Hello Ladies and Gentlemen, I am very happy to welcome you to todays session on Solar Mini Grids: Best Practices for Regulatory frameworks.

I would lie to thank the International Solar Alliance and the Clean Energy Solutions Center who facilitate this webinar series.

Overview of the expert

Factor is an international group, specialized in providing global, innovative and sustainable solutions in areas such as climate change, energy, sustainability, trading and innovation.

Our key value is our people. We have offices in six countries, where our interdisciplinary team works for public and private stakeholders, international organizations and non-profit entities.

Our own history and experiences are based on constant innovation. This helps us target our services, by combining academic knowledge, technology and practical experience.

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Hugo Lucas Porta
Head of Energy Dept, Factor
20 years in RE Sector
- Worked for governments and private sector on energy transition strategies

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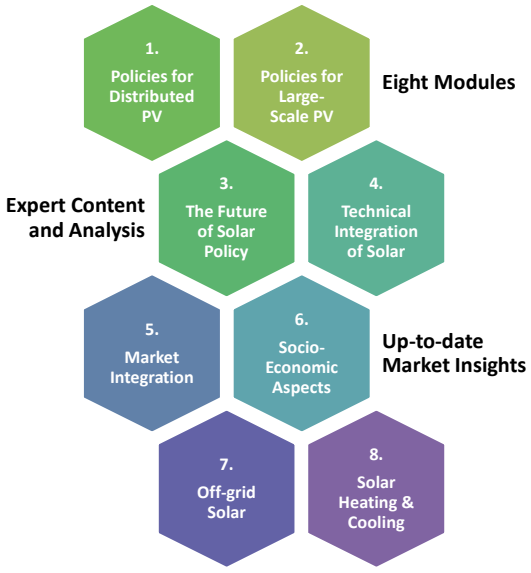
Some background from me: Before I joined Factor in 2010 I have been director for policies and finance at the International Renewable Energy Agency - IRENA. I was responsible for the design of the access to energy work programme in the Agency. Previously as Spanish civil servant I have been involved in many national and European Regulations for the promotion of renewable energies and energy efficiency.

Training Course Material

This Training is part of Module 7, and focuses on the Policy and Regulatory Frameworks of Mini Grids



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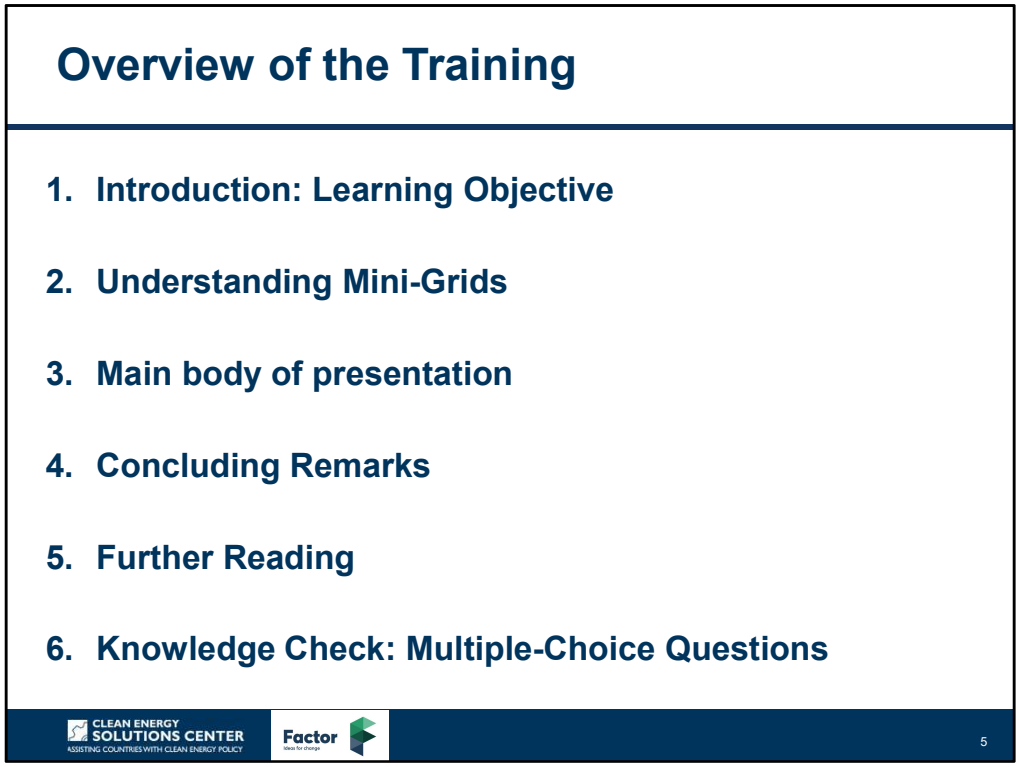
In this module we are continuing the discussion on mini grids from the previous module and dig deeper into the regulatory and policy framewroks.



In this module, we will as always start with a brief description and definition of what Solar Mini Grids are, and afterwards jump into the main body of the presentation. Don't forget, at the end of the presentation, you will be given the chance to test your knowledge with a little quiz.

1. Introduction: Learning Objective

Learning Objective

This module provides:

1. An introduction to the regulatory and policy framework of mini-grids.
2. First half of the discussion of energy sector policy instruments
3. A discussion of fiscal policy and regulatory instruments

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The learning objectives which this module aims to provide can be divided into three parts:

First of, we will learn about the regulatory and policy framework of mini grids more generally. This is followed by a discussion energy sector governance and more specifically energy policy. Finally, we will talk about economic policy and regulation with respect to mini grids. Be reminded, this is Part 1 of the 2 part module on mini grid regulation and policies.

2. Understanding Off-grid Solar Markets

Understanding Mini-Grids

A (solar) **mini-grid** is a set of **small-scale electricity generators** and possibly energy storage systems interconnected to a distribution network that supplies the electricity demand of a limited number of customers.

It can operate in **isolation from national electricity transmission networks** and supply relatively concentrated settlements or remote industries with electricity.

Source: worldbank.org

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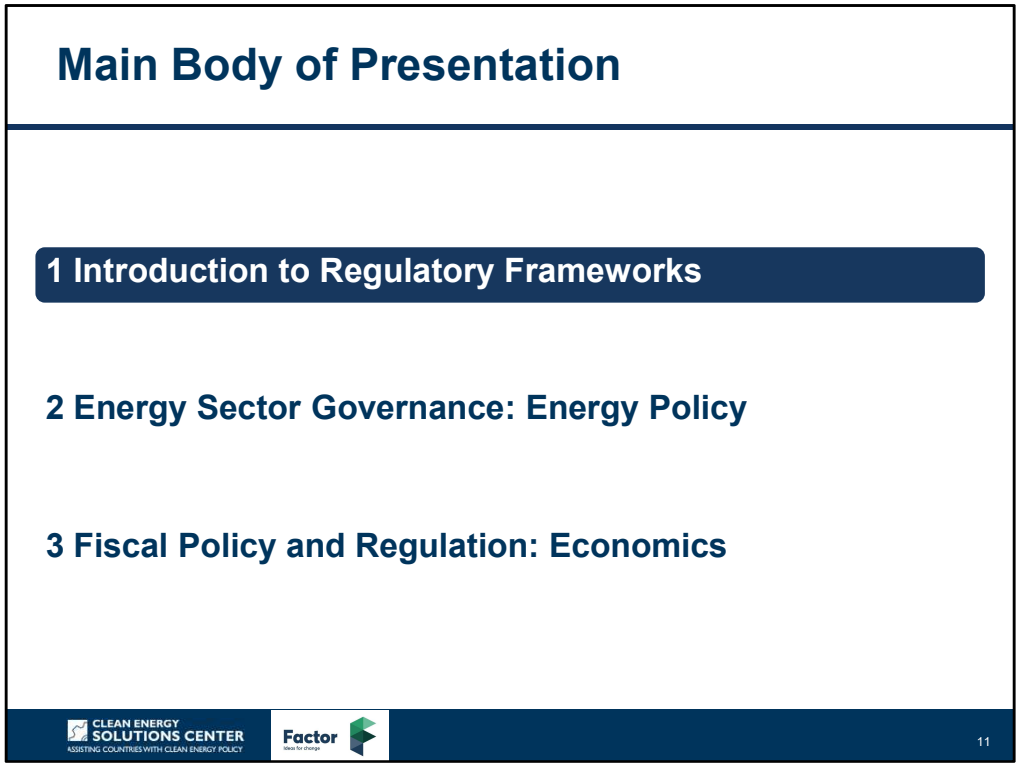
A quick backup of the kind of technology we are talking about:

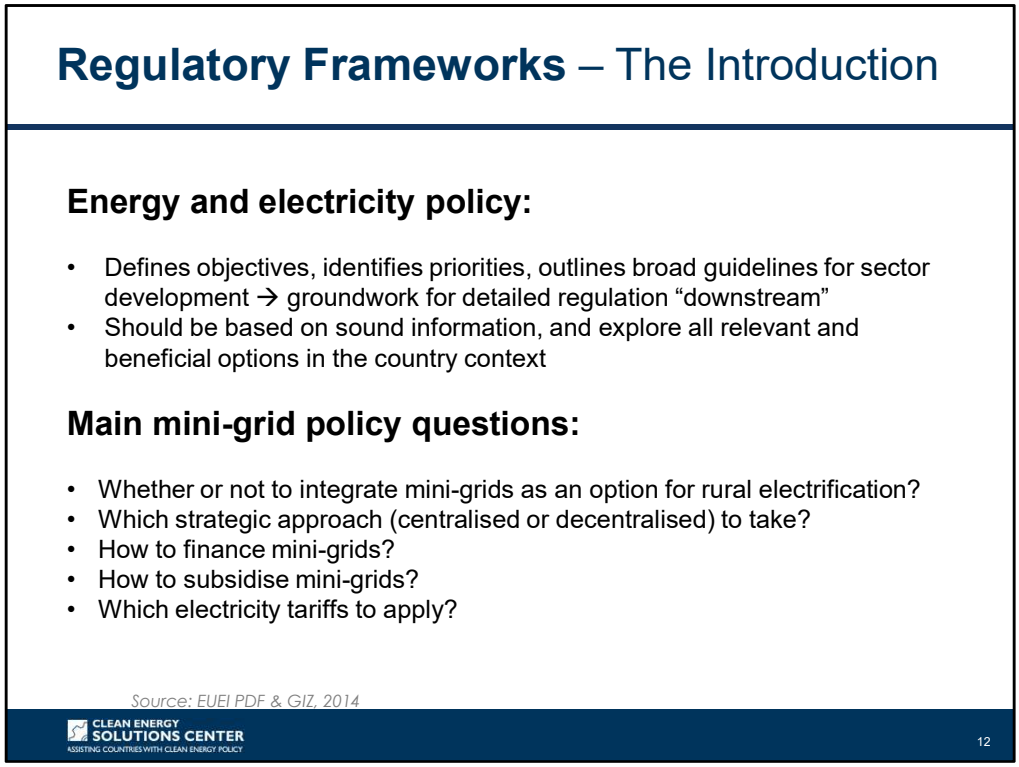
A **mini grid**, also sometimes referred to as a "**micro grid or isolated grid**", can be defined as a set of electricity generators and possibly energy storage systems interconnected to a distribution network that supplies electricity to a localized group of customers.

Mini grids offer **an alternative that entirely avoids many of the challenges that new and expensive grid infrastructure investments require**. Mini grid systems are becoming increasingly competitive compared to the cost of traditional grid extension programmes, and are a key component in achieving universal access to electricity for all. The reasons for this are the rapidly decreasing costs of the technology, increasing reliability and a solid deployment track record, all of which have strengthened the case for the accelerated adoption mini grid solar solutions across the the world.

3. Main Body of Presentation



The main body of this module is divided into 3 parts. We will begin with an introduction and then slowly work through the different perspectives on regulatory frameworks.



The Mini-grid policy and regulatory framework comprises the binding rules, strategies, institutions and associated processes that govern the mini-grid sector. It is developed and adopted by public bodies, including parliament and government agencies, and it determines whether and how mini-grid development takes places as well as whether and through which models mini-grids are developed, implemented and operated.

The principles of mini-grid policy and regulation should, in the best case, be stable and long-lived, clear and comprehensive, accessible, cost-effective and efficient, light-handed and simplified as well as transparent and predictable.

Main mini grid policy questions include the discussion of whether or not to integrate mini grids as an option for rural electrification, which approach to implement, how the approach is to be financed, whether and how mini grids are subsidiesed, as well as which electricity tariffs are to be applied.

During this and the following module, we will try to find potential answers to all of these questions.

Regulatory Frameworks – The Introduction

Principles of Policy and Regulation:

- Stable and Long-lived
- Clear and Comprehensive
- Accessible
- Cost-effective and Efficient
- Light-handed and Simplified
- Transparent and Predictable
- Technology Neutral

Source: EUEI PDF & GIZ, 2014

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Regulation is always based on principles – either intended or unintended ones. This slide gives a short overview of recommended principles to follow for the design and implementation of mini-grid regulation.

A stable policy and regulatory environment is the basis for attracting investment into mini-grids. Mini-grid investors require reassurance that both macro-scale and specific regulatory support mechanisms will remain stable and predictable for the life of the project. There is nothing that makes investors - both existing and prospective - more nervous than the feeling that the regulatory environment may “shift beneath them” once they have already committed to their project.

An incomplete or unclear mini-grid policy and regulatory framework will hinder rather than foster mini-grid roll-outs. There should be full clarity on permitted tariffs, licence and permit requirements, import duties, VAT, company taxes, and other possible incentives and subsidies, as well as the other policy and regulatory issues discussed in the next sections. The process by which regulatory decisions on these issues are reached should be clear and standardised for all transactions.

Policy and regulatory frameworks should seek to ensure that the points of contact for permitting, technical and financing support are easily accessible and available. Stakeholders should be able to contact the agencies (and/or individuals) that are key to implementing their project.

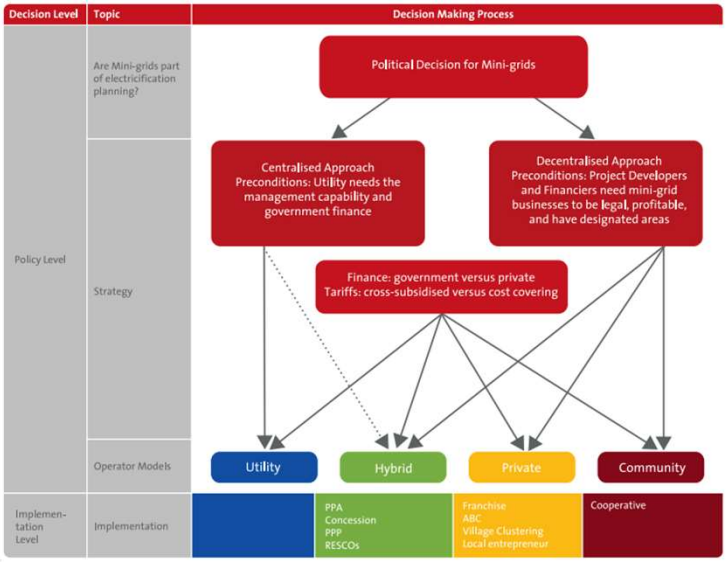
Regulations, procedures, and potentially resulting delays create transaction costs for the project developer, which are particularly critical for smaller developers. After all, mini-grids run on the “razor’s edge” of commercial viability. It is thus of paramount importance to design a mini-grid policy and regulatory framework that is cost-effective (for all players) and efficient, i.e. that minimises bureaucratic delays for granting licences and permits, responding to inquiries, or providing other support.

In general, less regulation is often better than more regulation, especially with small mini-grids (e.g. with a capacity below 0.5 MW). Very small mini-grids can be exempted from all regulation, as is the case in Tanzania and Cameroon for mini-grids below 100kW.

Regulatory decisions must be transparent, fair, independent of power suppliers, and prevent government interference in day-to-day operations. Furthermore, regulatory decisions on similar issues should be consistent with previous decisions to give greater credibility to the regulatory process.

Incentives for mini-grids should allow a level playing field between rural electrification technologies, and between alternative energy sources. All potential cost effective mini-grid technologies should be considered in a mini-grid policy and regulatory framework.

Regulatory Frameworks – Rural Electrification Strategy?



Source: EUEI PDF & GIZ, 2014

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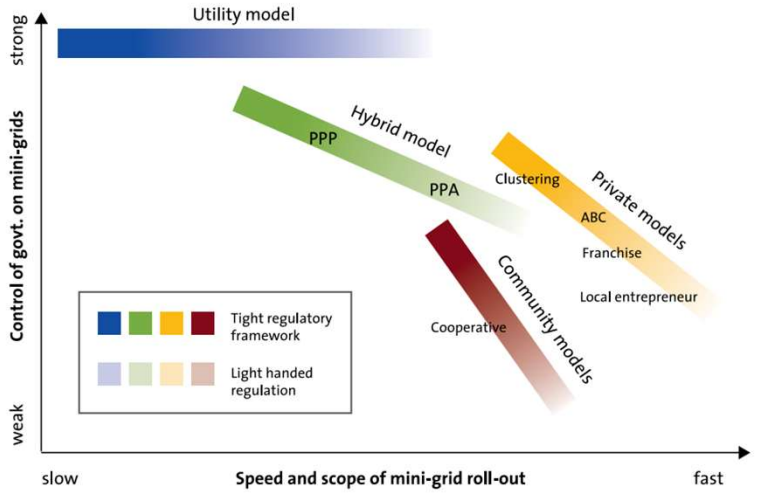
Before mini-grid policy and regulation can be designed, the basic political decision whether to include mini-grids in the rural electrification strategy has to be made. Following this, further strategic decisions have to be taken before going into the detailed planning of regulation and its implementation. These decisions relate to the general approach to be adopted (centralised vs. decentralised), upfront financing (government vs. private), and tariffs (cross-subsidised vs. cost-covering tariffs), each of which is discussed below. These decisions determine which mini-grid operator models can be applied in a country. Sometimes it may also be beneficial to support more than one operator model. In other words, these decisions are crucial starting points, since they are streamlined subsequently throughout the policy and regulatory framework.

Regulatory Frameworks – Centralized vs. Decentralized, Operator Models



Source: EUEI PDF & GIZ, 2014

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Most governments in Africa have developed national electrification strategies following either the centralised or the decentralised approach.

In a centralised approach, national government entities such as a public utility, rural electrification agencies or ministries undertake electrification alone or together and national grid extension is usually the primary means to electrification, with mini-grids playing a minor role.

With the decentralised approach, private and community players take over the electrification of areas far from the national grid, but are often still supported by public institutions in the planning, implementation and operation of mini-grids.

Mini-grids can be an integral part of both approaches. In the centralised approach, either a public utility is given the mandate to install and operate mini-grids, or the state can own and/or operate generation and/or distribution of mini-grid assets.

In the decentralised approach, private companies or communities are allowed to own and operate generation, distribution or both types of assets. Following both models in parallel is possible, but requires more effort and capacity, including very specific policy instruments and regulations to clearly define the roles and responsibilities of all actors. Governments have to decide which approach to follow, or whether to pursue both tracks at the same time.

Mini-grid deployment can be accelerated if regulatory processes are streamlined and actors are given the necessary tools and guidance for developing and implementing mini-grids. Levels of government involvement and types of operators models are interdependent and determine the pace and eventual success of implementation of mini-grids. Support instruments like subsidies, tax breaks, etc. can accelerate roll-out.

MM2

Regulatory Frameworks – Public vs. Private Financing

Where does the **upfront financing** of mini-grids come from?

- Public sector => centralised approach
- Private sector
- Communities
- Public or private forgein donors

Source: EUEI PDF & GIZ, 2014

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Upfront financing of mini-grids can be provided by the public sector, the private sector, communities, or foreign donors, both public and private. Public financing is the primary approach for the centralised track using utilities and their national grids to improve electricity access. The decentralised track usually involves other financial actors. This is mostly done out of necessity; public budgets are limited and the investment cost of providing electricity access is high. It is widely acknowledged that for providing universal electricity access, private investment is needed in most developing countries. Private investment is more easily attracted by private operators. Community contributions (financial or in-kind) are also important as they improve a project's financial sustainability

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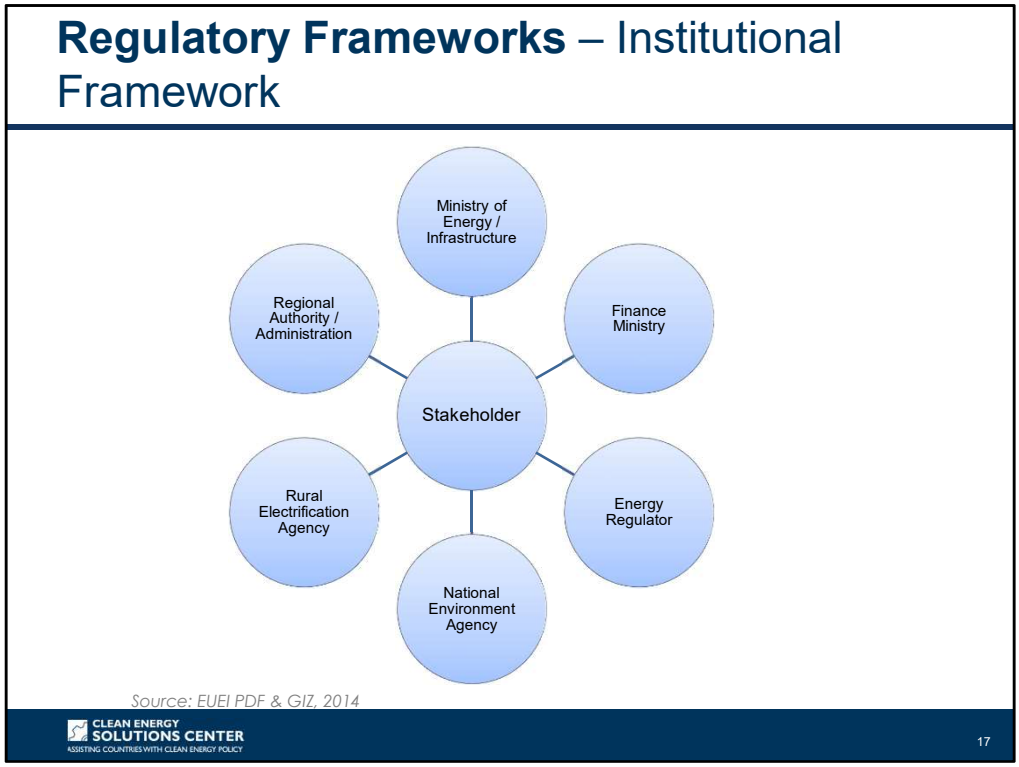
MM2 Mats Marquardt; 16/11/2018



Public actors must reconcile institutional, political and financial realities with rural development aspirations and the aim of achieving the highest possible rate of electricity access. Governments are assigning roles and responsibilities to specific public bodies to support mini-grids, and are sometimes creating new public agencies to assume previously assigned responsibilities.
In general, mini-grid institutional stakeholders should have specific responsibilities that are clearly allocated to a single actor to allow higher cost-effectiveness and accessibility.

It is the role of the Ministery of Energy to design rural electrification targets, strategy and mission, to design and administer national energy policy and planning, and to define rural electrification strategy (incl. the selection of operator models). Further, they ministry is repsonsible to administer public resource allocation and to initiate the mini-grid regulatory and institutional framework.

The finance ministry takes the role of the treasury: It provides the rural electrification budget, avails and coordinates grants and concessionary loans, provides input on national electricity tariffs and subsidies and determines stability of investment policy and designs fiscal incentives.

The energy regulator facilitates the implementation rural electrification targets, vision and mission, formulates and implements technical, economic and legal regulation. It also mediates disputes and provides an advisory function to other entities.

The national environment agency ensures that the mini-grid meets national environment standards and is responsible for Issuing licences and the monitoring of compliance with environmental regulations.

The rural electrification agency is responsible for driving implementation of selected national operator models and in some cases, performs specific regulatory tasks. Also, it manages mini-grid project cycles, channel loans and grants for mini-grid projects, for instance through a rural electrification fund. The rural electrification agency is also required to monitor and evaluate mini-grid projects and develope electrification plans.

Last but not least, regional auhtorites take array of responsibilities, including the provision of support for the identification of target areas, they authorise land use and award building permts and resource utilisation permits. They promote mini-grid programmes and facilitate contact with electricity users. Finally, they support the training and forming of capacity.

Main Body of Presentation

1 Introduction to Regulatory Frameworks

2 Energy Sector Governance: Energy Policy

3 Fiscal Policy and Regulation: Economics

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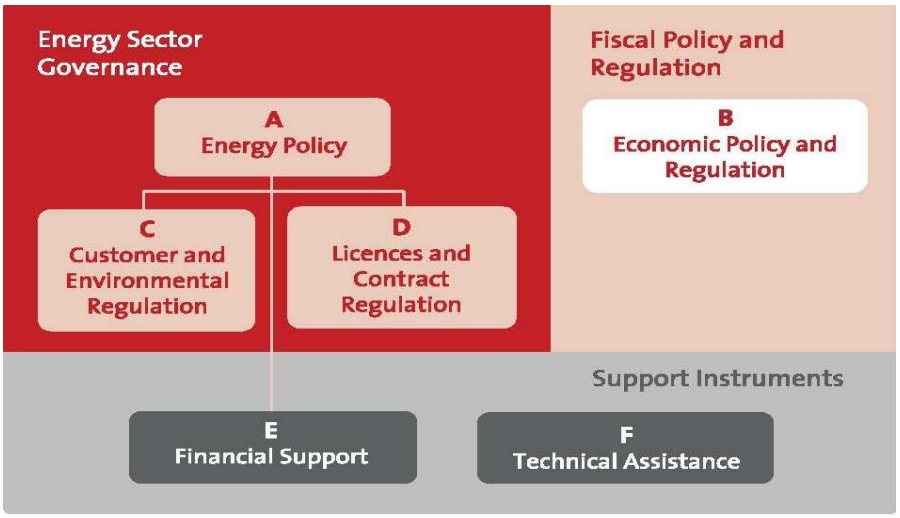
Regulatory Frameworks – Policy and Regulatory Instruments



Source: EUEI PDF & GIZ, 2014

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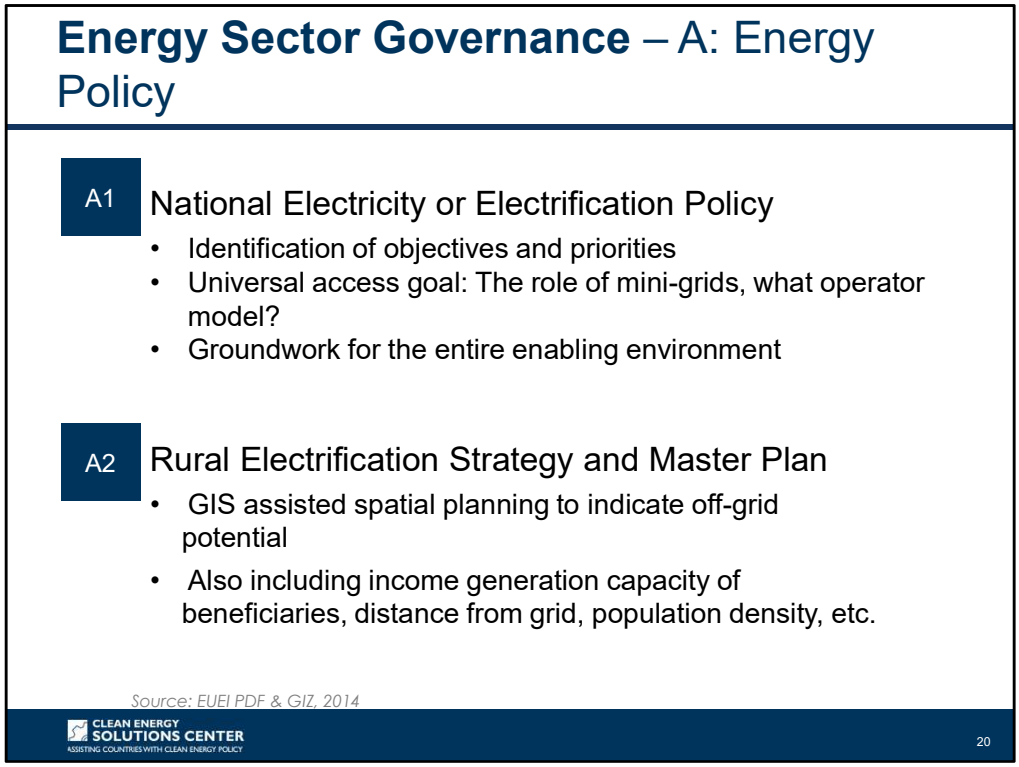
We will now identify and discuss policy and regulatory instruments for mini-grids. The policy and regulatory instruments are embedded in a broader process of designing and implementing a mini-grid policy and regulatory framework. This process can follow various paths, led by decisions and actions from policy-makers and regulators. An overview of the main linkages between the different policy and regulatory levels is given in this graph. Many instruments are linked and their effectiveness and efficiency depend on the other instruments.

In this graph, the two parts shaded in red represent the priority policy and regulatory instruments, which include all the foundation elements that have to be in place to allow the development and operation of mini-grids.

The grey shaded box in the bottom represents supportive policy and regulations, that help scale rollouts further and faster. Without these, key actors might be reluctant to participate and invest, or might wait for other players to pave the way before they start investing.

We will now go through these components in alphabetical order, but please bear in mind that this first part of the 2-part module will only cover box A and B.

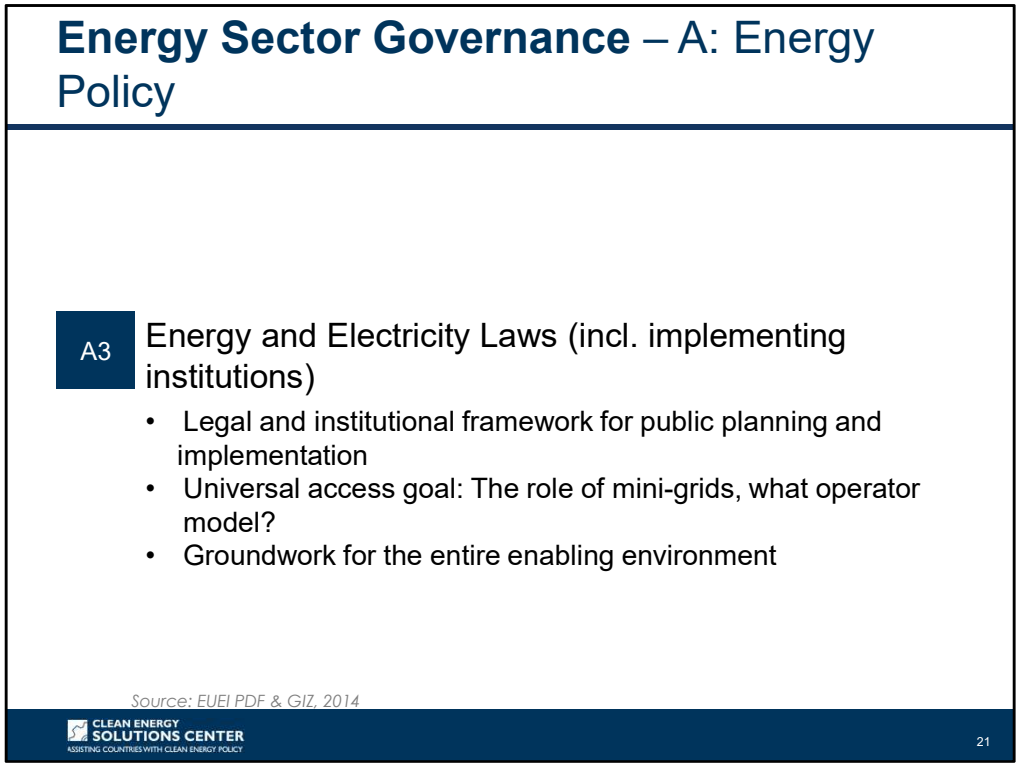


A1:
National energy policy defines objectives, identifies priorities, and outlines the broad guidelines for sector development. This might encompass the energy sector as a whole, or focus on specific sub-sectors, such as electricity and electrification. A key element, and a pillar of public support of a national rural electrification policy in general and mini-grids in particular, is the political aim for universal national electricity access. Setting targets and backing them up politically by providing the necessary framework and resources leads to focused action by the involved stakeholders.

Another essential aspect is the explicit decision to integrate mini-grids into the rural electrification approach. Subsequently, the policy should identify appropriate operator models in the respective country context, as each of the four basic operator models (utility, private, community and hybrid models) for mini-grids requires specific policy support.

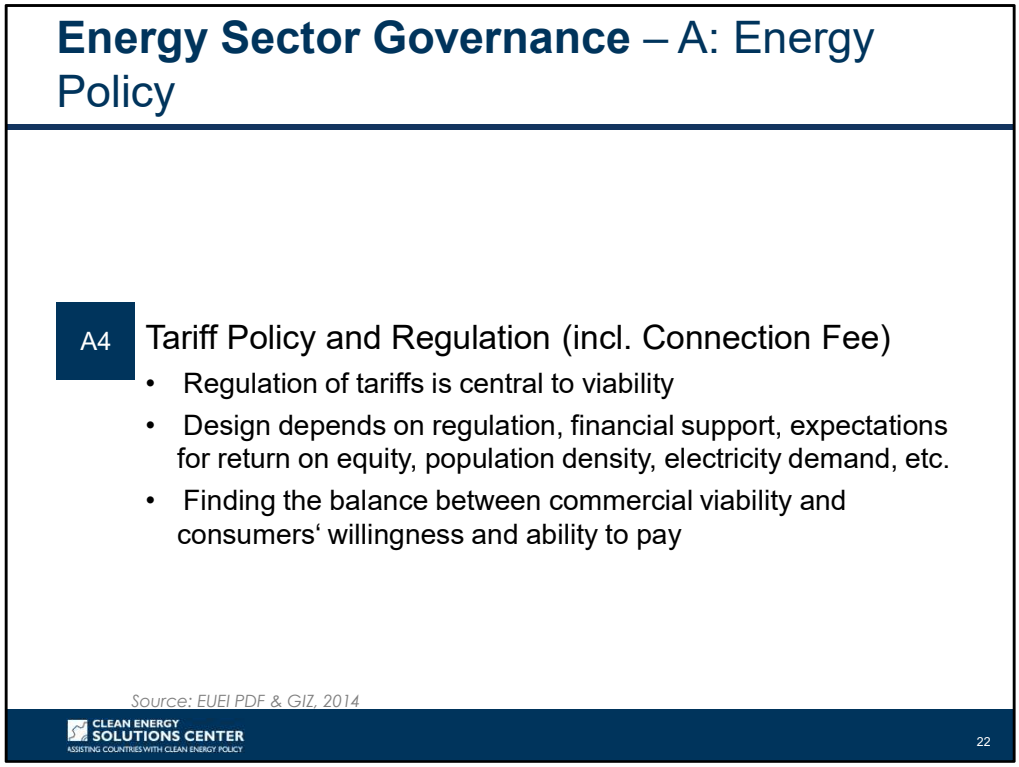
The energy or electrification policy thus lays the groundwork for the entire enabling environment, which is further operationalised at the subsequent levels.

A2:
If national electricity access targets are to be achieved, stakeholders need a plan to get there. For rural areas this plan should at least indicate grid and off-grid areas, on the basis of state of the art tools, including GIS based spatial planning software. Thus, it is beneficial for mini-grid developers if the Ministry of Energy, assisted by its national electrification agency, develops a rural electrification master plan. This electrification strategy and master plan should ideally be based on data about the existing or potential income generation capacity of the beneficiaries of electrification, the distance from the main grid, population density, equity between geographic areas and the local energy resource potential and cost.



A3:

Energy, electricity or renewable energy laws or acts establish the legal and institutional framework for public planning and the implementation and enforcement of regulations for rural electrification in general and mini-grids in particular, usually through an **act of parliament.** They lay down the responsibilities of important actors and provide the basis for any specific regulations or promotion instruments. All the instruments presented in the next slides and the second part of this module need this legal foundation, as well as public institutions to implement the energy and electricity laws, and design and enforce energy regulation.

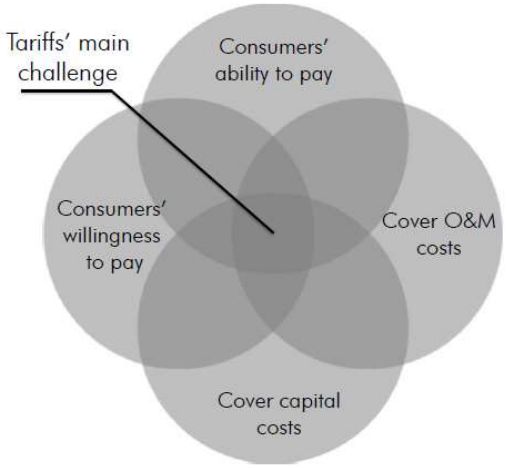


A4:

A tariff is any charge, fee, price or rate that has to be paid for electricity purchases. The **regulation of tariffs is central to the viability of any mini-grid business.** The design of tariffs highly depends on regulation and on available financial support, such as subsidies, debt service, as well as on expectations for return on equity (for utilities and private operators). Factors such as population density and electricity demand also influence the economics of mini-grids and need to be considered while setting the tariffs. Generally, tariffs and connection fees, together with subsidies, must strike a balance between commercial viability of the mini-grid projects and consumers' ability and willingness to pay.

Energy Sector Governance – A: Energy Policy

A4



Source: GIZ, 2014

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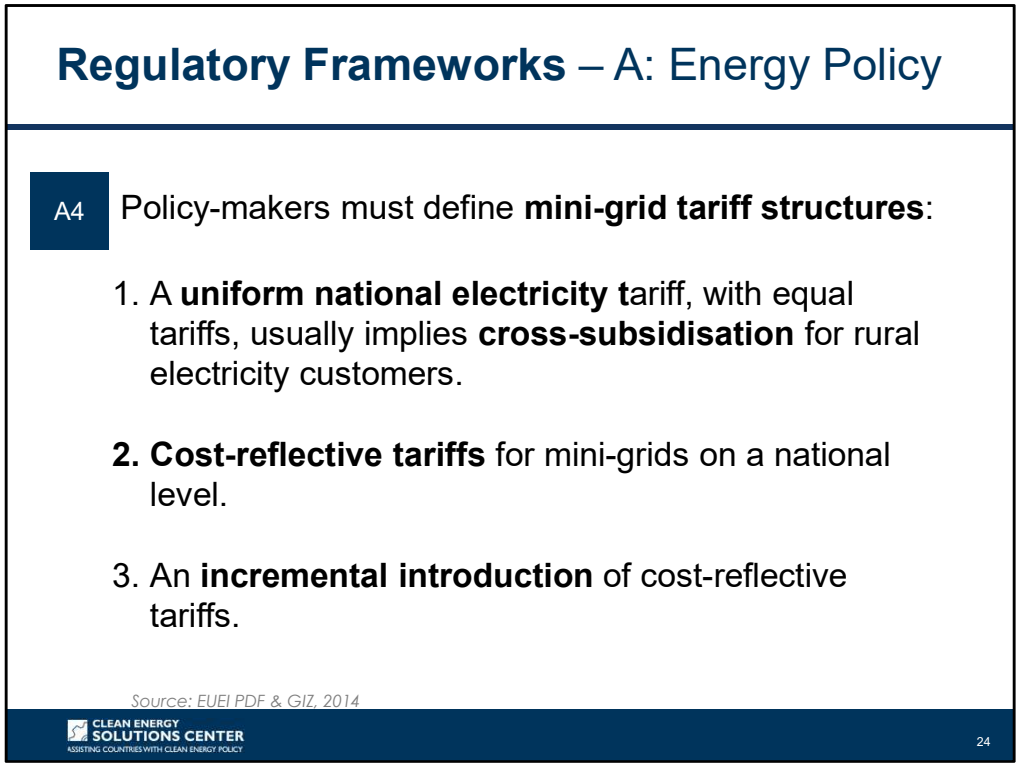
Tariffs should aim to attract private parties to invest in mini grids. Also, they should make MGs financially viable and sustainable. Tariffs can also pursue to support economic development and improve living standards in the villages. They may enable better understanding of mini grid operation. In the end however, the tariffs main challenge is to balance sustainability and affordability.

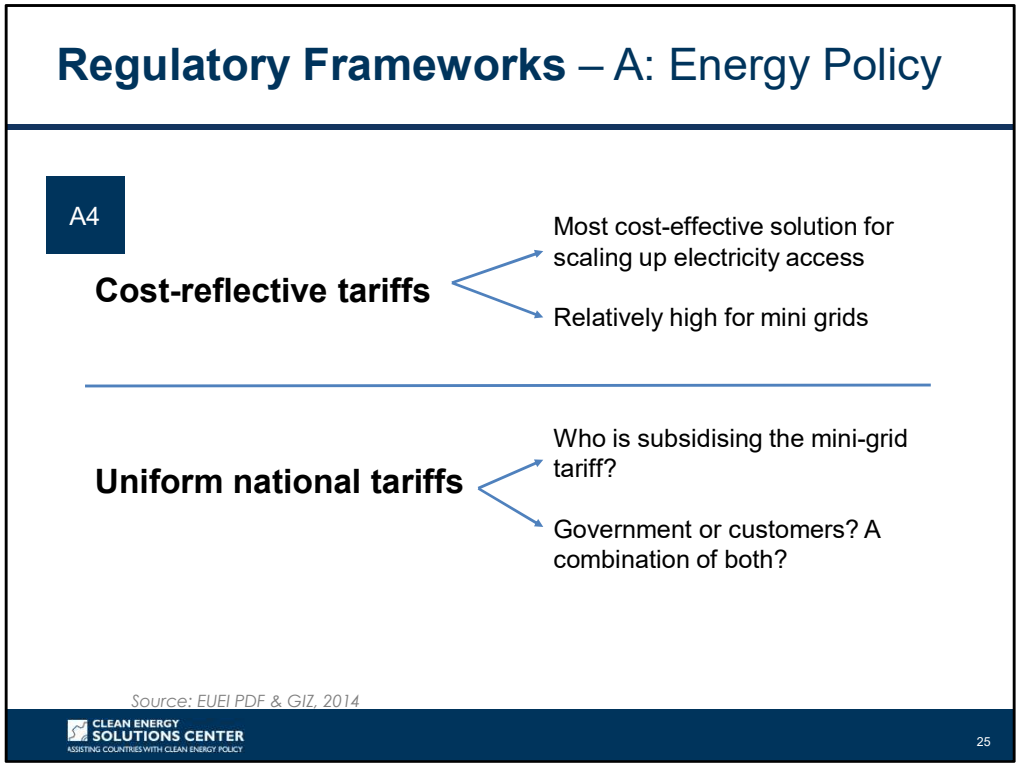


Generally, policy-makers must define mini-grid tariff structures that strike a balance between commercial viability and consumers' ability and willingness to pay. However, since electricity generation costs for mini-grids are higher than grid tariffs, a political equality issue arises regarding whether and how to subsidise electricity. We will now look at a couple of options available:

A uniform national electricity tariff, with equal tariffs for mini-grid and national grid consumers throughout the country, which usually implies cross-subsidisation for rural electricity customers.

Cost-reflective tariffs for mini-grids on a national level, which need a national consensus to accept different electricity tariffs for mini-grid customers.

An incremental introduction of cost-reflective tariffs, starting on a local level in order to determine whether it is politically sustainable, however, this is a high risk option for project developers.



With cost-reflective tariffs, only the people consuming electricity provide the revenues for recovering mini-grid investment and O&M costs. The equity issue comes into play here: why should the rural poor pay a higher price for electricity and the fundamental services it provides, when the urban middle and upper class enjoy electricity that is subsidised by the country as a whole? On the other hand, rural communities are generally willing to pay a fair price for consistent electric power - after all consumers need electricity much more than they need low tariffs. Yet, purely cost-reflective tariffs are relatively high for mini-grids, even though they may be the most cost-effective solution for scaling up electricity access in many regions.

With a uniform national tariff the main question is: Who is subsidising mini-grid tariffs? Is it the whole population, through extra subsidies financed by government budgets, or existing customers through higher electricity tariffs? Indeed, electrification in most countries was and is financially supported by governments, and subsidising mini-grids can be the best option to provide quality electricity wherever mini-grids are more appropriate than the available alternatives.

Finding a combination of both – the golden mean – is probably the most pragmatic solution for scaling up electrification.

Regulatory Frameworks – A: Energy Policy

A4

Retail tariff: Energy

Characteristics	(Dis)Advantages	Metering & Billing
• Customer pays per energy consumption [i.e. per kWh]	+ No limiters required	• Post-paid
• Metering required	+ Incentivies energy efficiency	o Meter reading
• Meter Reader required or Electronic readable meter	- Meter reader	o Bill calculation
	- Electronic readable system	o Customer payment
	- Risk of customer's unpayability	• Pre-paid
		o Customer buys energy before consumption

Example Bangladesh – PVDH mini-grid (100kWp mini-grid)

- Connection fee: 5,000 BDT (46.39€)
- >10 hours/day
- All household appliances allowed
- Max power per household : 2,2 kW
- 10 A limited circuit
- Price: 30 BDT/kWh (~0.28€ /kWh)
- Electricity meter
- Post-paid on a monthly basis

Source: GIZ, 2014

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Regulatory Frameworks – A: Energy Policy

A4

Retail tariff: Capacity

Characteristics	(Dis)Advantages	Metering & Billing
• Know as Flat-Rate, subscription tariffs • Customer pays a maximum power amount • Overcurrent device required or load limiter • Theft risk	+ No meter required, no bill calculation, no meter reading required - Hide charge per kWh - No efficiency incentive - Difficult demand prediction - Discourage productive use	• Pre-paid o Customer agrees energy price before consumption o Cash payment, Mobile phone payment or scratch cards

Example Nepal – Flat rate tariffs using load limiters

- Combined subscription tariffs with load-limiting devices
- Total wattage subscription below power plant capacity
- No risk of brownout
- Carefully scheduled load by consumers to meet conditions

Source: GIZ, 2014

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Regulatory Frameworks – A: Energy Policy

A4

Retail tariff: Service

Characteristics

- Energy is not any more sold per units of energy/power
- Energy priced per units of time, kg, etc
- Adequate for rural areas where costs of solar power electricity would be too high for villagers

(Dis)Advantages

+ Required precisse and adequate calculation of prices
+ Relates energy to other activities
- Hide price per kWh
- Customer not aware of energy efficiency

Metering & Billing

Pre or post-paid:

- Hours of TV/DVD
- Kg of ground wheat processed
- Litters of clean water processed

Example Odisha – Solar PV based Multy Utility Business Centre (MUBC) in Patapolasahi

- 35 households
- Agriculture as primary livelihood
- Service charged either on kilogram, litre or hourly
- Service charged is caped by an upper limit of the Ability To Pay of customers
- Price considering O&M costs, Logistics Cost, Business Risk, Inflation,
- TV service: 0.9 US$ /hour per person – Water purification: 0.036 US$ /litre per person

Source: GIZ, 2014

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Regulatory Frameworks – A: Energy Policy

A4

Retail tariff: Per device

Characteristics	(Dis)Advantages	Metering & Billing
• Power tariff adaptation • Customer pays per number of devices • Used to reduce initial costs with very low-income populations • No meter nor current limiter required	+ No tariff equipment required + Reduced grid consumption - Hide charge per kWh - No efficiency incentive - Difficult demand prediction - Discourage productive use - Unnanounced visits required	• Pre-paid ○ Customer agrees energy price before consumption ○ Cash payment, Mobile phone payment or scracth cards

Example India – Fixed price model by Husk Power Systems (HPS)

- Each household is allowed to run two fluorescent lights (15W) and charge mobile phones
- 50 rupees (~$1 per month) + connection cost 100 rupees (~$2)
- Further adjustment of the model for two 45W connections and 1,000W package

Based on Tenenbaum *et al.* (2014)

Source: GIZ, 2014

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After seeing all these tariff options, one could ask for recommendations regarding a best alternative. Potentially though, the best practice would be to grant the mini grid flexibility in deciding on the tariff structures that work best for their technology and business model.

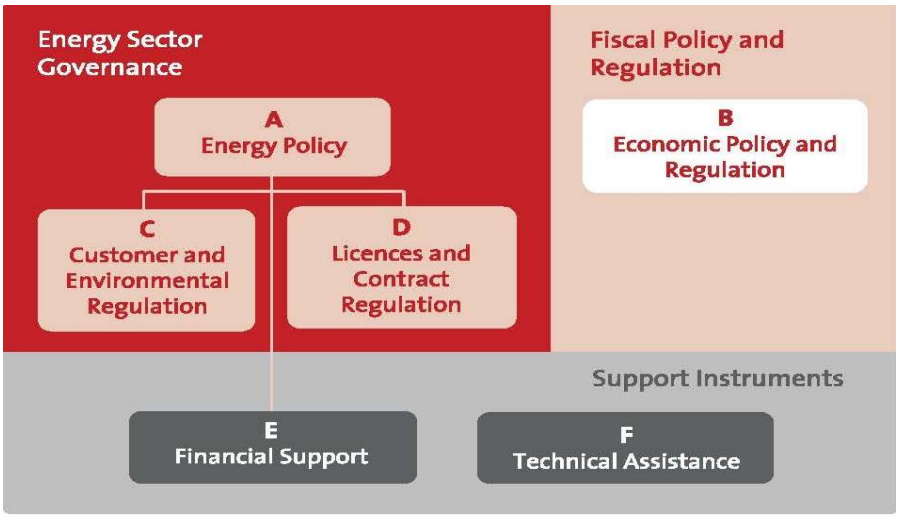
Main Body of Presentation

1 Introduction to Regulatory Frameworks

2 Energy Sector Governance: Energy Policy

3 Fiscal Policy and Regulation: Economics

Regulatory Frameworks – Policy and Regulatory Instruments



Source: EUEI PDF & GIZ, 2014

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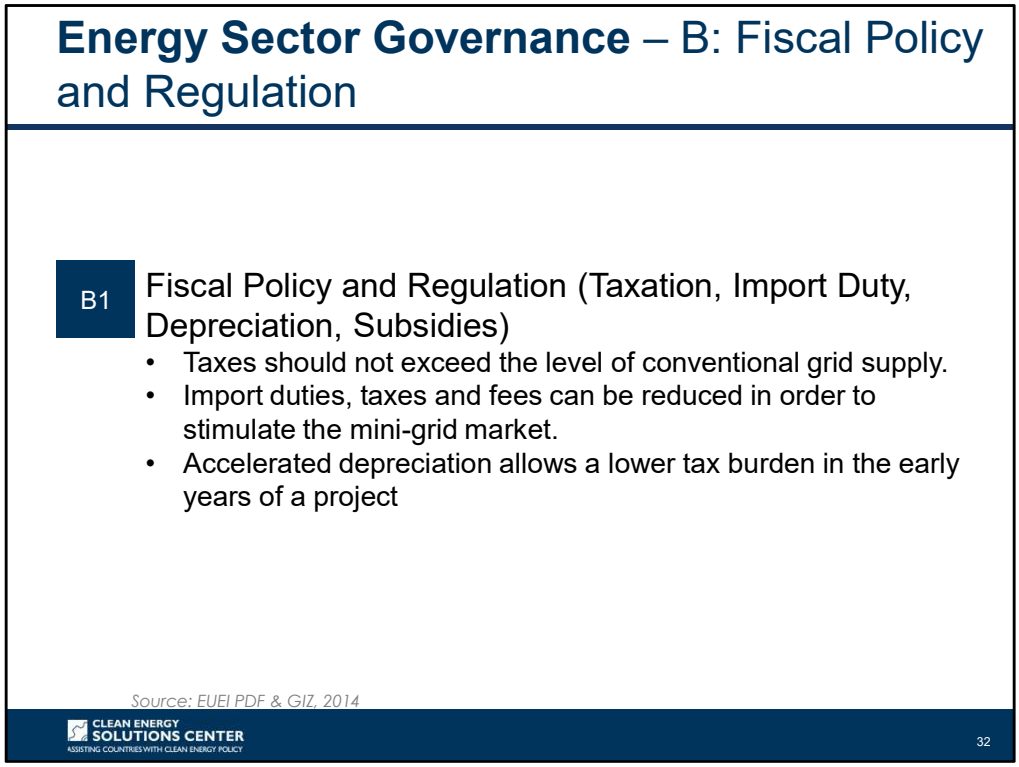
Before we talk about the components C and D from the energy sector governance box on the top left, we will now have a look at the fiscal policy and regulation part, the top right box.



B1:

Fiscal policy (and regulations) can support mini-grid implementation through low taxes and import duties, accelerated depreciation, or subsidies. Taxes on income, company profits, sales, property, value added or other taxes should not exceed the level of conventional grid supply and can be reduced further to stimulate the mini-grid market. The same holds true for **import duties, taxes and fees**, which can be reduced or exonerated for mini-grid equipment or components in order to support the mini-grid market. In general, the lower these taxes and import costs, the lower mini-grid electricity tariffs can be.

Accelerated depreciation allows a lower tax burden in the early years of a project. This depreciation should also be allowed for assets that are provided through grants, as these have to be replaced at the end of their lifetime. These fiscal rules should be clear and reliable to improve investor trust.

Energy Sector Governance – B: Fiscal Policy and Regulation

Fiscal measure	Explanation
Income tax holiday	No income tax during X numbers of years
Reduced corporate income tax	Income tax reduced from the beginning or after expiration of the tax holiday
Reduced Value Added Tax (VAT)	Equipment for the production of renewable energy is exempted from VAT. The list can include wind power generators, hydropower generators and solar PV panels and other equipment.
Import tax exemption or reduced	RE technology is exempted or gets a reduction
Accelerated depreciation	Investment in RE equipment and the distribution grid can be depreciated at an higher rate
VAT refund	VAT charged is partially or totally refunded

Source: EUEI PDF & GIZ, 2014

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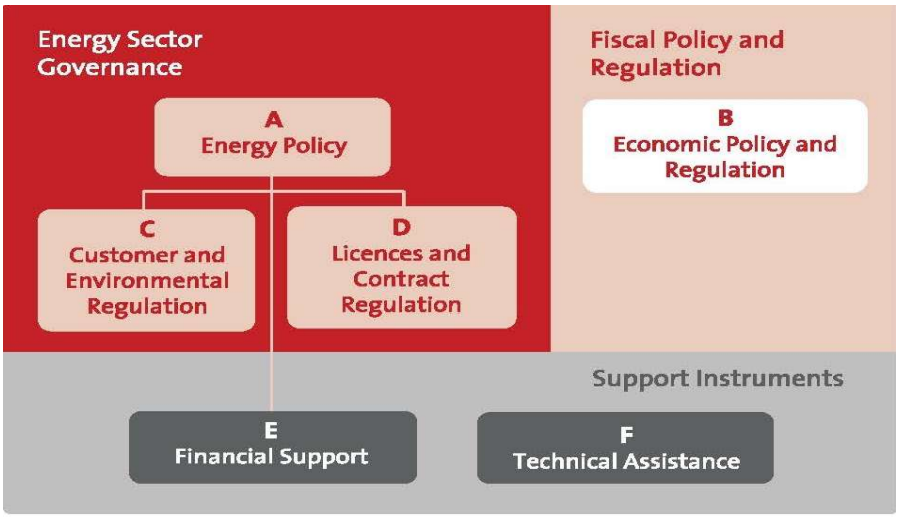
This table provides some further information and explanation on the respective instruments. Real life examples can be found in different parts of the world:

An example of the beneficial income tax treatment can be found in Sri Lanka, where a 5-year income tax holiday applies to power generation using renewable energies. In Madagascar, according to their tax code investments in renewable energy can benefit from a reduction in corporate income tax equivalent to 50% of the investment undertaken. Also in Madagascar, equipment from the production of renewable energy is exempted from value added tax. In Brazil, companies producing electrical energy from wind, solar and hydro power enjoy reduced import taxes. Once again in Madagascar, also, investment in equipment can be depreciated at an accelerated rate of 30% of net value. And finally, in Nepal, an arrangement has been made to refund VAT to small hydro projects developed and operated by community based consumer committees that do not elect to take the zero rate on import tax.

It should also be noted that while these instruments apply to generally all of the early introduced operator models, they represent only a subordinate role for the utility approach. For the hybrid, private and community operator model, they are however important tools.

Regulatory Frameworks – Policy and Regulatory Instruments



Source: EUEI PDF & GIZ, 2014

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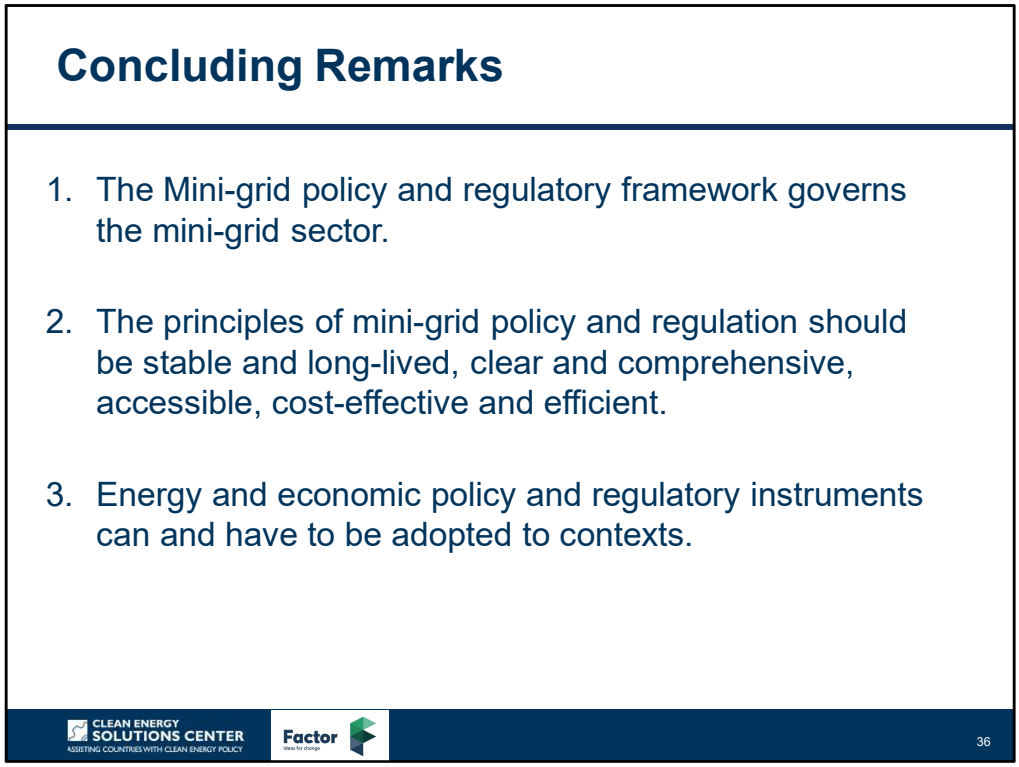
Ladies and Gentlemen, we will stop here and come to the end of this module. In this module, we have looked at the energy policy and fiscal policy and regulation. In the following section, we will continue with customer and environmental regulation, licenses and contract regulation, as well as with the support instruments.

4. Concluding Remarks



The Mini-grid policy and regulatory framework comprises the binding rules, strategies, institutions and associated processes that govern the mini-grid sector. It is developed and adopted by public bodies, including parliament and government agencies, and it determines whether and how mini-grid development takes places as well as whether and through which models mini-grids are developed, implemented and operated.

The principles of mini-grid policy and regulation should, in the best case, be stable and long-lived, clear and comprehensive, accessible, cost-effective and efficient, light-handed and simplified as well as transparent and predictable.

We have so far only learned about the first coupe of policy instruments, but already it is clear that their respective success is a function of contexts and diligent implementation.

With this we are coming to an end, I would like to thank you for our attention and I am hoping to be able to welcome you again for the second part of this module. As always, I would like to invite you to test your understanding with the following small quiz.

Thank you for your time!

5. Further Reading

EUEI PDF & GIZ, 2014. Mini Grid Policy Toolkit: Policy and Business Frameworks for Successful Mini-grid Roll-outs. http://www.euei-pdf.org/en/recp/mini-grid-policy-toolkit

GIZ, 2014. Billing Models for Energy Services in Mini-Grids. https://www.giz.de/fachexpertise/downloads/2014-en-philipps-pep-fachworkshop-minigrids.pdf

Kapika & Eberhard, 2013. Power Sector Reform and Regulation in Africa: Lessons from Kenya, Tanzania, Uganda, Zambia, Namibia and Ghana. https://www.researchgate.net/publication/290439901_Power_Sector_Reform_and_Regulation_in_Africa_Lessons_from_Kenya_Tanzania_Uganda_Zambia_Namibia_and_Ghana

UNEP, 2007. UNEP Handbook for Drafting Laws onEnergy Efficiency and Renewable Energy Resources. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwjB-pm179jeAhXHKewKHQUuCG8QFjAAegQICBAC&url=https%3A%2F%2Fwedocs.unep.org%2Frest%2Fbitstreams%2F12711%2Fretrieve&usg=AOvVaw2DQtZPaW7uEQSQyD_vBKE1

Usaid.gov, Mini-Grid Support Toolkit. https://www.usaid.gov/energy/mini-grids

6. Knowledge Checkpoint: Multiple Choice Questions