SOLAR MINI-GRID OPERATION FOR VILLAGE POWER SUPPLY AS A BUSINESS

How to set up a profitable micro utility

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AGENDA

01 How to **select a country** with mini-grid potential

02 Steps for successful **project development**

03 How to set up a proper **operation strategy**

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HOW TO SELECT A COUNTRY WITH MINI-GRID POTENTIAL

Foto: A Micro-Utility connects new customers; Sandra Kaudelka

Characteristics of countries that are ready for private sector mini-grid investments

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1. It must be **legal** to operate the micro-utility; micro-utilities should be able to **obtain licenses easily.**

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2. Micro-utilities must be allowed to charge **tariffs** resulting in **risk equivalent margins.**

3. Ministries/authorities must **disclose attractive villages/towns listed for mini-grid electrification.**

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WHICH COUNTRIES MEET THESE REQUIREMENTS?

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Kenya	OK	Cross-subsidy	OK
Tanzania	Good	Recently impl.	Difficult
Senegal	Recently impl.	OK	Good
Philippines	OK	Cross-subsidy	Local subject
Bangladesh	OK	Low end	Difficult

→ DIFFICULT TO FIND

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WHY IS IT DIFFICULT FOR GOVTS TO MEET THESE REQUIREMENTS?

THE POLTICAL ISSUE OF ELECTRICITY TARIFFS:

Electricity in mini-grids is **more expensive** than electricity from the national grid.

→ Villagers assigned to paying higher tariffs in mini-grids **complain through** their **member of parliament.**

→ Political parties allowing mini-grid customers to pay higher tariffs will **not be voted for** any more by those villagers.

It is highly **complicated** to politically sell mini-grid electrification.

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STEPS FOR SUCCESSFUL PROJECT DEVELOPMENT

Foto: Wind-Solar-Diesel hybrid power system with battery storage for village power supply designed and operated by ENERSA S.A., Senegal; INENSUS

BUILD A TEAM THAT PERFORMS

_ Development of a **business model** covering local constraints, system extension, reaction to conflicts

_ **Communication in villages** and with rural citizens

_ Handle **large amounts of** customer **data**

_ **Technical System Design** (Distribution grid / Power station / Metering System)

_ Preparation of **Financial Models** in various forms

_ Acquisition of **Financial Resouces** – Grant, Equity, Debt

_ **Licensing** procedures, **tariff** negotiations, lobbying work

_ **Company administration**, book-keeping, management

_ **Construction work**, **installation**, **commissioning**

_ Model **implementation**, trainings in villages

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HOW TO IDENTIFY POTENTIAL LOCAL PARTNERS

_ Big companies:
- **Well connected** in politics and society
- **Organizational structure** and **infrastructure available**
- **Slow and bureaucratic**
- Have their **own interest** and a strong lever to achieve their aims even against the international partner

_ Small companies:
- **More reliable and flexible**
- **Lacking resources** (staff, finance, infrastructure)
- **Limited** social/political **network**

_ Universities:
- **Well connected** in politics and society
- **Lacking resources** (finance, infrastructure)
- Highly **welcome in villages**
- Sometimes **lacking business focus and resources**

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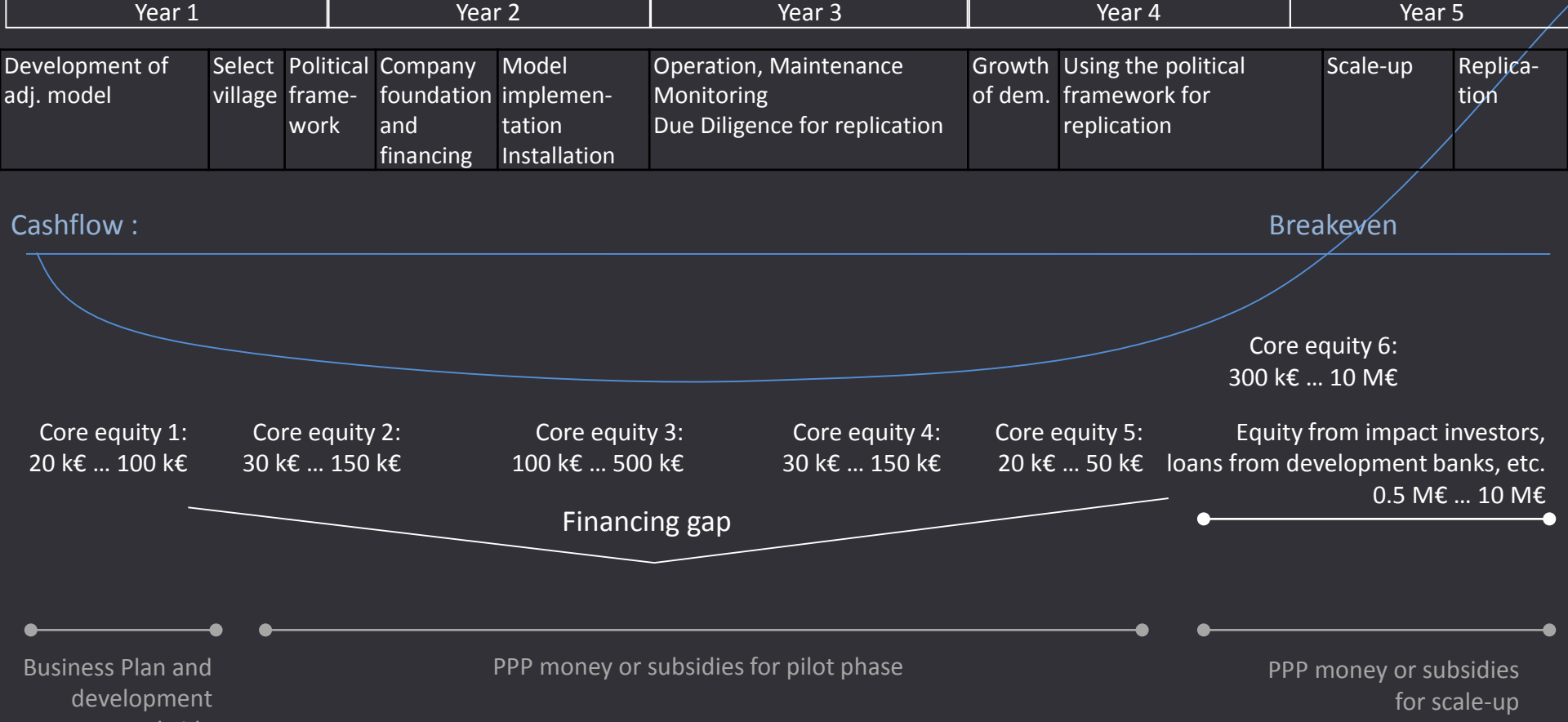
FINANCING ALONG THE MICRO-UTILITY DEVELOPMENT TIMELINE

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



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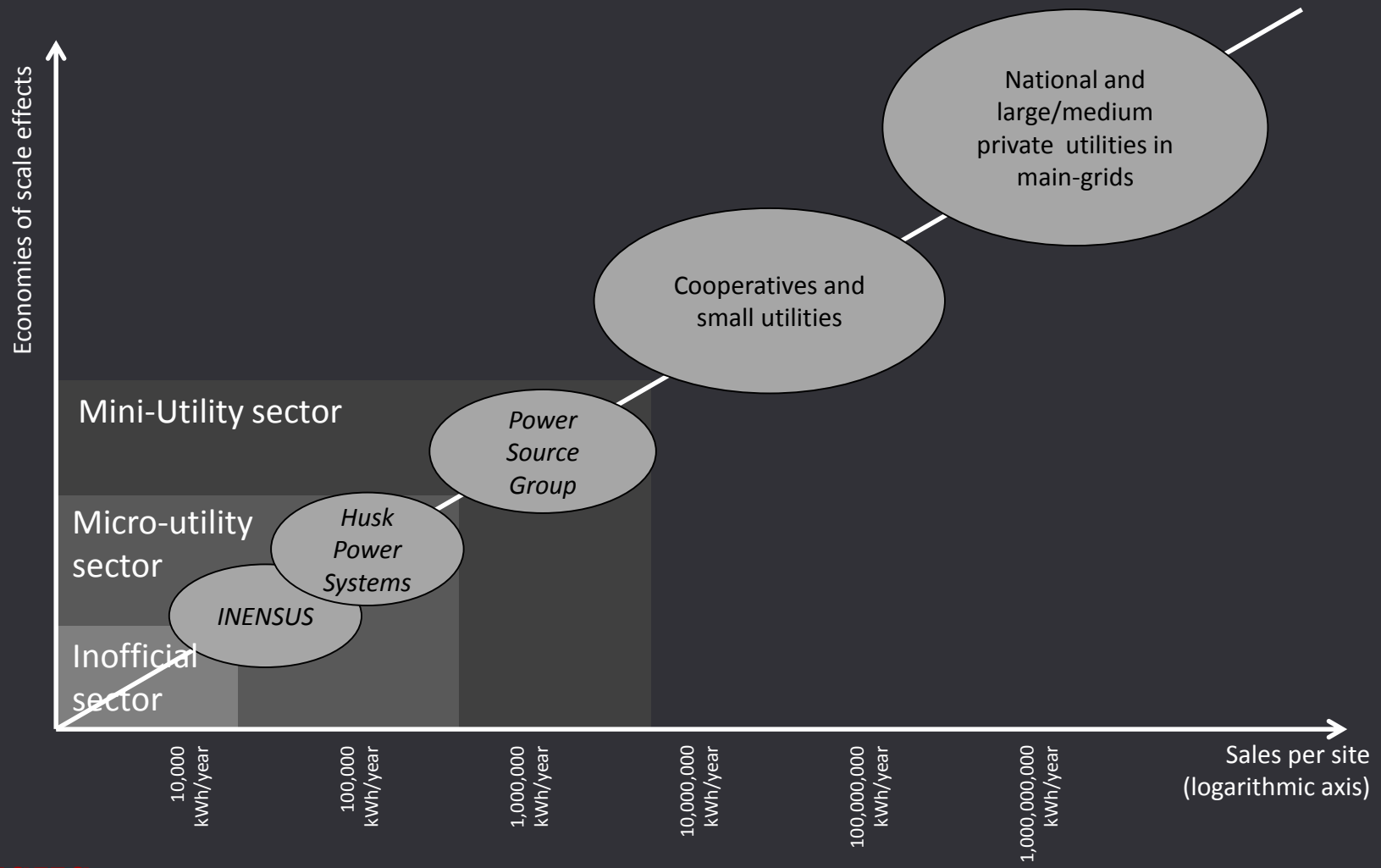
HOW TO SET UP A PROPER OPERATION STRATEGY

Foto: Mini-Grid connections in the Philippines; INENSUS

SMALLER GRIDS – DIFFERENT CHALLENGES



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SMALLER GRIDS – DIFFERENT CHALLENGES

Decreased economies of scale effects means increased challenges in:

1. Technical system stability due to **higher concurrency** in load patterns
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

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THE WAY OUT OF THE DILEMMA - BIG IS BEAUTIFUL

→ Keep track of your head management and transaction cost portion in the per kWh price

If it is above 15% - THINK BIGGER!

→ Development banks and equity investors do not like small projects

If you are below € 5M debt – THINK BIGGER!

→ UNFCCC does not like small projects

If you are below 20,000t CO2 emission reduction per year – THINK BIGGER!

If you do not have the experience to go for such big projects find a partner who has!

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THANK YOU!



Foto: Happy electricity cusomers;
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