#### Foundations of a Sustainable Society

# World Future Council

Creating markets for renewables – Best practise design of feed-in tariffs

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- Diffusion of feed-in tariffs
- Activities of the WFC
- Basic feed-in tariff design early stage market entry
- Design options for market integration incorporation of large shares of renewable electricity



# FITs in the European Union





### FITs world-wide

Africa	Americas	Asia	Australasia
Algeria	Argentina	China	Australia
Kenya	Brazil	India*	
Mauritius	Canada*	Indonesia	
(Nigeria)	Ecuador	Korea (South)	
South Africa	Nicaragua	Pakistan	
Uganda	United States*	Philippines	
		Sri Lanka	
		Thailand	
		Taiwan	
		Israel	
		Mongolia	



### **FIT activities of the WFC**

- •Research and evaluation of best practise
- Publication of books and brochures in order to inform policy makers
- Presentation at international conferences
- Parliamentary hearings
- Strategy workshops
- Creating of networks
- Study trips
- Feasibility studies



### **FIT activities of the WFC**

#### PACT Policy Action on Climate Toolki The PACT project aims to provide the necessary eler and advocates around the world access to the legal and technical expertise needed to envisage, to argue for and to enact laws and policies that effectivel World Future Counc protect the climate. Find out more Search The world urgently needs good FIT laws Home Feed-in tariff (FIT) laws have About the PACT project Before you start drafting proved the most effective Sitemap approach for increasing and Check you have answered the accelerating the deployment of Contact us renewables in the electricity most important questions we think legislators must address What is a FIT law? before proposing any FIT law This site aims to belo users Before you start drafting around the world to introduce or improve FIT laws in their country Features of a good FIT law or region Features of a good FIT law Tackling climate change means rapidly changing the way we generate We outline the essential and use energy. We can only achieve features of a good FIT law, this with an effective policy framework for promoting renewable and give you the opportunity energy and energy efficiency. FITs are a crucial element of any such to draft the basic elements of a proposed law framework.

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ferreamin Sovacool

Online policy advice: Make your own FIT law www.onlinepact.org

The feed-in tariff handbook:

http://www.earthscan. co.uk/?tabid=92822



#### **FIT activities of the WFC**





#### **Defining feed-in tariffs**

#### Basic feed-in tariff components

- Purchase obligation
  - Independent of electricity demand
- Guaranteed tariff payment
  - Fixed payment of a pre-defined tariff based on generation costs
- Payment over a long period of time
  - Reflecting the average lifetime of power plants (e.g. 20 years)



### **Tariff calculation methodology**

- Tariff calculation based on technology specific generation costs + "reasonable" rates of return
- Don't use "avoided costs" as point of reference
- Cost factors:
  - Investment costs (material and capital costs)
  - Grid-related and administrative costs (including grid connection, costs for licensing procedure
  - Operation and maintenance costs
  - Fuels costs (biomass and biogas)
  - Decommissioning costs (where applicable)



# **Tariff payment duration**

- Formerly: short periods (logic of conventional electricity sector)
- Nowadays: long payment durations (usually 20 years ~ lifetime of power plant)
- Necessary because of special investment structure





#### Effects of feed-in tariffs

- Increases investment security
  - Fixed tariff over a predictable period of time
- Reduces price risk and therefore costs
  - Even small and medium sized actors get cheap loans
  - -Risk reduction reduced additional costs for final consumer
- Replaces long negotiations between RES-e producers and utilities/monopolists
  - Short track for PPAs
  - Fast growth of renewable energy sector in a "protected" market

# → Creating markets for renewables!



### RES-e development in Germany (1990-2007)



Development of electricity generation from renewable energies



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Source: BMU 2009

### Additional design options

#### Basic FIT design options

- Financing mechanism
- Targets and progress report

# Design options for tariff differentiation and adjustment

- -Technology, size and location specific tariffs
- Tariff degression
- -Inflation indexation



#### **Conclusion:**

### Feed-in tariffs manage to incentivise investment into renewable energy sources at an early stage of market development.

#### Question:

# Can feed-in tariffs help to incorporate an increasing share of renewable electricity?



# Share of renewable electricity in EU countries (excluding hydro, 2004)



Figure 4.1: Share of electricity from renewable energy sources of gross electricity consumption excluding large-scale hydro power in 2004

Source: [OPTRES 2006]



#### **Design options for market integration**

#### Alternative sales options

- Market sales
- Premium feed-in tariffs
- -Auto-consumption (solar PV)

Tariff payment for improved system integration

- Auxiliary grid services (reactive power, voltage dips)
- Demand-oriented tariff payment
- Tariff payment for steady electricity supply

Regulations for controlling power output

- Forecast obligation
- -Remote-controlled power output



With an increasing share of RES-e the debate has to move from from designing support mechanisms to the design of electricity markets:

- Fixing tariffs vs. market sales
- -Which kind of actors do we want in the power generation business?
- How to cope with merit-order effect?
- Establish capacity markets?



#### ...the end...

#### Thank you for your attention!



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