

*EPRG & CEEPR European Energy Policy Conference
Universalization of electricity supply*

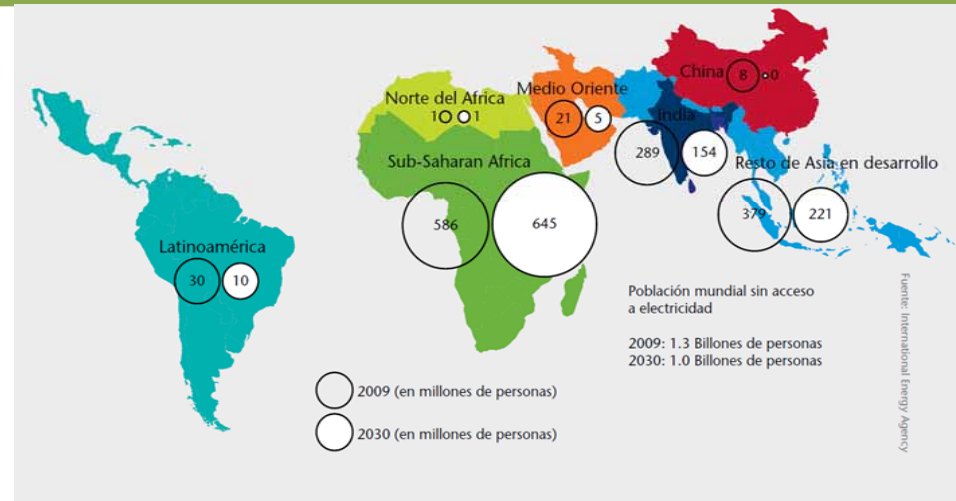
“Universal access to electricity: models, challenges, and opportunities”



*Carlos Sallé
Director of Regulation
Madrid, Spain
July 3rd 2014*

The challenge: supplying energy access for all

More than 1.300 million people have no access to electricity and 2.600 million do not have clean cooking facilities

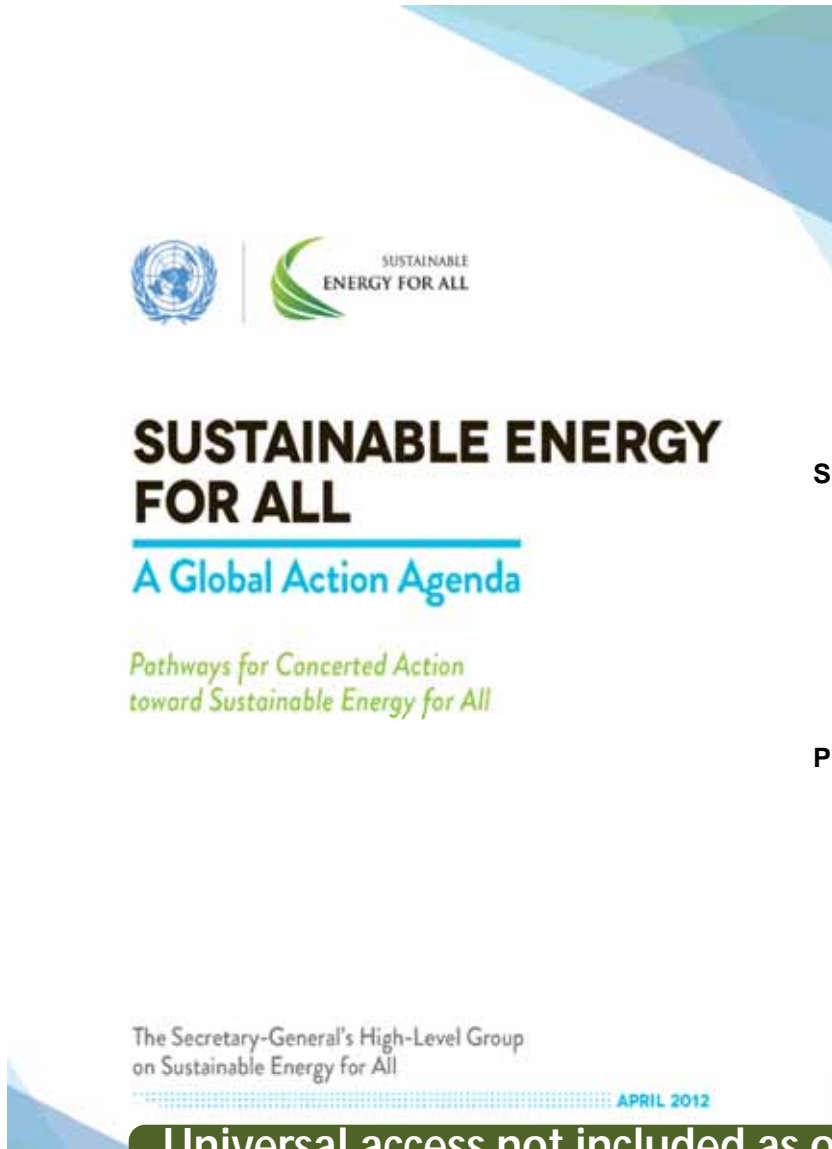


Challenge: provide quality energy supply to developing countries

- a) Minimum service (three lamps and one phone charger)?
- b) An ambitious objective: to achieve a standard of service comparable to the rest of the world

An energy mix that does not jeopardize sustainability

Business models that allow scalability of the solution (more than 1 Trillion \$ till 2030)



Sustainable development is not possible without sustainable energy

Private-sector investment is key to building a serving those markets

ABOUT US | THE OBJECTIVES | ACTIONS & COMMITMENTS | TRACKING PROGRESS

EVENTS & OUTREACH | UNIVERSAL ACCESS | RENEWABLE ENERGY | ENERGY EFFICIENCY

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UNIVERSAL ACCESS


Sustainable energy powers opportunity. Yet 1.3 billion people—one in five globally—lack electricity to light their homes or conduct business.

SUSTAINABLE DEVELOPMENT IS NOT POSSIBLE WITHOUT SUSTAINABLE ENERGY

Nearly 70% of the world's population rely on their food breathing in toxic smoke that causes lung disease and kills nearly two million people a year, most of them women and children.

Electricity enables children to study after dark. It enables water to be pumped for crops, and foods and medicines to be refrigerated. Modern fuels for cooking and heating relieve women from the time-consuming drudgery and danger of traveling long distances to gather wood.

Without access to modern energy, it is not possible to achieve the Millennium Development Goals, the eight-point global agenda adopted by the United Nations in 2000—whether reducing poverty, improving women's and children's health, or broadening the reach of economic development, offering opportunity for improved lives and economic progress.



Replacing outdated cookstoves and open fires with modern energy services would save the lives of 800,000 children who die each year as a result of exposure to indoor smoke.

PRIVATE-SECTOR INVESTMENT IS KEY TO BUILDING AND SERVING THOSE MARKETS

Energy can be used to support businesses and achieve greater prosperity. A farmer who irrigates his fields can double the size of his crop, feed his family, and earn a living. A sewing machine and a light to work from at night can enable a woman to generate extra income for her family.

Greater prosperity means more disposable income and new markets for consumer goods.

Without sustainable energy, we will not meet the Millennium Development Goals.

Through innovation in energy products and investment in deployment, businesses can create jobs and supply millions of people with the tools they need to make a better life. Policymakers can do their part to remove legal and regulatory barriers that stand in the way of business innovation and investments. Civil society groups can encourage governments to make more sustainable choices and provide community-based models of energy innovation.

LATEST ON FACEBOOK
UNABLE TO RETRIEVE LATEST MESSAGE AT THIS TIME. [VIEW ALL POSTS](#)

LATEST ON TWITTER

FEATURED COMMITMENT
Initiative will provide 600 million people in the developing world with the support they need to gain access to... [READ MORE](#)

FEATURED EVENT
RIO +20 UNITED NATIONS CONFERENCE ON SUSTAINABLE DEVELOPMENT
June 20 / Rio de Janeiro
At the Rio+20 Conference, world leaders, along with thousands of participants from governments, the... [READ MORE](#)

Universal access not included as one of the Millenium Goals, but recognised by SE4All as key for achieving them

“Lack of electricity does constitute a barrier to the people development and their welfare”

100% electrified
countries

- **All the consumers are “in the grid” but there are economic vulnerable consumers (*fuel poverty*).**
 - Public subsidies, tariff subsidies, obligation schemes (CERT/CEST/ECO en UK), social bund...

No electrified
countries

- **Consumers “out of the grid”**
 - Expansion of the existing grid
 - By using micro grids
 - By domestic electrification
- **Economic vulnerable consumers**
 - Public subsidies, tariff subsidies,...

The theory to successful: multistakeholder solution



Traditional models of public service are no longer useful: concession holder/Administration

Multistakeholder solution



New models of governance: Public Private Partnerships for development

The theory to successful: steps to be solved among all



Some steps for the good governance of any type of universalisation project

1. Need

Contacts among communities, Administrations

2.- Eligibility

Priorities and community

3.- Technical solutions

Data, adequate technical solutions
(investment and O&M), optimising scarce resources

4.- Environment

Data, consequences

5.- Synergies

Water, health, education, new economies...

6.- Side-effects

Sociological and cultural effects

7.- Regulation

Existing legal frameworks and their changes

8.- Business models

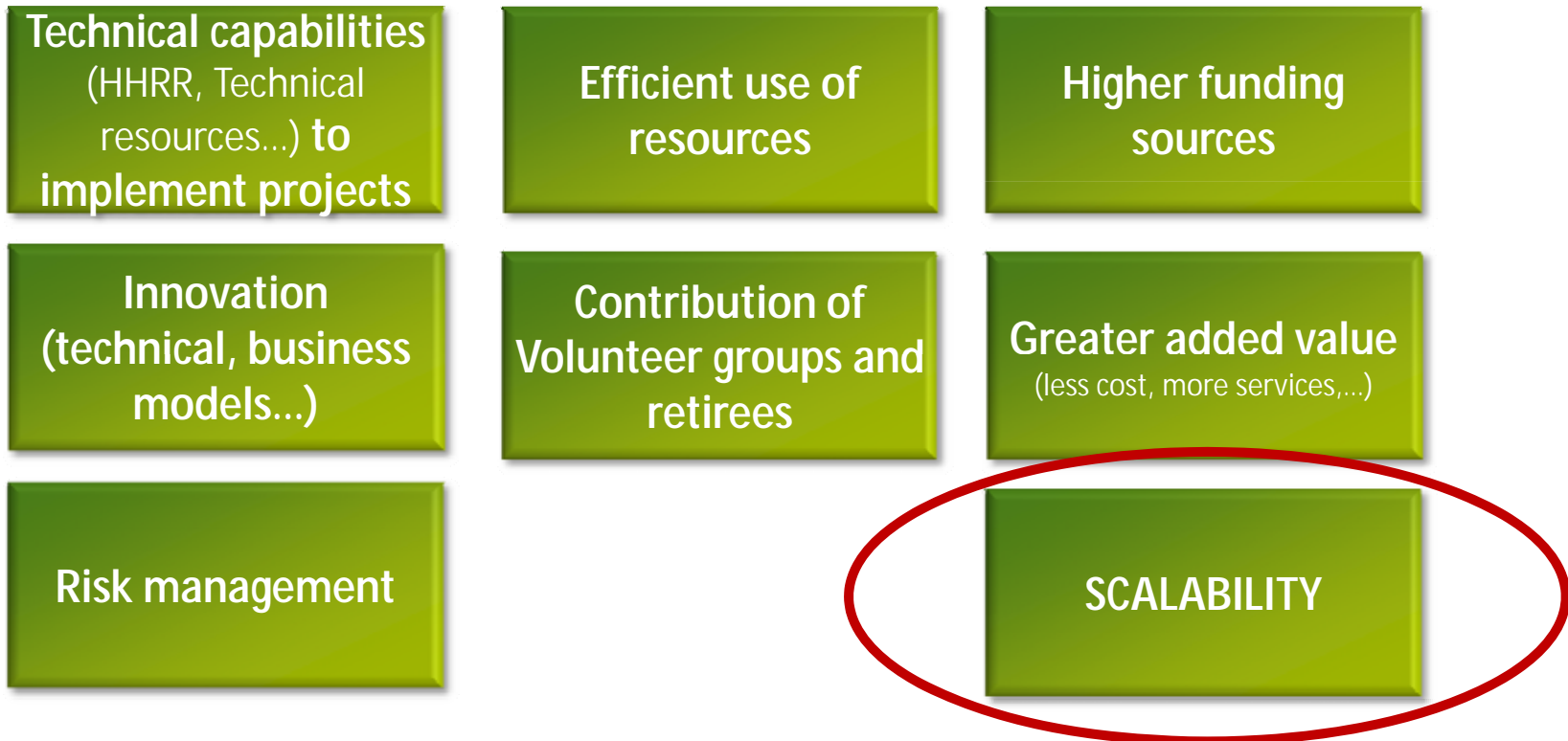
Local partners, chain of private companies , scale, from projects/assets driven to services driven...

9- Sustainability

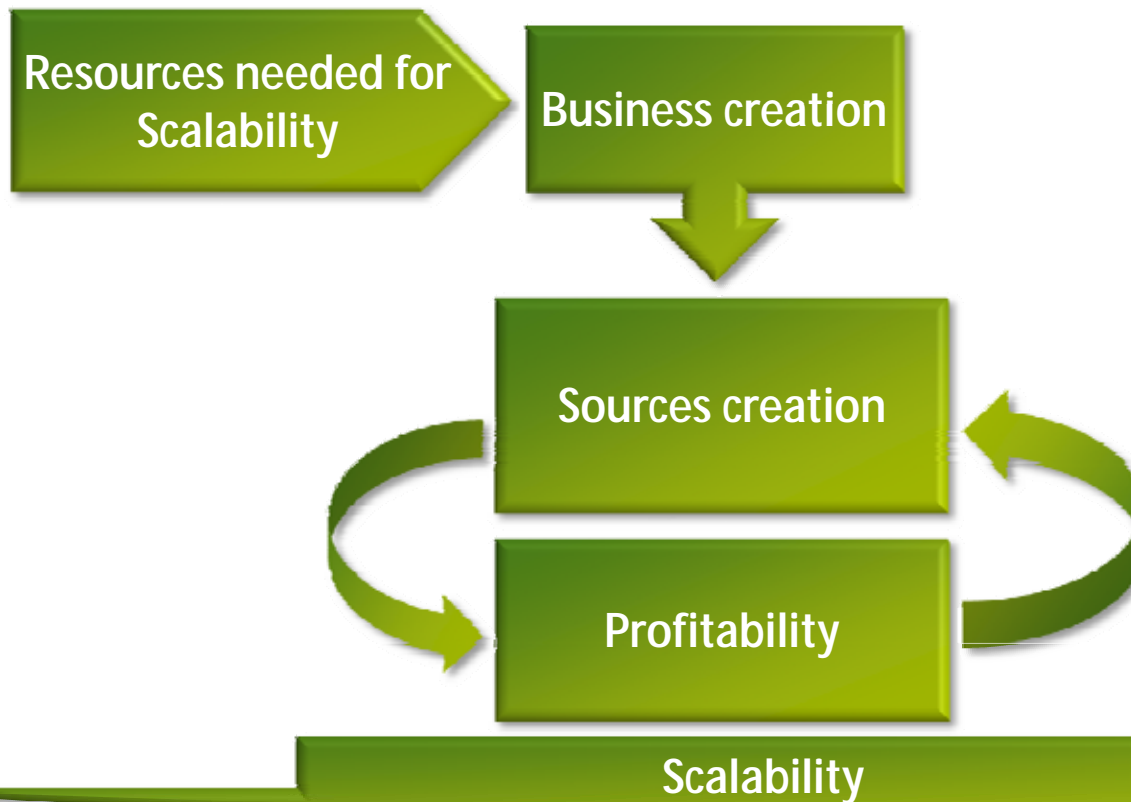
Funding (investment, O&M, subsidies, tariffs, Affordability, ability to pay in equity ...) involvement of beneficiaries

New governance models: importance of allocation of responsibilities.

The theory to successful: the private companies contribution



The theory to success: Scalability required for universal supply cannot be achieved only with philanthropy and social action



Shared Value= Economic Value + Social Value

“Why business can be good at solving social problems” (Michael Porter) (*)

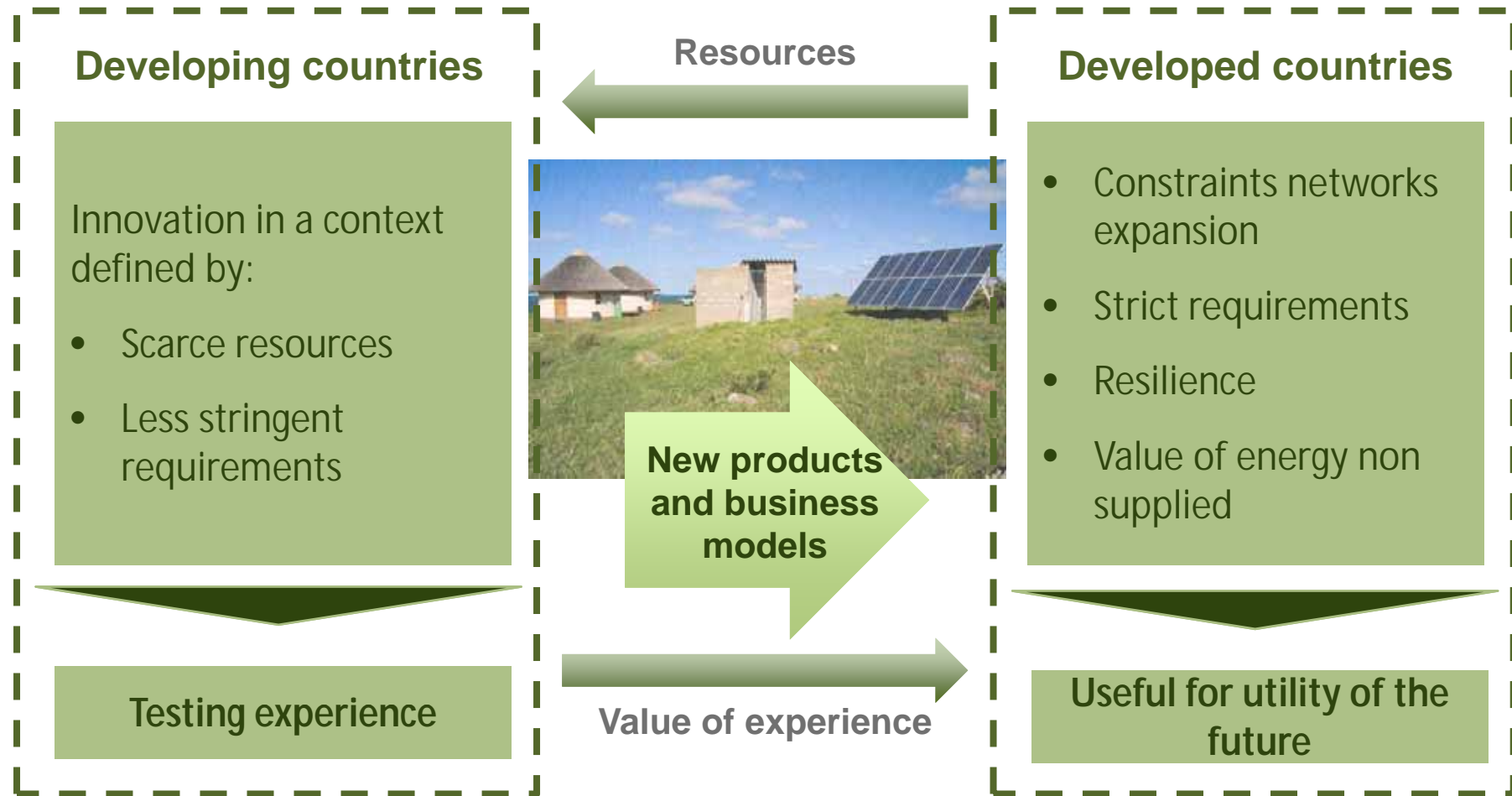
(*) http://www.youtube.com/watch?v=0ilh5YYDR2o&feature=player_detailpage

Some help to scalability: The "Reverse innovation" ...



HANG, C., & GARNSEY, E. (17 de June de 2011). Opportunities and resources for disruptive technological innovation. *Working Paper, University of Cambridge*. Cambridge.

...to link "universal service" and "utility of the future"

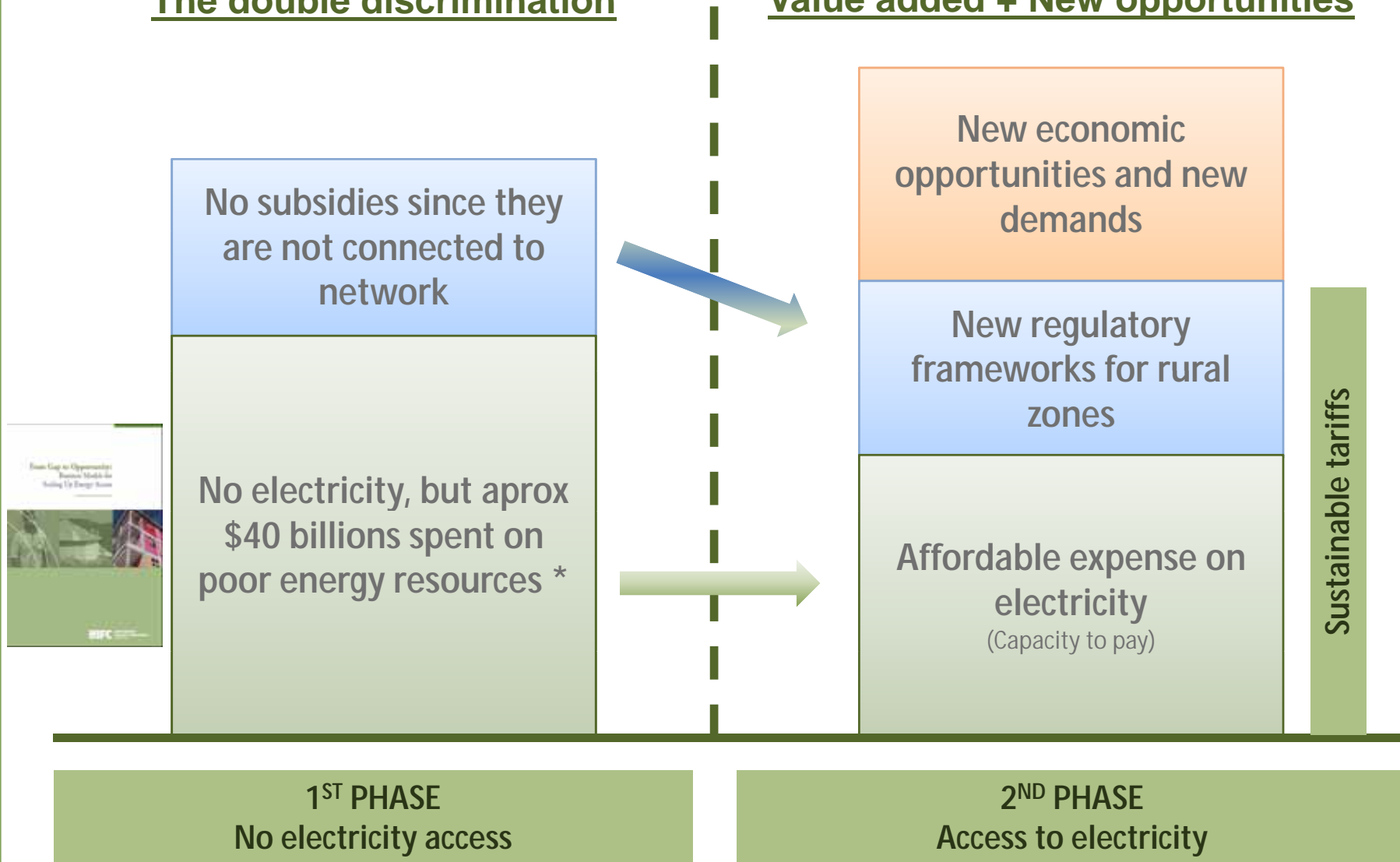


Applying to global market the knowledge extracted from local developing countries markets

Some help to scalability: Understanding the base of the pyramid to develop new business models

The double discrimination

Value added + New opportunities



(*) Source: "From gap to opportunity: Business models for Scaling up energy access. IFC".

Luz para todos (Light for all)

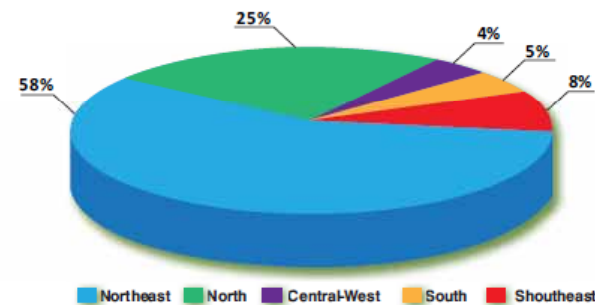
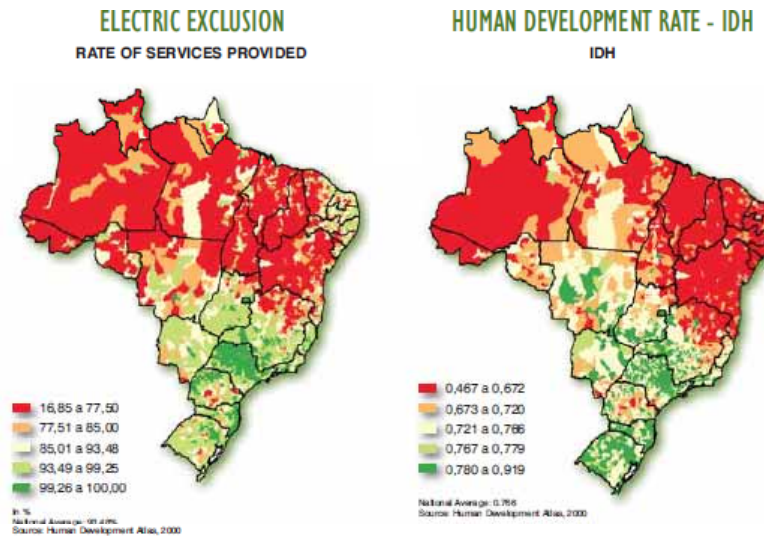
Previous programs for universalization in Brasil

Initial experiences start in 90's

Learning of failures

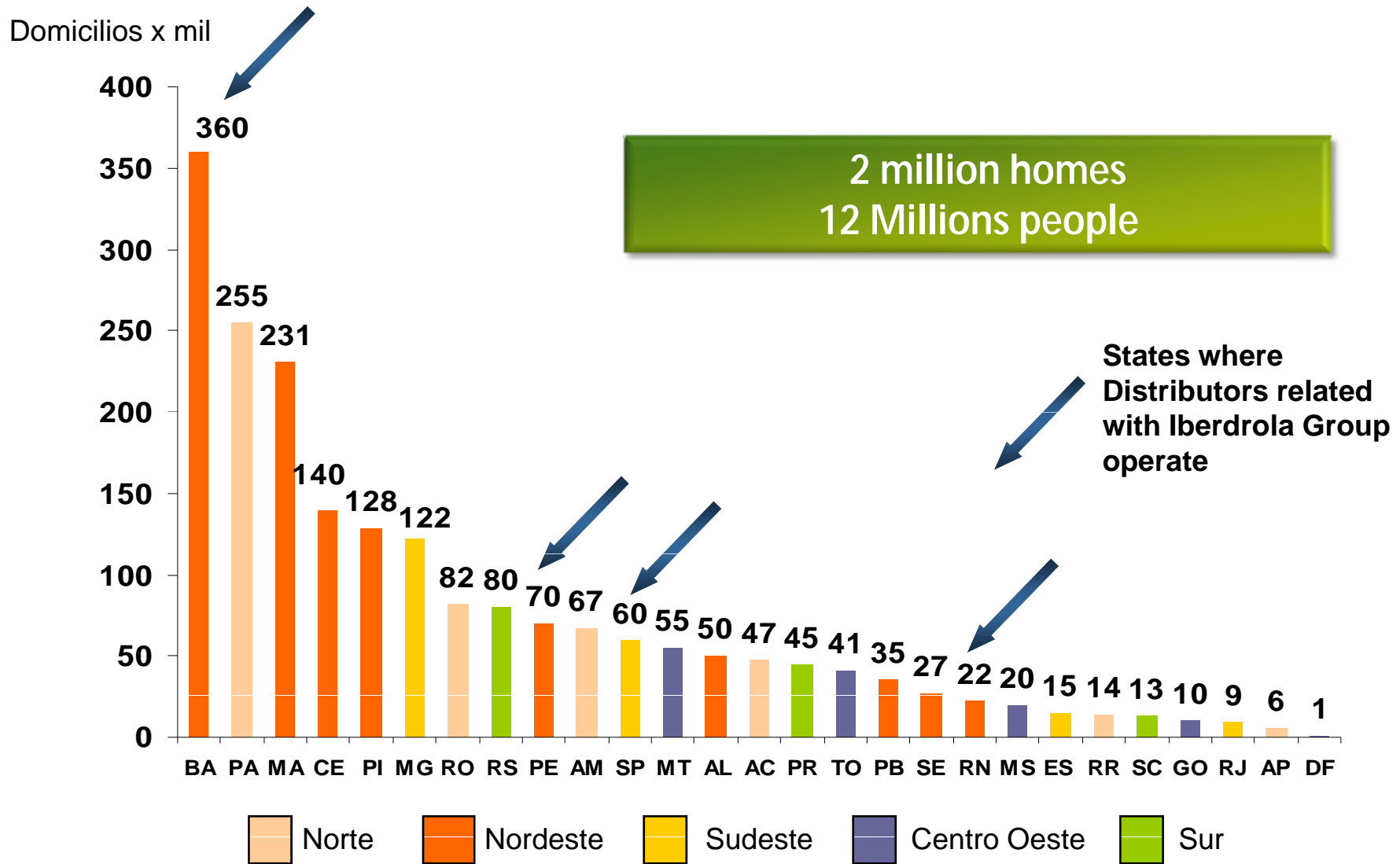
Luz para todos (Light for All)

National electricity exclusion in 2000



Families without electricity access were mainly located in areas with the lowest Human Developed Index (IDH) and were Very Low rents families and located in rural areas

Homes without electricity at the beginning of the program



Fuente: Censo IBGE, con actualización, ampliación y elaboración de ABRADÉE

Launching Light for all

Creation

- Decreto N.º 4.873 de 11 de noviembre de 2003

Objectives

- To guarantee energy access in all rural areas in 2008, with intermediate goal of 90% in 2006. Extended in 2011 till 2014.
 - Priorities for zones with low development index and families with low rents
- To mitigate tariffs impacts using official subsidies complemented with financial and own recourses of Distribution



Information <http://luzparatodos.mme.gov.br/luzparatodos/asp/>

A Multistakeholder solution. Main agents in Light for all



Coordination: Ministry of Mining and Energy

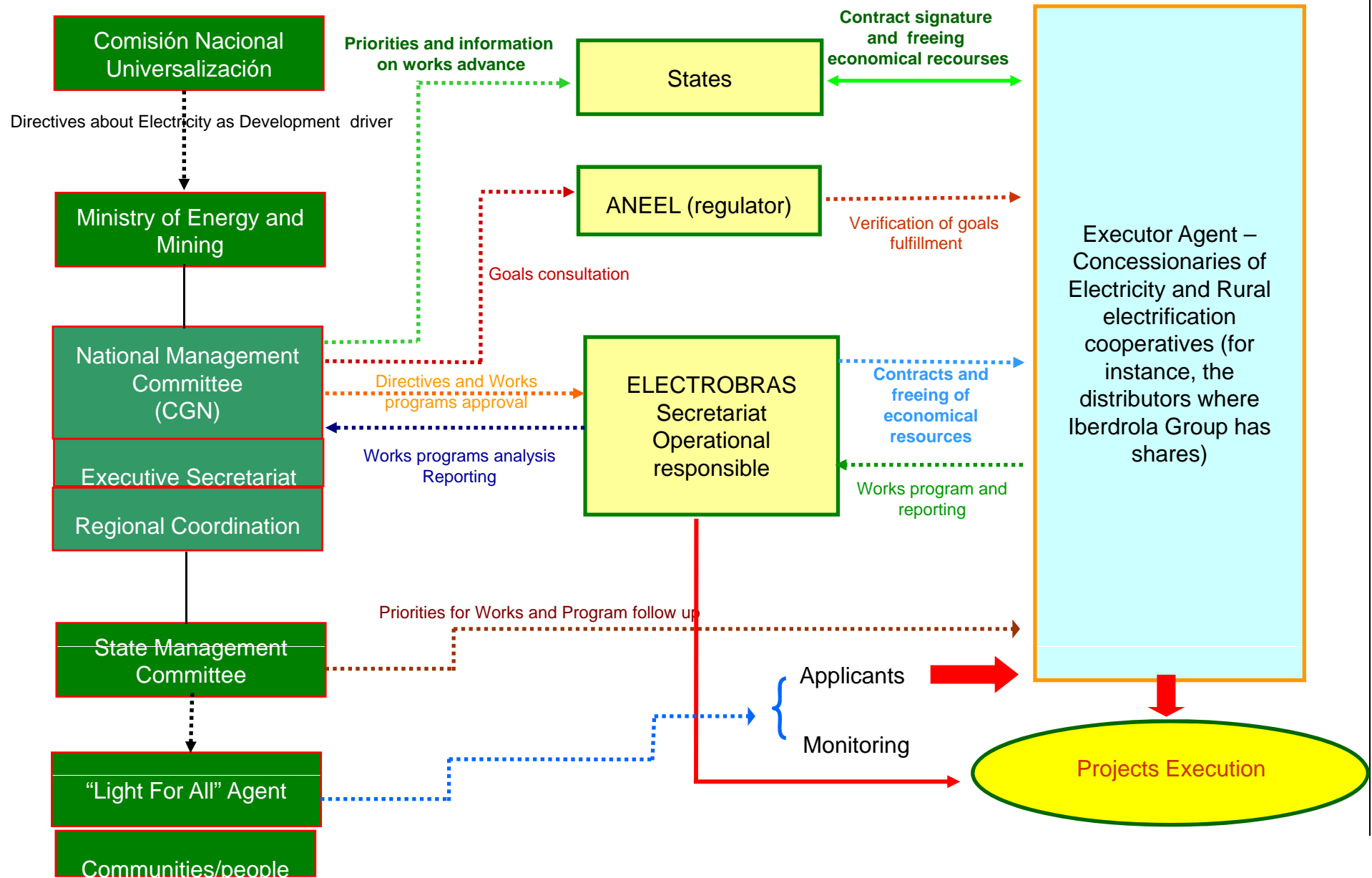
Operation: Electrobras and State Governments

Execution: Distributors (as Coelba, Distributor with a share of Iberdrola)

Detection of needs, information and education about the program to communities: Community agents

The applicants: people in rural areas

The governance structure of Light for All



Economical Resources and concretion of governance



Funding from public budget, and contracts with Electrobras and with State Governments guarantee the economical sustainability

Federal Government:	75% (originally 50% Subsidy (Funds CDE Electrobras))
State/Municipalities:	0 % (initially 10% minimum)
Distributor:	25% in RAB (initially 15% minimum + xx% completing 100% soft financing(Funds RGR))
Total	100%

A comprehensive legislative, contractual, operational and technical set of documents establishes the obligation/rights of all the stakeholders

Goals of Light for all (1)



Programa Luz para Todos

10 ANOS

15 MILHÕES DE PESSOAS SAÍRAM DA ESCURIDÃO

Main goal:
Initial objective: Access for 10 million people.
Currently 15,1

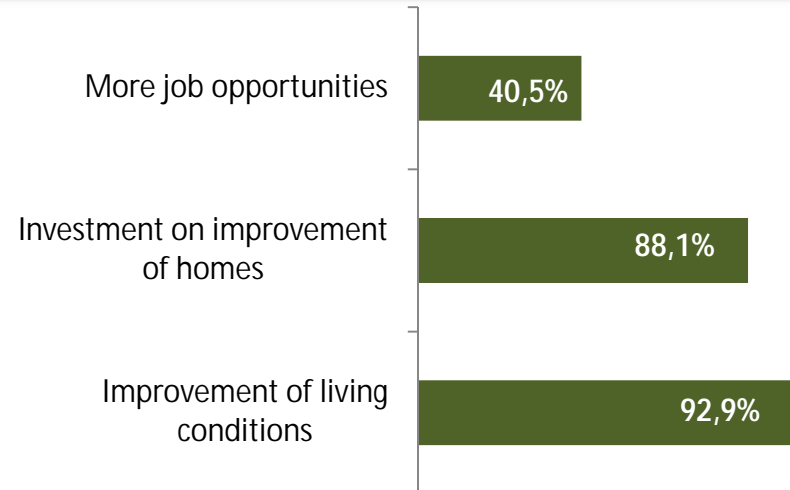
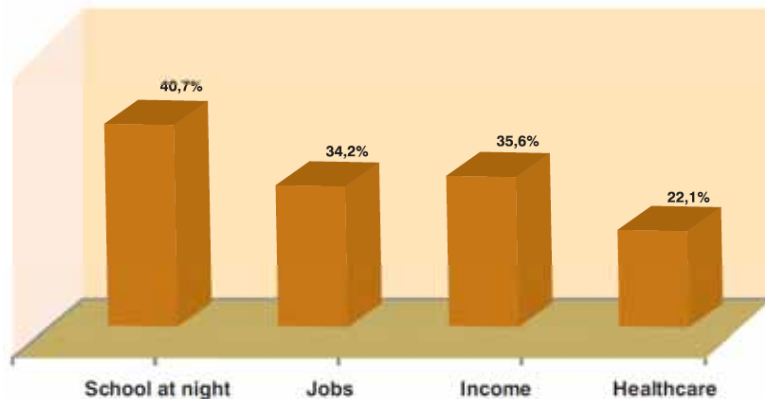
Investment: USA\$ 20.000 Millions

New jobs: 460.000

Source: <http://www.mme.gov.br/10anosluzparatodos/resultados.html>

Other effects

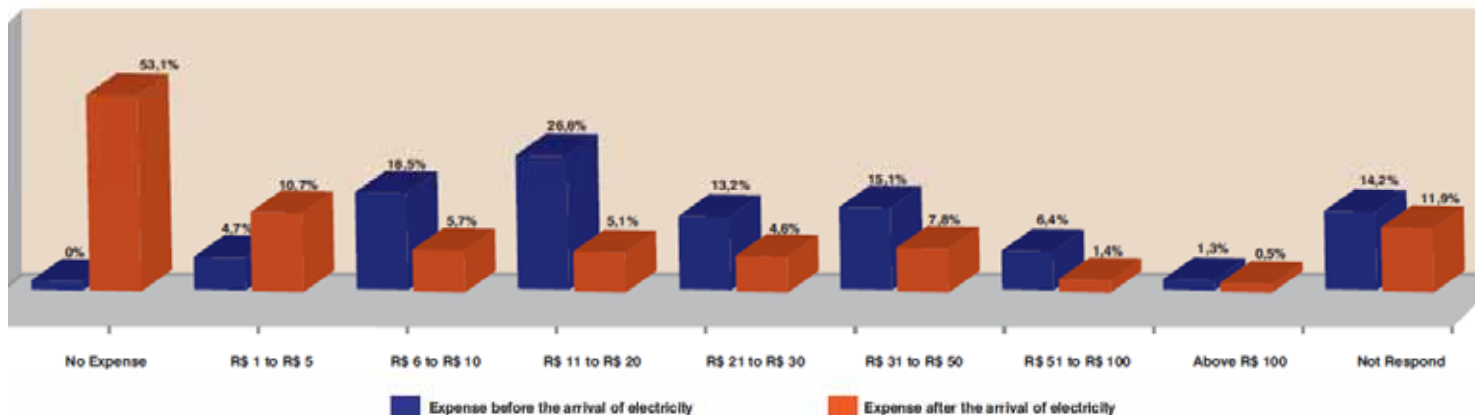
Effects of "Light for All" on the opportunities of work, study, health and income



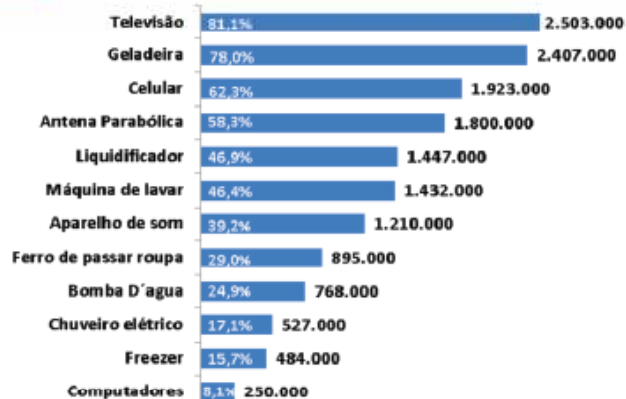
Source: http://luzparatodos.mme.gov.br/luzparatodos/downloads/Informativo_LpT_nr.41.pdf

Improvement of welfare, creation of new economies, avoiding emigration from rural areas, availability of rents for efficient ways of energy....

Monthly average expenses with renewable energy in Brazilian reais



Programa **LUZ** para todos
AQUISIÇÃO DE ELETRODOMÉSTICOS



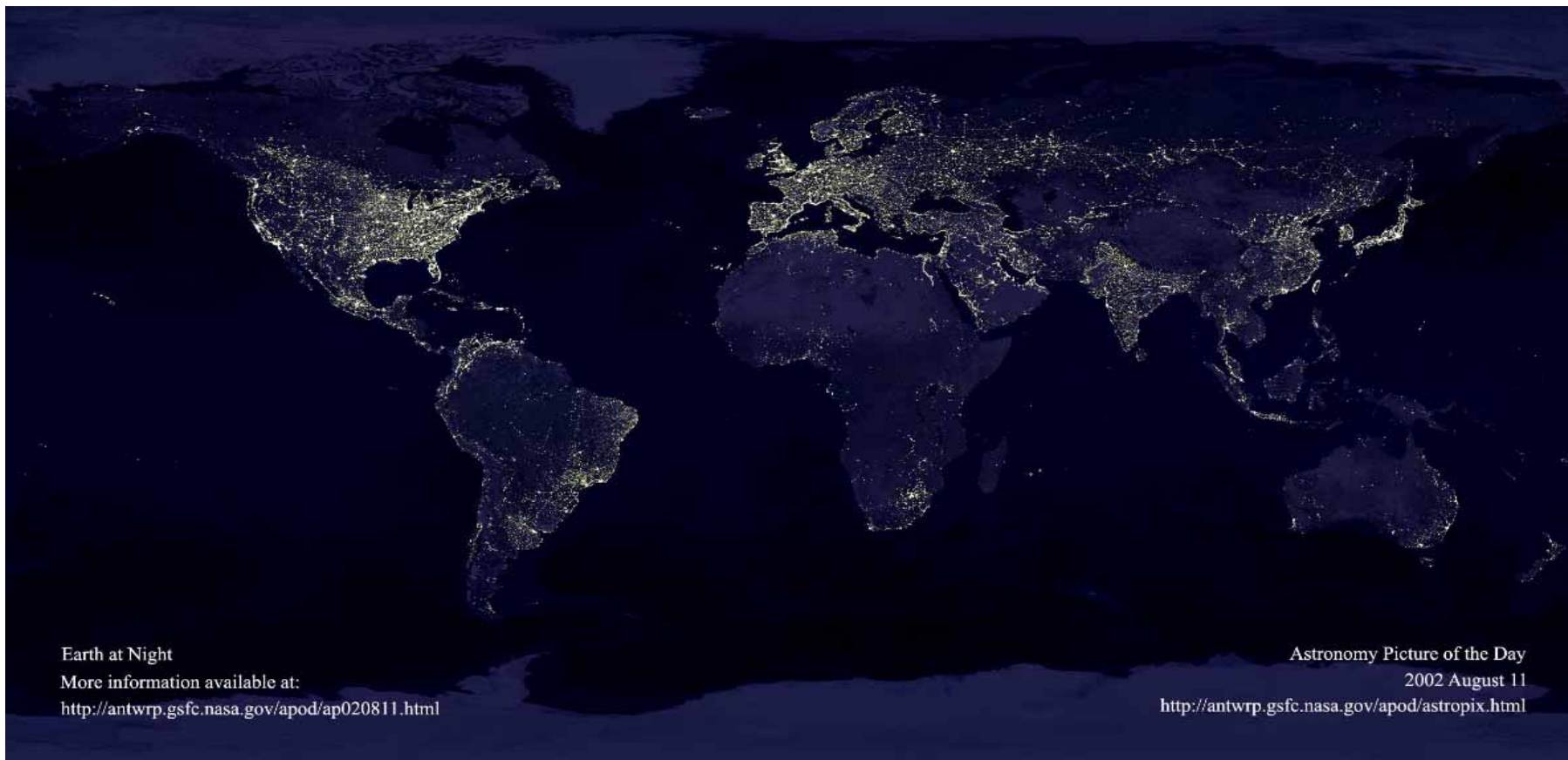
Strong increase of household appliances for more than 3 million households benefited from the program

**7 Million poles
1,5 million kms of lines**

Source: <http://www.mme.gov.br/10anosluzparatodos/noticia3.html>

...and Research & Development in new technologies (e.g. Construction in complicated regions/access, electricity poles with resins of polyester)

Other initiatives/references



Energía Sin Fronteras (EsF).



The screenshot shows the website for Energía Sin Fronteras (EsF). The header includes the logo, the tagline "Energía y Agua para la Vida", the years "2003 - 2013", a search bar, and a language dropdown set to "Español". The navigation menu includes "Inicio", "Quiénes somos", "Proyectos", "Asesoría Técnica", "Estudios", "Informes", "Cursos", "Voluntariado", and "Amigos de". The main content area is titled "EN SERVICIO" and contains a list of 13 projects. Each project entry includes a number, a country, and a brief description of the project.

Se incluyen en esta categoría todos los proyectos que están en servicio.

Filtrar por título

Mostrar #

Título del artículo

- 1 Perú. Luz Comunitaria en diez centros de San Pablo, Cajamarca, Perú.
- 2 ALBERGUE SANTA MARÍA DE LA PAZ, MADRID
- 3 Camerún. Acceso sostenible al agua potable mediante bombeo fotovoltaico. Mayo-Kani-Illir
- 4 Guatemala. Electrificación fotovoltaica de centros comunitarios del Municipio de Cobán, Alta Verapaz
- 5 Benín. Suministro de agua potable a diez comunidades de las municipalidades de Kalalé, Nikki y Peréré
- 6 Benín. Suministro de electricidad mediante energía solar fotovoltaica al centro de salud de Bongowerou
- 7 Benín. Aula de formación profesional en energía solar fotovoltaica en el centro Don Bosco de los Padres Salesianos en Parakou
- 8 Camerún. Acceso sostenible al agua potable mediante bombeo fotovoltaico en el poblado de Ouro Karamba
- 9 RD.Congo. Mejora de las condiciones sanitarias en la región de Kivu-Sur mediante la electrificación de diez centros de salud.
- 10 Togo-Abastecimiento agua potable en el Cantón de Defale
- 11 Nicaragua. Instalación de una microcentral hidráulica de 25 kW en el Valle de Condega
- 12 Perú. Mejora de abastecimiento de agua en cinco pozos del distrito de La Matanza
- 13 R.D. Congo. Electrificación fotovoltaica de siete centros sanitarios en la isla de Idjwi
- 14 Togo. Abastecimiento de agua en las Comunidades de... (text truncated)

A NGO dedicated to Universal Service (Electricity and Water). Near 100% of volunteers

ENERGÍA Y COOPERACION

¿CÓMO PROMOVER EL ACCESO A LOS SERVICIOS
ENERGÉTICOS EN ZONAS DESFAVORECIDAS
MEDIANTE LA COOPERACIÓN AL DESARROLLO?

GUÍA DE BUENAS PRÁCTICAS



FUNDACIÓN ENERGÍA SIN FRONTERAS

PROYECTO SUBVENCIONADO POR EL AYUNTAMIENTO
DE MADRID CON LA COLABORACIÓN DE FICAD



Solar field Nyumbani Ecovillage Project (Kenya)



First village of this kind in Kenya

- The village initially was comprised 1000 orphaned children of both parents, dead because of HIV, and 100 grandparents who care for children.
- Nowadays, **it deals with 4,152 children**, grandparents who live in the village and people who come to the health center.



- The project, with a **budget of 220.000€**, has been run by the Foundation **Energía sin Fronteras (EsF)***.
- The **project consists of a village** where each house has its own vegetable patch and a farm with pets. It involves the **installation of a solar field of 216 panels** 210 w/unit (~45.5 kw) connected to a local micro network.

Access to solar energy will avoid from dependence from fossil fuels, with high costs and other harmful consequences, allowing the Ecovillage be self-sufficient and sustainable.

*These funds have come both from EsF own resources and thanks to the contribution of external donors: HC Energía, Fundación Iberdrola and Iberdrola Ingeniería y Construcción, Sunalia, SMA, Sunpower (donation of PV panels) Tudor (batteries) and Praxia (grant structures).



Global Sustainable Electricity Partnership

Association founded after the Rio Summit in 1992 dedicated to promoting sustainable development in the electricity sector globally

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Renewable Energy Projects

[Home](#) » [Renewable Energy Projects](#) » [Energy for Education Project](#)

[Renewable Energy Projects](#)

[Project Videos](#)



Nepal — Energy for Education Project



KEY OBJECTIVES:

- To demonstrate the potential of solar energy as a viable power source for improving education in the region.
- To use the energy from photovoltaic system for lighting and to launch a computer program in two rural schools.
- To provide clean portable small solar home systems for students and residents of rural Matela, significantly reducing the emission of toxic gases from the current use of kerosene lamps.

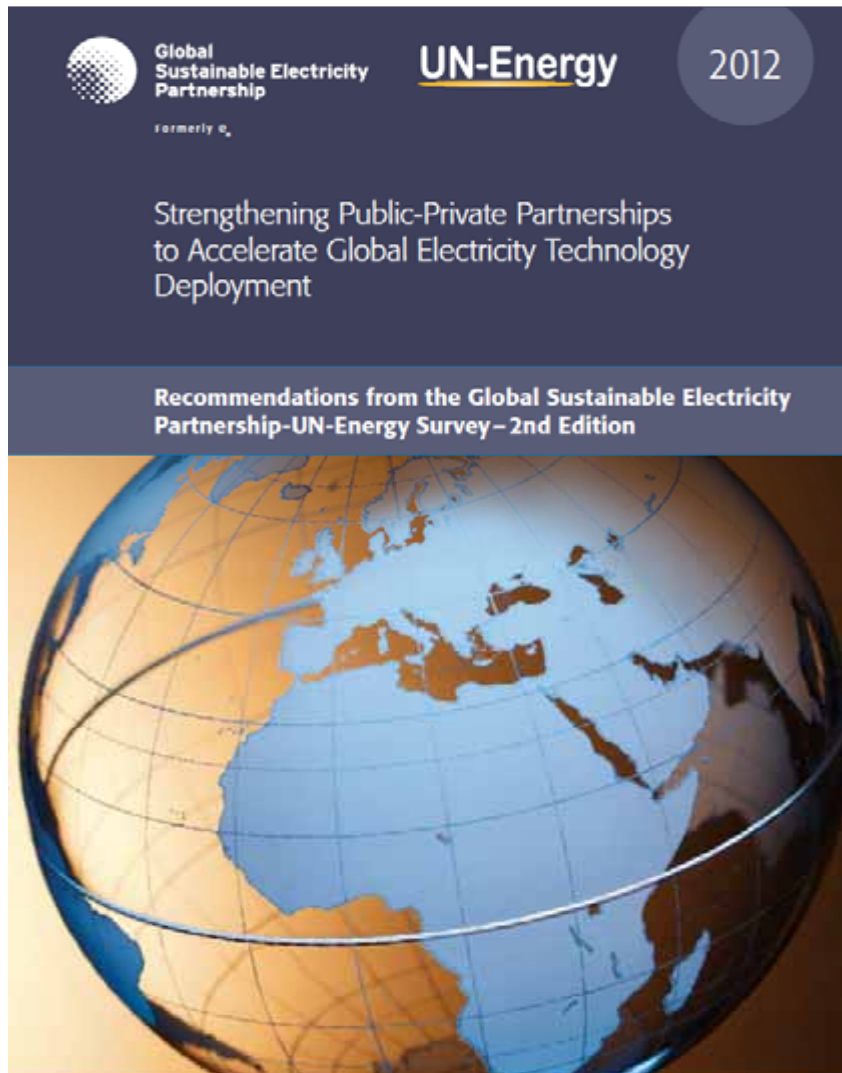
STATUS:

Completed

Sample video on:

<http://www.globalelectricity.org/en/index.jsp?p=271>

Survey on Public-Private Partnerships



Strengthening Public-Private Partnerships to accelerate global electricity technology deployment.
What is given to a Public Private Partnership by each party

Technical aspects

(Real Academia de ingeniería)

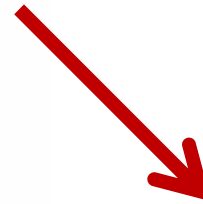


TECNOLOGÍAS PARA EL DESARROLLO HUMANO DE LAS COMUNIDADES RURALES AISLADAS

COORDINADORES:
José Ignacio Pérez Arriaga
Ana Morano Romero



REAL ACADEMIA DE INGENIERÍA



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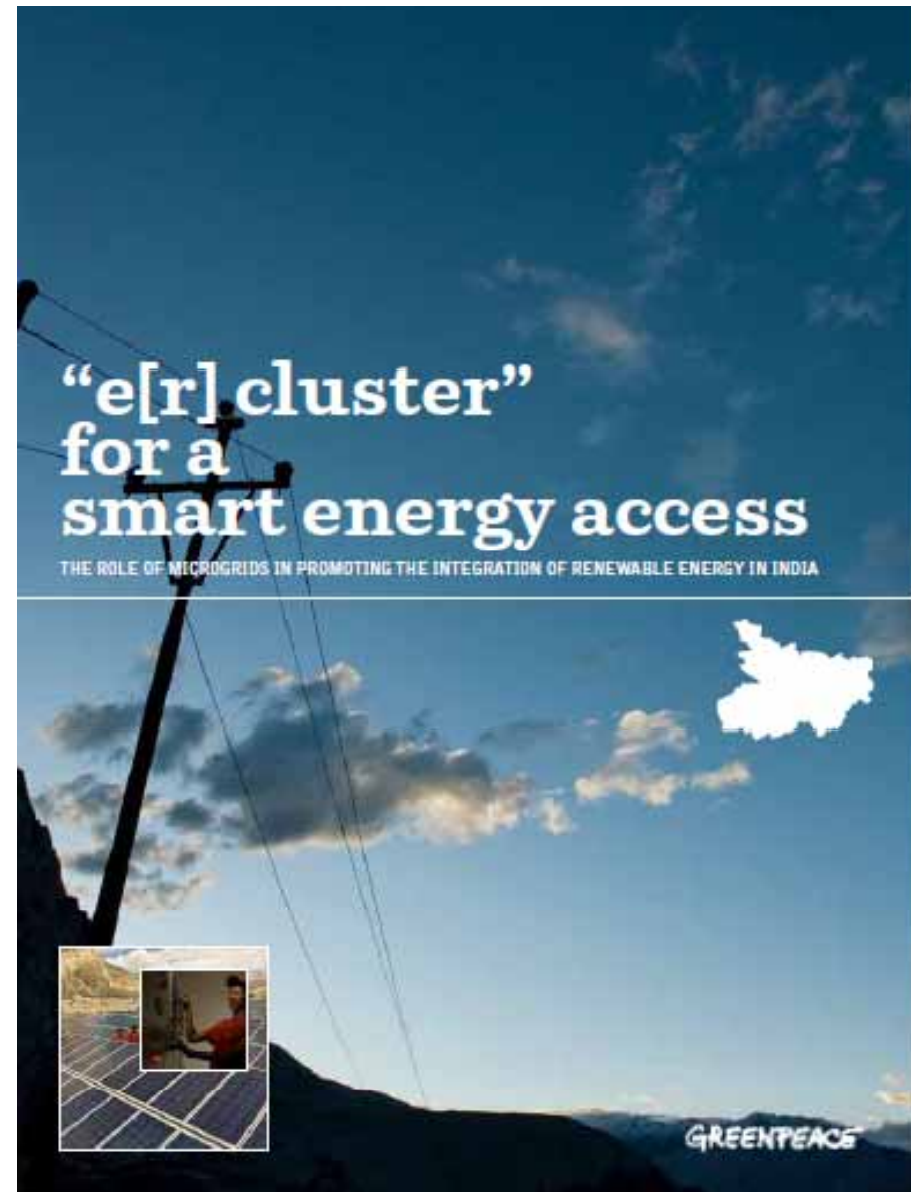
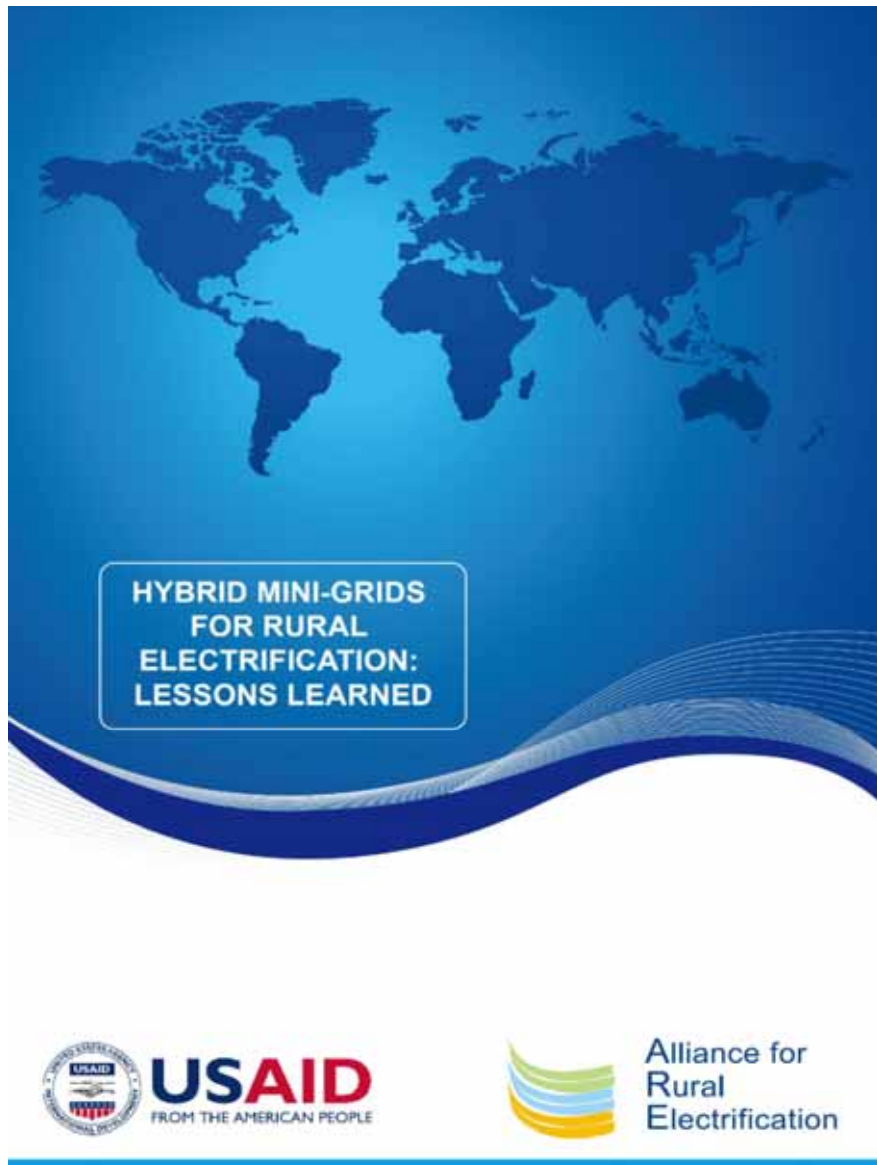
Asesorador técnico
José Luis Díaz Fernández

4

General conclusions: A Decalogue for electrification in isolated rural locations

1. Energy access is an essential requirement to poverty reduction fight and human development.
2. Isolated rural locations (IRL), devoid of adequate energy supply and without predictable access to the electricity grid, hold much of poverty.
3. The states, through their various administrations (central, regional or local) are responsible for ensuring universal access to energy services.
4. Renewable energy technologies allow access to energy in IRL through isolated systems from the grid.
5. The energy actions must be technically and economically affordable and requiring novel solutions for an efficient and sustainable management.
6. Consumers in IRL should not pay for electricity over their ability to pay, and by a principle of equity, no more than those in similar condition serviced from power grids.
7. There is a consensus among multilateral development organizations that universal access to modern energy sources needs crucial private sector involvement.
8. However, the free functioning of the market is not enough to supply ISL in terms of equity.
9. Along with the new technologies, creating companies or organizations providing energy services at the local level and an appropriate institutional framework are necessary for the electrification in IRL.
10. Active and joint position of governments, businesses, cooperating institutions and communities is required to promote the sustainable provision of services to IRL.

General approach to mini-grids



Proyecto: APPD para la electrificación de ZRA en Latinoamérica



Grupo de Investigación en Organizaciones Sostenibles
Universidad Politécnica de Madrid

[Tarea 3: Desarrollo de modelos de APPD para el suministro de energía eléctrica a las ZRA:](#)

Documento de avance 1:

APLICACIÓN DE LA EMPRESA SOCIAL A LA ELECTRIFICACIÓN DE ZONAS RURALES AISLADAS EN LATINOAMÉRICA

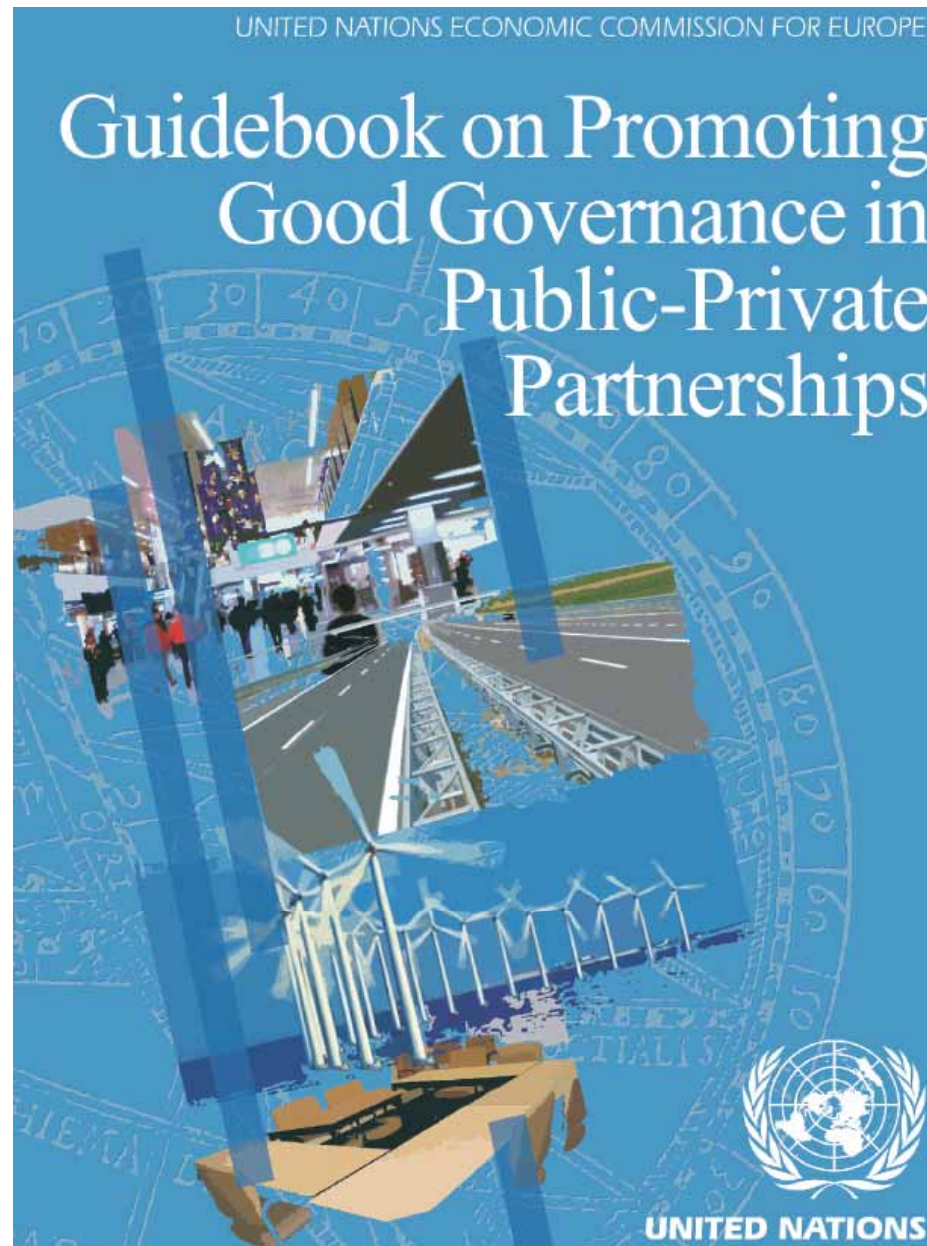
Ana Moreno Romero – Ramón Fisac García – Luis Miguel Uriarte



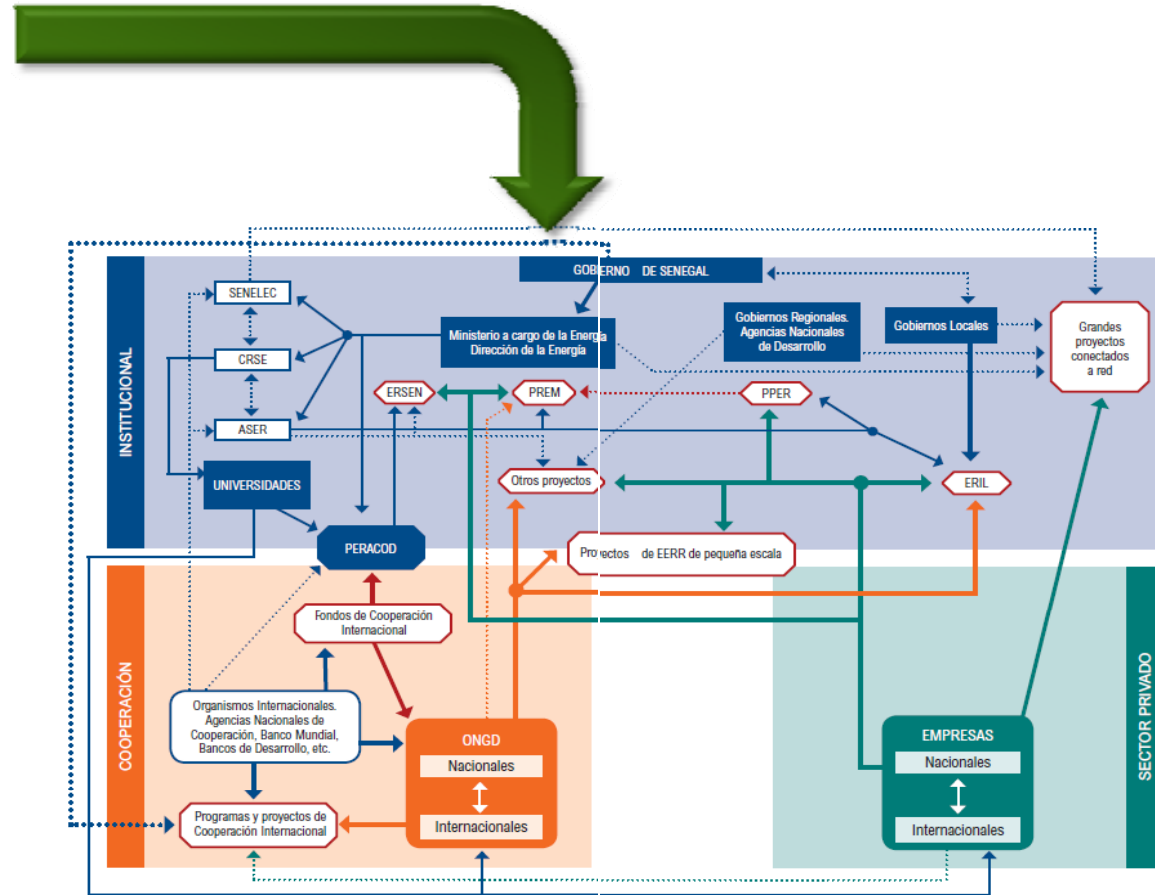
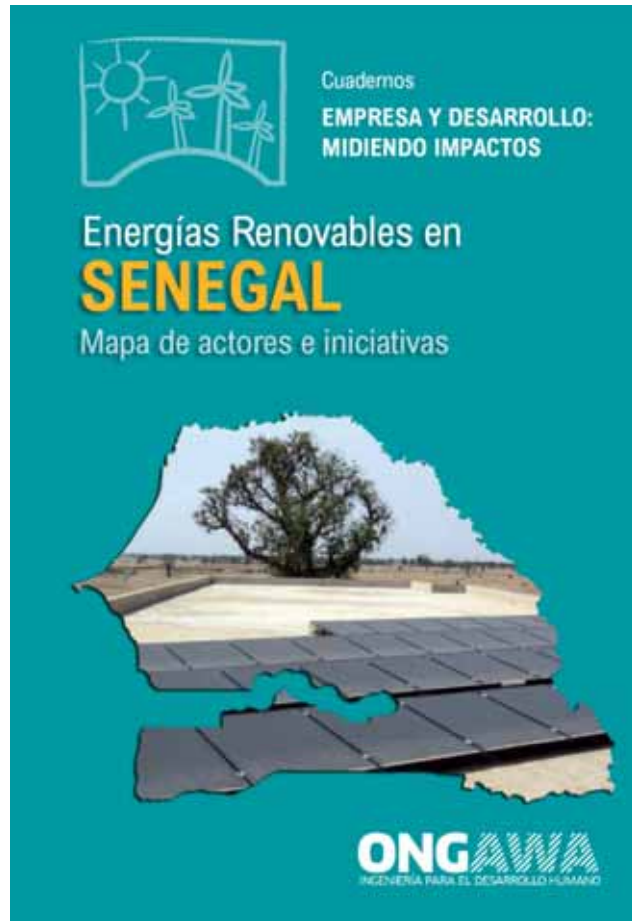
EsF - Aula de Solidaridad – UPM – FICAIPD

Enero de 2011

Preparado y Revisado: Ana Moreno Romero



Governance aspects and Public Private Partnerships



Business to solve social problems



http://www.youtube.com/watch?v=0ilh5YYDR2o&feature=player_detailpage

Thank you very much for your attention



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