



# Offgrid Power: Intro Day 1



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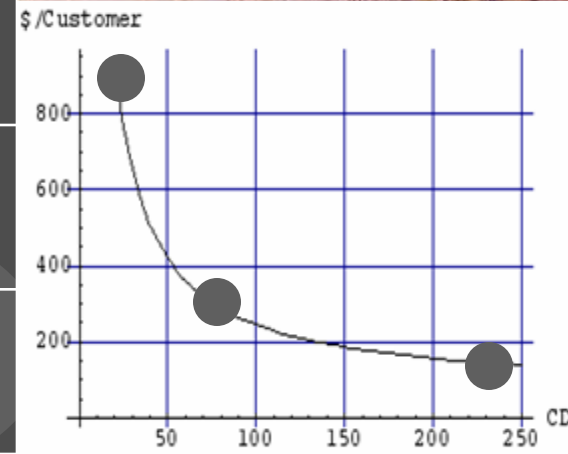
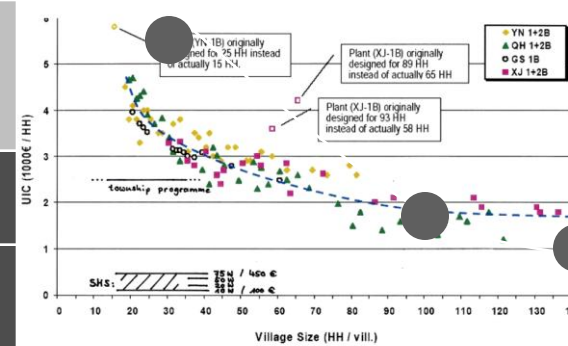


# Offgrid Power – Why?

Typical HH: **5 \$/m** – Kerosene: 5-10 l/m at **0,1-1 \$/klmh** – Grid: **10-100 kWh/m**

BAHIA	Grid extension costs per consumer in US\$					
	Columns: Distance from existing grid in km					
Posts per consumer	0-1	>1 – 5	> 5 – 10	> 10 – 20	> 20- 50	> 50
≤ 0.5	105	145	202			
> 0.5 – 1	322	324	357	373		
> 1.1 – 2	632	642	646	711		
> 2.1 – 4	1.179	1.184	1.208	1.325		
> 4	4.166	4.343	4.763	6.530	6.818	28.219

Source: ESMAP 2006





# Offgrid Power – What?

>100M  
>200M

>20M  
>500M

>10M  
> 1B

<1M  
>100M

Person



HH



Village



Diesel

Water

Sun

Wind



# Business Models Differ...

y-Axis: Provider's Legal Status

private (for profit)	small, decentral	Small grid reseller (India)	Hydro minigrids selling to local customers and to the main grid (China, Nicaragua) Formerly isolated minigrid now connected to grid, (Cambodia)	Diesel or hydro minigrid (Cambodia, Ethiopia)	SHS (Honduras, Kenya, Indonesia, Sri Lanka) WHS or pico hydro (Argentina, Mongolia, Nepal) PV/wind/diesel water pumping (Chile, Mexico)
	large, central	Privatized concessionaire extends grid (Argentina, Chile, Guatemala, Uganda, ...)	Technology neutral electrification concession (Senegal)		Offgrid concession (Argentina) SHS (Bangladesh, Bolivia, Morocco, South Africa)
non governmental	cooperative	Cooperative finances grid extension (Costa Rica, Bangladesh, US)		Multi-service Coop with diesel or hydro microgrid (Bangladesh, Bolivia, Philippines)	Agricultural Coop using diesel genset (Bolivia)
	other community organizations	Small 'community gateways' (Bolivia)		Community microgrids (Brazil, Cambodia, Honduras, Indonesia, Nicaragua, Sri Lanka)	Diesel genset or renewable energy to power a school, clinic, community center (Argentina) PV Battery Charging Stations (Nicaragua)
public (state owned)	small, decentral	Small state-owned utility extends grid (Colombia, Brazil)		Municipal diesel or hydro minigrid (Bolivia)	
	large, central	State utility extends grid and sells at retail (Botswana, Mozambique, Thailand, Tunisia, ...) <i>Cell 1A</i>		Residual state-owned isolated diesel-minigrids with fuel subsidies (Nicaragua, Cambodia)	SHS (Mexico) <i>Cell 4A</i>
		grid extension	connected village minigrid	isolated village minigrid	single user system
		← Grid			Offgrid →

X-Axis: Technology Solution



# Financing Needs Differ...

Small village grid: High Upfront Costs / Small Company → financing gap!

SME		<b>large upfront, small provider</b>	<b>small upfront, small provider</b>
Coop or village assoc.		<b>large upfront, small provider</b>	
Large DisCo	<b>large upfront, large provider</b>		
	grid	village grid	SHS, diesel

Gap:

small  
large



# Regulation Differs...

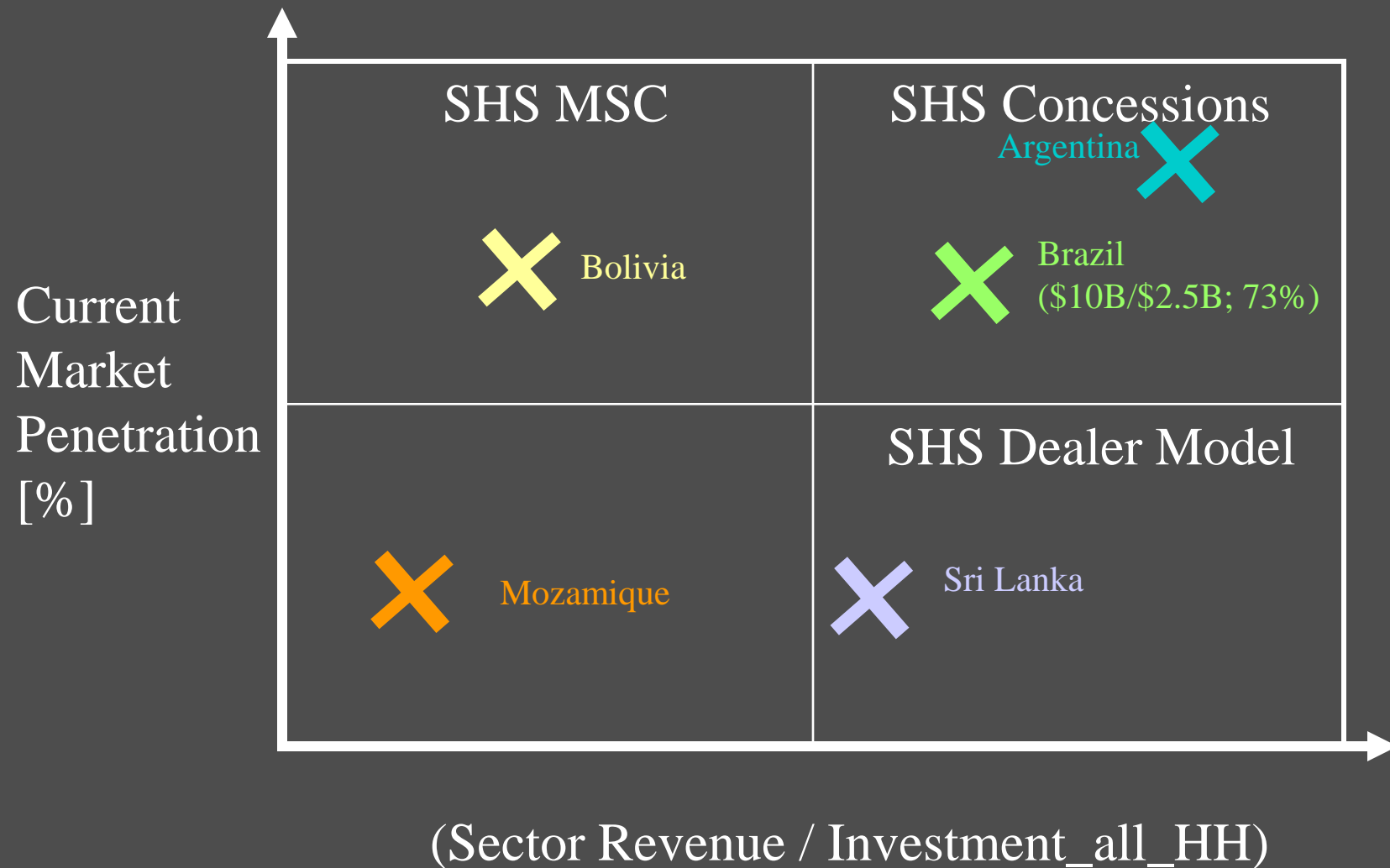
Small/Med. Companies			<b>contract</b>
Coop/Gov.		<b>both</b>	
Large DisCo	<b>law</b>		
	Grid	M-Grid	SHS, diesel

Legend:

- law
- contract



# Scale-Up Strategies differ...





# Offgrid Power Session – 4 PPTs

Retrofit +  
Regulation

Project  
Developers

Cost:  
2\$/W

Siting:  $v^3$

Person			PPT2	
HH			PPT1	
Village	PPT4	PPT3		
	Diesel	Water	Sun	Wind