Modelos de negocio y emprendimiento social en el Acceso Universal a la Energía

GREDS - Cátedra BP de Energía y Sostenibilidad

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Madrid, 29 de Noviembre de 2013

Contenidos


¿Qué Acceso Universal?
¿Qué entorno?
¿Qué Tecnología?
Modelo de negocio social
¿Qué mercado?
¿Qué usos?

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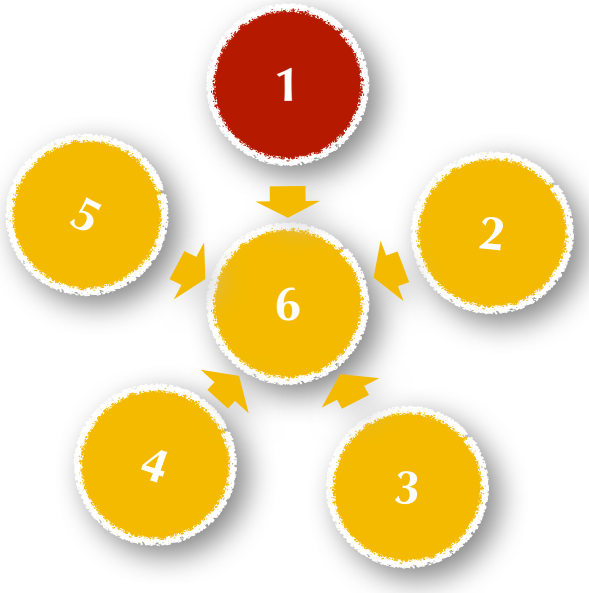


¿Acceso Universal a la Energía?

What do we mean by “universal access”?

“Access to energy services that are clean, reliable and affordable for cooking, heating, lighting, health, communications and productive uses”

Energy for a Sustainable Future” (UN AGECC 2010)

Relevance & urgency of universal access

"One of the major obstacles to energy sustainability is the lack of universal access to modern energy services"

"Universal access to electricity must be a permanent objective until it is finally achieved"

The International Energy Agency (IEA) has set 2030 as the target year to achieve universal access to modern energy services

The size of the problem - electricity

"This chapter highlights another **key strategic challenge for the energy sector**, one that requires immediate and focused attention by governments and the international community. It is the alarming fact that today billions of people lack access to the most basic energy services, electricity and clean cooking facilities, and, worse, this situation is set to change very little over the next 20 years, actually deteriorating in some respects. This is **shameful and unacceptable**.

Today, there are 1.4 billion people in the world that lack access to electricity, some 85% of them in rural areas. Without additional dedicated policies, by 2030 the number of people drops, but only to 1.2 billion. Some 15% of the world's population still lack access, the majority in sub-Saharan Africa."

IEA, "World Energy Outlook 2010"

The size of the problem - electricity

1.4 billion people
lack access in 2009
In 2030 this number drops
only to 1.2 billion

IEA, "World Energy Outlook 2010"

The size of the problem - (heat)

"The number of **people relying on biomass** is projected to rise from 2.7 billion today to 2.8 billion in 2030. It is estimated that household air pollution from the use of biomass in inefficient stoves would lead to over 1.5 million premature deaths per year (over 4 000 per day) in 2030, greater than estimates for premature deaths from malaria, tuberculosis or HIV/AIDS."

"Addressing these inequities depends upon international recognition that the projected situation is intolerable, a commitment to effect the necessary change, and setting targets and indicators to monitor progress. **A new financial, institutional and technological framework is required, as is capacity building in order to dramatically scale up access to modern energy services at the local and regional levels.**"

IEA, "World Energy Outlook 2010"

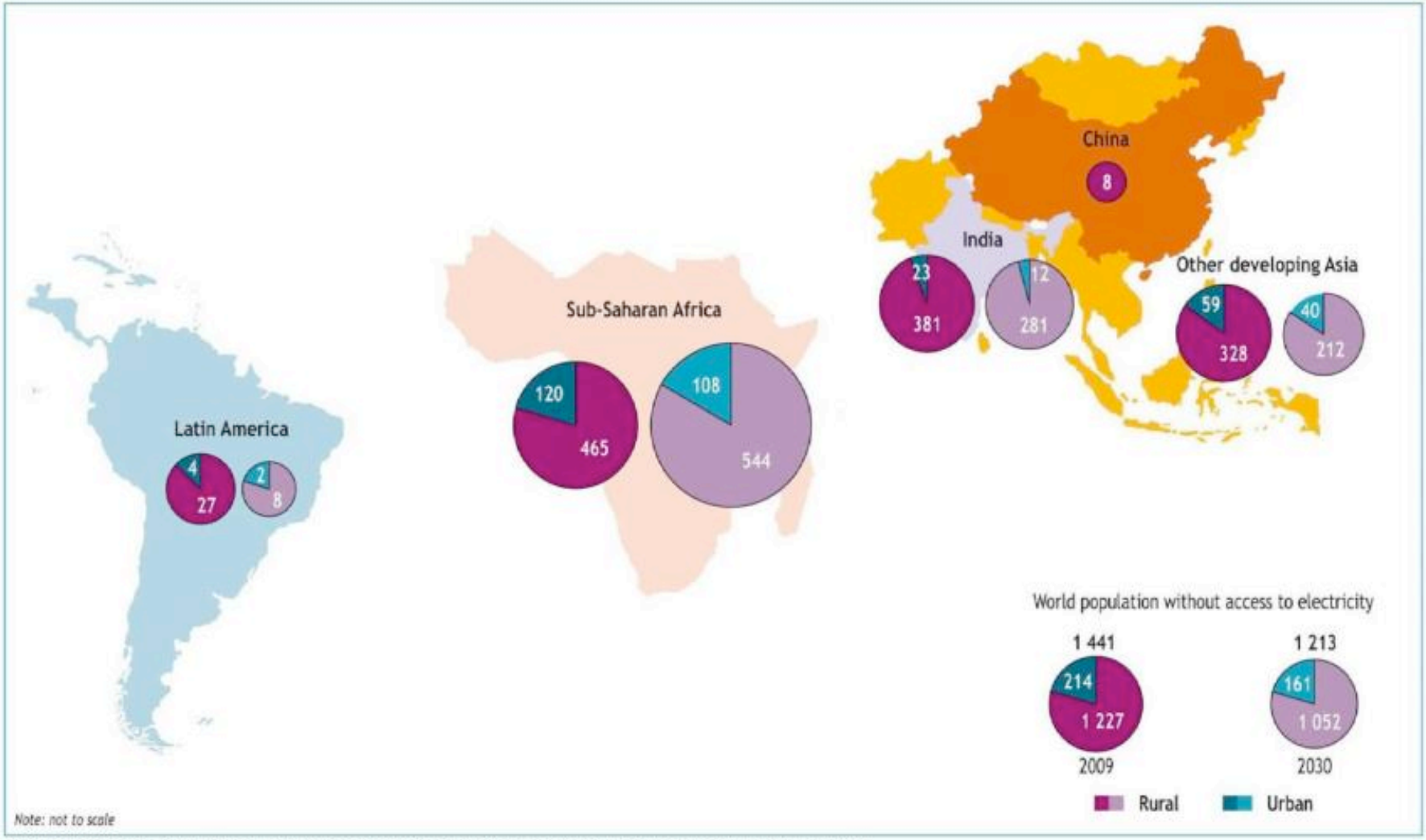
The size of the problem - (heat)

2.7 billion people lacks access to modern heating in 2009

In 2030 this number reachesup to 2.8 billion

IEA, "World Energy Outlook 2010"

The number of non-electrified declines by 2030 except in sub-Saharan Africa *(millions of people)*



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

Investment needs

"**In 2009, we estimate that $9.1 billion was invested** in extending access to modern energy services, supplying 20 million more people with electricity access and 7 million people with advanced biomass cookstoves. This amount was **sourced from multilateral organizations (34%), domestic government finance (30%), private investors (22%) and bilateral aid (14%)**."

"**To provide universal modern energy access by 2030 cumulative investment of $1 trillion is required –an average of $48 billion per year, more than five times the level in 2009**. We estimate that around $18 billion per year is needed from multilateral and bilateral development sources, $15 billion per year from the governments of developing countries and $15 billion per year from the broad range of actors that form the private sector."

IEA, "World Energy Outlook 2011"

Investment needs

$1 trillion is required

$48 billion per year

IEA, "World Energy Outlook 2011"

Scaling up access

"Addressing these inequities depends upon international recognition that the projected situation is intolerable, a commitment to effect the necessary change, and setting targets and indicators to monitor progress. **A new financial, institutional and technological framework is required, as is capacity building in order to dramatically scale up access to modern energy services at the local and regional levels.**"

IEA, "World Energy Outlook 2010"

Estimated impacts

"Achieving universal access by 2030 would **increase global electricity generation by 2.5%**. Demand for **fossil fuels would grow by 0.8%** and **CO2 emissions go up by 0.7%**, both figures being trivial in relation to concerns about energy security or climate change. The prize would be a major contribution to social and economic development and help to avoid 1.5 million premature deaths per year."

"**Adding** 0.003 $/kWh, some **1.8%, to current electricity tariffs in OECD countries** could fully fund the additional investment." (IEA WEO 2010)

IEA, "World Energy Outlook 2010"

Sources of finance

"**Financing the amount needed to provide universal access to modern energy services in 2010-2030**, compared with the New Policies Scenario, **is a major challenge. All available sources of finance will need to be tapped**: international funds, public/private partnerships, bank finance at multilateral, bilateral and local levels, microfinance, loans and targeted subsidies."

"The financing mechanism adopted will need to be matched to the particular characteristics of the financing need. **The public sector can be expected to fund the costs of creating the necessary enabling environment, for example, establishing the appropriate policies, regulations and institutions, and will often need to finance the relatively large investments, such as additional generating capacity or transmission links**."

IEA, "World Energy Outlook 2011"

An interesting EU initiative

EUROPEAN COMMISSION - PRESS RELEASE

"Energising Development": Commission's new initiative to help achieve energy access for all by 2030

Brussels, 16 April 2012 - A new EU energy initiative which will provide access to sustainable energy for an additional 500 million people in developing countries by 2030 was today announced by European Commission President, José Manuel Barroso. Speaking at the EU Sustainable Energy for All Summit in Brussels, the President unveiled this EU commitment in the framework of the Sustainable Energy for All Initiative (SE4All) launched by UN Secretary-General Ban Ki-moon last year.

The Commission's proposals include a new EU Technical Assistance Facility worth €50 million over the next two years, which will support those developing partners that "opt in" to the initiative by providing EU expertise in the field; thereby promoting sustainable development and inclusive growth.

President Barroso also emphasized that in the run-up to the UN Conference on Sustainable Development in Rio in June, the "Rio+20" conference, the EU and Member States will look to mobilise additional support of up to several hundred million euros to support concrete new investments in sustainable energy for developing countries – working with banks and the private sector to create a leverage effect to multiply this amount many times over. As the largest provider of development assistance in the world, the EU plays a crucial role in efforts to end energy poverty around the globe.

The EU talks about committing 50 M€/yr immediately & raising several hundred M€ to leverage private funds and give access to 500 million people by 2030

Enable private funding & channel funding also at local level

"**Private sector investment needs to grow the most, but significant barriers must first be overcome**. Public authorities must provide a supportive investment climate, such as by implementing **strong governance** and **regulatory reforms**.

The public sector, including donors, needs also to use its tools to leverage power sector investment where the commercial case is marginal. At present, energy access funding tends to be directed primarily toward large scale electricity infrastructure. This does not always reach the poorest households. **Access to funding at local level is essential to support initiatives that cater effectively for local needs, building local financial and technical capacity and stimulating sectoral development.**"

IEA, "World Energy Outlook 2011"

Making Energy Access Meaningful

"The world's poor need more than a token supply of electricity. The goal should be to provide the power necessary to boost productivity and raise living standards"

Morgan Brazilian, Roger Pielke 2013

"The provision of one light to poor people does nothing more than shine a light on poverty"

Kandeh Yumkella - UNIDO 2013

Underestimation of the energy access challenge

"The current forecasts for energy demand in the developing world may be understated because they do not accurately capture the dramatic increase in demand associated with poverty reduction"

Wolfram, Shelef, Gertler 2012

"The lower the assumed scale... the more likely the focus will turn [...] to poverty management rather than the transformational changes that will be necessary if we are to help billions climb out of poverty."

Morgan Brazilian, Roger Pielke 2013

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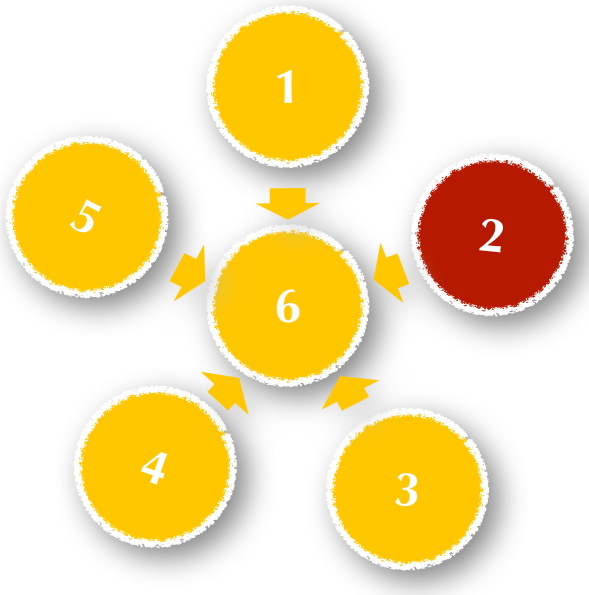

Tecnologías para el Acceso Universal

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Low Cost Technologies for Energy Access

A Review

Heat & Cooking

- **Modern Fuels** — LPG, Biogas, Briquettes, Pellets
- **Improved Stoves** — Ceramic, Metal, Solar
- **Solar Water Heaters** — Solar collectors; Active or Passive

Electricity

- **Small and Pico Lighting** — Solar/Rechargeable Lanterns, Solar Kits
- **Single-User Systems** — Isolated household or residential systems
- **Mini Grids** — Isolated or Connected
- **Grid Extension** — Low-cost extension, Distributed generation

Low Cost Technologies for Energy Access

A Review

Heat & Cooking

- Modern Fuels
- Improved Stoves
- Solar Water Heaters

Electricity

- Small and Pico Lighting
- Single-User Systems
- Mini Grids
- Grid Extension

B Characterize

- Investment Cost
- O&M Costs
- Fuel Costs
- Emissions
- Pollution
- Capacity
- Efficiency
- Lifetime
- Reliability
- Additional Technical Parameters

C Assess

- Availability
- Accessibility
- Affordability
- Cultural Acceptability

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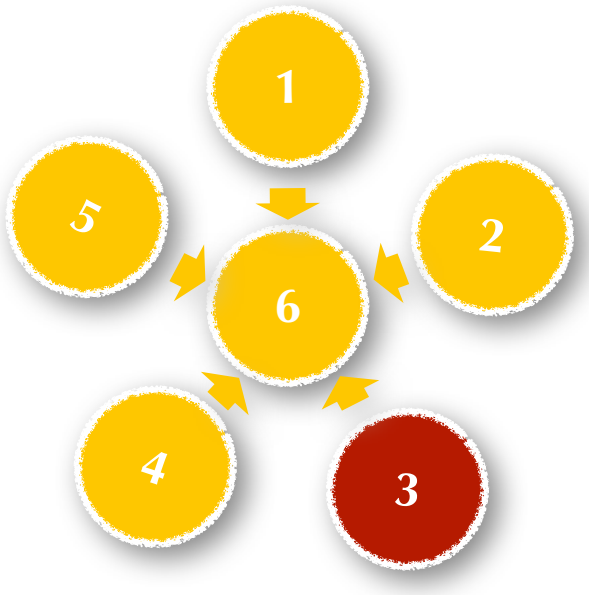
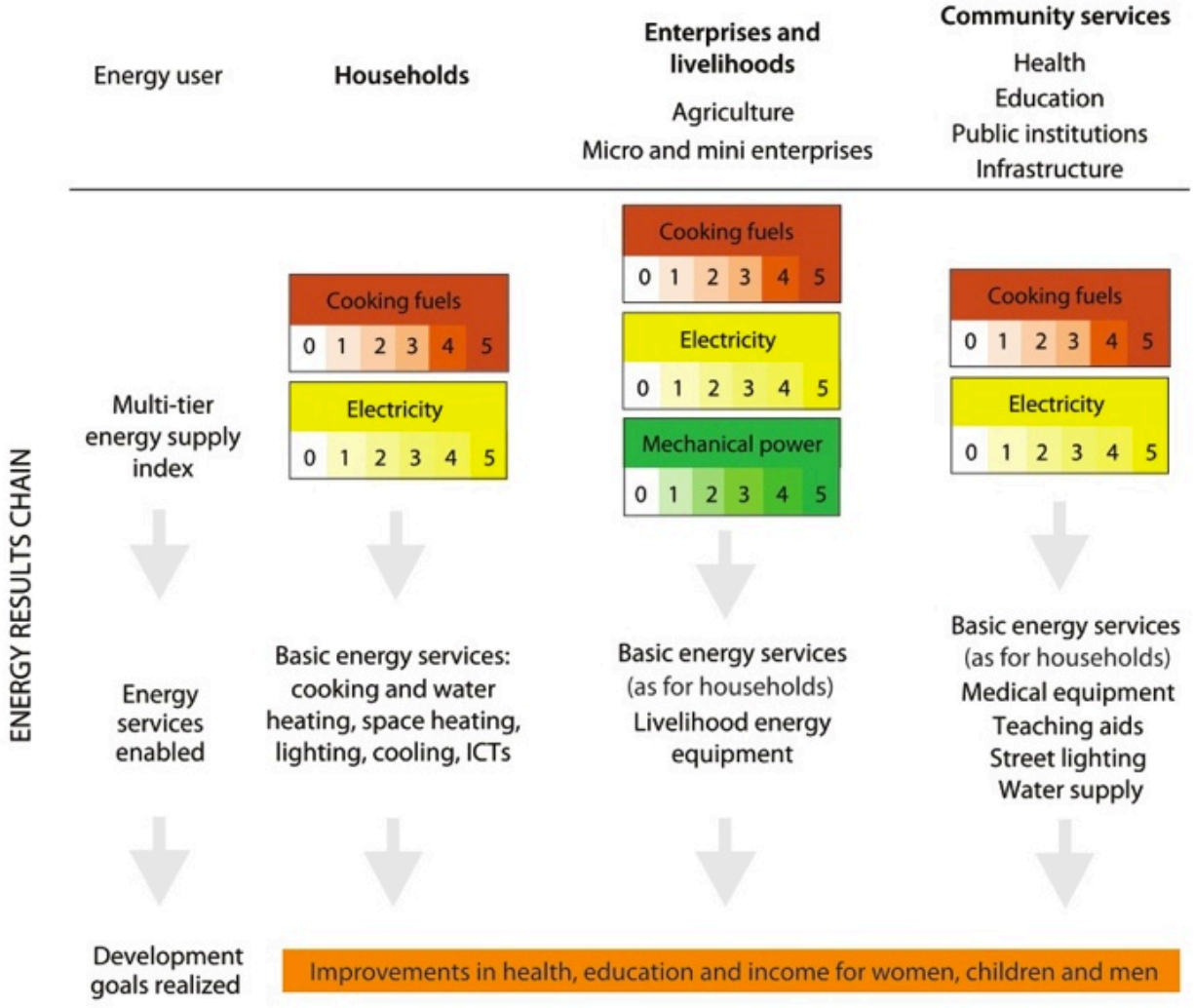


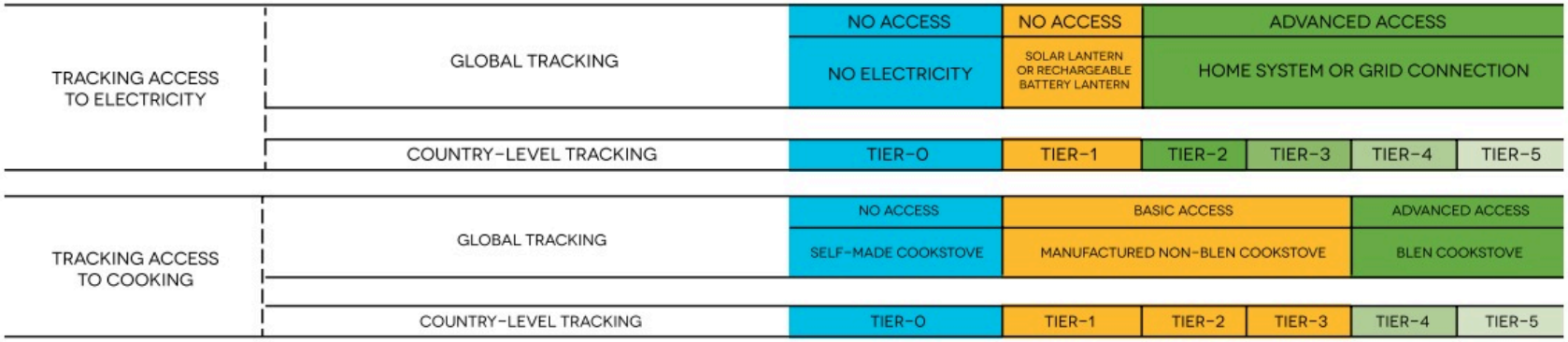
Usos Energéticos

Energy Access Ladder - Services framework



Source: Practical Action. Poor People's Energy Outlook - 2013

Energy Access Ladder



Source: SE4All Global Tracking Framework - ESMAP, WB, IEA 2013

Energy Access Ladder - Electricity

ACCESS TO ELECTRICITY SUPPLY

ATTRIBUTES	TIER 0	TIER 1	TIER 2	TIER 3	TIER 4	TIER 5
Peak available capacity (W)	-	>1	>500	>200	>2,000	>2,000
Duration (hours)	-	≥4	≥4	≥8	≥16	≥22
Evening supply (hrs)	-	≥2	≥2	≥2	≥4	≥4
Affordability	-	-	√	√	√	√
Legality	-	-	-	√	√	√
Quality (voltage)	-	-	-	√	√	√

- Five-tier framework.
- Based on six attributes of electricity supply.
- As electricity supply improves, an increasing number of electricity services become possible.

Index of access to electricity supply = $\sum(P_T \times T)$

with P_T = Proportion of households at tier T

T = tier number {0,1,2,3,4,5}

USE OF ELECTRICITY SERVICES

TIER 0	TIER 1	TIER 2	TIER 3	TIER 4	TIER 5
–	Task lighting **AND** phone charging (OR radio)	General lighting **AND** television **AND** fan (if needed)	Tier 2 **AND** any low-power appliances	Tier 3 **AND** any medium-power appliances	Tier 4 **AND** any high-power appliances

- Five-tier framework.
- Based on of appliances.

Index of access to electricity supply = $\sum(P_T \times T)$

with P_T = Proportion of households at tier T

T = tier number {0,1,2,3,4,5}

Source: SE4All Global Tracking Framework - ESMAP, WB, IEA 2013

Energy Access Ladder - Cooking

	LOW GRADE	MEDIUM GRADE			HIGH GRADE
Attributes	Grade-E	Grade-D	Grade-C	Grade-B	Grade-A
Efficiency		Certified Non-BLEN manufactured Cookstoves			
Indoor pollution					
Overall pollution	Self-made cookstoves or equivalent	Uncertified Non-BLEN manufac-tured cookstoves			BLEN cookstoves or equivalentt
Safety					

- Three types of attributes, as listed below:

Conformity	• Chimney/hood/pot skirt used (as required). • Stove regularly cleaned and maintained (as required).
Convenience	• Household spends less than 12 hrs/week on fuel collection/preparation. • Household spends less than 15 min/meal for stove preparation. • Ease of cooking is satisfactory.
Adequacy	• Primary stove fulfills most cooking needs of the household, and it is not constrained by availability or affordability of fuel, cultural fit, or number of burners. • If multiple cooking solutions are used (stacking), other stoves are not of a lower technical grade.

- Multi-tier measurement is based on technical performance adjusted for the above attributes.

LEVEL 0	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
				Grade-A w/o CCA	Grade-A w/ CCA
			Grade-B w/o CCA	Grade-B w/ CCA	
		Grade-C w/o CCA	Grade-C w/ CCA		
	Grade-D w/o CCA	Grade-D w/ CCA			
Grade-E w/o CCA	Grade-E w/ CCA				

Source: SE4All Global Tracking Framework - ESMAP, WB, IEA 2013

Energy Access Ladder - Productive uses

Tier	0	1	2	3	4	5
Likely energy supply technology resource	Human power	Animal power		Renewable power	Engine	Electrical power
Possible energy technologies for key livelihood activities						
Water pumping	Bucket	Treadle pump	Hydraulic ram pump	Water-current turbine	Solar PV water pump, motorised pump	High power electric pump
Agro-processing	Hand pounding	Animal powered mill	Traditional water mill	Improved water mill	Diesel-powered mill	High power electric mill
Small-scale manufacturing	Hand tools	Treadle tools	N/A	Mechanical lathe	Engine-powered circular saw	Electric saw

Source: Practical Action. Poor People's Energy Outlook - 2013

Energy Access Ladder - Community: Health

Tier	0	1	2	3	4	5
Attributes of energy accessed	Continuous spectrum of improving energy supply attributes including adequacy, availability, reliability					
Basic energy services	Lighting	Limited task lighting + mobile phone + radio	Tier 1 + limited general lighting + air circulation + VHF radio cooking	Tier 2 + multiple lighting + air cooling + refrigeration + computer w/ internet + TV	Tier 3 + air cooling/ heating	All applications are feasible
Feasible energy applications (indicative)						
Medical equipment	None	None	Vaccine refrigeration Sterilization	Low power medical appliances: microscope, testing equipment etc. Incineration	Tier 3 + high power equipment: x-ray machines, ultrasound scanners etc.	All applications are feasible
Likely energy supply technology (indicative)	Kerosene lamps Candles	Third-party charging Improved cookstoves	Small stand-alone solar PV Kerosene/gas refrigerator Solar autoclave Institutional cookstoves	Mini-grid connection Incinerator	Grid connection Unreliable Unreliable + backup	Reliable

Source: Practical Action. Poor People's Energy Outlook - 2013

Energy Access Ladder - Community: Education

Tier	0	1	2	3	4	5
Attributes of electricity accessed	**Continuous spectrum of improving energy supply attributes** including adequacy, availability, reliability					
Basic energy services	Lighting	Limited task lighting + mobile phone + radio	Tier 1 + limited general lighting + air circulation + VHF radio	Tier 2 + multiple lighting + air cooling + refrigeration +	Tier 3 + air cooling/ heating	All applications are feasible
Feasible energy applications (indicative)		cooking	cooking space heating			
Teaching equipment	None	None	Limited computer use	Projector + Laboratory equipment + Multiple computers w/internet	Tier 3	All applications are feasible
Likely energy supply technology (indicative)	Kerosene lamps; Candles	Third-party charging; Improved cookstoves	Small stand-alone solar PV; Kerosene/gas refrigerator; Institutional cookstoves; Biomass heater	Mini-grid connection; Unreliable; Incinerator	Grid connection; Unreliable + backup	Reliable

Source: Practical Action. Poor People's Energy Outlook - 2013

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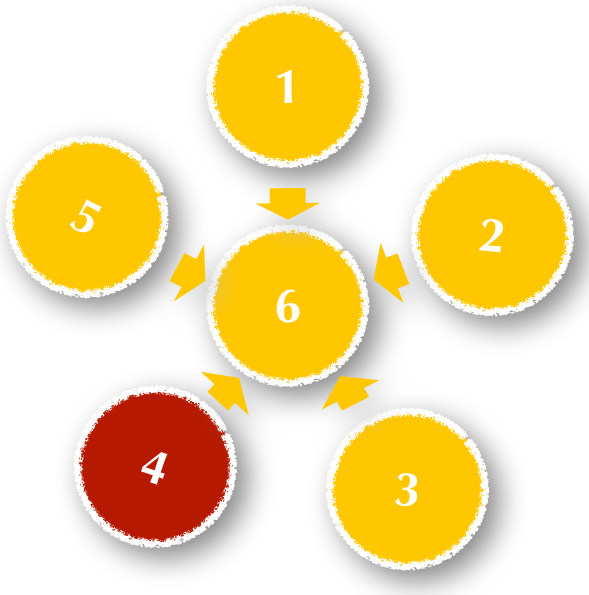

Mercado en la base de la pirámide y acceso a la energía

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Energy access is also a business opportunity

"While there is broad recognition that lack of access to modern energy has major implications for development, **the energy access gap is increasingly being seen as a market**"

"Each year, **the poor spend $37 billion on poor-quality energy solutions to meet their lighting and cooking needs**. This represents a substantial and largely untapped market for the private sector to deliver better alternatives."

"…an estimated 90 percent of (poor) people already spend so much on kerosene lamps, candles, and disposable batteries to meet their lighting needs that **they could afford to purchase better options**, such as solar lamps. Even more people could afford efficient cookstoves because of the fuel cost savings they offer."

International Finance Corporation, "From gap to opportunity: Business models for scaling up energy access", 2012

Energy access is also a business opportunity

$37 billion per year

on poor-quality

energy solutions

International Finance Corporation, "From gap to opportunity: Business models for scaling up energy access", 2012

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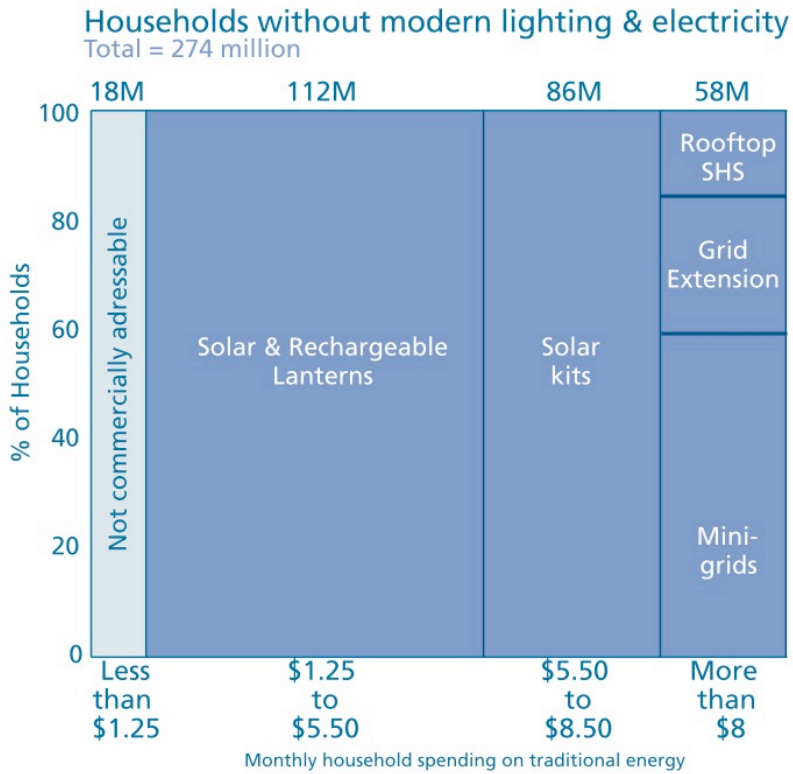
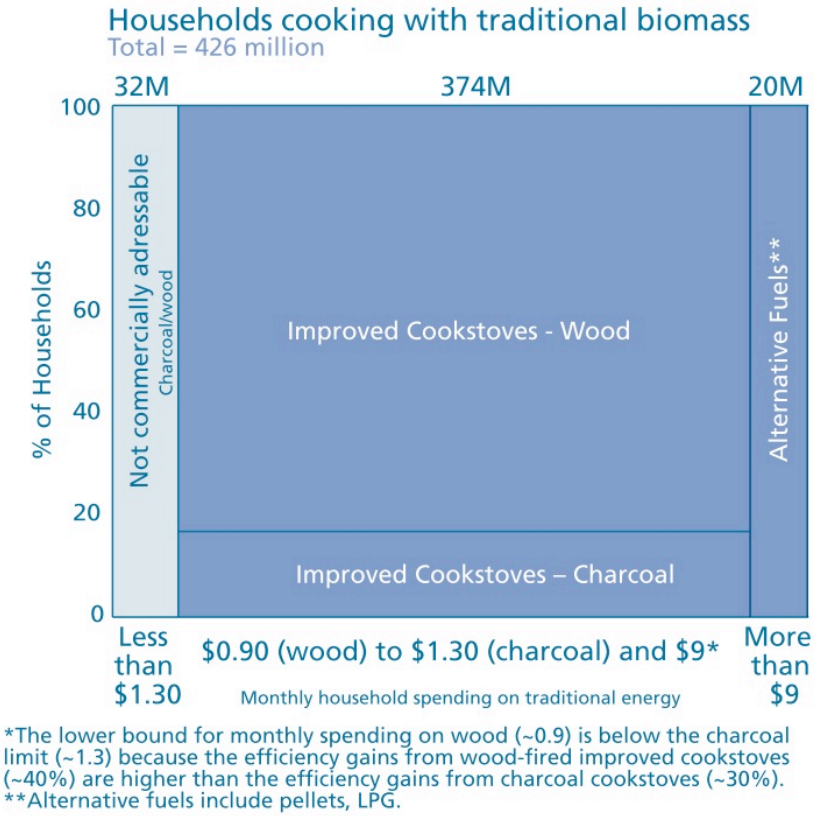
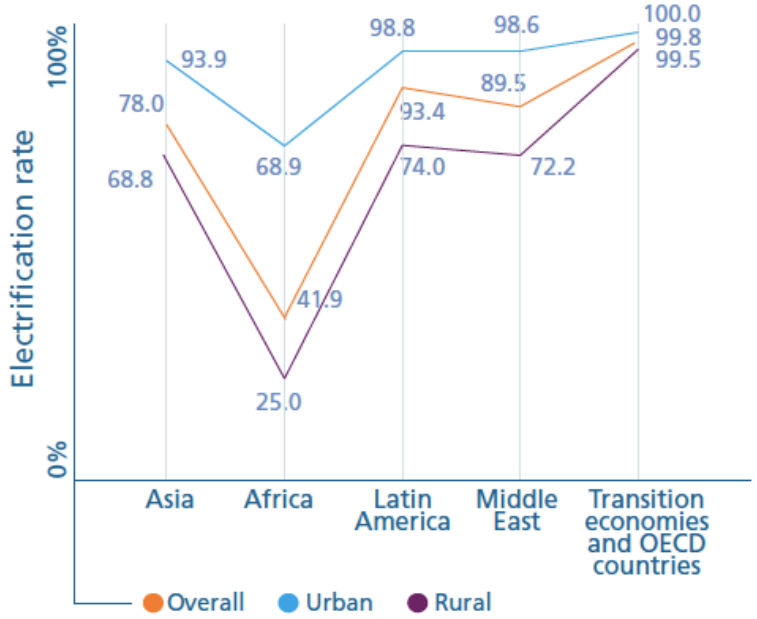
Market size and segmentation (households)

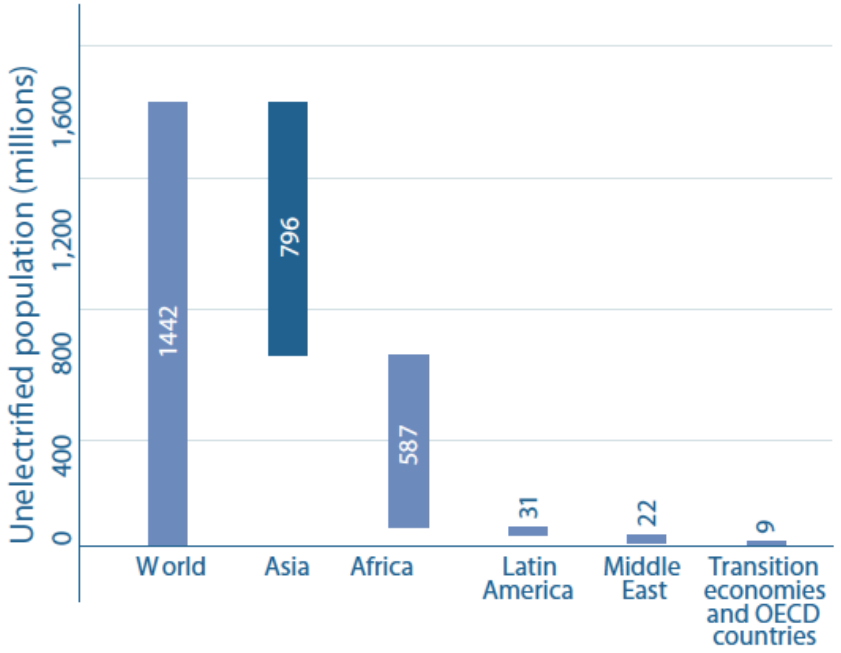




Source: From Gap to Opportunity. International Finance Corporation - WB 2012

The addressable market for electrification on all scales is heavily biased to SSA and Asia





Source: From Gap to Opportunity. International Finance Corporation - WB 2012

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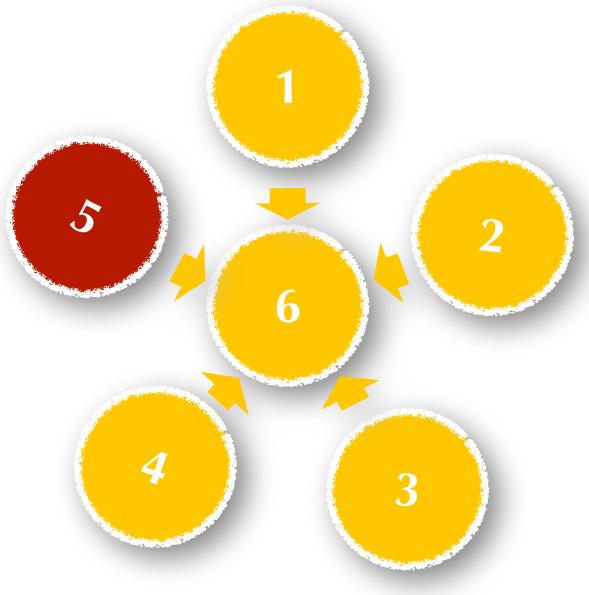
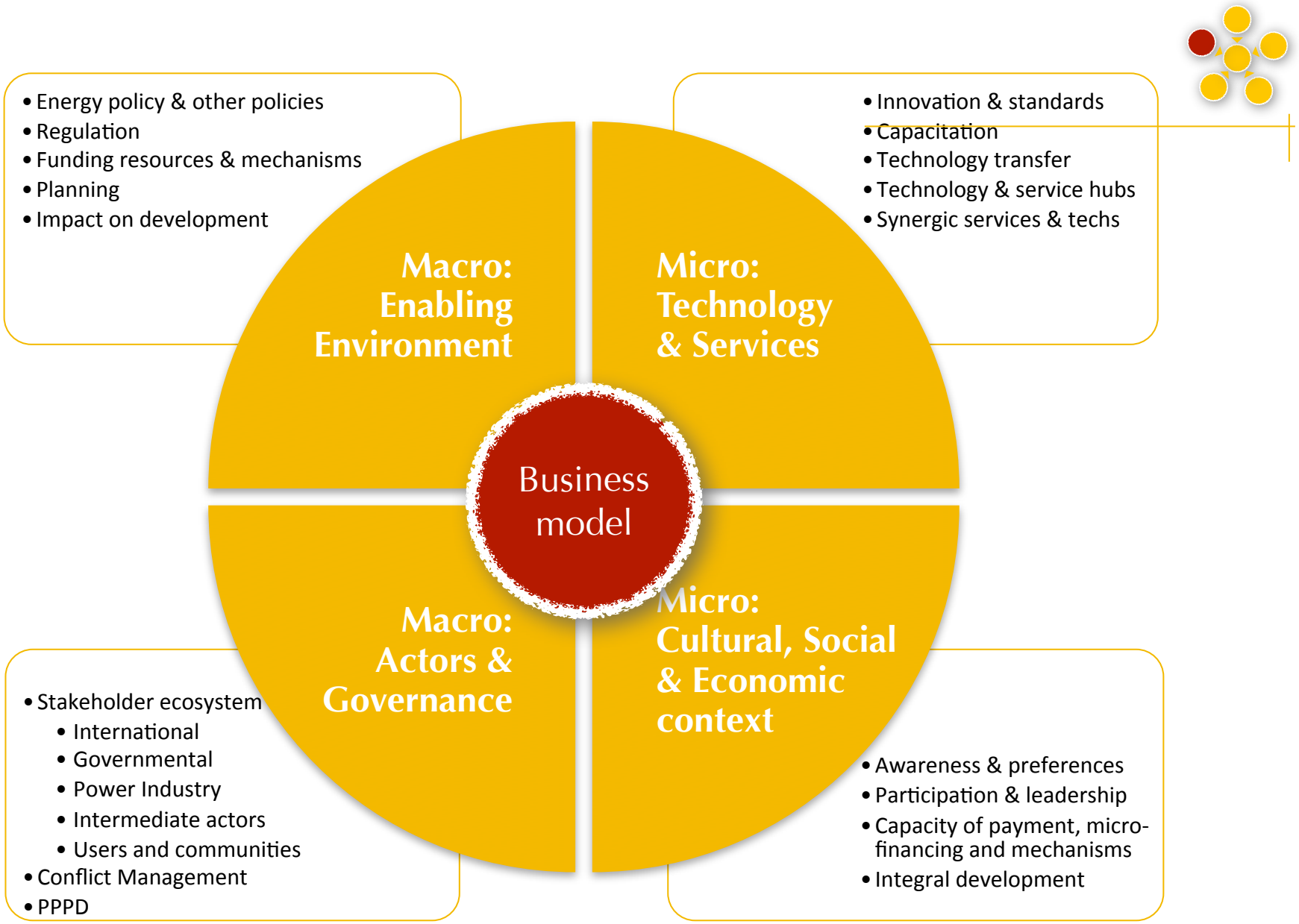


¿Cómo crear un entorno favorable para los modelos de negocio?


• Energy policy & other policies
• Regulation
• Funding resources & mechanisms
• Planning
• Impact on development
Macro: Enabling Environment
Micro: Technology & Services
• Innovation & standards
• Capacitation
• Technology transfer
• Technology & service hubs
• Synergic services & techs
Business model
Macro: Actors & Governance
• Stakeholder ecosystem
• International
• Governmental
• Power Industry
• Intermediate actors
• Users and communities
• Conflict Management
• PPPD
Micro: Cultural, Social & Economic context
• Awareness & preferences
• Participation & leadership
• Capacity of payment, micro-financing and mechanisms
• Integral development

7

Modelos de negocio y empresa social

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Modelo de empresa social

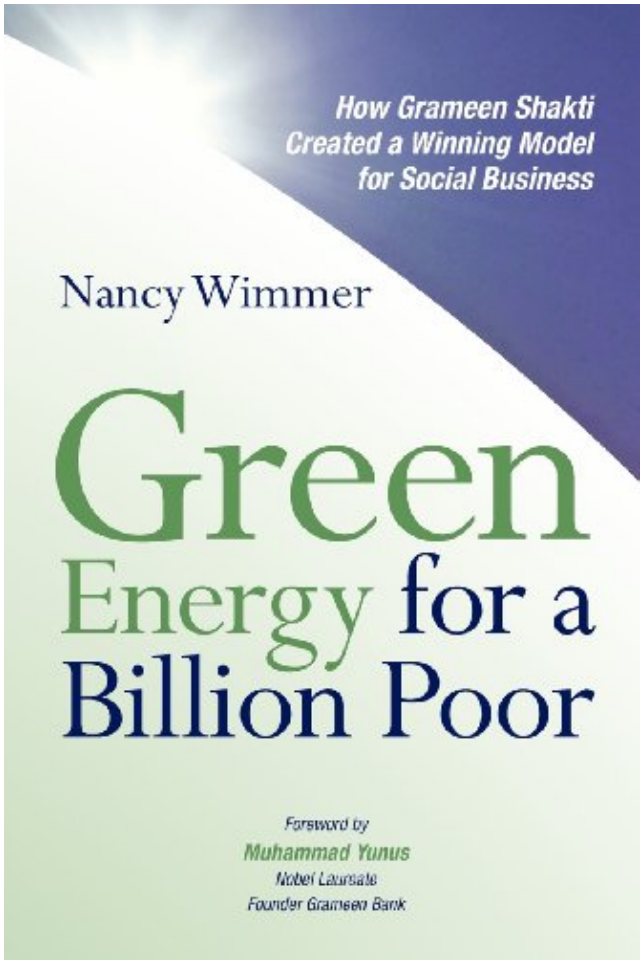
- Perspectiva europea: "Org. privada, sin ánimo de lucro que proveen bienes y servicios directamente relacionados con el objetivo implícito de **beneficio de la comunidad**"
- Mundo en desarrollo: Protagonismo de los colectivos excluidos en su **propio desarrollo**.

Fuente: GIOS. Fiscac R., Moreno A., Palacios M. , Pérez D., Uribe D. 2011

- Perspectiva norteamericana: "Negocios cuyo principal objetivo es el **bien común**... para hacer avanzar la agenda de justicia humana, social y medioambiental"

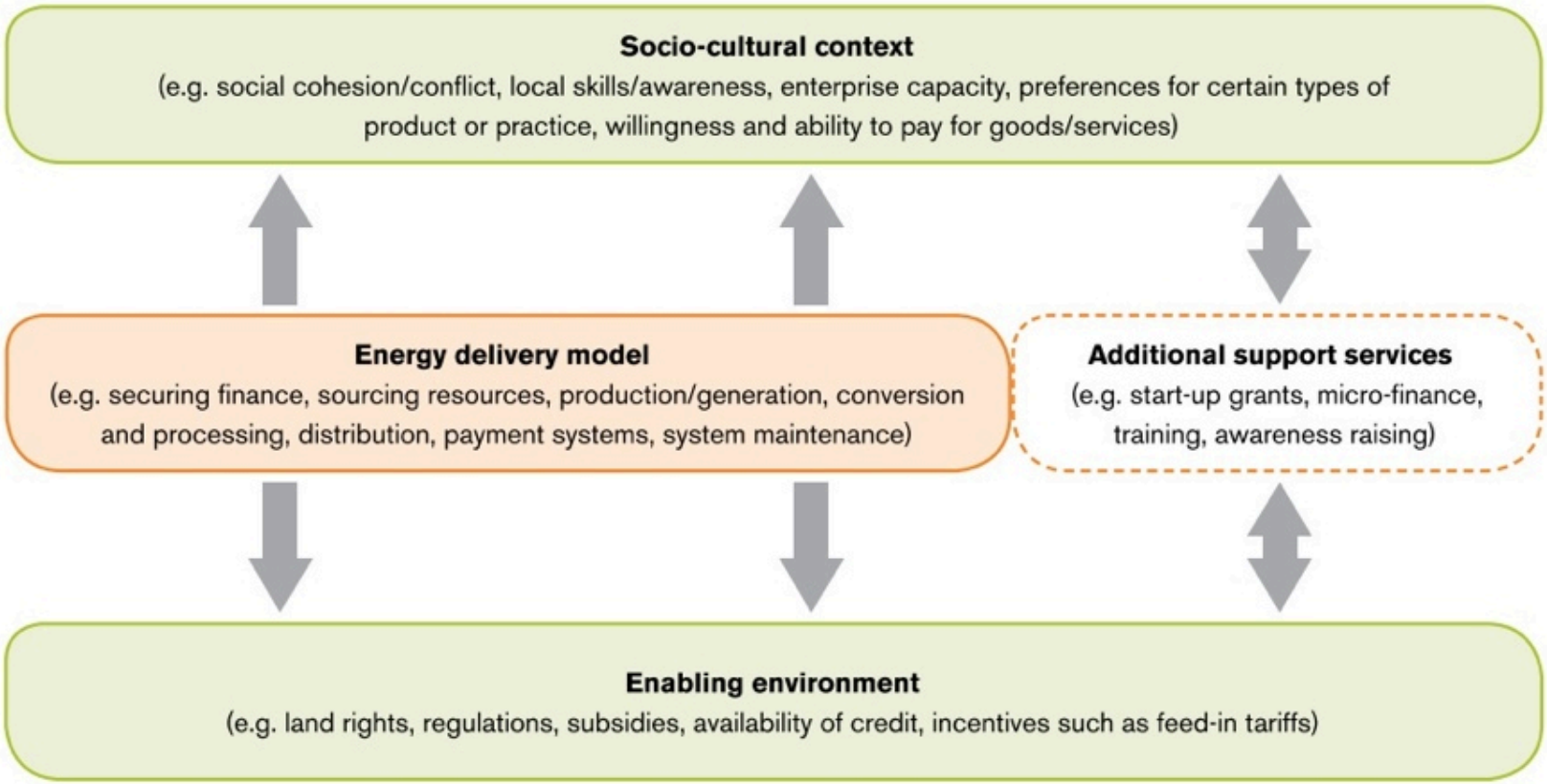
Fuente: Social Enterprise Alliance. 2013

Empresa social y acceso universal



- Innovadora
- De abajo a arriba
- Autosostenibles con enfoque empresarial, innovador, eficiente y competitivo.
- Primacía objetivos sociales sobre los económicos. Reinversión.
- Integración de la comunidad local.
- Estructura orientada a la colaboración en red.

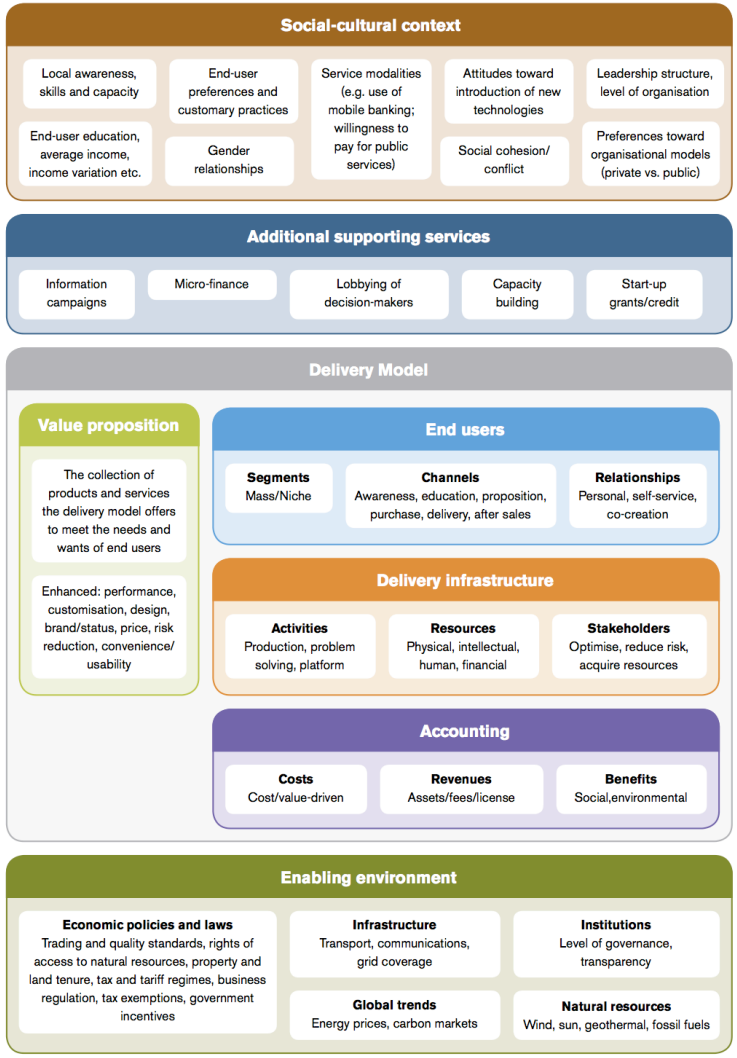
Business model mapping (SE4All - IIED)



Source: Wilson, Godfrey and Garside 2012

Business model analysis

- User centric approach
- Value proposition: Services and product for energy uses and contribution to development targets
  - Residential
  - Commercial
  - Productive
  - Community
- Socio economic and cultural context
- Market niche and segmentation
- Delivery model & revenue estructure
- Key issues
  - Sustainability
  - Scalability
  - Replicability



Source: Bellanca and Garside 2013

Technologies vs. business models classification

		Grid Extension	Connected Mini grid	Isolated Mini grid	Single User System	Pico Solar Systems	Modern fuels connected	Modern fuels isolated	Improved Stoves	Solar Water heaters
For profit	*Small, decentralized*									
	Large, centralized									
Non profit	*Cooperatives*									
	Social enterprises									
	Other community org.									
	NGOs									
Public	*Small, decentralized*									
	Large, centralized									

Alternative Business Models

¡Gracias!

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