

### **Tool for Feed-in-Tariff calculation (FiT Tool)**

This explanation relates to the FIT Tool provided at the **Mini-Grid Policy Toolkit Portal**. This FIT Tool and further support tools are available for download at [minigridpolicytoolkit.euei-pdf.org/tools](http://minigridpolicytoolkit.euei-pdf.org/tools)

**Feed in Tariff (FiT)** is a (policy) mechanism to encourage the deployment of renewable technologies. The level of FiT must be carefully calculated, in order to avoid unnecessary high public expenditures for FiT financing and to avoid the discouragement of investors by having the FiT level set too low. The FiT payment is made to energy generators by energy suppliers (utilities) at the level that is usually above the retail electricity price.

This FiT tool is designed for the calculation of technology-specific Feed-in Tariffs (FiTs) for mini-grids selling power into the main grid. The main output of this tool is the **calculation of appropriate level of FiT**, being received for the period of 20 years. Based on the initial investment costs and ongoing operational costs, inflation rate and the yearly revenue from FiT, the tool also calculates the project cash flows (operating, investing, financing and net cash flows) for the period of 20 years. Main inputs include built capacity and estimated capacity factor, as well as the investment costs (e.g. feasibility, development and construction and transmission connection costs) and operating costs.

Based on the financing terms, such as **loan period, initial gearing, loan interest rate** and pre-tax **Return on Equity (RoE)**, the tool calculates investor returns, considering real internal rate of return (IRR) and the considered period. **The tool allows adjusting the targeted/planned FiT in order to achieve the desired RoE.** The included graphic of Annual Return on Equity during the 20 years visualises the break-even point.

The Tool was prepared as part of the EUEI PDF project for the Regional Electricity Regulators' Association of Southern Africa (RERA) to establish a framework for attracting increased investment in mini-grids employing renewable and hybrid generation in Southern African Development Community (SADC).

#### **Glossary**

**Return on Equity (RoE)** - measures a corporation's profitability and represents the amount of net income returned as a percentage of shareholders' equity

**Initial gearing** - The percentage of investments financed with debt

Inputs:

<b>Characteristics</b>		
Technology	type	Wind
Capacity	MW	10
Capacity factor	%	40%
Full load operating hours	hours	3.504
<b>Investment costs</b>		
Outlay of capex in first year	%	50%
Outlay of capex in second year	%	50%
Feasibility, development and construction	\$m	23,00
Transmission connection costs	\$m	0,00
Total (before interest)	\$m	23,00
Interest during construction	\$m	-
Total	\$m	23,00
<b>Operating costs</b>		
Fixed O&M	\$000	469
Fuel costs	\$/MWh	0
Variable O&M	\$/MWh	0
<b>Financing terms</b>		
Initial gearing	%	70%
Loan period	years	10
Cost of debt (interest)	%	10,0%
Interest during construction	%	0,0%
Pre tax ROE	%	18,0%

<b>Inflation</b>				
Inflation rate	%	2%		
Inflation factor (costs)	%	100%	102%	104%
Inflation factor (revenues)	%			100%

FiT Rate:

<b>Feed-in tariff</b>	<b>(Goal seek FIT so that target ROE is reached)</b>						
FiT	c/kWh			10,00			
Indexed FiT	c/kWh	0,00	0,00	10,00	10,20	10,40	10,61

Calculations:

Project cash flows					
Year		-1	0	1	2
<b>Operating cash flows</b>					
Revenue from FIT	\$m			3,50	3,57
Fixed costs	\$m		-	0,49	0,50
Variable costs	\$m			-	-
Interest on loan	\$m		-	1,63	1,46
Net operating cash flow	\$m		-	1,39	1,61
<b>Investing cash flows</b>					
Investment costs	\$m	-	11,50	-	11,73
Net investing cash flow	\$m	-	11,50	-	11,73
<b>Financing cash flows</b>					
Proceeds on loan	\$m		8,05	8,21	
Principal paid on Loan	\$m			-	1,63
Equity contributions	\$m		3,45	3,52	
Net financing cash flow	\$m		11,50	11,73	-
<b>Net cash flows</b>					
Cash at Beginning of Year	\$m		-	-	-
Net Change in Cash	\$m		-	-	0,24
Cash at End of Year	\$m		-	-	0,24
<b>Investor returns</b>					
Annual return on equity	\$m		-	3,45	-
IRR (nominal)	%			15,1%	
Target ROE	%			18,0%	
Difference	%			-2,9%	
IRR (real)	%			12,80%	

Visualisation of the RoE

