
**CHALLENGES AND SUCCESSFUL MODELS OF
PRIVATE SECTOR MICRO-UTILITIES**

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AGENDA

- 01 Best practice Micro-Utility business models
- 02 Overcoming classic Micro-Utility challenges
- 03 Overcoming the financing gap
- 04 Technology application strategies





DEFINITION OF MICRO-UTILITIES

Micro-Utilities:

- _ are often SMEs with limited financial resources
- _ Have besides financial interest intrinsic motivation to electrify rural areas
- _ Need innovative approaches to be successful
- _ Typically supply electricity to less than 5000 customers and generate revenues of below 1 M€ per system

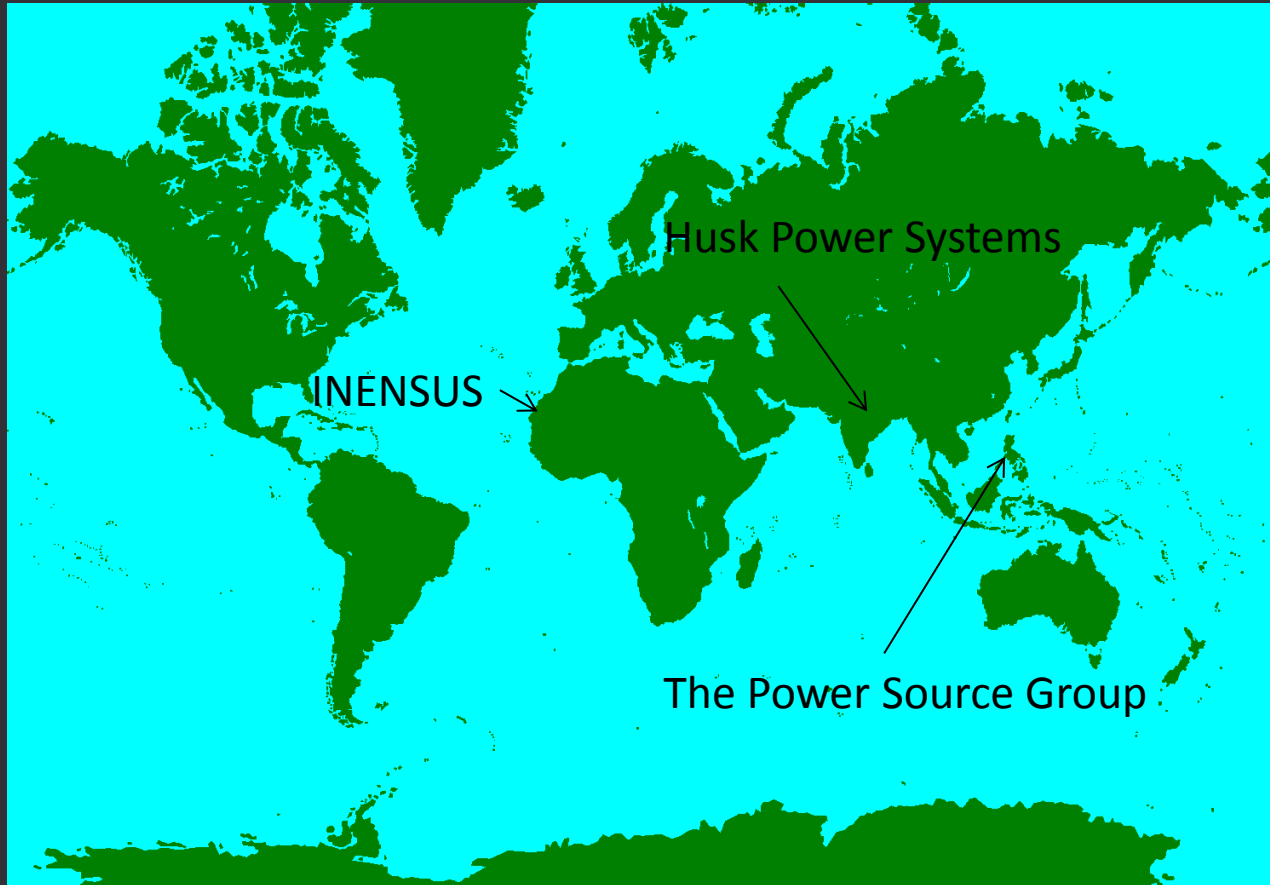
BEST PRACTICE MICRO-UTILITY BUSINESS MODELS



Foto: A Micro-Utility connects new customers



WORLD MAP OF BEST PRACTICE MICRO-UTILITIES PRESENTED HERE





THE POWER SOURCE GROUP – HUSK POWER SYSTEMS – INENSUS





BEST PRACTICE MODELS AND THEIR CHARACTERISTIC MARKETS

	The Power Source Group	Husk Power Systems	INENSUS
<i>_Country of first appl.</i>	The Philippines	India	Senegal
<i>_Regulatory framework</i>	Regulated environment with subsidies	Electrification outside of national regulation	Concession, regulated tariff
<i>_Availability of subsidies</i>	Subsidy per kWh supplied to end customer	Investment subsidy	Intern. invest. subs./ local scheme in prep.
<i>_Lives touched</i>	Approx. 30,000	Approx. 200,000	Approx. 6,000
<i>_LCOE</i>	0.26 €/kWh to 0.4 €/kWh to be decreased by subsidies	0.1 €/kWh to >2.0 €/kWh depending on user behaviour	From 0.6 to 1.2 €/kWh depending on transaction costs



BEST PRACTICE MODELS AND THEIR CHARACTERISTIC MARKETS

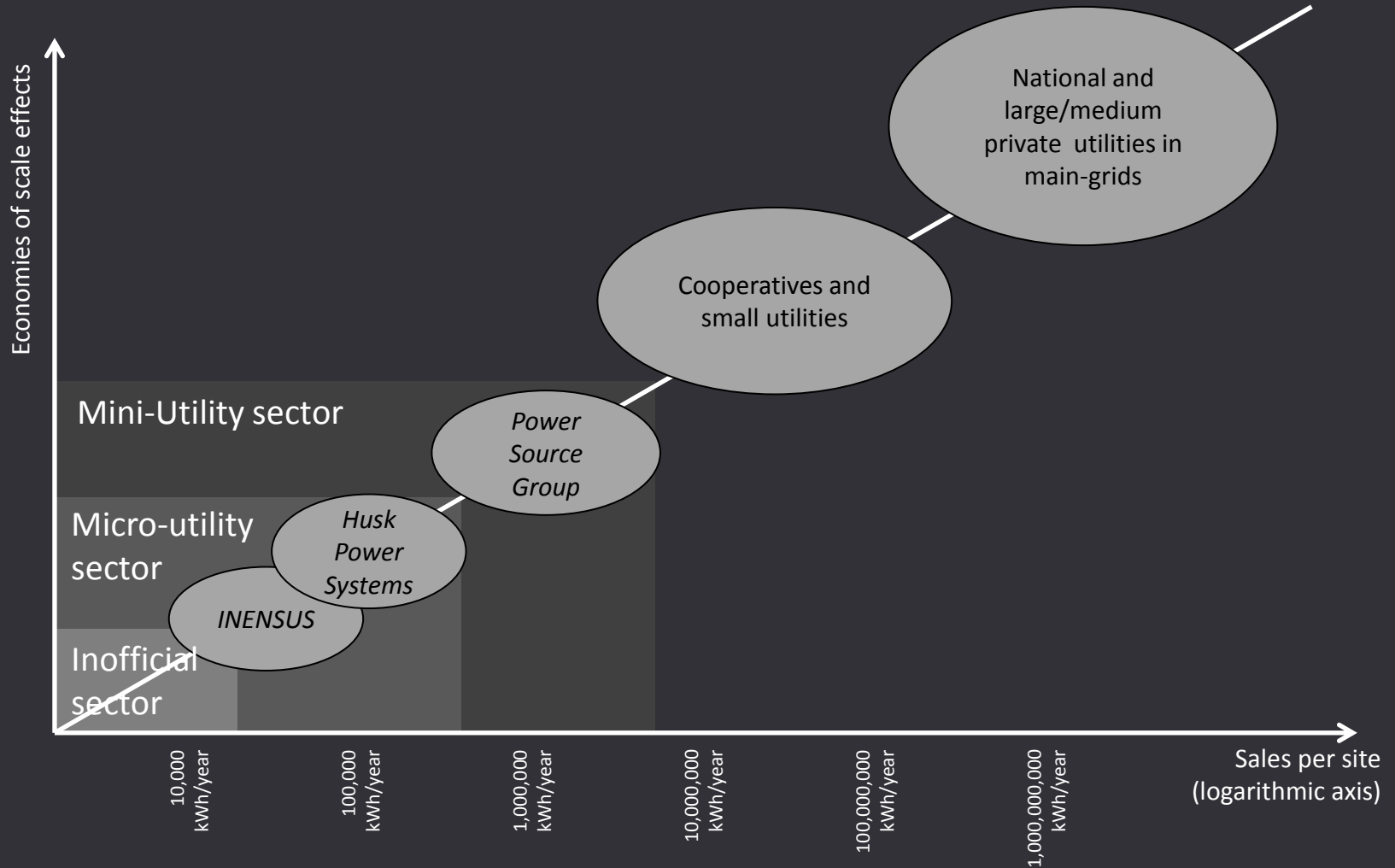
	The Power Source Group	Husk Power Systems	INENSUS
<i>_Targeted system sizes</i>	>1,000,000 kWh per year; >0.5 MW installed capacity	>30,000 kWh per year; >30 kW installed capacity	20,000 to 500,000 kWh per year; >20 kW installed capacity
<i>_Energy sources:</i>	Diesel with renewable off-set (solar PV, biomass gasification)	100% biomass (preferably rice husk) gasification	80% wind-solar, 20% diesel, battery storage
<i>_Availability of supply:</i>	24 h per day, well trained local staff	6 - 12 h per day depending on franchisee	24 h per day, fully automatic operation

OVERCOMING CLASSIC MICRO UTILITY CHALLENGES





SMALLER GRIDS - DIFFERENT CHALLENGES





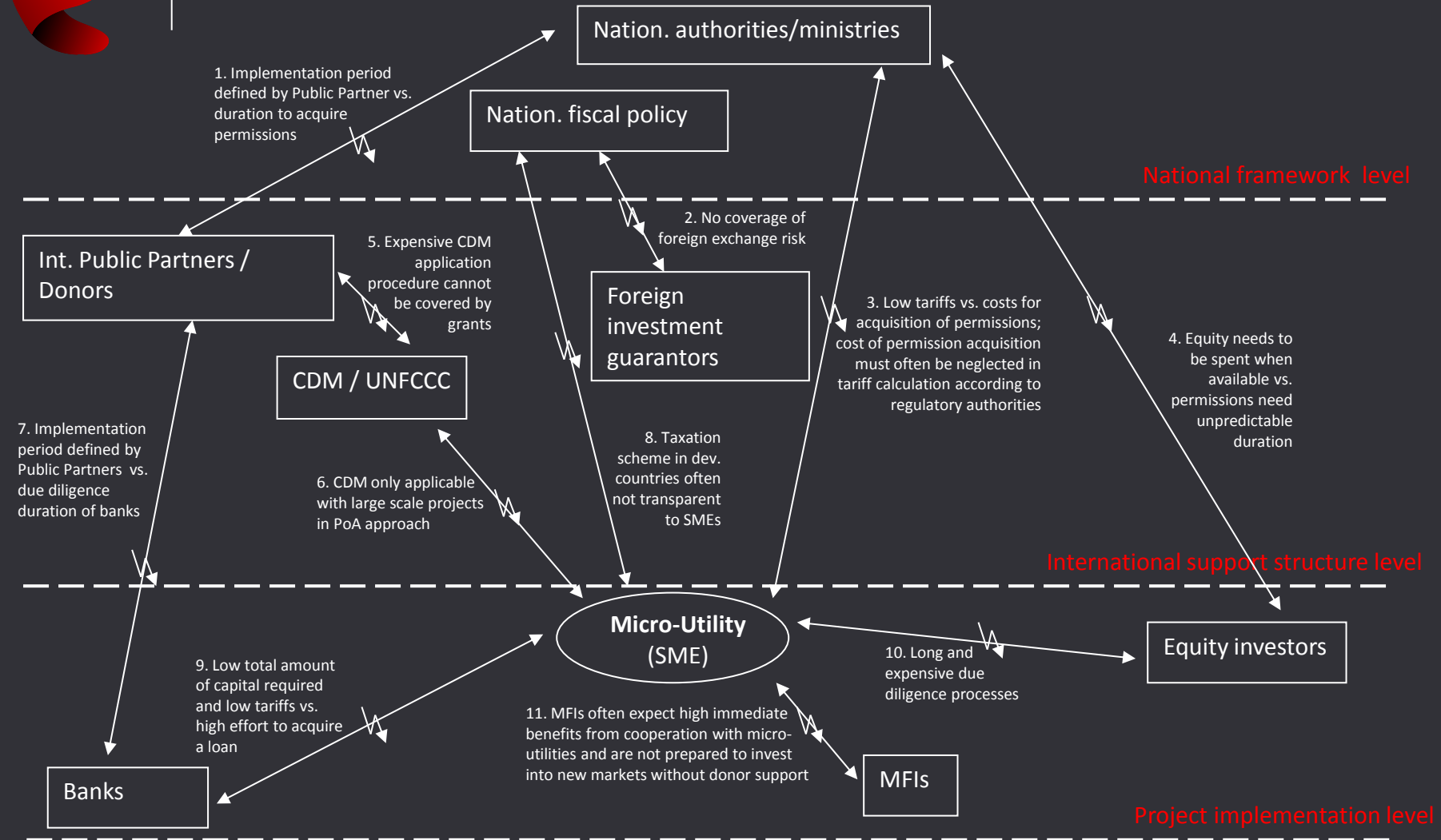
SMALLER GRIDS – DIFFERENT CHALLENGES

Decreased economies of scale effects means increased challenges in:

1. Technical system stability due to **higher concurrency**
2. Prevention of conflicts arising due to intransparent **community decision making structures**
3. Revenue stabilization due to **less divers income sources of customers**
4. Increasing operation and **transaction costs per kWh produced** require new management approaches



MANAGING COMPLEXITY / TRANSACTION COSTS





THE TRANSACTION COST LEVER

High transaction cost lead to high electricity prices resulting in:

1. Electricity price elasticity challenge
2. Conflicts with Regulatory Authorities
3. Conflicts with willingness / ability to pay



STRATEGIES TO OVERCOME CLASSIC MICRO-UTILITY CHALLENGES

	The Power Source Group	Husk Power Systems	INENSUS
<i>_Techn. system stabilization</i>	Flexible diesel genset capacity available to cover any load	Limit total available power bandwidth to below power plant capacity	Primary control load management in meters, electr. block planning
<i>_Reduction of community conflicts</i>	CRM with local personell on site (applic. only in large grids)	Franchise model: Local operation; Maintenance by prof. company	Grid owner = public partner; Power station / movables owner = priv. company
<i>_Income stabilization</i>	Community Energizer Platform for productive electr. use	Production of incense sticks from ash, husk purchased from local sources	Cooperation with MFI prov. loans for productive use of electricity
<i>_Transaction cost per kWh reduction</i>	Selection of large villages to reach scale	Working outside of regulatory framework	Lean quality management procedures

OVERCOMING THE FINANCING GAP

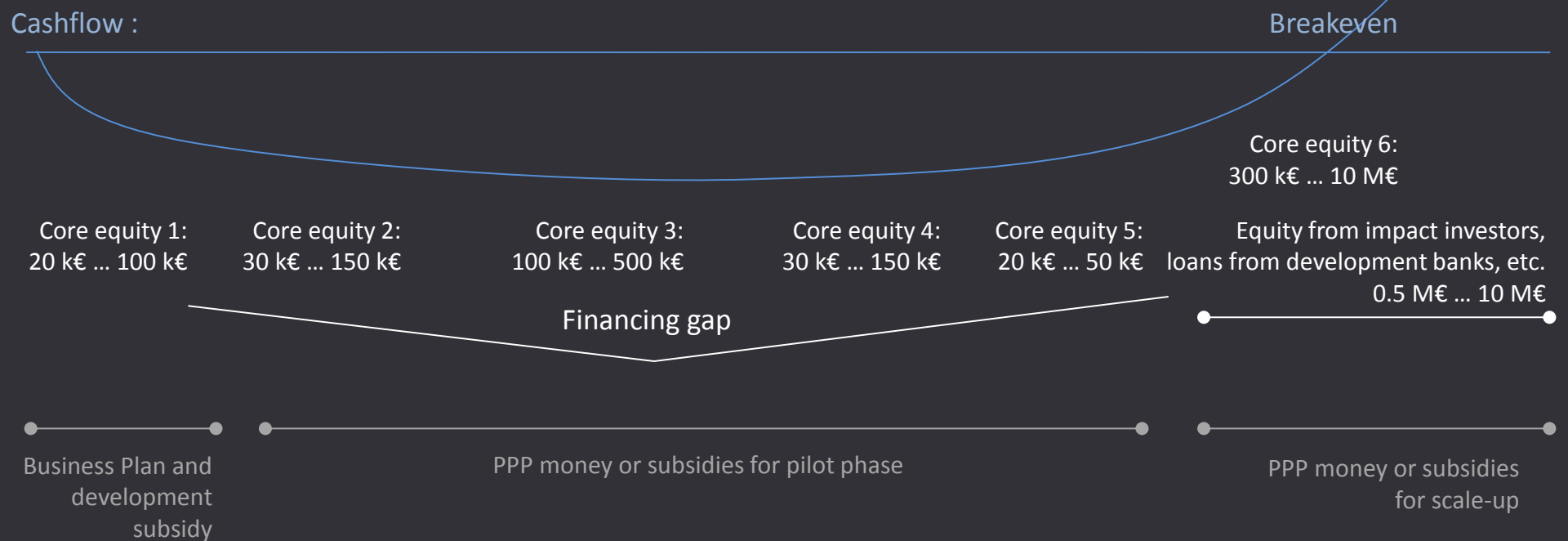


Foto: Happy electricity customers of a Micro-Utility



FINANCING ALONG THE MICRO-UTILITY DEVELOPMENT TIMELINE

Year 1		Year 2			Year 3		Year 4		Year 5		
Development of adj. model	Select village	Political framework	Company foundation and financing	Model implementation Installation	Operation, Maintenance Monitoring Due Diligence for replication		Growth of dem.	Using the political framework for replication		Scale-up	Replication





STRATEGIES TO OVERCOME THE FINANCING GAP

	The Power Source Group	Husk Power Systems	INENSUS
<i>_Model/techn. development and pilot phase</i>	Equity from company founders (from USA)	Winning business plan awards in the US	Equity from core business leveaged by subsidies from German institutions
<i>_Capital for initial scaling to profitability</i>	Impact investors	Impact investors + grants	Development bank + local equity in kind + grant
<i>_Capital for large scale replication</i>	Local equity investors + banks	Franchisees + local banks + grants	

TECHNOLOGY APPLICATION STRATEGY





APPLICATION OF TECHNOLOGY

	The Power Source Group	Husk Power Systems	INENSUS
<i>_Electricity production</i>	Production plants from proven international manufacturers	Low cost gasification equipment from own R&D and manufacturing	Int. brands of solar, wind and battery products, local constr. works
<i>_Electricity distribution</i>	Medium and low voltage distribution system meeting international standards	Sub-standard low voltage least cost distribution with bamboo poles and thin lines	Standard low voltage distribution system to be connected to national grid once available
<i>_Metering/ billing:</i>	Invoicing according to readings from electro-mechanic meters	Own prepaid load limiter , power capacity is sold not kWh	Own prepaid meter with load- and demand-management function

THANK YOU

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