Green Power for mobile

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1. Orange for Development

2. Orange solar deployment update

3. Community mobile solar-based charger

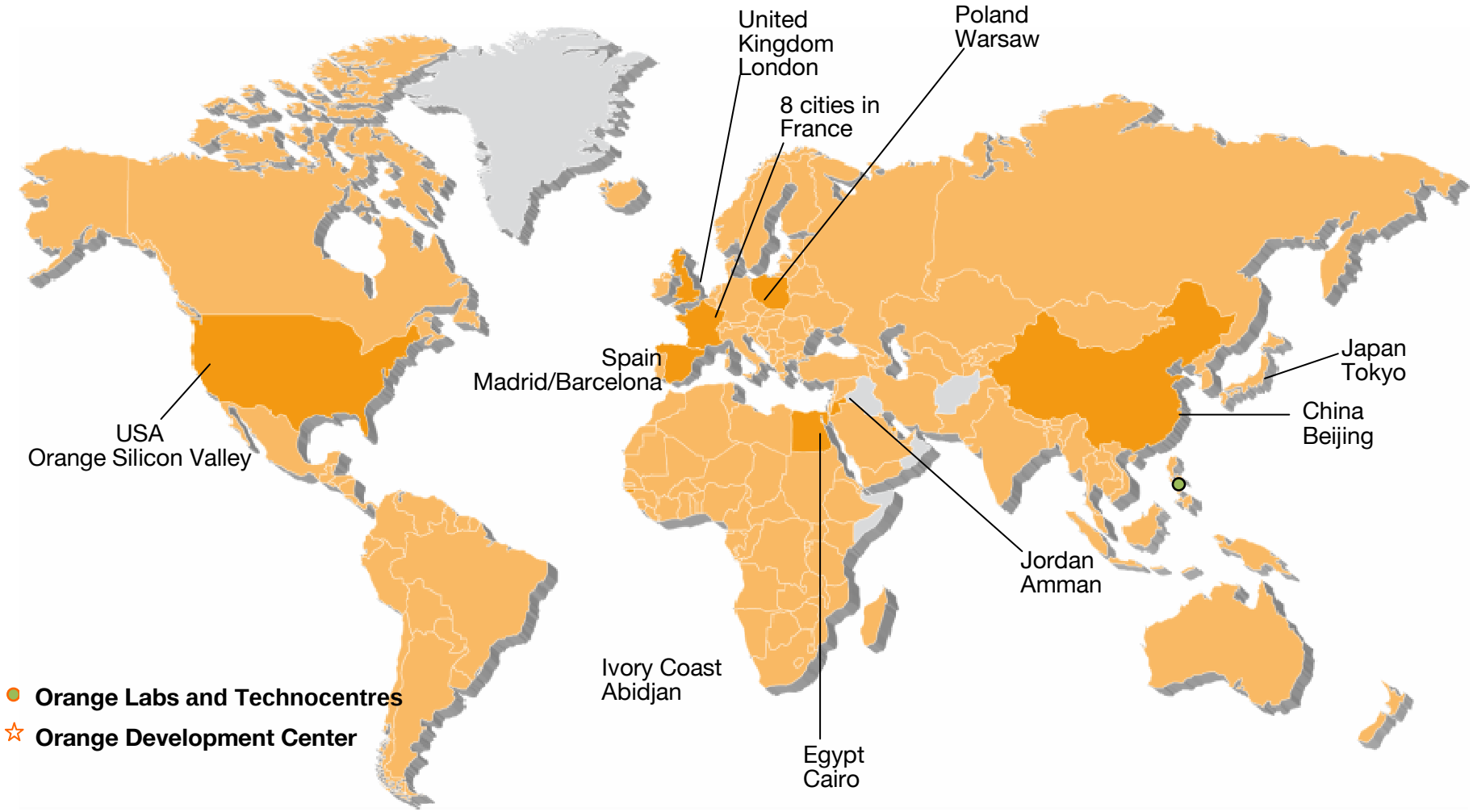
4. Energy innovation from Japan

Orange: over 226 million customers worldwide



our Group provides services for residential customers in 35 countries* and for business service customers in 220 countries and territories

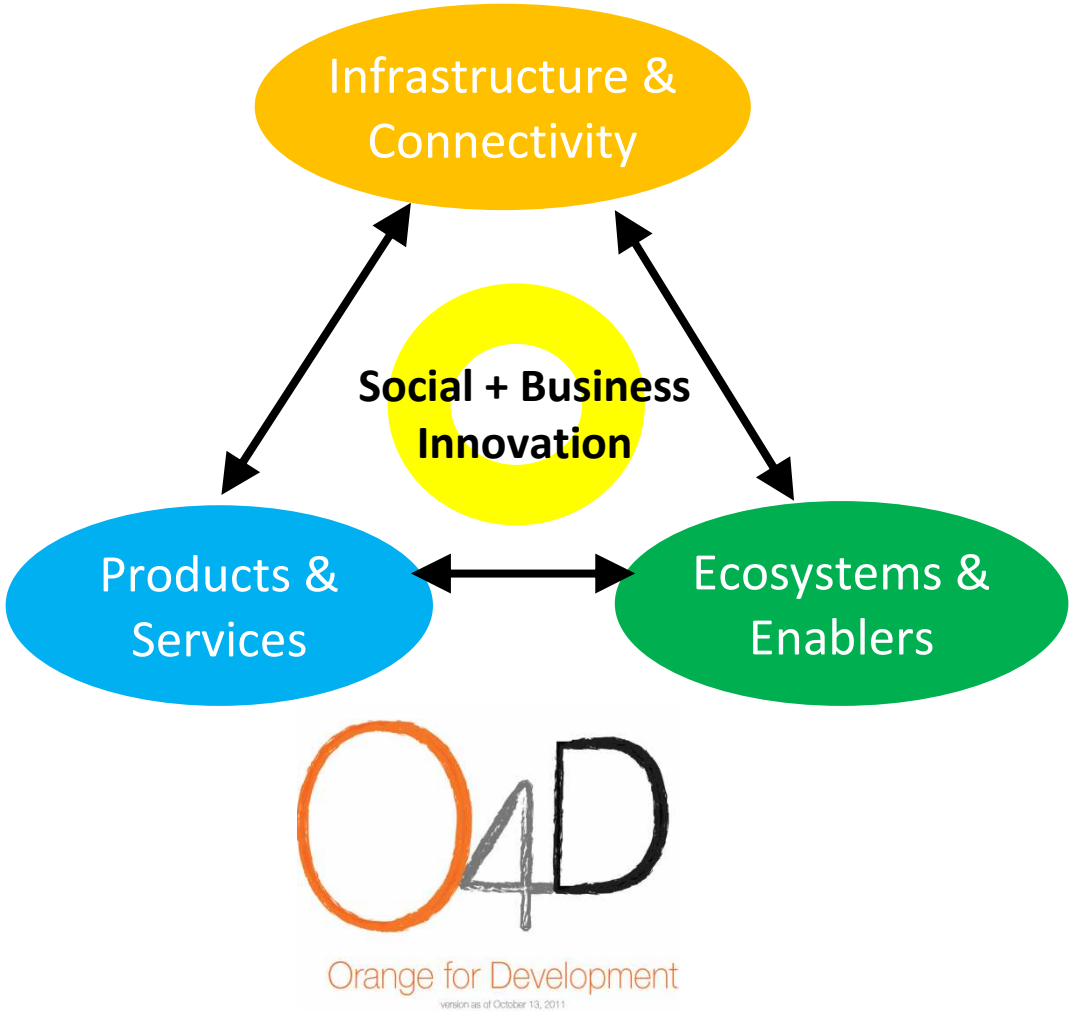
5,100 employees working on innovation



Orange for Development strategy

The “Orange for development” business strategy is setting the principles along three main axes:

- improving network coverage
- proposing innovative services for health, education, agriculture, financial services, government;
- supporting the development of local ICT ecosystems.

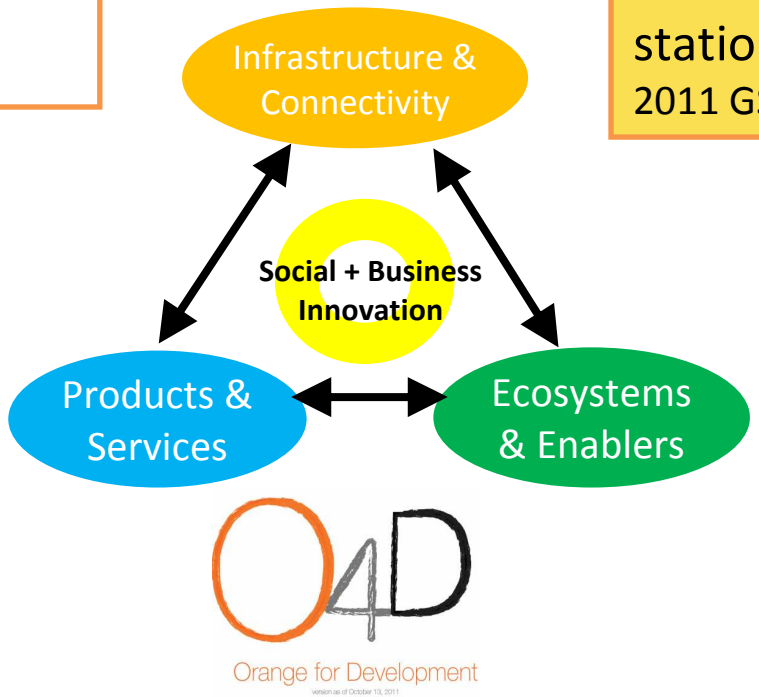


Orange in Africa: Innovation for Development

More than **2100 Community Phones** in Mali, Niger, Côte d'Ivoire, CAR, Madagascar; Community Internet solutions currently being tested

Orange Money in 11 countries: more than 4.8 mn users

E-health: telemedicine in several African countries, drug supply management in Kenya, connected health care centres in Niger, …



Over 2000 solar base stations in 17 countries
2011 GSMA Global Mobile Award

Orange supports **competitions for local developers** in Tunisia, Egypt (with World Bank), and Jordan

Orange is partner of a World Bank/Infodev **business incubator** in Senegal, and is currently supporting the creation of an incubator in Niger focusing on ICT, renewable energy, environment.

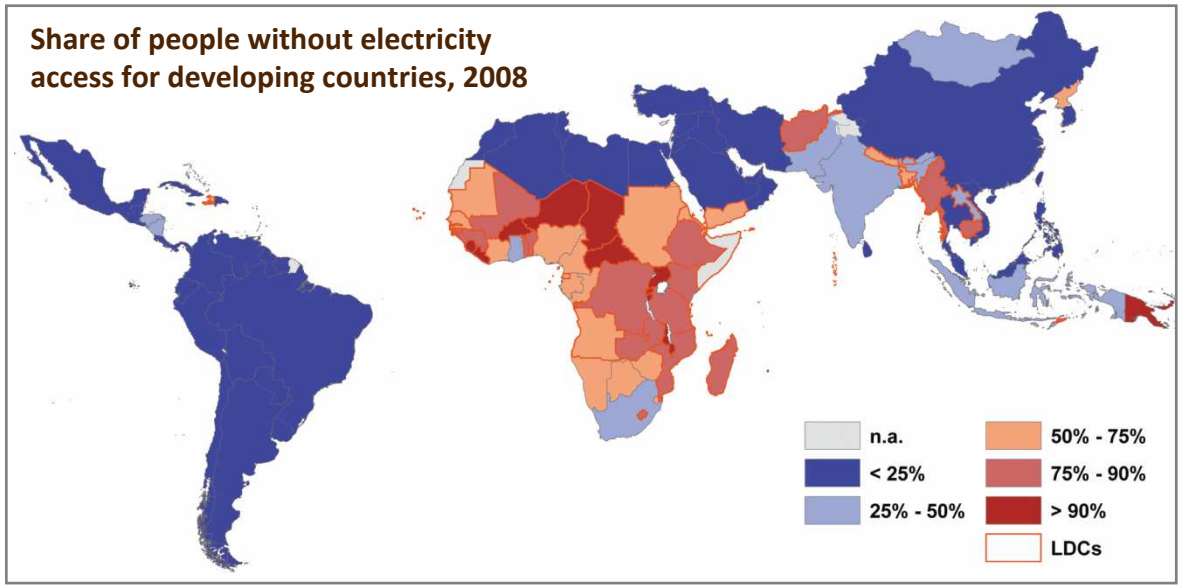
E-education: teacher training through mobile phone in Madagascar; testing tablets in schools in Niger (both projects in partnership with AFD)

M-agriculture: Market price information services in Côte d'Ivoire, Senegal, Niger, Mali; Cattle tracking services in Botswana

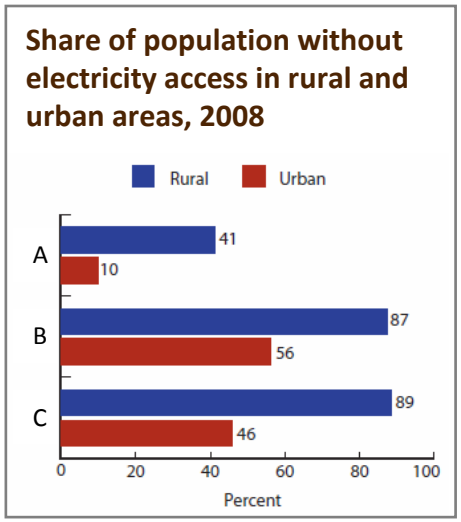
Orange African Social Venture Prize for young social entrepreneurs rewarding innovative projects using ICTs for social and economic development in Africa

electricity access in Africa

- 1.5 billion people in developing countries lack access to electricity
  - ~600 million in sub-Saharan Africa = 74% of population
- In rural areas of developing countries, access to electricity considerably lower than in urban areas
  - In Sub-Saharan African, 89% of rural populations live in off-grid villages
- Only half of developing countries now have targets for improving access to electricity



The Energy Access Situation In Developing Countries, United Nations Development Programme, 2009



A: developing countries
B: least developed countries
C: Sub-Saharan Africa

Exploring options to distribute electricity in Out of Grid areas – leveraging assets & synergies

Electric generation solution	*Partnerships*		*B2B(2C)*	*B2C*
	Mobile Towers Orange Network	Village Phone Business Extension	Self employed micro Business	End User Offer
Services and BM depending on telecom operations	Mini Grids, Micro Grids 		SharedSolar	ECONET SOLAR
Services and BM not relying on telecom operations	Safaricom	ERICSSON STATIONENERGY	nüru STIMA	indigo ToughStuff SUNTRICA

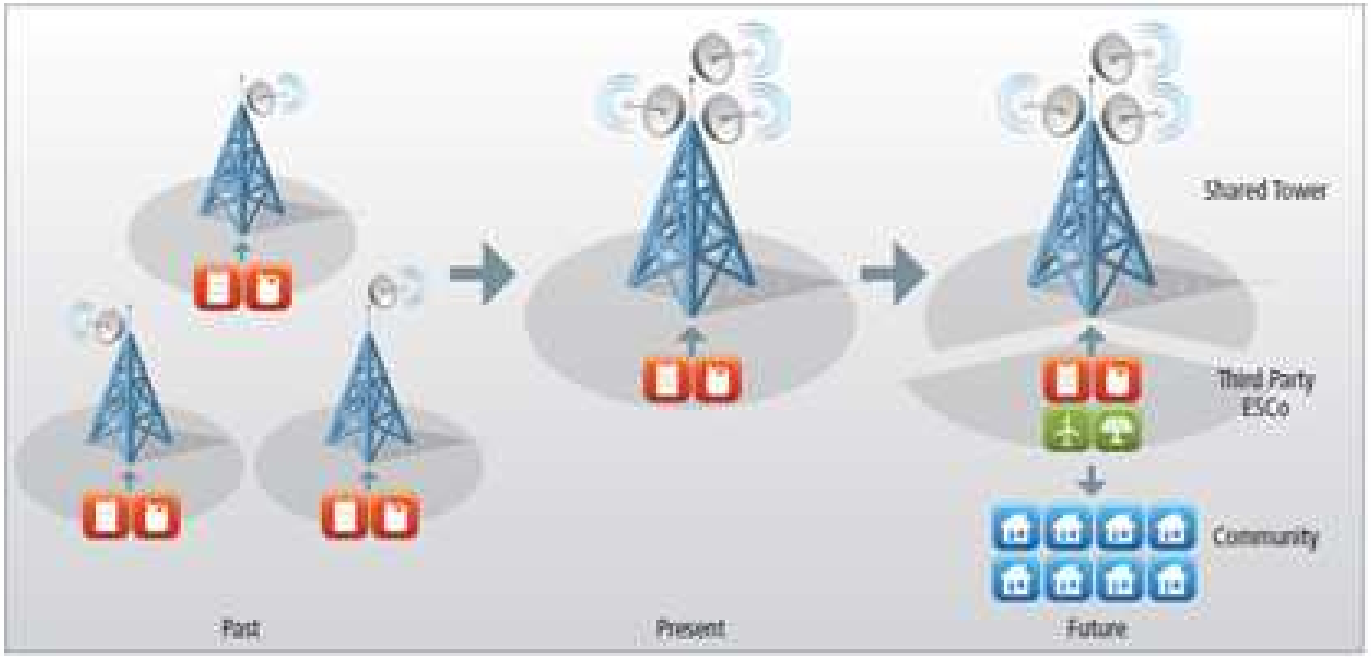
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Energy is a business development option for Tower-co's

3rd Party Community Power Applications

EatonTowers

- Mobile operators and tower companies have strong interest in the scenario whereby third party-owned green power plants provide power to local communities and telecom towers. However, these third parties need to provide very high quality service with minimum outages since operators/tower companies have very high service level requirements.



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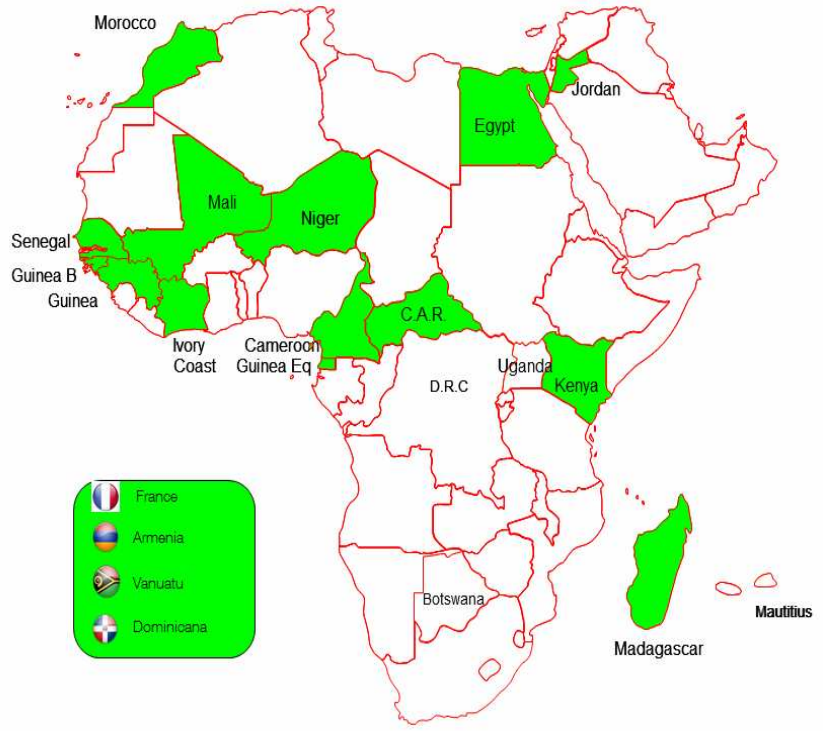
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Orange Solar program (1/2)

A key contributor to the Group Green strategy



The project was initiated in Senegal and is now deployed in 18 countries of the Orange-FT Group



Greener and more sustainable rural networks

- Higher efficiency telecom equipment and no active cooling
- 2065 solar sites for 3.3 million people covered end of 2011
- 13 GWh solar energy produced in 2011
- 25 million liters fuel and 67000 tons CO2 saved in 2011
- Quality of service much better than for Diesel Generators
- Opex reduced by 90% vs GenSet based solution

  Mainly on fuel consumption and much lighter maintenance due to elimination (or limited usage) of Diesel Generators and Air Conditioning.

Orange Solar program (2/2)

A key contributor to the Group Green strategy



Social Responsibility

- Enhanced telecom and digital inclusion with low cost solution.
- Positive impact on local economy(guard, maintenance jobs)
- Solar electricity in excess freely provided for local use of populations.



Site sharing

- Thanks to solar Capex decrease, Telco Operators have now the opportunity to move to Site Sharing with renewable energies.
- Today Hybrid solutions based on solar allow to reduce dramatically energy and maintenance OPEX while improving significantly the Quality of Service.
- Orange Group suggests to create a «Sustainable Site Sharing » initiative with Telco Operators operating in the AMEA zone.

For further information please contact: paul.mesguich@orange.com

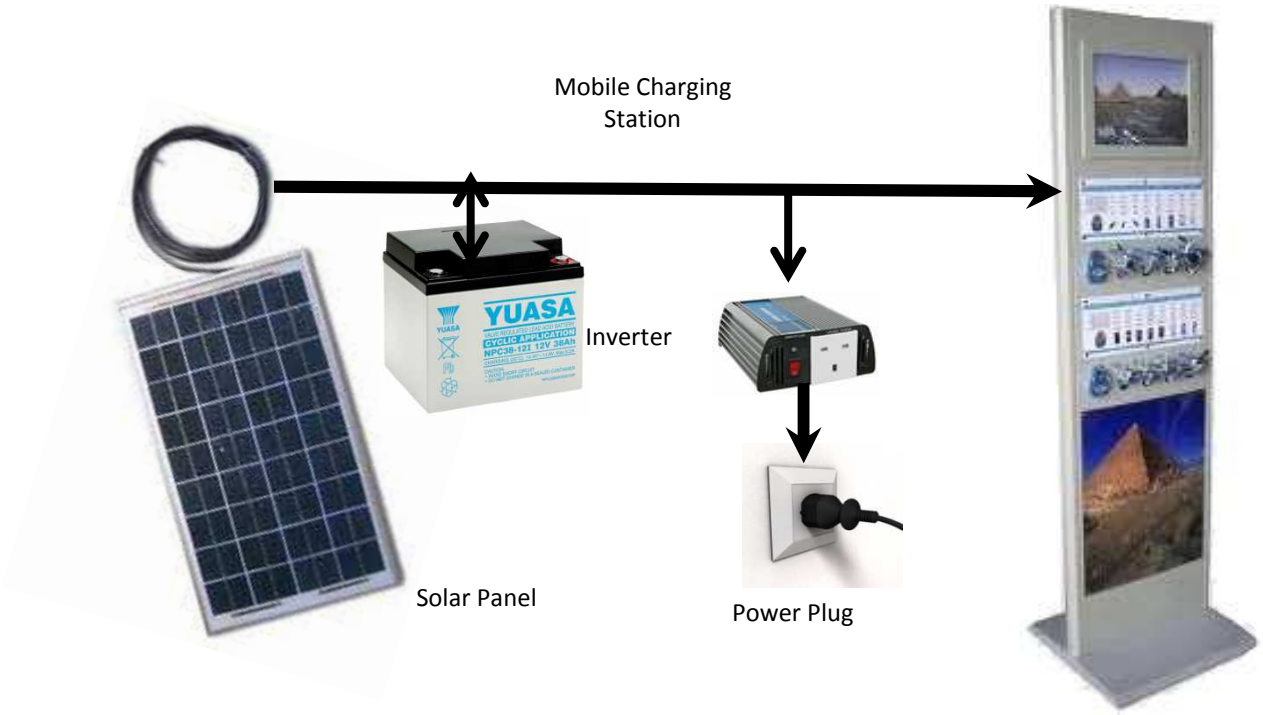
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Community Solar Mobile Charger (O-lab Cairo)



- Solar-based mobile charging station will allow 10-20 simultaneous charging.
- Avoid losing traffic due to power un-availability in off-grid rural areas.
- Improve mobile adoption in rural areas and on-top services for rural inhabitants.
- Both free and pre-paid charging models exist

use cases in eco-systems

- **Energy Access Point – B2B2C.**
  An entrepreneur own or rent CSMC to charge mobiles, power Village Phone, Net -books and TV.



- **Charging Station – B2C**
  In areas that have electricity but have shortage in number of power outlets such as gardens, clubs, green fields, large malls and plaza. Could even be used for Advertisement.

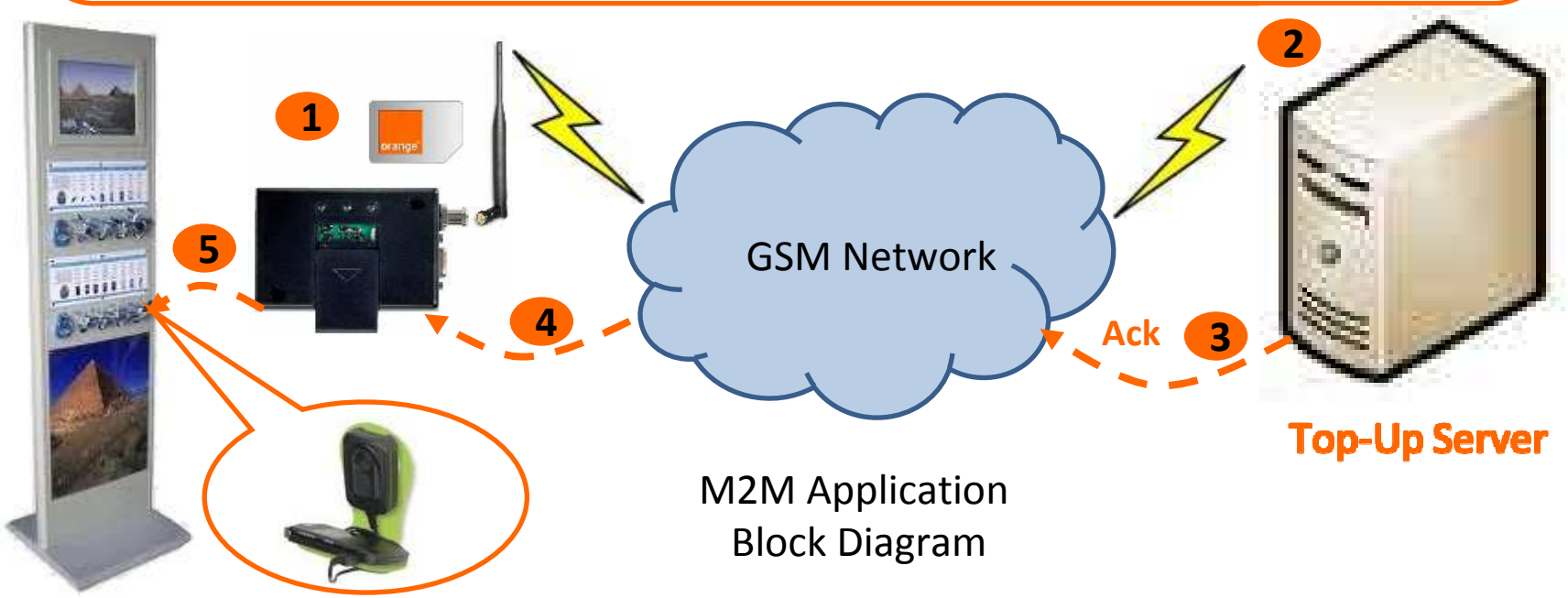


- **Prepaid Charging – B2C**
  The customer is out-of-battery in off-grid area. He/she sends a premium SMS through the charging station and he is able to charge his mobile for 30 minutes. Could be operator-locked or different tariffs is applied for outside-network.



pre-paid charging

- The charger station is provisioned by a built-in GSM module terminal.
- **The customer inserts his sim in the station**, press a charging-time key and the station sends premium SMS to the network (1,2).
- The network responds to the built-in GSM module (3,4) to enable the corresponding charging tip for the selected period (5).



M2M Application
Block Diagram

France Telecom Group
restricted

summary

- solar system with backup battery could supply the station to work day and night.
- many use-cases could be exploited to best utilize mobile charging station when provisioned by solar, battery, and inverter.
- enhanced version is suggested through one of M2M applications to enable pre-paid concept of power charging.
- Contact Orange Lab Cairo

France Telecom Group
restricted

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energy situation in Japan fosters innovation

- A country with low "resource self-sufficiency rates", especially in energy
  - To overcome issue, development of energy-saving technologies and early implementation of oil alternatives triggered by series of green measures taken after energy crisis in 70's
- Importance of energy question reinforced after Fukushima crisis
  - With nuclear power plants shutting down one after another for security reasons, risk of power shortage are present every summer and winter
  - Government active in smoothly switching from nuclear to renewable energies
    - New feed-in tariff since July 1st for solar and other renewable energies, one of most generous in the world (0.41EUR/ kWh for 20 years)
    - Several subsidy programs launched to accelerate multiplication of smart homes (residential storage batteries, energy visualization systems, home energy management systems) + promotion of smart meters
  - New ways of working and living to avoid power consumption peak and reduce bill
    - Working time shift including weekend and holiday shift, reduction of indoor lighting and air conditioning, use of electric appliances at night (washing machine, dishwasher…), green curtains on buildings and houses…

African and Japanese contexts are very different but share similar needs for smart management of limited energy resources and for introduction of renewable energies

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energy management in Japan is mature

- Whole range of energy technologies made in Japan, provided by industrial giants with great experience in energy management acquired notably through tens of smart-grid projects

energy generation



solar panels, fuel cells, wind turbines, thermoelectric devices…

energy storage



Li-ion, fast charge, electric vehicle, large-scale NaS, lead…

energy distribution



superconducting cables, PLC, high voltage DC, low voltage DC…

energy management

smart meters, energy visualization, smart taps, HEMS, BEMS, CEMS, V2H…

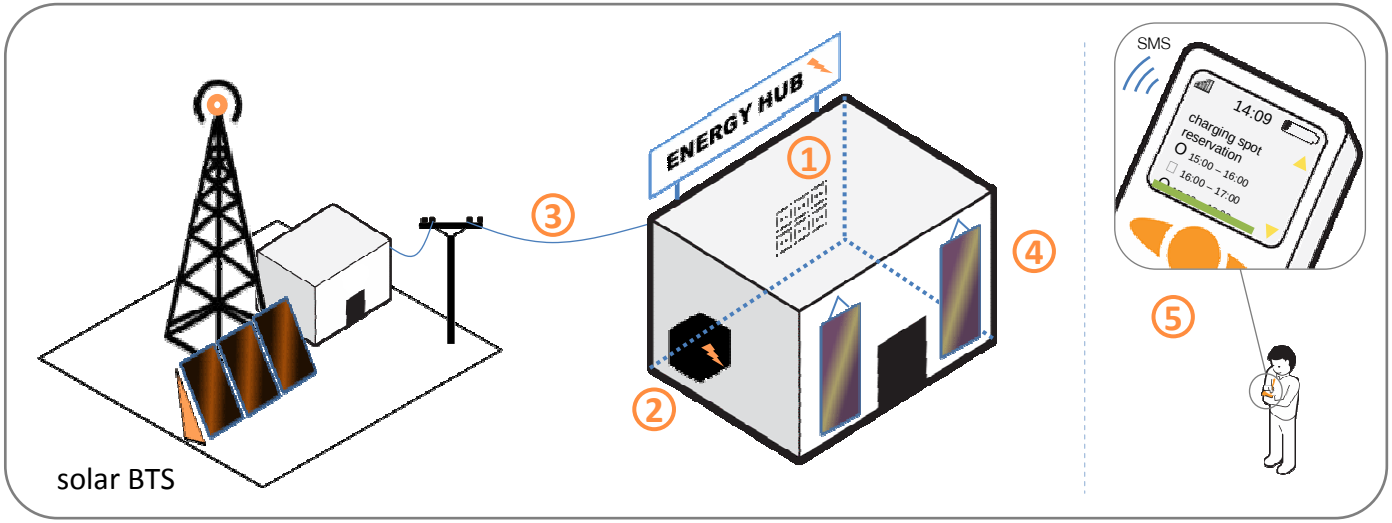


Japanese actors could contribute to African energy development

- short term by bringing technological bricks to improve current situation
- middle term by efficiently aggregating existing structures
- long term for construction of fully integrated smart communities

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application example



charging service using surplus electricity from solar BTS combined with dynamic pricing system to match demand and supply and limit storage capacity (cost reduction)

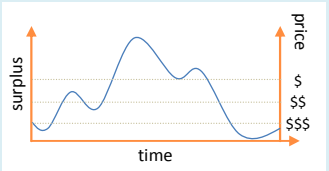
1: Smart outlet
control of charging points in energy hub by smart outlet with authentication feature, combined with payment method
Sony



2: Power Yiile+
heat-resistant Li-ion battery with remote monitoring system (3G module + Ethernet interface)
Eliiy Power



5: dynamic pricing
dynamic pricing combined with SMS push and reservation system to match charging demand and electricity supply while limiting investment in energy storage capacity



3: DC power distribution
efficient distribution of electricity limiting energy loss by suppressing use of AC current
Panasonic, Sharp



4: light-weight solar panels
additional power generation capacity, easily removed and safely stored in energy hub at night
giao, Fuji Electric

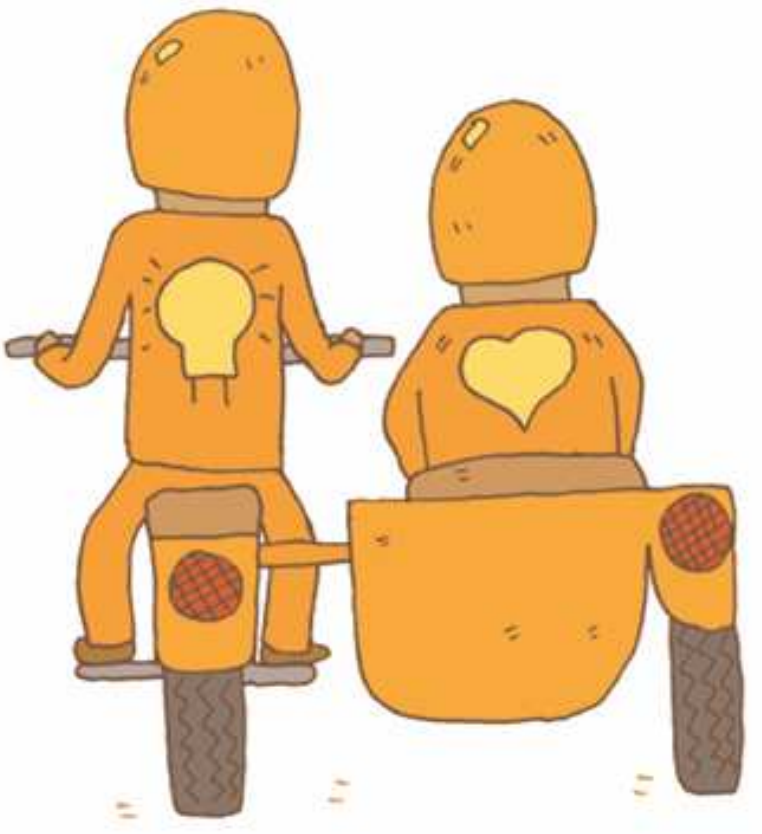


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