



SMART VILLAGES
New thinking for off-grid communities worldwide



Date 25 April 2017

THE SMART VILLAGES INITIATIVE

Presenter: Dr John Holmes



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1.1bn

PEOPLE LIVE WITHOUT
ACCESS TO ENERGY

3bn

COOK ON UNCLEAN STOVES
LEADING TO

4.3m

DEATHS PER
YEAR



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IN LATIN AMERICA

- Around 22 million people without access to electricity
- In hard to get to places: mountains and jungles
- Linked to high levels of poverty
- Reduced eligibility for international development funding





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SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



SUSTAINABLE
ENERGY FOR ALL

7 AFFORDABLE AND
CLEAN ENERGY



Ensure access to affordable, reliable, sustainable and modern energy for all

By 2030:

- Ensure universal access to affordable, reliable and modern energy services
- Increase substantially the share of renewable energy in the global energy mix
- Double the rate of improvement in energy efficiency



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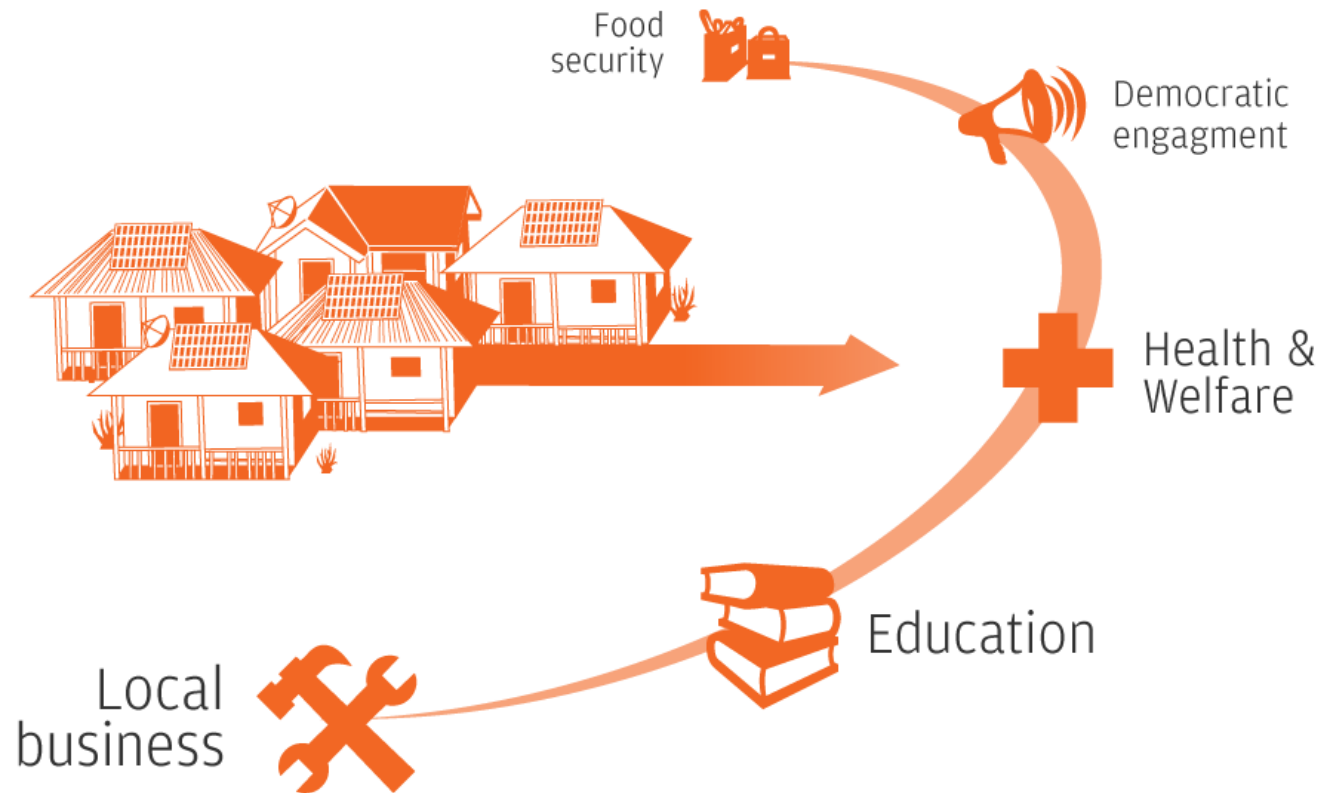
ENERGY ACCESS AS ENABLER OF MOST SDGS





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ENERGY AS A CATALYST FOR DEVELOPMENT



SMART CITIES: NEED FOR A VILLAGE LEVEL ANALOGUE

47% of world's
population and 70% of
the world's poor live in
rural villages

SMART
CITIES



SMART
VILLAGES



SMART VILLAGES: SOME KEY FEATURES



Key services: education, health , clean water and sanitation

- ICT connectivity: distance learning and world's knowledge base
- Modern health services and tele-medicine
- Provision of clean water and safe sanitation



Foster entrepreneurship in the provision and use of energy services

- Capture more of the agricultural value chain
- Create new businesses



Through ICT connectivity, participate in governance processes

- At local, regional and national levels
- Smart communities with strong rural/urban linkages



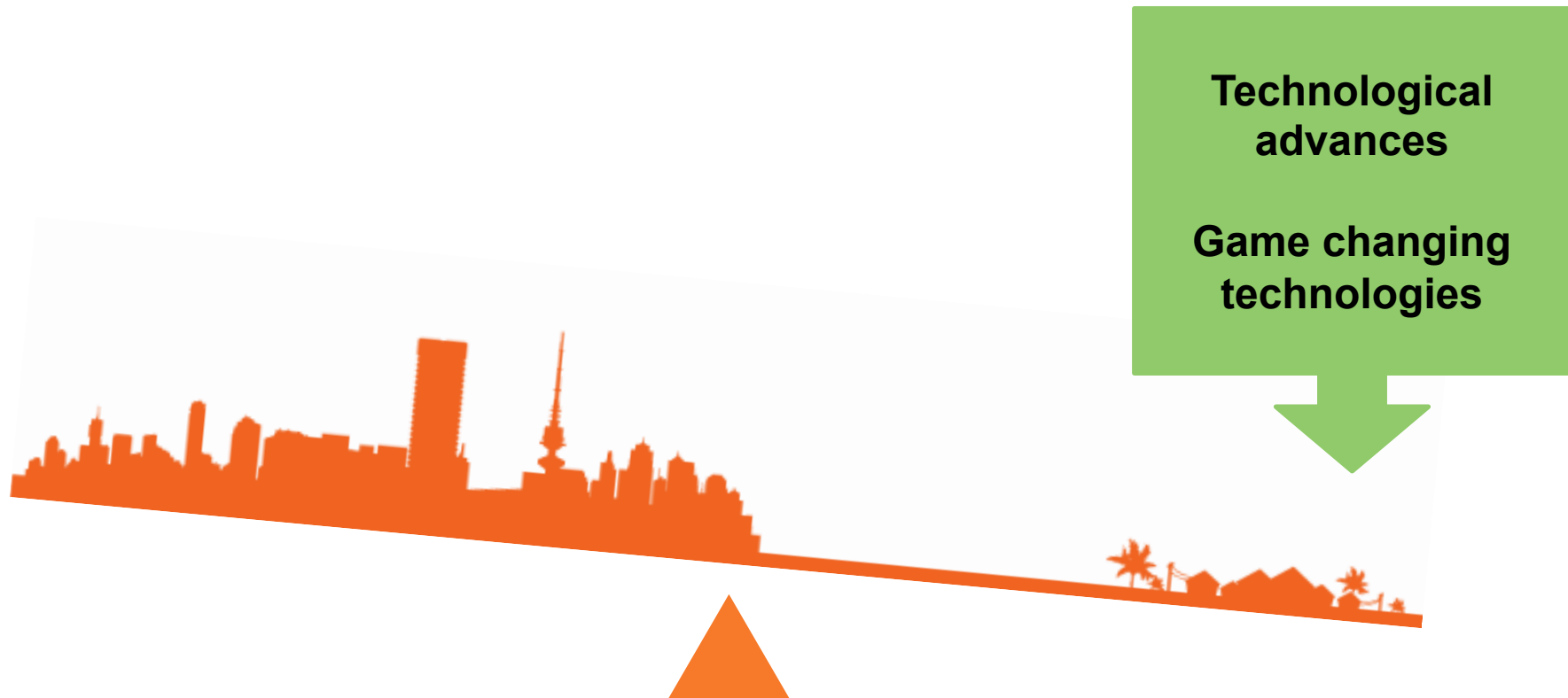
Building more resilient communities better able to respond to shocks

All enabled by
access to modern
ENERGY



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SHIFTING THE BALANCE OF OPPORTUNITIES BETWEEN CITIES AND VILLAGES



e4sv.org

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Focus: sustainable local energy solutions for rural communities

Policy advice: an insightful, 'view from the frontline' of the challenges of village energy provision for development, and how they can be overcome

Engagement: bringing together the key players: scientists, entrepreneurs, villagers, NGO's, financiers, regulators and policy makers etc:

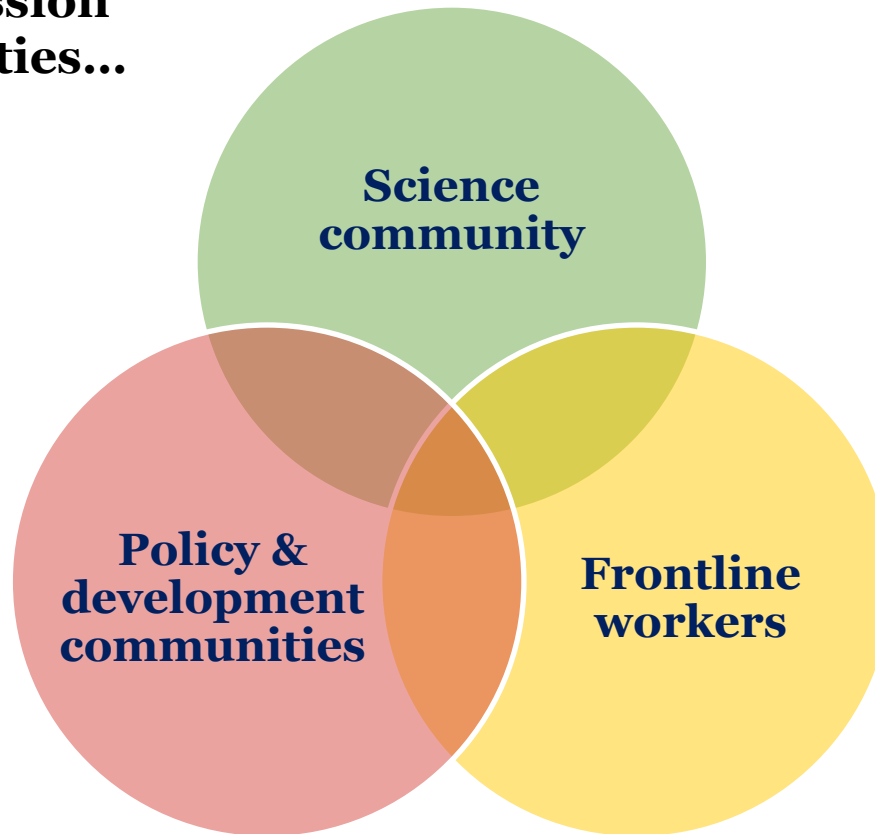
- **What are the barriers?**
- **How can they be overcome?**
- **What messages to funders and policy makers?**





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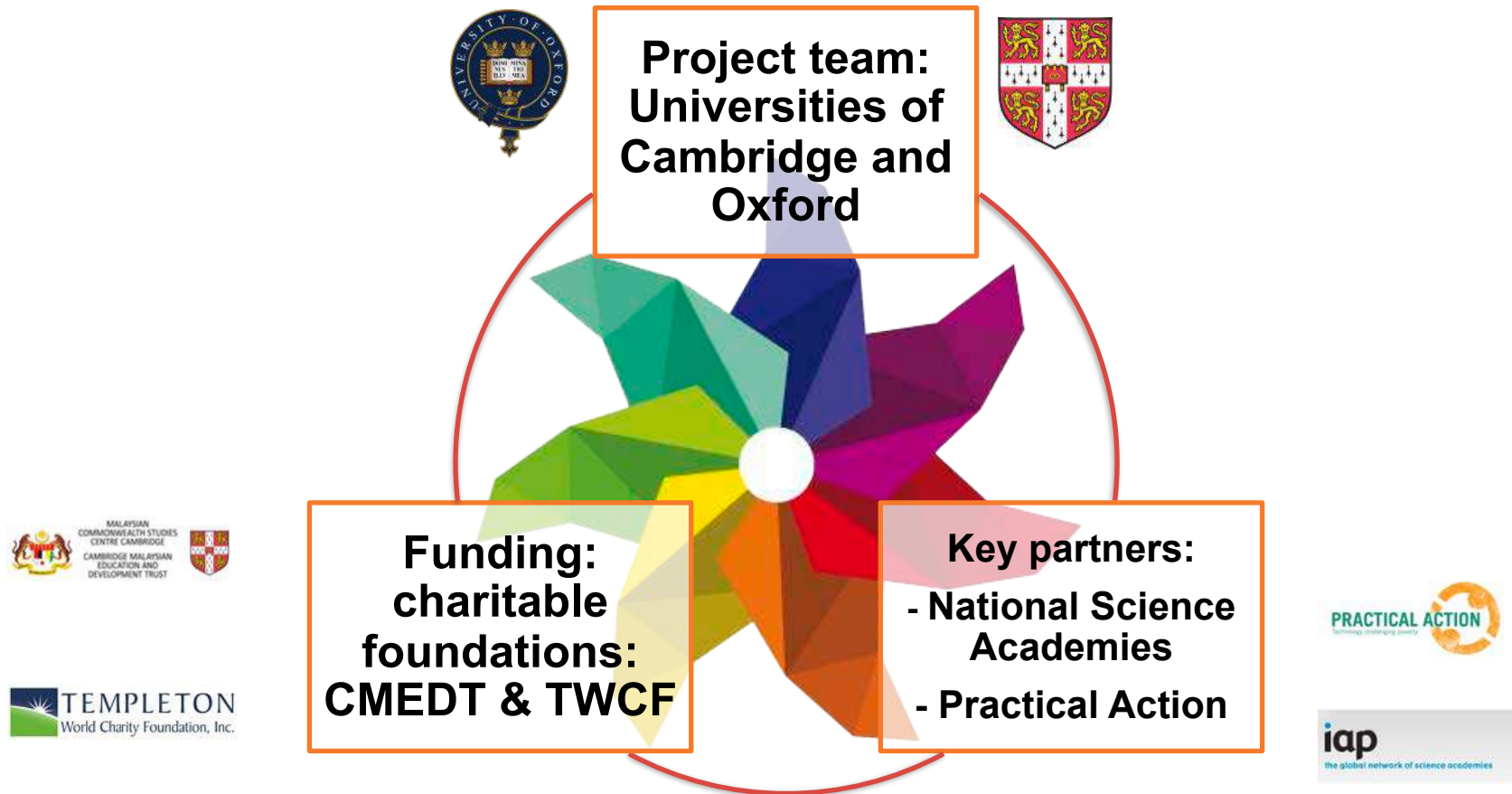
**Facilitating discussion
between communities...**



**...on the barriers to energy access for rural
development and how they can be overcome**

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SMART VILLAGES INITIATIVE: A PARTNERSHIP

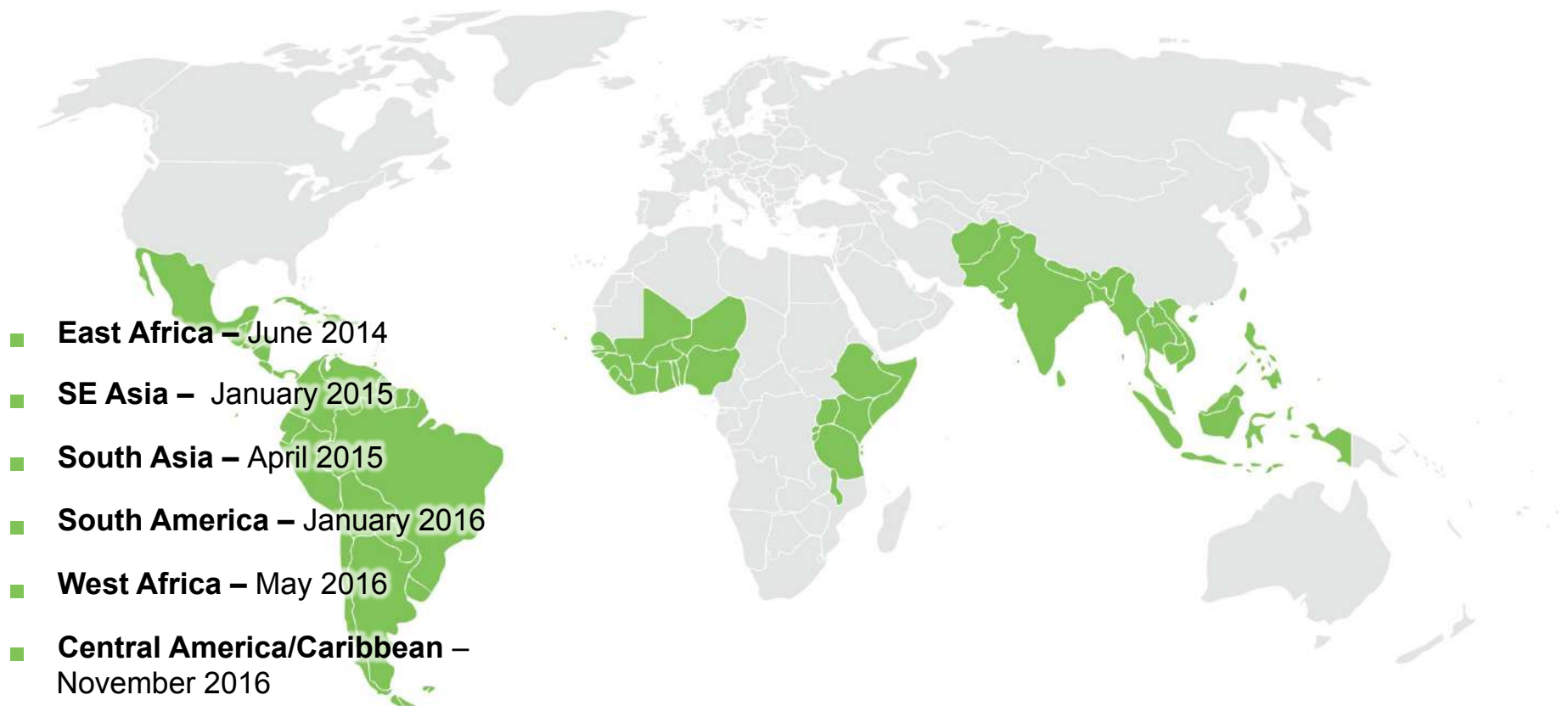




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SIX REGIONAL ENGAGEMENT PROGRAMMES

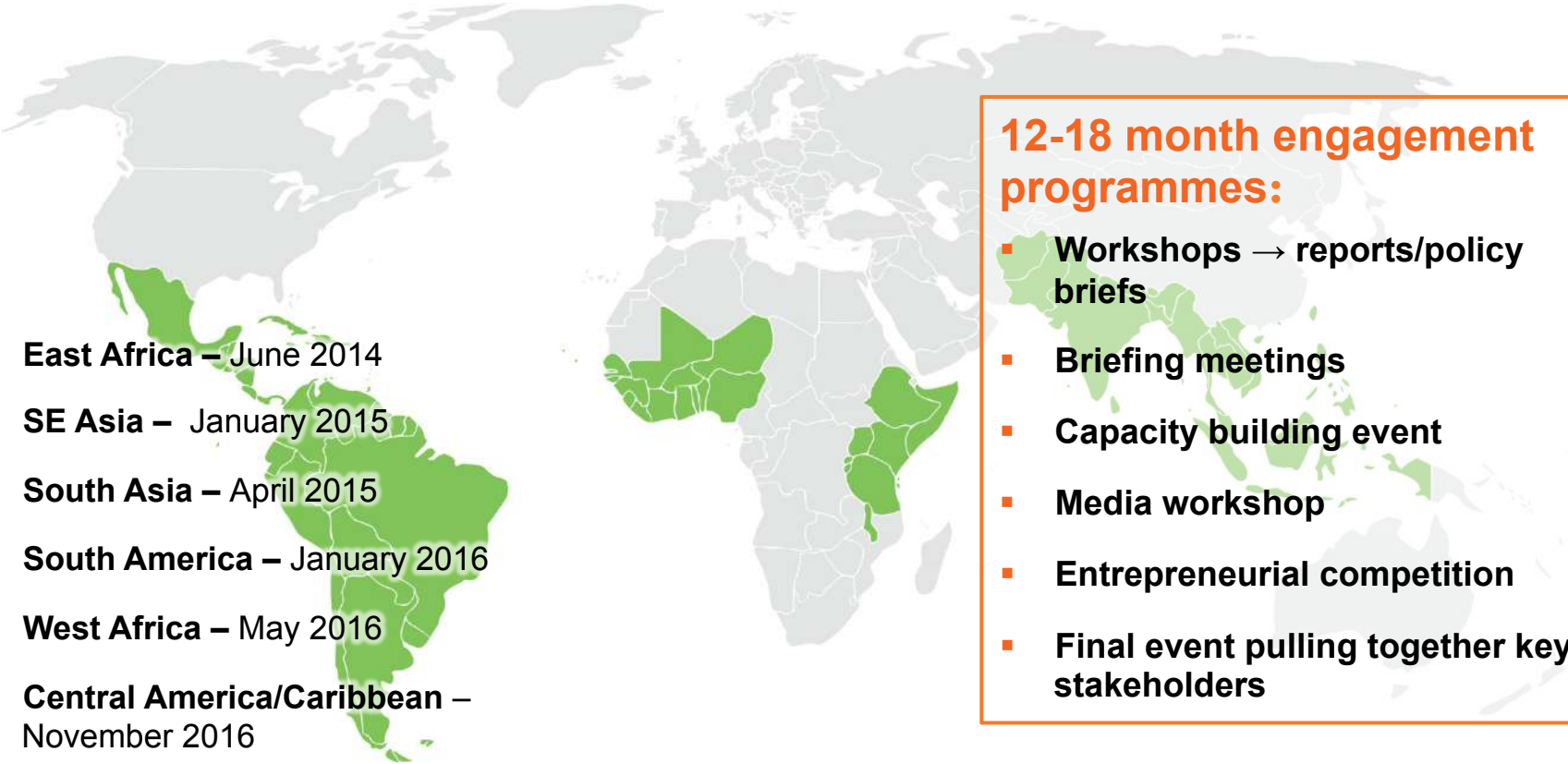




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SIX REGIONAL ENGAGEMENT PROGRAMMES

- 
- **East Africa** – June 2014
 - **SE Asia** – January 2015
 - **South Asia** – April 2015
 - **South America** – January 2016
 - **West Africa** – May 2016
 - **Central America/Caribbean** – November 2016

12-18 month engagement programmes:

- **Workshops** → reports/policy briefs
- **Briefing meetings**
- **Capacity building event**
- **Media workshop**
- **Entrepreneurial competition**
- **Final event pulling together key stakeholders**



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CROSS-CUTTING ACTIVITIES



WORKSHOPS HELD TO DATE

West Africa

- First West Africa Regional workshop: Accra, Ghana, May 2016
- The WEF nexus, Senegal, August 2016
- Country focus – Togo, February 2017
- Concluding high-level workshop for West Africa engagement: Abidjan, Cote D'Ivoire, March 2017

East Africa

- First East Africa regional workshop: Arusha, Tanzania, June 2014
- East Africa media dialogue workshop: Kigali, Rwanda, November 2014
- East Africa Community Leaders' dialogue workshop: Terrat, Tanzania, August 2015
- Concluding high-level workshop for East Africa engagement: Kigali, Rwanda, September 2015

South Asia

- Smart Villages in Nepal: Kathmandu, Nepal, April 2015
- Southeast Asia media dialogue workshop, Seoul, June 2015
- Smart Villages in Bangladesh: Dhaka, Bangladesh, August 2015
- Smart Villages in Pakistan: Islamabad, October 2015
- State level brainstorm: Odisha, India, April 2016
- 4th Forward Look workshop: Mini-grids, Bangalore, India July 2016
- Energy & Agriculture, Hyderabad India, September 2016

Southeast Asia

- First Southeast Asia regional workshop: Kuching, Malaysia, January 2015
- Southeast Asia media dialogue workshop: Seoul, South Korea, September 2015
- Energy for off-grid islands: Bunaken island, Indonesia, November 2015
- Sustainable dissemination of improved cookstoves: lessons from Southeast Asia: Yangon, Myanmar, December 2015
- Smart Villages and resilience to natural disasters: National University of Singapore, May 2016
- The energy & water nexus, Philippines June 2016
- Asia wrap up Workshop, Thailand March 2017

South America

- **First South America regional workshop: Lima, Peru, January 2016**
- **Sustainable energy for rural communities in Bolivia: La Paz, Bolivia, April 2016**
- **Media workshop, Paraguay, July 2016**
- **Resilience, Ecuador January 2017**

Central America, Mexico and Caribbean

- **Opening regional workshop, Dominican Republic, November 2016**
- **Off-grid energy in Haiti, January 2017**

UK

- 1st Forward Look workshop: New technologies for off-grid villages – a look ahead: January 2014
- 2nd Forward Look workshop: Potential breakthroughs in the use of energy in off-grid villages: December 2015
- Business and financial models: January 2016
- 3rd Forward look Workshop: Frontier energy storage technologies: Edinburgh University, May 2016

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1. A key aim: identify framework conditions to:

- foster entrepreneurial activities in delivering & using energy services
- maximise leverage of public sector funding

2. An underlying premise: to maximise social benefit and development impact:

- integrate energy access with other development initiatives
- take a community level approach

3. An important concern:

- to catalyse rapid progression through the various levels of energy access

FINDINGS FROM THE LATIN AMERICA ENGAGEMENT PROGRAMMES

1. Cross-cutting issues
2. Home-based supply
3. Mini-grids
4. Clean cooking
5. Productive uses
6. Resilience to natural disasters
7. Sustainable Development Goals



1. CROSS-CUTTING ISSUES

■ **Improve access to affordable finance:**

- For all stages of value chains
- risk mitigation: credit guarantees
- reduce transaction costs

■ **Establish supportive policy framework**

- High level political commitment
- National energy access plan
- Renewable energy targets
- Integrated approach to rural development
- Intelligent subsidies



1. CROSS-CUTTING ISSUES CONTINUED

- **Provide support to entrepreneurs:**
 - Enhance role of SMEs
 - business incubation & advice services
 - cut red tape / give breathing space
- **Build skills and capacity:**
 - technical/business/institutional/finance
- **Create awareness**
- **Involve women and youth**
- **Build markets - Don't give things away**





2. HOME-BASED SUPPLY: SOLAR HOME SYSTEMS AND PICO-SOLAR LIGHTS

Key advances

- **PV cost reductions**
- **Increased efficiency of appliances**
- **Pay by instalments**

3rd Generation systems

- **1/3 the power to support level of service**
- **50 kg down to 6 kg**
- **Cost reduction of 30-50%**

Going Forward

- **Access to finance**
- **Build and Leverage distribution networks**
- **Build skill base**
- **Shift from government/NGO led/subsidised schemes to commercial PAYG models?**

2. HOME-BASED SUPPLY: LOOKING AHEAD

- Tackle problem of poor quality and counterfeit products
- Technical developments:
 - Better batteries
 - Recycling
 - Plug and play
 - Easily maintained
 - Control systems
 - New PV technologies
 - Appliance efficiency
 - Standardisation



3. MINI-GRIDS

More limited progress – costs greater than revenues – how can we balance the books?



- Technical developments reduce equipment costs
- Economies of scale: replication
- Anchor loads absorb costs
- Reduce set-up overheads
- Reduce financing costs
- Capital cost subsidy



- Get the tariffs right: constraints of affordability & equality
- Stimulate productive enterprise to increase incomes
- Increase load factors: improved control systems & productive enterprises
- Increase level of connections
- Operating cost subsidy

3. MINI-GRIDS: COMMUNITY ENGAGEMENT

- Villagers should be the main drivers
- Build on local knowledge and customs
- Work with trusted individual and organisations: local champions
- Ensure that the poor have a voice & stake, not just the powerful



“projects are 70%social / 30% technical”

4. COOKING: KEY DRIVERS

- Health risks
- Environmental impacts
- Social benefits

Clean cooking should be included in national energy frameworks at the same level of importance as electricity access strategies



4. COOKING: KEY FINDINGS

1. Address user needs and cultures
2. Financing schemes (& subsidies) to ensure viability of all stages of value chain
3. Enhance product quality
4. Technical and business support
5. Training in stove maintenance



5 PRODUCTIVE USES

- Development benefits should be core driver of energy access initiatives
- Key challenge: capture more value from the agricultural value chain:
 - Agro-processing
 - Reduced wastage
 - Better market prices



5. KEY FINDINGS ON PRODUCTIVE USES

- Complex/diverse interactions but silo approach and lack of coordination → integrated/cross-ministry policies and initiatives based on better understanding of synergies and competing interests
- Take a participatory and market-based approach building on existing practices and respecting local cultures:
 - Identify and connect to markets
 - build links with cities
 - Deliver the quality required by the market
- Create a conducive environment for the private sector and ensure access to affordable finance
- Build capacity including in the policy community and through providing advice to smallholder farmers: *foster entrepreneurial spirit*
- Pay particular attention to smallholder farmers in poor areas: harder to improve livelihoods
- Address gender issues: women play a key role



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6. BUILDING RESILIENCE TO NATURAL DISASTERS

‘Rural development gains are hard won, but easily lost’

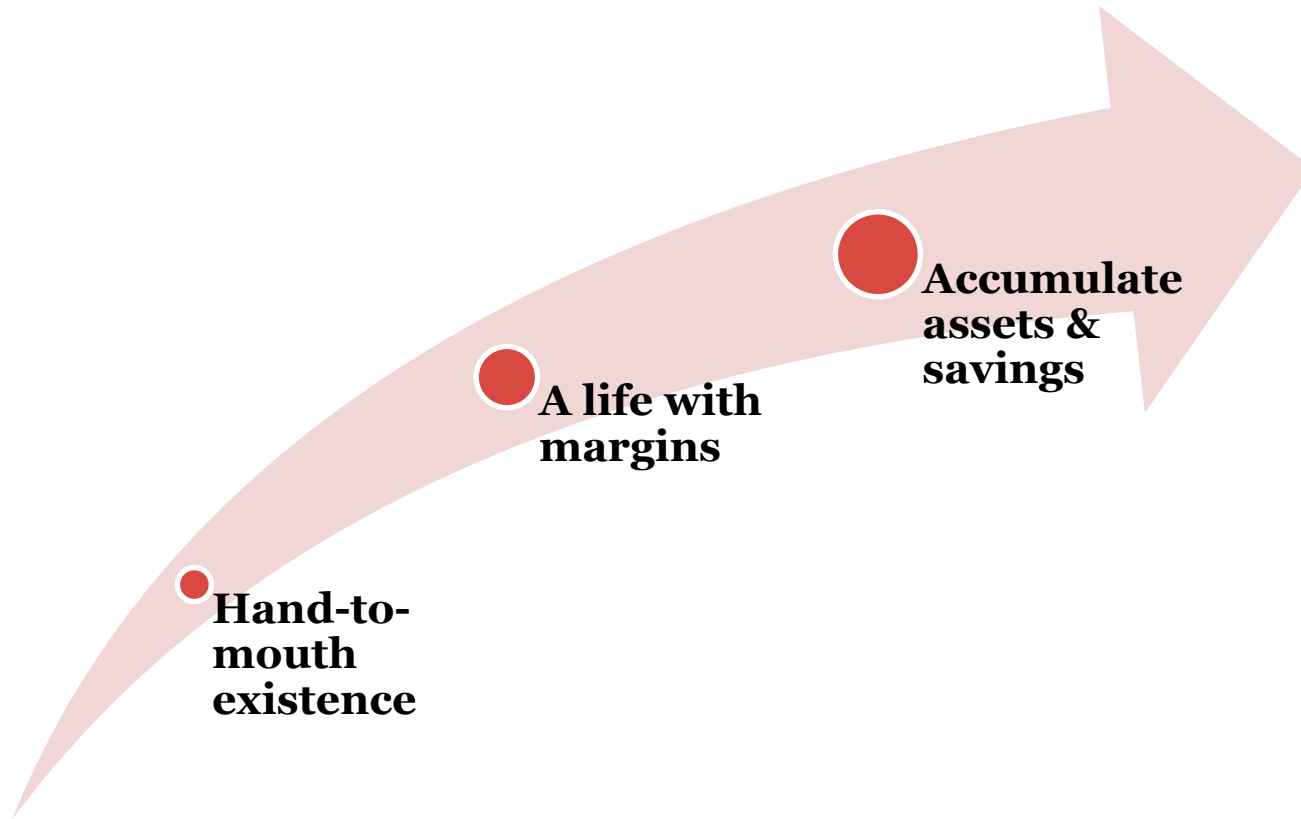




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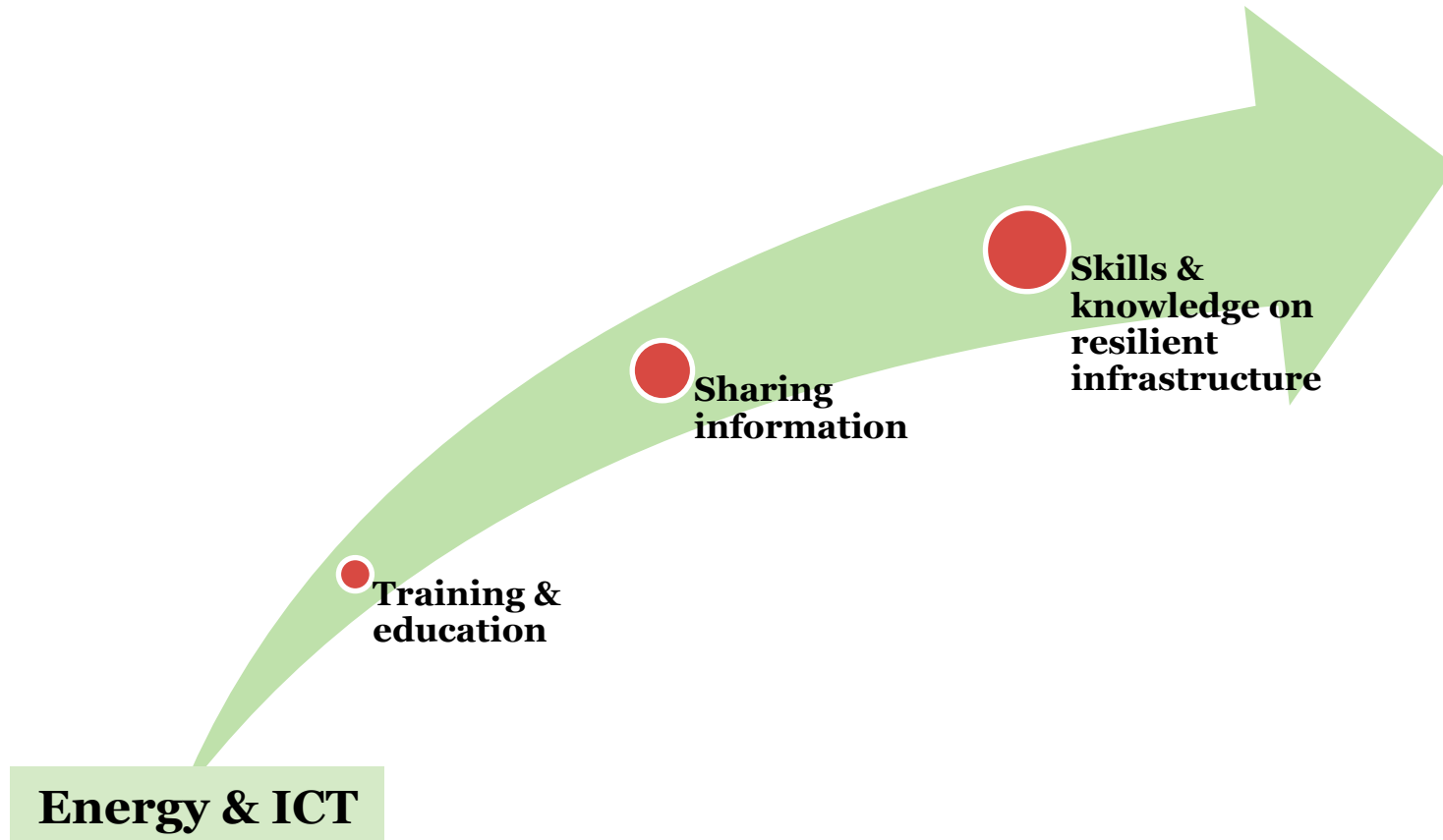
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6. BUILDING RESILIENCE IN SMART VILLAGES - ENHANCING PROSPERITY



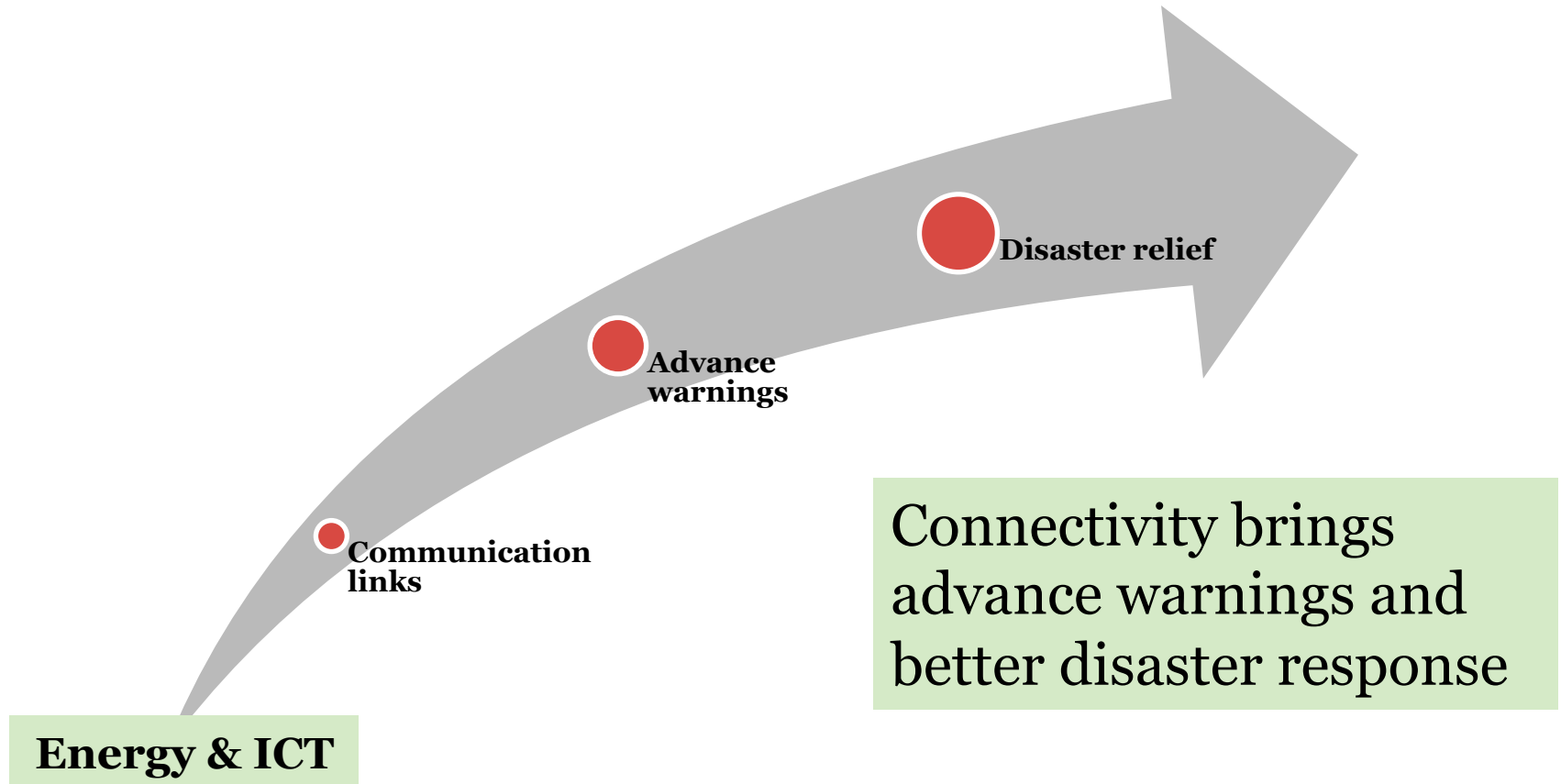


6. BUILDING RESILIENCE: SKILLS AND KNOWLEDGE





6. BUILDING RESILIENCE: CONNECTIVITY

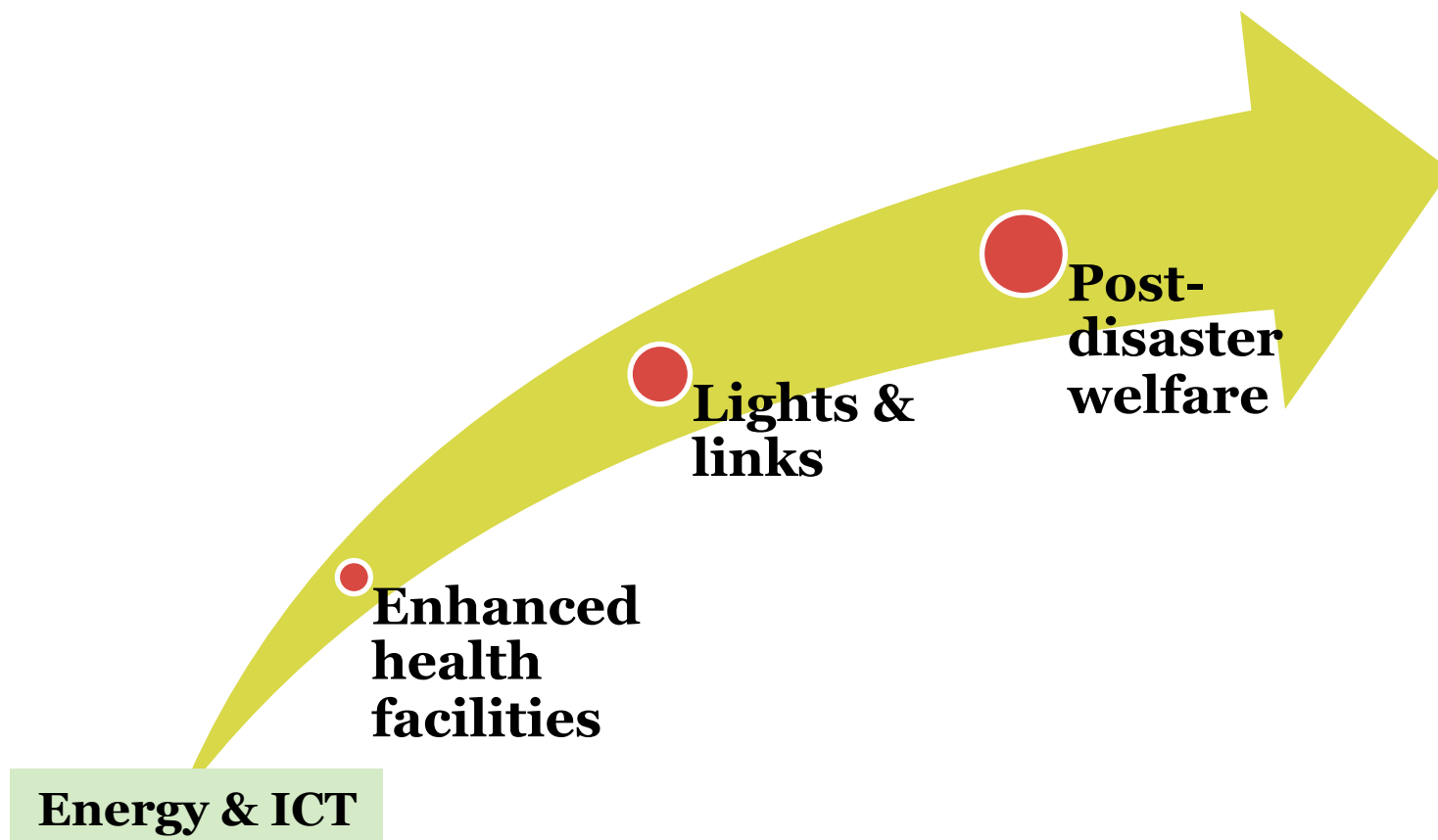




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6. BUILDING RESILIENCE: IMPROVED SERVICES





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6. BUILDING RESILIENCE: ADDITIONAL CONTRIBUTORS



**Social
capital**

**Environment
stewardship**

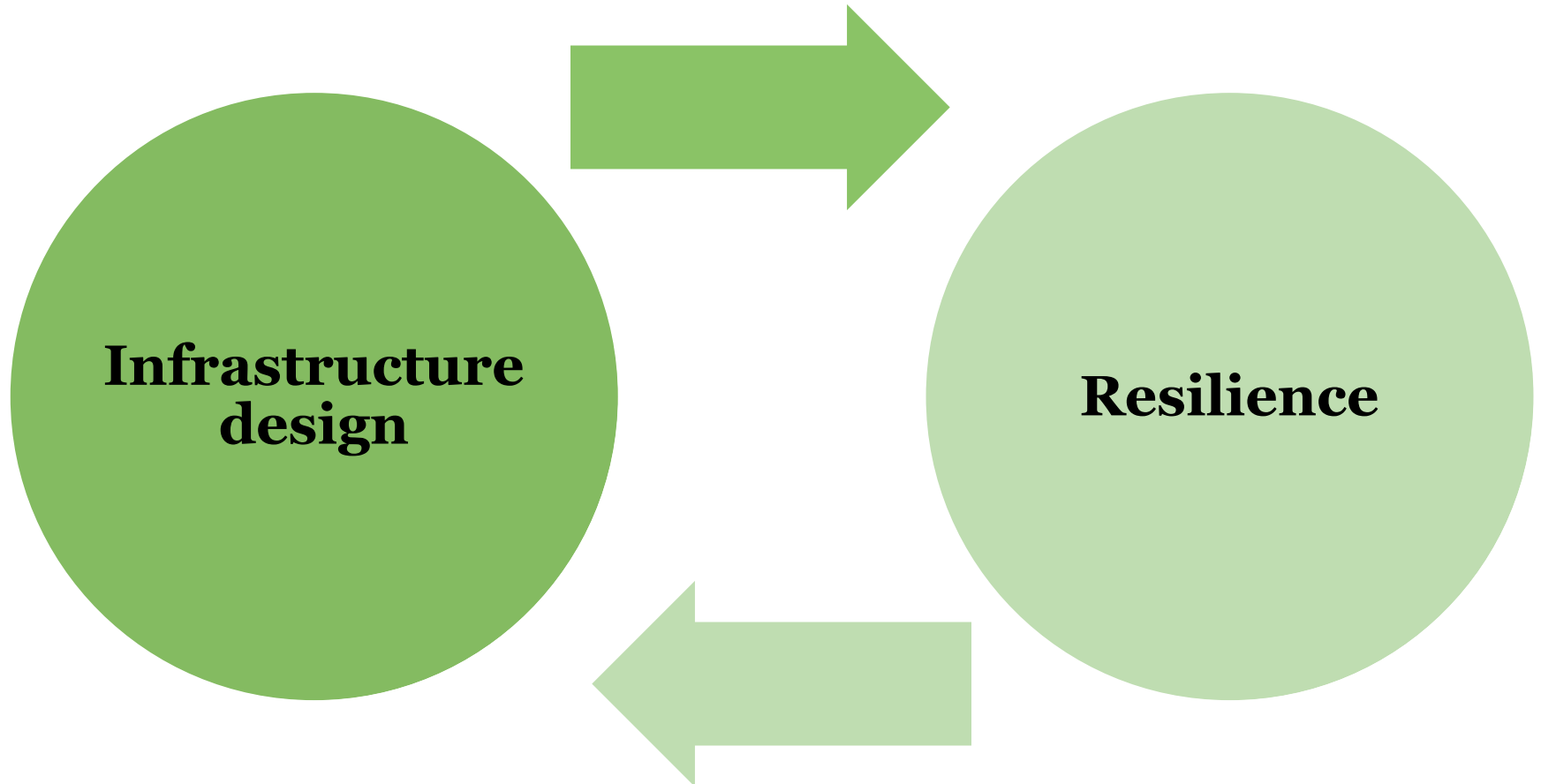


**Access to
finance
systems**



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6. BUILDING RESILIENCE: BY DESIGN



6. BUILDING RESILIENCE: SOME FINAL POINTS

- None linear path to resilience
- Need integrated approach
- Sustainability of initiatives beyond project completion
- Tension between standard approaches for scale-up and responding to the unique circumstances of each community



7. SUSTAINABLE DEVELOPMENT GOALS

- Goal 7: level of ambition
- Other goals: integrated approach
- Goal 17: strengthen means of implementation:
 - Better coordination
 - Sharing of information : web-based platforms
 - University collaborations
 - Evaluating development outcomes



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Thank you for your attention

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