

[23] Democratic Alliance Gauteng Provincial Legislature, June 2012.

[24] Greater Johannesburg Metropolitan Council. September 27–30, 2000. *Report on the Interactive Planning Workshop for Johannesburg.*

4.1.2 Feedback for the CIC

The concepts of climate change and variability were perceived by Alexandra residents as having more impact on their rural counterparts. Climate innovations were valued less for their mitigation and adaptation potential and more as a response to the community's urban planning and infrastructure concerns.

The community appreciated the CIC's direct outreach, but emphasized that further interaction and an ongoing engagement process was required. Community members cited the limited progress made with the Alex Techno Park, a similar incubation initiative. Residents suggested that Central Johannesburg College and the Techno Park could provide a local platform

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for the climate innovation process, under the guidance of the CIC, to partner township youth with role models. In this context, it was envisaged that the local facilities could be used to organize community innovators, provide training and ongoing technology transfer, business advice and small-scale funding to entrepreneurs. This would minimize the time and cost burden of traveling to Pretoria for ad-hoc consultations.

4.1.3 Photo Documentation

1. **Bottom left:** The University of Johannesburg's Sustainable Energy Technology and Research Centre (SeTAR) displays a range of traditional cook stoves and fuels as well as newer, cleaner models that are currently commercially available or in development.

2. **Bottom left:** Robert Mtshali, a young entrepreneur, consults with Jonathan Coony and Simi Siwisa regarding his plans for Young Minds Cleaning Services. The company is a car wash service that will use less water than manual washing and provide part-time youth employment.

3. **Top right:** Jonathan Coony and Phelisa Nkomo fielding questions about *info*Dev's Climate Technology Program.

4. **Right:** Workshop attendees during the dialogue.

5. **Bottom right**: Community residents interact with EnerGCare products and representatives

6. **Bottom right:** A student describes how Alexandra residents "must burn tires to stay warm because there is no electricity."

Date: June 21, 2012

Audience: 100, mainly village residents

Notable Organizations Present: University of Fort Hare, Eastern Cape provincial government, Global Research Alliance (CSIR South Africa, CSIR Australia, TNO)

Exhibitors: Flammable GreenGel, EnerGCare

4.2 Melani village, East London

Melani is an indigenous village situated about 10 kilometers from the University of Fort Hare. The reasons for choosing this village as a site for the project include the following:

- The presence of a local sawmill plant whose tons of saw dust waste are currently being destroyed through burning
- Proximity of potential biomass feedstock to the project area
- Proximity of the project to the initiating agent (University of Fort Hare)
- The advantages of initiating a custom-designed service in the community and opportunity for learning from the project for future replication

The workshop in East London also involved a visit to the University's working prototype of an off-grid house, as well as a community-based biomass gasifier that powers the local bakery and has provided employment to rural villagers.

4.2.1 Local Context

There are many challenges confronting the community of Melani. First and foremost is the lack of access to funding for community and individual initiatives, which constitutes a serious stumbling block for developing income-generating projects. Some of the residents have good ideas for small ventures that would benefit the village, but no awareness of how to meet start-up financing requirements. This has led to the suspension of operations of some community initiatives in poultry, brick-making and pig farming. Other businesses that have managed to subsist are not able to grow. There is also a lack of knowledge of the assistance available for community projects from local and nearby institutions, such the Nkonkobe municipality.

4.2.2 Infrastructure

Melani's roads are in poor condition. Only one gravel road runs across the village from the tarred road between Alice and Hogsback. This is the main road of the village, on which a private car can drive only very slowly. During rainy season, the part of the road near the tarred road becomes difficult to navigate, and must be maintained by the local sawmill. Footpaths throughout the village are crossed with furrows and dongas, a local term for ditches formed by the erosion of soil.

Transportation is a major problem; the community relies on one 15-seat taxi that runs between Alice and the village. A trip starts only when the taxi is full. A round trip to Alice and back is R 10 ($1.25). Cargo, such as a bag of potatoes, 25 kg. of sugar or mieliemeal, 25 liters of paraffin, etc. is charged at R 5 ($0.62) per item. This becomes costly for local spaza shops that rely on this method of transportation for their stock.

The village has no post office; residents use the address of the local shop to receive their mail, and travel to Alice to send letters or parcels. There is only one telephone booth, which is operated with Vodacom cards and is on average a kilometer's walk for the residents. There are three livestock grazing areas in Melani. The fencing for the grazing areas is old and needs regular maintenance to keep animals from roaming.


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4.2.3 Social services

The community needs irrigation services, water pumps and windmills to increase agricultural activity. Melani's small-scale and subsistence farmers currently depend on rain for their crops; thus, the quantity and quality of produce suffers during drier years.

Water for household use is reticulated from the Binfield dam and is distributed from communal taps to households through long black rubber pipes. Toilets in the village are pit latrines with very poor sanitary conditions. They are constructed by individual families, some with poor and low quality materials that create both health and safety hazards.

There are no recreation facilities in the village except for the community hall, which serves as a social center for community meetings, training, and other community activities. The hall is a donation from the local sawmill factory owner.

Many families depend on social security, such as the old-age care service, whereby seniors in need can go to the village center twice a week for a meal and a bath. Food is bought through contributions from community members. The cooking used to be done by village volunteers on a daily basis, but has since been reduced to twice a week because of financial constraints.

There is concern about the emigration of young people to urban areas in pursuit of employment opportunities and better educational facilities for their children. Many have not come back to the village.

4.2.4 Environment

The sawmill factory is a major environmental concern in Melani. It produces 150 cubic meters of sawdust that it currently disposes of through incineration. As a result, the incinerator produces a constant stream of smoke that affects local air quality. The factory is on the eastern side of the village. Although the incinerator is situated downwind of the village, there are times when the wind changes course. This causes health problems for the residents, leaves residue on houses and visibly contaminates water that is left in open containers.

Soil erosion is another problem for the village. This is caused by running water during rainy seasons, which creates dongas and furrows that damage the roads and soil, making transportation and productivity more difficult for the community.

Melani village receives its electricity supply from ESKOM. There are two substations that supply Melani and the surrounding villages, one in Alice and a secondary one in Macfarlane village. Electricity in Melani is used by the residents for some of their household needs. It is used to supplement other sources of energy, namely, firewood, paraffin and gas. The sawmill factory, the schools and the clinic all require electricity for their operations. The general store also uses electricity for lighting and refrigeration, while the spaza shops use electric refrigeration for meat and drinks. Other projects do not use electricity because of its cost.

4.2.5 Photo Documentation

1. **Bottom left:** University of Fort Hare, World Bank, Global Research Alliance and Eastern Cape provincial officials view the off-grid model house.
2. **Top right:** Thulani Bhengu demonstrates the Flammable GreenGel stove.
3. **Right:** Workshop participants during the dialogue.
4. **Right:** Flammable GreenGel donated fuel and heating devices to the local community.
5. **Right:** Bringing inclusive green growth to rural villages such as Melani involves very different executional challenges compared to crowded urban townships.

4.3 Ivory Park Township, Gauteng

Date: June 22, 2012

Audience: 40, mainly students and township residents

Notable Organizations Present: Green Life Style (local youth group)

Exhibitors: EcoVest SA, EnerGCare

4.3.1 Local Context

Ivory Park is one of the old African townships, located in an area of Gauteng called Midrand. It is adjacent to a growing middle-class residential area, and the establishment of the township was intended to provide a source of labor to this affluent suburb. Over time, urban migration and shrinking rural economies have grown the township population to 800,000 people in 170,000 households. Compared to rural areas, the Ivory Park community is better resourced; it has access to clinics and schools, average-quality road infrastructure, and access to various forms of transportation. However, the majority of community members live off social welfare, which ranges from social grants to free basic water and electricity.

The growth and development context of this community shows a complex duality. There are high levels of persistent poverty, which is exacerbated by issues such as unemployment, low levels of enterprise activity, lack of infrastructure development, and lack of access to capital. Most of the population cannot participate in the formal economy due to a lack of skills. To ameliorate living conditions in the community, the government has introduced a housing scheme to increase electrification and improve sanitation services in poor households.

The ever-increasing divide between rich and poor is evident in the Ivory Park community. Many of its residents are active in South Africa's informal "second economy," which includes spaza stores, vegetable stalls, local sewing projects, child-care activities, etc.

Major strides were made towards improving the quality of health care, significantly increasing access for the general public, particularly children, women and people with disabilities. The community is one of the beneficiaries of the successful inter-sectoral comprehensive HIV and AIDS programs, thus contributing to the stabilization of the epidemic in the community. Urban sprawl is putting a lot of pressure on the social infrastructure in Ivory Park and neighboring townships such as Tembisa.

Successes and strengths of local interventions include the short-term job opportunities created through the Community Based Public Works Programme (CBPWP). The decision to converge the CBPWP into an Expanded Public Works Programme (EPWP) aims to build on the successes of the CBPWP, and increase its ability to move beyond its limited primary focus on short-term job creation, to an approach that encompasses the provision of necessary social and economic infrastructure in a manner that creates jobs as well as facilitates development of longer-term relevant skills ranging from project management to labor-intensive tasks.

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4.3.2 Energy Needs

Energy consumption patterns for the households have been changing over time, particularly in the past ten years. There has been a gradual movement from the predominant use of firewood for household fuel needs to paraffin and gas, and lately, to electricity. Due to urbanization in Gauteng, almost all the households are electrified. A local student pointed out during the workshop that in addition to lighting and heating, their community has a great need for cheaper means of insulation.

4.3.3 Photo Documentation

1. **Top right:** A community resident describes local needs and conditions preventing innovation and growth of climate friendly enterprises. "Today I learned a lot, but what about the rest of my community and South Africa? Must they all go to the CIC in Pretoria?"
2. **Bottom left:** Technology demonstration by EcoVest and EnerGCare.
3. **Bottom left:** School children test a safe and energy-efficient heater.
4. **Bottom center:** A solar-powered television from EcoVest SA that can also be used to access the Internet.
5. **Bottom right:** The EcoVest solar-powered refrigerator/cooler.
6. **Bottom right:** Ivory Park residents were initially skeptical of the effectiveness of solar technology on overcast days. This woman was delighted to find that a solar mobile phone charger could supply her phone with power, despite the relatively cloudy winter weather on the day of this workshop.

> *"Today I learned a lot, but what about the rest of my community and South Africa? Must they all go to the CIC in Pretoria?"*

4.4 Soweto township, Gauteng

Date: June 25, 2012

Audience: 80, mainly university students, researchers, aspiring entrepreneurs, and Eskom retrofitting technicians

Notable Organizations Present: Eskom (Sustainable Development and Small Business), University of Johannesburg (Soweto Campus)

Exhibitors: EcoVest SA, EnerGCare, Flammable GreenGel, Sunfire Systems

4.4.1 Community Overview

The South Western Townships (Soweto) is situated on 153 square kilometers of land and is home to more than 1,250,000 people, who constitute about 40 percent of all residents of the Johannesburg Metropolitan Council. Soweto has strong historical significance in South Africa, as it was initially used to house African laborers working in the mining sector. Later, Soweto became a vibrant, politicized community and played a prominent role in the fight against apartheid.

Despite its political significance and sizable population, the region's economic performance is limited, contributing only 4 percent of Johannesburg's economic activity. This can be considered in the context of high unemployment, estimated at 53 percent in the Soweto area. High unemployment can be attributed to low skills and de-industrialization, as evidenced by more than 30 hectares of industrial parks standing vacant. In terms of structure, economic activity is concentrated around government and social services. There is limited intra-Soweto economic activity, with the majority of employed citizens working in neighboring Johannesburg regions.

4.4.2 Feedback for the CIC

Soweto continues to struggle with high unemployment, especially among young people. The community expressed interest in working closely with the Province and the CIC to explore whether job creation through innovation could be achieved in a manner similar to expanded public works, where basic levels of training are often provided. The University of Johannesburg Soweto Campus, which hosted the program, was identified as a valuable potential partner to serve the township. The campus offers specific short-term training program for Soweto-based tradesmen, entrepreneurs and young persons.

The group stressed energy poverty as a priority sector where intervention is needed. Although the government sponsors free basic energy access, residents consume this sparingly to power low-intensity activities. A majority of the Soweto participants indicated

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that they utilize paraffin for cooking and electricity only for lights. Communities agreed that solar-powered devices would not only alleviate energy poverty, but would improve safety.

With respect to local climate innovation, the community felt that it would be beneficial for them to get technical support and equipment in order to replicate certain technologies. They noted that some of the innovations appeared to be simple and could be replicated at the local level if specific support were provided. This consequently raised concerns about standardization and product safety; according to participants, communities lacked specific capacity to test and prove concepts.

The community noted that lack of integration among government agencies creates confusing overlaps and a lack of accountability. One of the business people suggested that the CIC must also incorporate Eskom and other players, including municipalities, in order to provide a one-stop solution to clients. In this instance, the gentleman explained that accessing the value chain was difficult for most entrepreneurs and that market access is integral to success.

The Soweto community expressed frustration over limited access to knowledge and information. In this context, community members indicated that they have the ability and willingness to learn about technologies, but require some level of mentorship. One participant said that he "has been thinking about ideas and how to solve problems" over the past few years. However, he "does not know how to move from dreaming to implementing."

Finally, the entrepreneurs in Soweto raised concerns about intellectual property protection. They noted previous experiences of having community innovations "stolen by sharks," prejudicing small-scale innovators. Most participants were concerned about how they can safeguard their ideas. It was noted that protecting small innovators would be integral to the CIC's services.

4.4.3 Photo Documentation

1. **Bottom left:** James Robinson of the Sustainable Energy Technology and Research Centre discusses safer, cleaner cook stoves as a key example of inclusive climate technologies.
2. **Bottom left:** Students, entrepreneurs and researchers during the workshop dialogue.
3. **Bottom right:** Dr. Thami Mazwai, Director of the Centre for Small Business Development at the University of Johannesburg Soweto Campus, delivers opening remarks.
4. **Above right:** Workshop participants inquire about the Sunfire solar cooker, which can boil a kettle or pot of water in less than ten minutes by simply reflecting and concentrating the sun's energy.

4.5 Aggregated Findings

The below table highlights the key issues that were discussed and raised in each of the workshops. While each community has its own individual set of needs, it is also evident that the barriers not only include limited access to finance, but that each township has individual characteristics that also hinder the adoption of climate technology solutions. The CIC can maximize benefit by strengthening these local ecosystems.

Township	What are the community's most pressing needs? In what areas would climate technology be of greatest impact?	What are the barriers or issues hindering the adoption of climate technology solutions in the community?	How can the CIC better serve the needs of South Africa's communities and encourage local climate innovation?
Alexandra township, Gauteng	• Water management including low water pressure and overloaded sewer system • Inadequate power supply and distribution	• Lack of access to capital • Lack of infrastructure • Lack of access to knowledge and information	• Engage in local partnership efforts with existing incubation initiatives and universities • Establish local facilities that provide training, business advice and small scale funding to minimize time and cost burden of travelling
Melani village, East London	• Sustainable Agriculture: Lack of infrastructure for agricultural activities such as irrigation services, water pumps and windmills. • Adaptation: Soil erosion • Pollution: Sawmill factory that incinerates sawdust, affecting local air quality • Energy: Electricity available but is used as a supplement to firewood, paraffin and gas	• Lack of access to capital • Lack of knowledge of assistance available for community projects from the municipality and other local institutions	• Provide small scale funding for community and individual initiatives • Offer advisory services: Residents have good ideas but lack knowledge in meeting start-up financing requirements • Build a network: Connecting and advising the community and entrepreneurs on funding and assistance available by local institutions and the municipality
Ivory Park township, Gauteng	• Energy: Light, heat, and insulation	• Lack of access to capital • Lack of skills to participate in formal economy	• Establish local facilities that provide training, business advice and small-scale funding to minimize time and cost burden of travelling • Education: Provide relevant development in technical/ business skills
Soweto township, Gauteng	• Energy Poverty: Despite the government sponsoring free basic energy, majority of residents utilize paraffin for cooking and electricity only for lights.	• Lack of access to capital • Lack of integration among government agencies that creates overlaps and lack of accountability. • Lack of access to knowledge and information, hindering implementation of ideas	• Train youth for job creation opportunities • Partner with the University of Johannesburg Soweto Campus • Provide capacity and technical support to innovators, particularly protecting small scale innovators through intellectual property protection • Network: Provide integration with government agencies, Eskom and other stakeholders

4.6 SME Exhibitors

The firms below are a sampling of existing efforts by South African enterprises to serve low-income and BoP markets. They represent potential clients for the Gauteng CIC and for the CTP's regional climate innovation networks.

4.6.1 Ecovest SA[25]

Ecovest is a manufacturer and supplier of solar powered lighting and household appliance systems. The firm's target market is people living in off-grid rural areas of the African continent. Ecovest's lighting products are safe, efficient and affordable; users are able to save money and increase productivity through extended work and study hours. The company's flagship product is the Eco-kit (pictured at left), which consists of an LED lantern, solar panel, and battery-controller unit. The modular design of the kit makes it more suited to daily household use than an all-in-one portable solar lantern. Instead of taking the entire unit outdoors to charge in the sun, the panel can be installed on the roof or window, while the other components are placed indoors. Users can hang the controller on the wall to mimic a fixed light switch, while the lantern can be installed in place of a regular light fixture.

Ecovest's other solar products, which include a refrigerator, water heater, and television with Internet browsing capability, can be added on to this system to minimize each household's required investment in solar panels. The company is also piloting a way to make its products more affordable and create employment in low-income communities. Under this model, households would only have to purchase the lights and appliances, powering them through rented battery packs from a central charging station.

[25] Photo and information courtesy of Ecovest Website, http://www.ecovestsa.com/

4.6.2 EnerGCare[26]

EnerGCare is a brand created by consulting firm Restio Energy, entrepreneurship NGO The Business Place and microfinance NGO PlaNet Finance. EnerGCare creates social enterprises that sell clean energy products to low-income households in the informal settlements around Cape Town and in Gauteng Province. The range of products includes EcoZoom cook stoves, a combination solar LED light and mobile phone charger, the WonderBag energy-saving insulation device for cooking and cooling, and converted shipping containers that can be used as business or community space. EnerGCare uses a direct sales model, with 30 agents active in Cape Town and Gauteng.

4.6.3 Sunfire Solutions[27]

Mathias Weber and Crosby Menzies of Sunfire Solutions have developed a parabolic solar cooker that can prepare meals and boil water using only the sun's energy. The unit is available in different sizes with corresponding power output capacities, performs comparably with traditional appliances, and has an expected useful life of 10 to 15 years.

[26] Photos and information courtesy of EnerGCare page on Restio Energy Website: http://www.restio.co.za/2011/08/19/energcare/

[27] Information courtesy of Sunfire Solutions website: http;//www.sunfire.co.za/

The Sunfire cooker reduces the need for electricity, paraffin, wood, and charcoal fuels, thereby minimizing harmful emissions and reducing grid dependency. Even during winter, South Africa's climate provides a sufficient number of clear and sunny days for the device to substantially impact household expenditure. For rural communities, there is an added benefit of time saved collecting fuel, which is often done by women and children.

However, the savings and other consumer advantages remain out of reach for those who cannot afford the upfront investment for a parabolic cooker. Prices range from R 1,500–2,500 (approximately $180–300), a substantial amount considering that cost savings from using the product only accrue over several months following purchase. The company has begun to address this issue by providing reduced prices for social development projects, but price remains the key obstacle to widespread market adoption.

4.6.4 Flammable GreenGel[28]

Flammable GreenGel is an ethanol-based alternative clean fuel for use in heating, lighting and cooking. The brand is manufactured and distributed by Global Renewable Energy Solutions (GRES), a private company based in the South African province of KwaZulu-Natal. Unlike traditional household fuels such as paraffin, wood and coal, the gel is non-toxic, non-explosive, and burns without creating ash or smoke.

GRES estimates that it has invested R 1.2 million over three years in Rural Development and Cooperative Enterprise Development initiatives. It has identified, trained, mentored, financed and supplied over 20 cooperatives to market its products. Through these cooperatives, as well as related businesses such as trucking, it has contributed to the creation of more than 70 jobs in KwaZulu-Natal and the Eastern Cape. The company seeks assistance to scale its operations nationwide and beyond.

[28] Information courtesy of Flammable GreenGel website: http://www.flammablegreengel.com/

Findings and Recommendations

5.1 International Experience

This report has highlighted selected frameworks and initiatives by international organizations that endorse and have elaborated on inclusive green growth frameworks and policy toolkits including the UN, World Bank and OECD. These frameworks and initiatives can help catalyze and mainstream green growth within national objectives. The design and implementation of national green economy plans are rapidly emerging in developing economies.

The integration of public policies supporting green growth emerged from National Sustainable Development Strategies (NSDS) introduced in 1992, which evolved into Low-Emission Development Strategies (LEDS) and, more recently, Green Economy & Green Growth Strategies. These national plans integrate environmental and development objectives by addressing a broader range of environmental, social and economic issues[29].

These national reform efforts are helping to create a foundation to further a greener and more equitable form of growth. Korea led the way in green growth strategies by publishing its *National Strategy for Green Growth and Five Year Plan in 2009*, and green growth strategies have also been published in Cambodia, France, Ethiopia, South Africa, Rwanda, Grenada and Vietnam, among others.

5.2 Inclusivity Strategies

An exhaustive survey of green BoP innovations conducted for a World Bank study indicates that very few BoP (and related low-tech) green innovations have been sufficiently scaled up to date. However, it is evident from the community consultations that there is scope for inclusive innovations in South Africa. This inclusivity is not only limited to innovators; it has the ability to harness community end-user buying power through the adoption of innovative clean technology products. Climate innovation can unlock local economic development and social mobility for innovators and end-users, given the challenges and needs existing in most communities.

The community workshops and inclusive growth research yielded valuable and actionable insights, which further informed the design of the Gauteng CIC. As it moves towards implementation, *info*Dev recommends that the Center employ four strategies to maximize inclusive green growth and climate technology innovation. These strategies will directly inform the operations of the Gauteng CIC, but are also more widely applicable beyond the South Africa context. They are designed to localize and accelerate inclusion, facilitate access to climate technologies, and spur green job creation at the BoP.

Further Other Services That Can Be Extended to SMEs to Promote Inclusion

- **Demand generation:** Promoting awareness of climate technology solutions that are designed for the BoP and marginalized groups
- **Supply Management:** Helping SMEs develop distribution networks, pricing strategies and other executional considerations for BoP markets
- **Information management:** Aggregating, analyzing and disseminating knowledge to counteract existing market fragmentation
- **Relationship management:** Advocating on behalf of inclusivity with provincial and national government entities, international organizations, etc.

[29] *UNDESA*, 2012. A guidebook to the Green Economy

5.2.1 Improve the quality, timeliness and flow of information on climate-friendly solutions to end users at the BoP

Information asymmetry is a major barrier to purchase. Sellers have disproportionately more knowledge than end users, and are relatively less effective at conveying this knowledge in a timely and locally relevant manner. For a low-income household, purchase decisions are inherently riskier and more complex. Prospective end users need active guidance in understanding and evaluating options before they are driven to purchase.

There is, therefore, a need to improve the quantity of information that the poor can access about affordable clean technology alternatives. Workshop participants admitted that they were aware of some products, such as the solar lamp and cleaner cook stoves, but some technologies that were presented were completely new to them. However, following the workshops, several community members expressed interest in becoming customers and/or salespeople.

The implication for companies with an inclusive business model is that they should prioritize low-cost, grassroots communications channels and direct marketing over mass-media outlets. Euromonitor estimates that mobile technology has a 95 percent penetration rate in South Africa, compared to only 10 percent for the Internet. Television and radio use are inconsistent across BoP markets, and are prohibitively expensive for start-up businesses, except in the case of free public relations features or public service announcements. Word of mouth thus becomes a major marketing channel for reaching low-income South African households.

Moreover, the quality of available information should be made more digestible for its intended audience. Websites and marketing materials are predominantly in English; however, most workshop participants were only comfortable in their local dialects, particularly in the Eastern Cape. The tone of messaging should also be respectful of the consumers rather than condescending or imposing. In both rural and urban areas, the use of personable and relatable local community representatives serves to build trust and engender consumer confidence, while streamlining marketing and distribution costs for the seller.

Finally, there is a need to tailor end-user messaging to focus on co-benefits (e.g., energy access, cost savings, health, safety, and increased income or productivity). Many participants knew of climate-friendly technologies such as solar lamps and cleaner cook stoves, but remained unconvinced or uninformed about their other benefits. During the dialogues and demonstrations, they were more compelled by results that they described as tangible and personal, in contrast with macro-level impacts such as GHG emissions. Initiatives to increase environmental awareness through public information campaigns and educational programs will help link individual behavior and responsibility to environmental benefits and green growth, i.e., making citizens aware of the benefits of solar lamps compared to paraffin. Such outreach and branding campaigns, implemented by businesses and NGO's, can catalyze demand so as to achieve long-term market gains, which will sustain demand for clean technology innovations and products.

5.2.2 Match end user financing to the stream of benefits, thereby reducing the upfront cost of switching or adoption.

Price sensitivity is extremely high at the BoP. The scarcity of disposable income means that end users are more likely to forego products and services, economize on usage of existing solutions, or employ makeshift substitutes. They are more careful and critical not only about the purchase price, but also follow-on ownership costs such as fuel, upkeep, and repair. Price sensitivity is exacerbated by the fact that the direct benefits of adopting a technology are often spread out over time.

CIC financing is targeted towards innovators and entrepreneurs. However, the center can connect end users to microfinance or crowdfunding institutions that can help to similarly spread out the cost of acquiring climate technology products. This mitigates the difficulty of having to save up for a lump-sum upfront investment, since the timing and size of payments can be matched more closely to the resulting savings.

Another option is to promote sharing of technologies that are too expensive for household or individual use. A cook stove, water filter or solar cooker can be shared by two or more homes in communities where residences are built in close proximity.

In certain cases, this approach can be further expanded to community-wide social enterprise projects. EcoVest SA is exploring this through modularization of its solar-powered appliance system: Whereas a complete solar light kit costs R 500, the company has made the light bulb alone available for R 65. A local business is established where batteries are charged and rented out, effectively sharing the cost of the solar panel and batteries. For houses that can afford to buy the entire kit, the company's other products (televisions, water heater, refrigerator) can be added on to the system with or without buying additional solar panels. Another example is the biomass gasifier, which was installed in Melani's village bakery to increase economic output, decrease waste and create local jobs. Because it generates value for the entire community, residents share responsibility for its operation and maintenance.

Further Other Services That Can Be Extended to SMEs to Promote Inclusion

- **Demand generation:** Promoting awareness of climate technology solutions that are designed for the BoP and marginalized groups
- **Supply Management:** Helping SMEs develop distribution networks, pricing strategies and other executional considerations for BoP markets
- **Information management:** Aggregating, analyzing and disseminating knowledge to counteract existing market fragmentation
- **Relationship management:** Advocating on behalf of inclusivity with provincial and national government entities, international organizations, etc.

5.2.3 Extend community-level presence of institutional apparatus through partnerships with established actors in the social economy.

To a certain extent, the interventions required to fully mainstream inclusive green growth may lie beyond the scope of the CIC's capabilities. This constitutes a valuable opportunity to leverage institutional linkages with the public sector, academe, industry and civil society. Non-governmental organizations, cooperatives, and other community-based organizations can all become key proponents in the design and implementation of effective and sustainable green economy approaches and interventions. Institutional partners will also be valuable in building a human capital base of knowledge, skills and entrepreneurial appetite that will sustain the climate innovation system. The CIC should collaborate with these entities and leverage their expertise to deliver effective, holistic, and sustainable green economy interventions.

Another recommendation is to establish satellite offices in urban and rural poor communities outside of the CIC's central location in Pretoria. These offices can deliver CIC expertise and assistance on a micro scale. This also includes financial support; the CIC's inclusivity grants may be smaller in size in order to serve a greater number of entrepreneurs and maximize job creation. To illustrate, Robert Mtshali requires only R 15,000 for his water-saving car wash business, far less than the R 100,000 peg for inclusivity grants and the CIC's average cost per job. Each satellite office could be responsible for parceling out a R 100,000 inclusivity grant to support multiple ideas like Robert's. To this end, it will be important to leverage the expertise of the microfinance and rural banking industries in order to minimize related transaction and monitoring costs.

5.2.4 Offer assistance and incentives that motivate firms to innovate towards inclusion

The market potential at the BoP is often overshadowed by the logistical complexity and cost structure implications of serving poor constituencies. To facilitate the mainstreaming of an inclusive mindset, the CIC must actively inform and channel existing innovative capacity towards serving the disadvantaged.

The primary way to achieve this is through the center's financial services. In addition to the inclusivity grants, criteria for social benefit can be weighted into the screening for proof-of-concept funding and seed investments, such that larger SMEs are encouraged to consider incorporating social development into their business plans and related milestones.

The center can also provide entrepreneurs with product development assistance and specific insight into community needs. For instance, many types of improved cook stoves are rejected by people in communities where coal is unavailable or expensive. Product functionality and design that are appropriate for a rural community may not be relevant to an urban one, and vice versa.

However, innovation in technologies and products is not enough. Processes and business models also need to be tailored to the target market. For example, many companies that operate in low-income markets struggle with financing, billing and payment. Because income streams are limited and sporadic, large upfront costs and even monthly payments can be a significant challenge. Companies may also struggle to develop efficient collection systems, whether in urban or rural settings.[30] The Gauteng CIC can respond by providing community based-training programs, ranging from Information and Communications Technology (ICT) skills to business plan development, which are vital in improving employability and building a knowledge-based economy that can foster innovative entrepreneurs. Additionally, a number of platforms can be created to connect these innovators with a network of mentors and investors, such as "Idea Challenges" and Proof-of-Concept (PoC) competitions. Workshops and other programs, such as small group networking among local entrepreneurs and peer-to-peer mentoring, can facilitate peer learning and knowledge exchange opportunities, creating new networks and collaborations.

[30] IFC, 2011. *Energy Access Business Models: Leveraging the Private Sector to Serve the Poor.*

5.3 The Gauteng CIC's Approach to Inclusivity

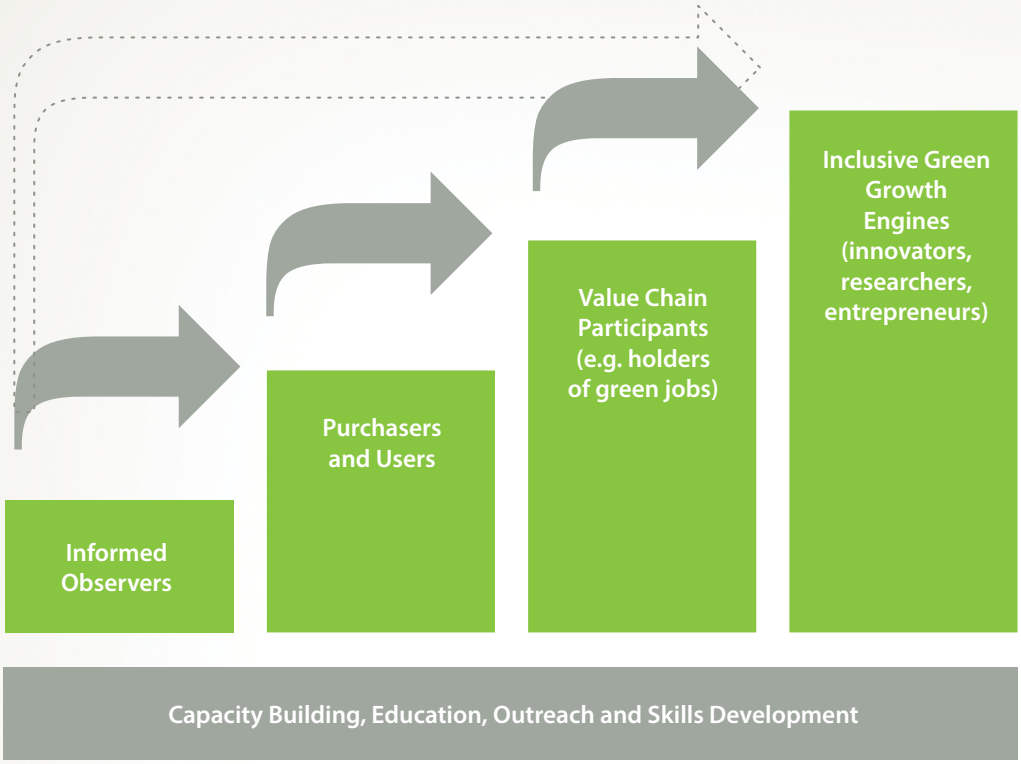
The generic CIC model is not income-neutral; it is distinctly more relevant to the South African "first economy" and middle class. A complementary, not divergent, strategy is needed to include the second economy and informal sector. The Gauteng CIC will be the first in *info*Dev's global network to highlight inclusive growth as a strategic priority, and has the potential to become a center of regional and international leadership in this field.

Stakeholder feedback emphasized the need for a village-by-village or township-by-township approach to inclusivity, where each community has a stake in deciding which projects and activities are implemented. This will build a sustainable stream of locally-grown products, services, technologies and business models that can then be funneled to the center's main services and programs.

In this regard, it is useful to depict inclusive green growth as a ladder or journey (Figure 14), with each step representing a progressively more active stake in its benefits. The CIC's inclusivity platform will have the long-term goal of empowering disadvantaged South Africans to become active participants in the green economy innovation ecosystem. This is supported by the capacity building, education and skills development that the Center will deliver through direct intervention and relevant institutional partnerships.

The goal will be achieved in two ways, which the CIC will pursue simultaneously due to the range of needs, resources and capabilities faced by poor South Africans.

Figure 9—Progressive Levels of Engagement in Inclusive Green Growth



- The solid arrows depict a **gradual progression**, which begins with informing target groups about climate solutions and encouraging them to adopt appropriate technologies. Their inclusion at this stage increases their propensity to become value creators, and thus eligible for inclusion in the main CIC service lines. Given the feedback from the communities themselves, it is anticipated that this will comprise the majority of the CIC's inclusivity focus at the onset of operations.
- The dotted arrow represents **accelerated engagement**, which the CIC will catalyze by identifying individuals or groups at the BoP with sufficiently high interest and ability to leapfrog directly into contributing value and innovation. This approach will capture early results in job creation and enterprise development where possible. The CIC's efforts and impact over time will increase the potential for leapfrogging to occur and succeed.

South Africa faces a number of pressing socioeconomic and development challenges to effective achievement of the United Nations Millennium Development Goals. These are compounded by the challenge of effectively addressing climate change mitigation and adaptation in the wake of a global economic crisis. In conjunction with technological, political and infrastructural improvements, pervasive change in habits and mindsets must take place at all levels of society. Disadvantaged populations must be fully included in the climate technology revolution in order to realize South Africa's transition to sustainable lifestyles. They must share the vision of a climate-compatible economy, where profitable growth need not be sacrificed for environmental sustainability.

Annex

Annex 1: About *info*Dev's Climate Technology Program

The Climate Technology Program (CTP) accelerates climate technology innovation and entrepreneurship in developing countries. By helping the private sector seize opportunities in the rapidly expanding cleantech industry, the CTP reduces emissions, increases climate resiliency and, importantly, creates jobs, driving economic development. The CTP is designed to deliver inclusive green growth through its focus on developing countries, SMEs and the climate sector, as well as committed to customizing its services to specific local contexts.

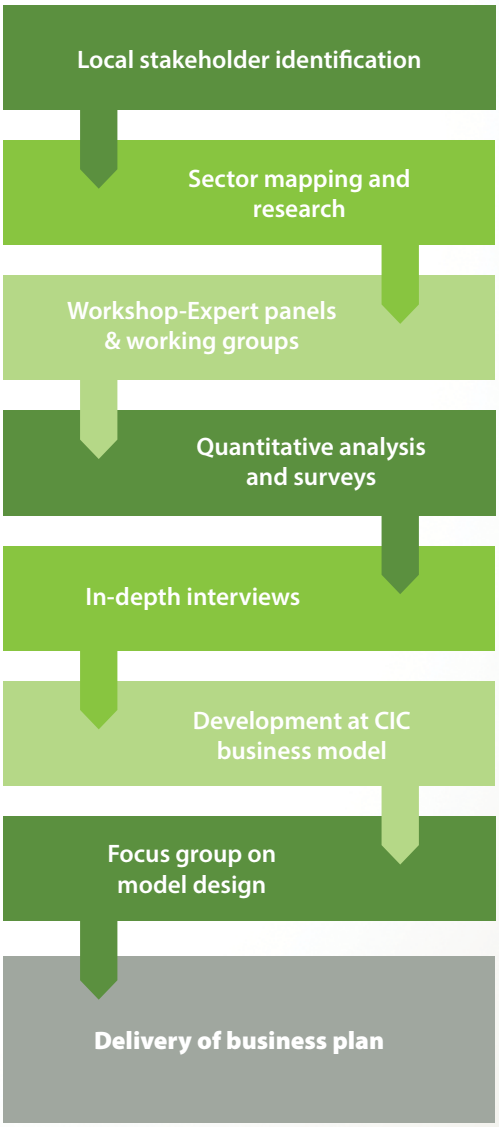
In addition to its activities at the global and country levels, the CTP is coordinating closely with other organizations and networks involved in promoting climate technology development and deployment. Its unique position within the Financial and Private Sector Vice Presidency allows the CTP to leverage the networks, expertise and funding of both The World Bank and the IFC. The CTP will also help to consolidate climate technology innovation efforts both within the World Bank Group and externally through partnering with relevant organizations. The CTP aims to complement the efforts and resources of other networks, platforms and initiatives, such as the United Nations Framework Convention on Climate Change (UNFCCC), Global Green Growth Initiative (GGGI), International Renewable Energy Agency (IRENA), Climate and Development Knowledge Network (CDKN), UNDP, UNEP, and World Intellectual Property Organization (WIPO).

Local Activities—Climate Innovation Centers (CICs)

The Climate Technology Program's flagship initiative is a network of Climate Innovation Centers (CICs), which will accelerate the development, deployment, and transfer of locally relevant climate technologies.

The first eight CICs will be launched in Kenya, Ethiopia, India, Ghana, South Africa, Vietnam, Morocco and the Caribbean

Figure A1—CIC Business Plan Development Process



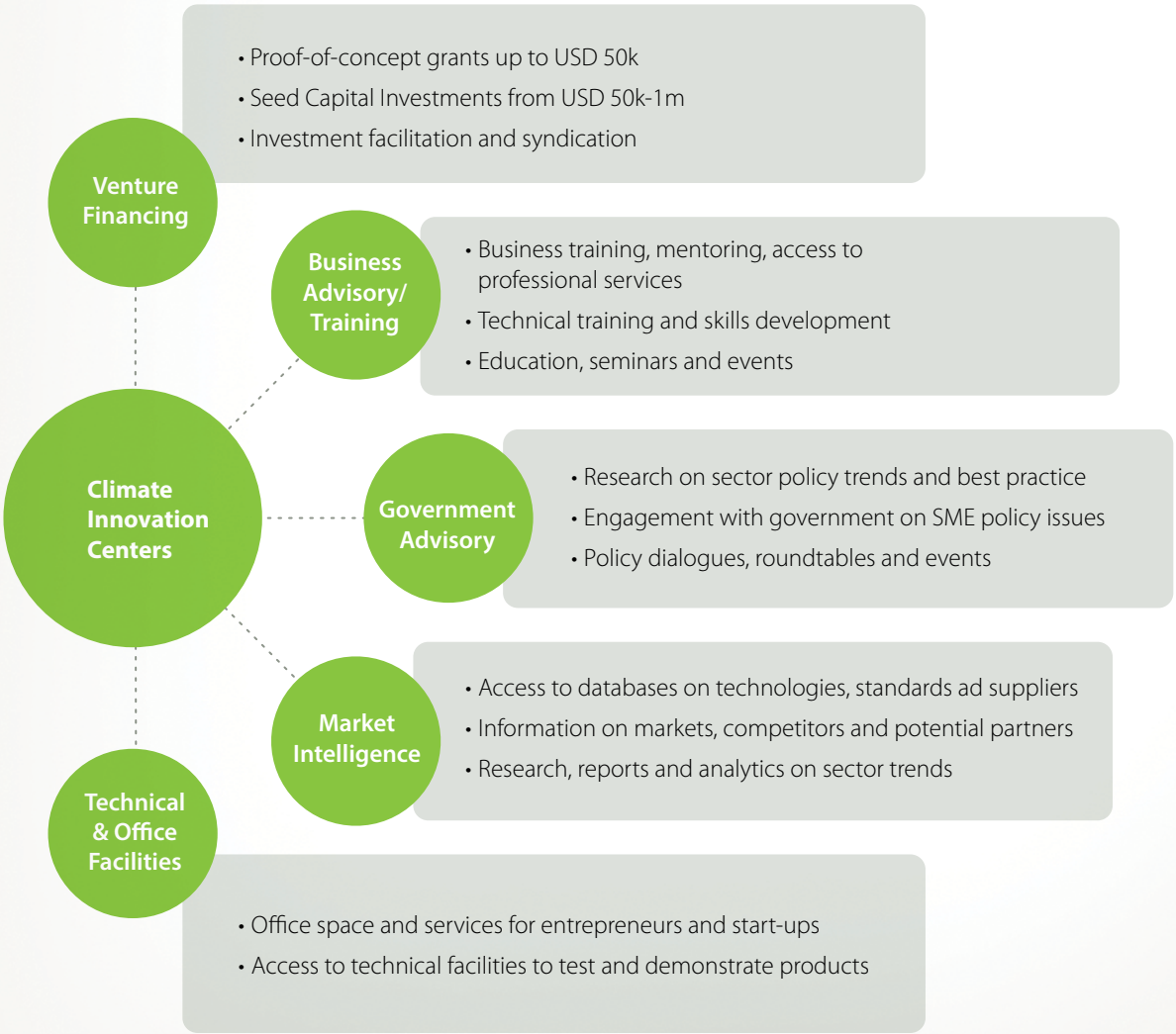
*info*Dev undertakes rigorous business planning (Figure A1), fundraising, and implementation activities for each center prior to its official launch. The CIC in Kenya was the first to launch at the end of Q2 2012, while the South Africa CIC is currently being rolled out and the CICs in Ethiopia and India expect to launch in June 2013 and the first quarter of 2014, respectively.[31] The business plan has been completed for the CIC in Vietnam, while those for Morocco and the Caribbean are presently in development.

Each CIC is customized to the unique country and regional context in which it will operate. Based on local stakeholder feedback, *info*Dev determines the priority gaps and needs in the innovation ecosystem. Further analysis results in the optimal CIC business model as well as impact and sustainability projections.

At the country level, CICs build capacity and address barriers to innovation by offering a tailored suite of financing and services that support domestic companies (Figure A2). With a CIC's assistance, innovative enterprises can become more competitively and profitably involved in booming local and international cleantech markets. This serves the program's mission of climate-responsible job creation, economic growth, and poverty alleviation in the developing world.

[31] Full business plans for the first four CICs are available at http://www.infodev.org

Figure A2—CIC Capabilities and Service Offerings



Global Activities

Over the next three to five years, *info*Dev will also be launching five global service lines in parallel to the planned CIC rollout described above.[32] These activities will serve to integrate and scale country-level operations, facilitate the creation and application of knowledge, and engage countries that do not have a physical CIC presence.

a. CIC Launch: CIC Scoping and Design

CTP will expand scoping and design activities to meet strong client country demand for Climate Innovation Centers (CICs). [33]CICs will continue to be tailored to the particular needs of each country. Detailed operational and financial plans are packaged in a business plan which determines feasibility and serves as a blueprint for local implementation.

b. IGNITE Fund: Global Financing

The CTP will mobilize and syndicate global funding for innovative technologies in the form of strategic applied R&D prizes, innovation prizes and seed investments. Global financing, facilitation, and syndication will address crucial funding gaps while offering deal-flow to public and private investors eager to support promising climate ventures in developing countries.

c. ClimateTRACK: Evidence-based Analysis

The CTP will actively package lessons from individual CICs and provide cutting-edge analytical products and policy toolkits on supporting private-sector innovators. The experiences from the CICs will provide tremendous learning on climate innovation across multiple countries and regions, which can be enriched through collaborative research work.

d. MarketCONNECT: Internationalization of Business and Research Partnerships

Working through the CICs, the CTP will establish a technology database to link promising companies with global partners and expertise. Business seminars and events will connect entrepreneurs to find international suppliers, partners, financing and export markets and grow a world-class business. The CTP will also formalize three regional innovation networks in East Africa, North Africa and the Caribbean.

Impact Xchange: Measurement Tools

CTP will provide client governments with a CIC-based Monitoring and Evaluation (M&E) tool to track domestic innovation progress. This will be highly useful for policy makers to access timely data on R&D activity, employment numbers, technology impact, and the involvement of women in local climate sectors. Aside from benchmarking and disseminating its own results, CTP will offer exchanges and training for interested partners.

Figure A3 is a schematic representation of how the local and global activities will complement each other once the CTP is fully operational.

[32] The CTP is developing a five-year program prospectus; the final version will be available upon request.

[33] The governments of Kazakhstan, Egypt, Senegal, Ghana, Rwanda, Tanzania, Mexico, Columbia, Nepal, Algeria, Argentina, and the Philippines have approached *info*Dev regarding CIC feasibility for their countries.

Figure A3—Integration of CTP local and global activities

VENTURE FINANCE

+ Proof-of-concept grants up to USD 50k
+ Seed Capital Investments from USD 50k-1m
+ Investor facilitation and syndication

BUSINESS ADVISORY & TRAINING

+ Business training, mentoring, access to professional services
+ Technical training and skills development
+ Education, seminars and events

GOVERNMENT ADVISORY

+ Research on sector policy trends and best practice
+ Engagement with government on SME policy issues
+ Policy dialogues, roundtables and events

MARKET INTELLIGENCE

+ Access to databases on technologies, standards and suppliers
+ Information on markets, competitors, potential partners
+ Research, reports and analytics on sector trends

ACCESS TO FACILITIES

+ Office space and services for entrepreneurs and start-ups
+ Access to technical facilities to test and demonstrate products

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About *info*Dev

*info*Dev is a global partnership program in the Financial and Private Sector Development Network of the World Bank Group. Its mission is to enable innovative entrepreneurship for sustainable, inclusive growth and employment. Its business model is built on three pillars:

INCUBATION

*info*Dev has catalyzed enterprise and job creation through a global network which today includes over 400 business incubators in more than 107 developing countries. Since 2002, this network has assisted more than 25,000 companies and helped create close to 250,000 jobs worldwide.

NETWORKING

*info*Dev's value-add is building global entrepreneurial and SME communities of practice through its network to share and disseminate best practices and facilitate collaboration. It brings together early-stage entrepreneurs, public and private sector financiers, and policymakers in both physical and virtual settings, thereby ensuring a robust and thriving innovation ecosystem.

POLICY WORK

*info*Dev has created practical toolkits, research and other interventions to guide the regulation of technology sectors and foster an enabling environment for its supported industries. It provides up-to-date expertise on issues such as licensing, competition, universal access, bandwidth sharing, and net neutrality.

About the Innovation Technology & Entrepreneurship Global Practice

The Innovation, Technology and Entrepreneurship Global Practice (ITE) works to promote knowledgeable workplaces, receptive markets and technology commercialization in developing countries. The ITE portfolio is focused on building innovation capacity in the public and private sector, which includes building a knowledge workforce, promoting technology commercialization and entrepreneurship, strengthening science and innovation policy and supporting inclusive innovations for developing countries.

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