

# Financing Renewable Energies the Case of Senegal

*Some Considerations from the Point of View of a DFI*

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## Outline of the Presentation

- KfW – what we are and what we do
- Largest financier of renewable energy projects
- Our approach for appraisal of power projects
- Power sector of Senegal – An Agenda for reform
- What do we plan in the coming years



## Key Figures for KfW Entwicklungsbank

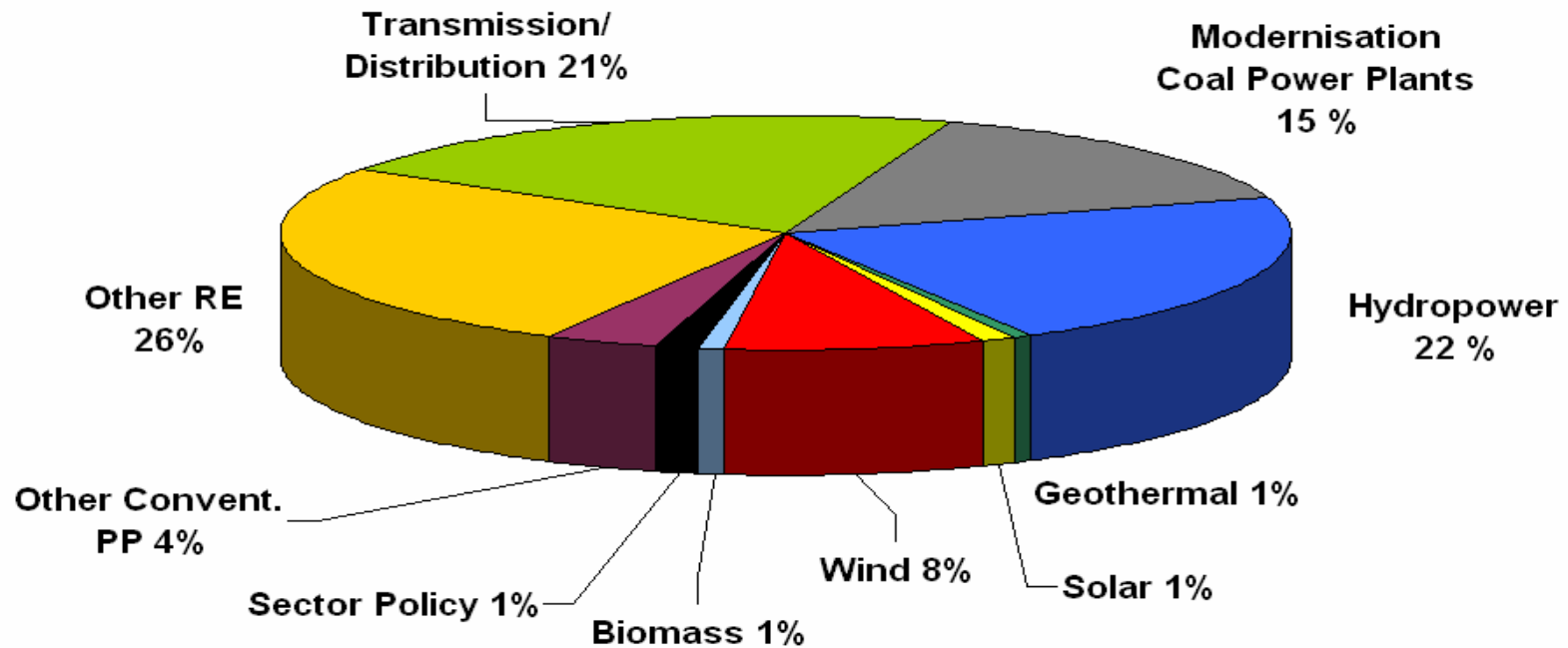
Number of Staff	~ 400
Ongoing projects	over 1,400 in over 100 countries
Representative offices abroad	About 50
Commitments (2008)	EUR 3.8 billion
➤ of which KfW's own funds	EUR 2.0 billion
Disbursements (2006)	EUR 1.5 billion (of which EUR 1.1 billion from budget funds)
Loans outstanding (2006)	18.5 bn. EUR
➤ of which budget funds	15.7 bn. EUR
➤ of which KfW funds	2.8 bn. EUR

# Our Portfolio in the Power Sector

Commitments 2004 – 2008



**Energy Total:** 2.304 Mio. Euro  
**Energy Efficiency out of Total:** 1.322 mil. Euro (57 %)



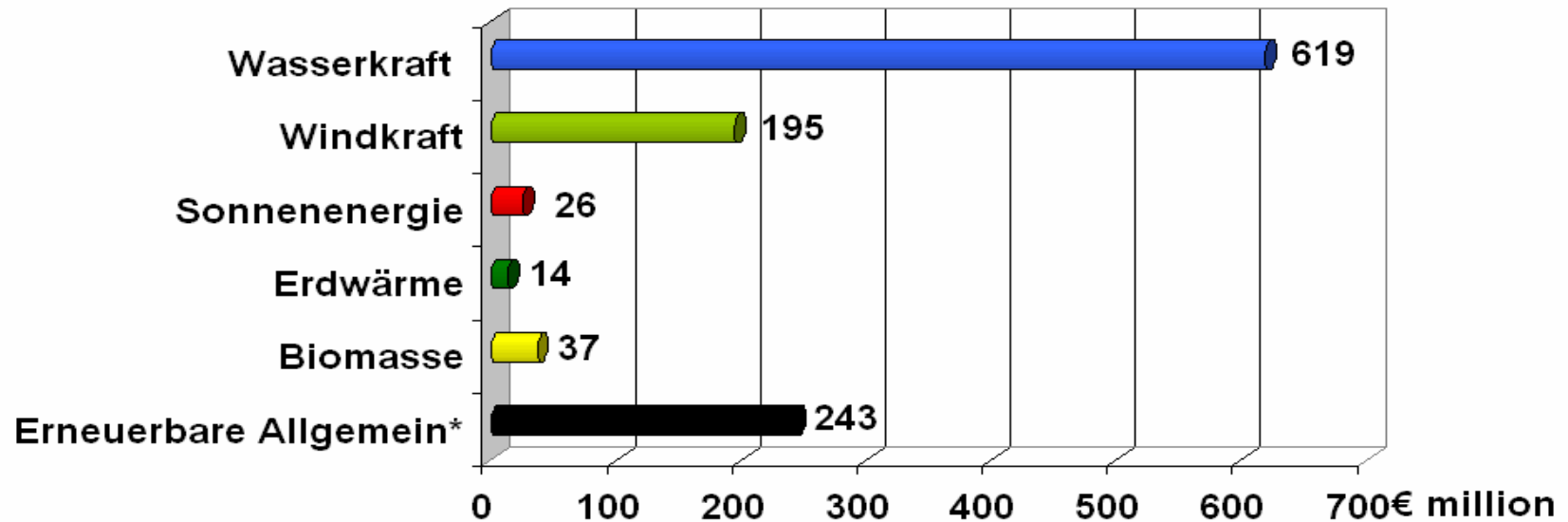
CRS

# Energy Portfolio – Renewables

Commitments 2004 – 2008



**Energy total: 2.304 billion Euro**  
**Renewables out of total: 1.134 million Euro (49%)**



\* Creditlines CRS 23 4E partially 50%



## Role of KfW Development Bank

- Financing **project preparation** for investment projects
- **Finance** infrastructure projects in co-operation with local governments
- Project related **technical support and training**
- **Support sector reforms** in energy sector based on the market principle, including decrease of subsidies, deregulation, commercialization and privatisation
- Develop consistent and long-term energy **programmes and strategies**

## Some key Principles ...

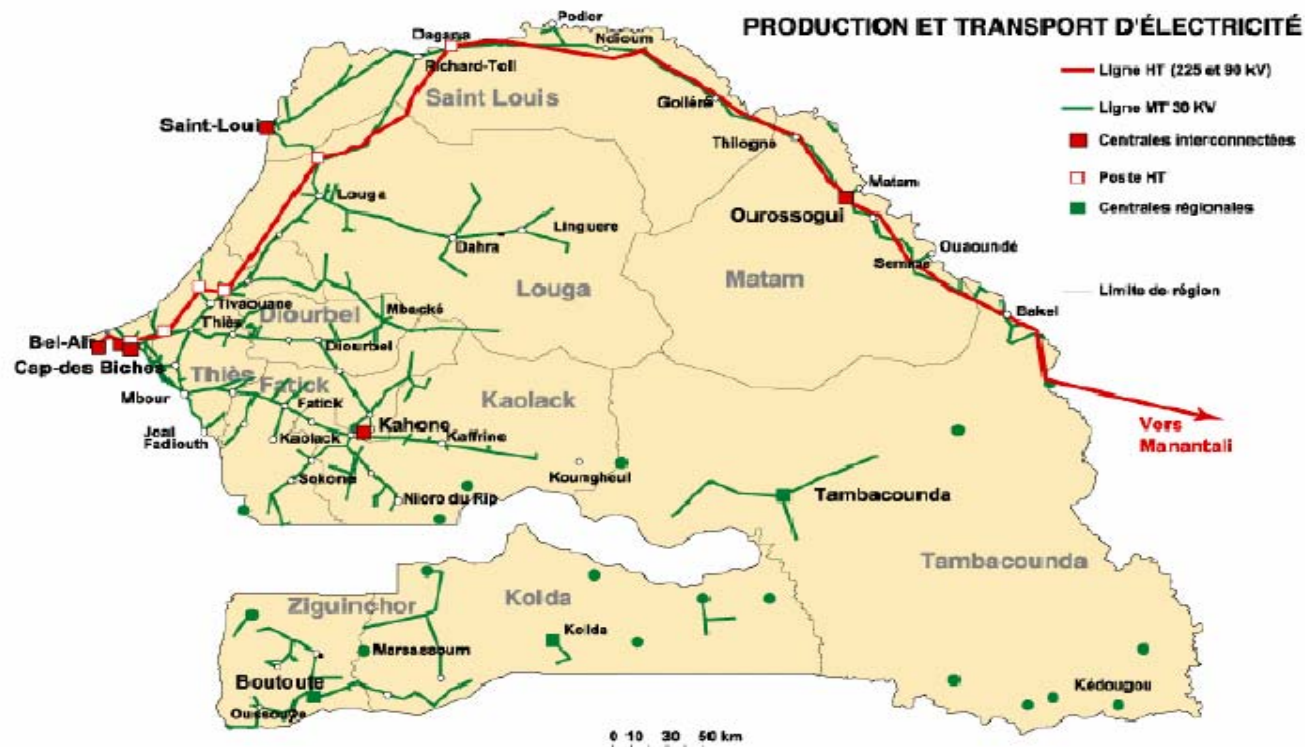
... for supporting power projects in the context of the German bilateral development assistance

- Support to power projects within the framework of the German bilateral development assistance primarily for **support economic development**
- **Costs do matter** (investment costs / levelised unit costs) – we are seeking **least cost solutions**
- We are **neutral** with regard to the **technology** – although specific consideration given to renewables and measures to boost energy efficiency
- We do not focus on ring-fenced projects – we look at the **sector in a broader sense** - are there unfinished **reform agenda**?
- Generation is the most visible bottleneck - what about **complementary investments** (transmission, distribution, regulatory reform...?)

## Recent Experience in the Power Sector in SSA

Country	Project	Remarks
Uganda	HPP Bujagali	Participation of DEG and KfW in a broad consortium of DFIs Flagship project
Uganda	Rural Electrification Programme	Focus on rural areas in Northern parts of the country. Island grids, small hydro
Regional	WAPP (Benin - Togo)	Part of the Consortium funding the envisaged Interconnector
South Africa	Energy Efficiency Programme	Municipal Programme for improved Energy Efficiency (Solar Water Heating)
Senegal, Mali, South Africa	Rural Electrification	Funding of "negative Concessions"
Nigeria	HPP Rehabilitation	Rehabilitation of existing Hydro Power Plants
Kenya	Expansion of Geothermal Power Plant Olkaria III	Part of the funding Consortium under the leadership of DEG
Regional	SAPP (Namibia – Zambia)	Part of the Funding Consortium (together with EIB, AfD) for Senior Loans. Closing foreseen for the end of 2007 / early 2008
Regional	OMVG	Project preparation of comprehensive funding package (HPP plus transmission) ~ EUR 700 m with a large group of DFI

# Senegal Transmission Network



## Sectoral Framework



### Key Criteria for Economic Appraisal of Power Projects

#### Efficient **Allocation** of Funds

- Economic Cost coverage of Power Production – Target >100% - Minimum threshold > 65%
- If Cost coverage > 65% and < 100% -> productive use of power > 60% of additional production
- In Case of RE projects: cost for CO<sub>2</sub> abatement in line with the Costs for CER

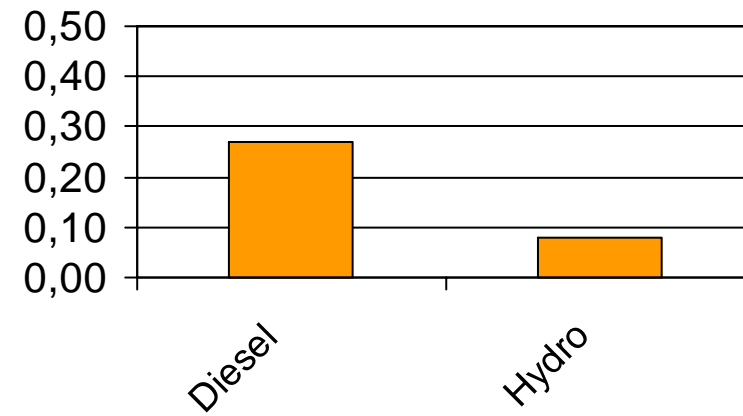
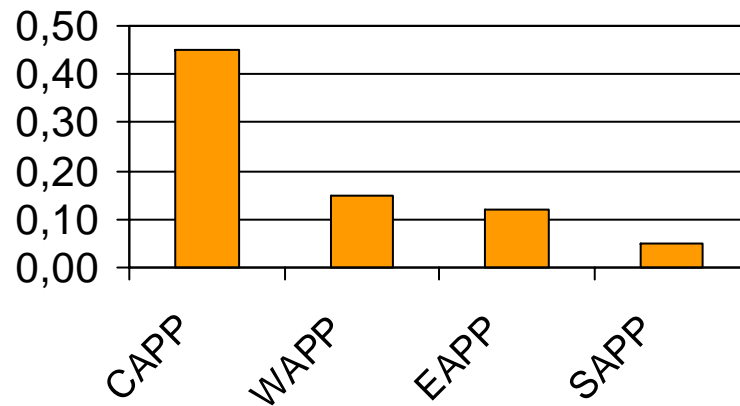
#### Efficient **Production**

- Transmission and Distribution Losses (technical losses) < 20%
- Availability of thermal power plants > 75%
- Financial cost coverage > 100% (issue of non technical losses)
- Collection Efficiency > 95%

## Sectoral Framework

- Existing **power plants** beyond their economic life span, **oil based** with high production cost (notably at times of high oil prices – as up to 2008)
- Production **Capacity not sufficient**. Reserve capacity negative: **-11%\***
- Supply to Rural areas based on availability of power in the national transmission network. **Load shedding affects rural areas** in the first instance
- Own experience with rural electrification – **slow and complex** processes
- National Utility **Senelec** in urgent **need of reforms**
  - recapitalisation ~ EUR 200 m over 3 years,
  - cost cutting programmes,
  - efficient production,
  - loss reduction
- **Large parts** of the country not connected to the national grid; **regional integration** in the context of the WAPP not yet completed

## Production cost per KWh



## Power Sector Statics

**Situation in 2007:**  
Improved,  
due to

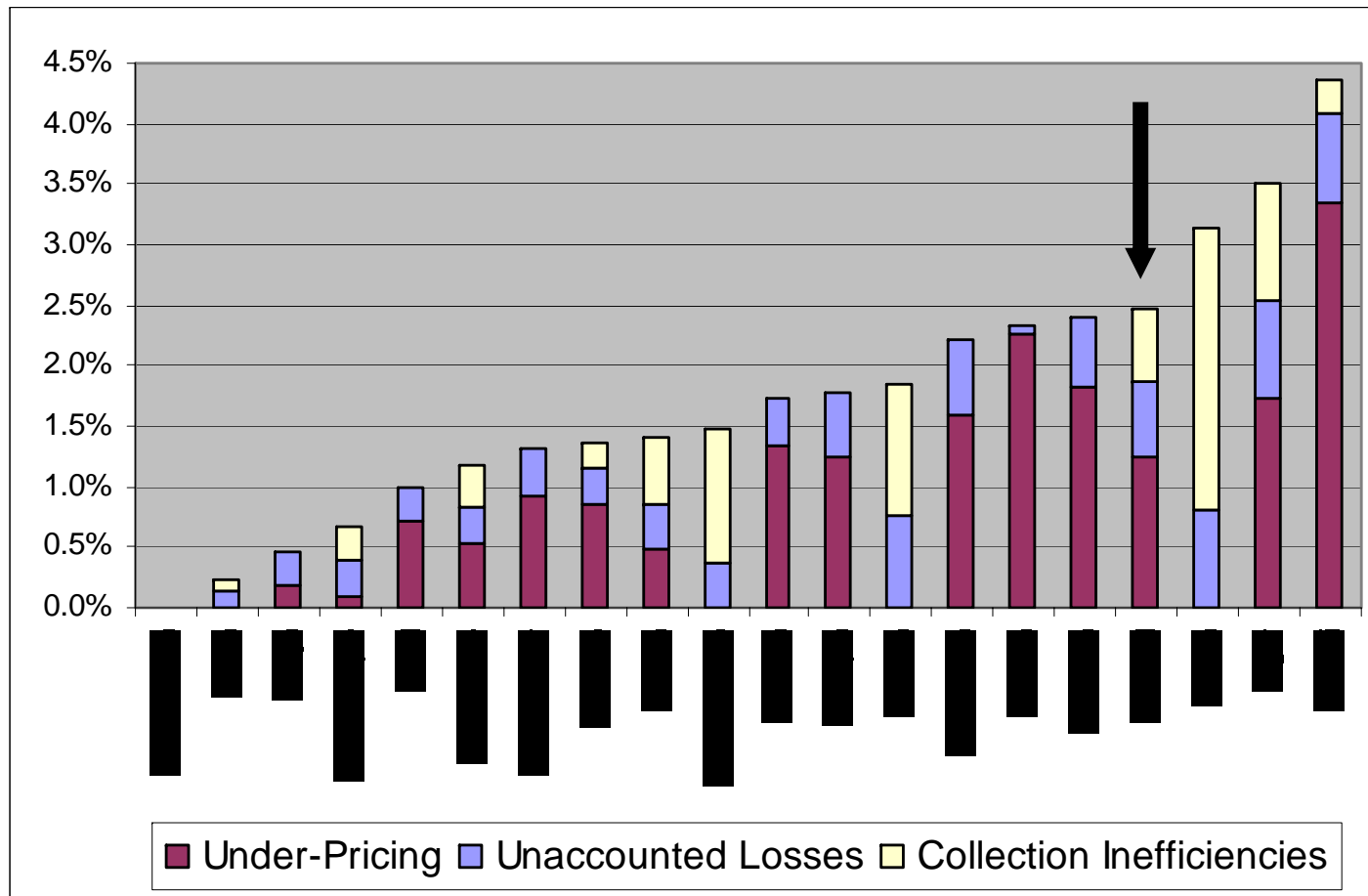
- higher tariffs,
- cost cutting exercises

net loss reduced to  
some EUR 10 m

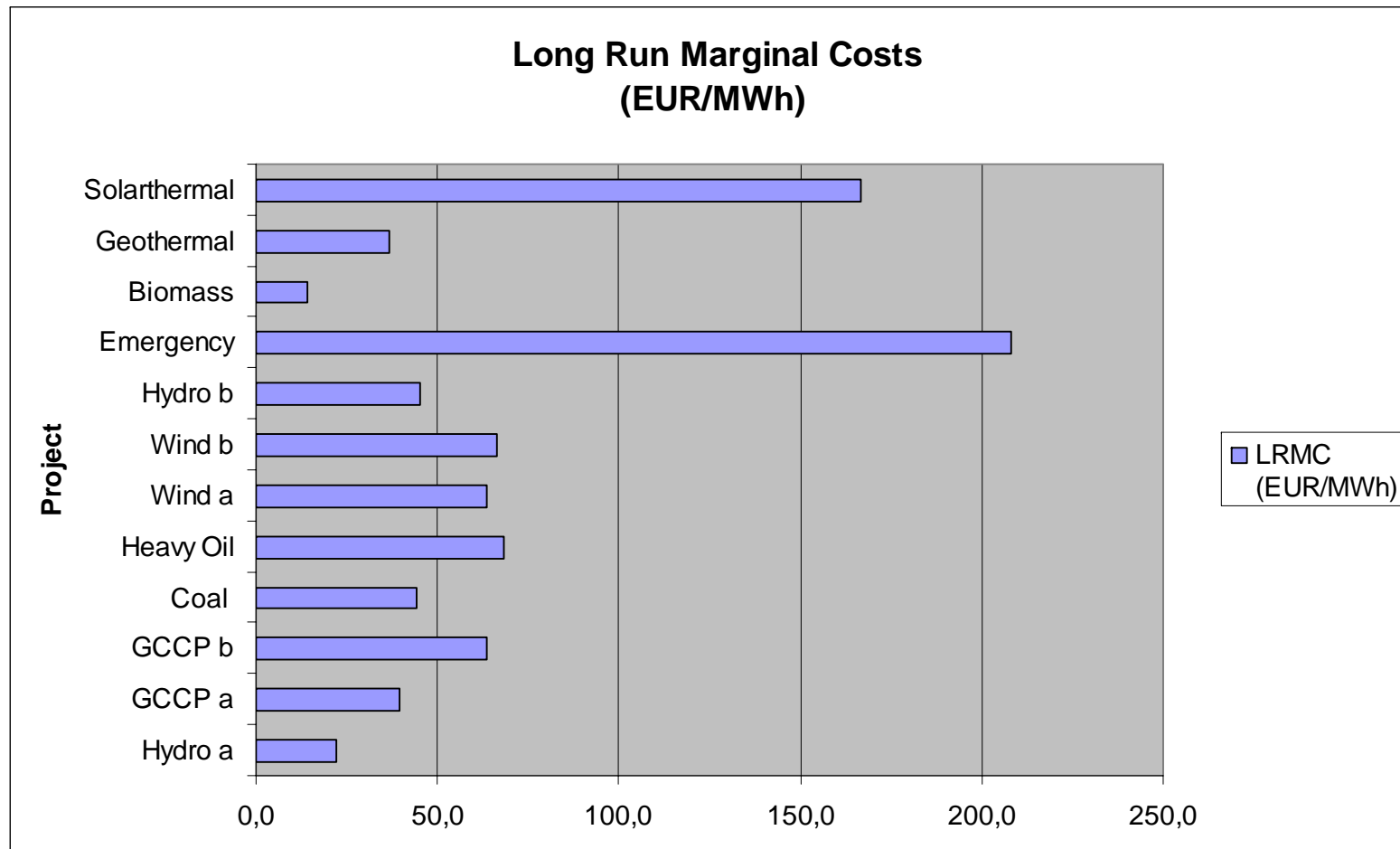
	2000	2002	2004	2005	2006
Operational Data					
GWh generated	1.117	1.177	1.307	1.449	1.449
Power purchased GWh	300	547	644	720	742
Losses GWh	268	338	399		
Losses (%)	18,9	20	20,6		
Electricity Sold (GWh)	1.149	1.352	1.540	1.710	1.723
Electricity Sales FCFA billion	85,4	108,1	126,5	134,6	157,0
Average revenue per kWh FCFA	74,3	80,4	82,2	78,7	91
Other revenues	4,2	4,1	4,8	4,9	5,2
<b>Gross revenues</b>	<b>89,6</b>	<b>112,2</b>	<b>131,3</b>	<b>139,5</b>	<b>162,2</b>
Generation and electricity Purchase variable	47,4	58,3	61,1	96,8	134,7
Cost per kWh FCFA	41,2	43,1	41,6	56,6	78,2
Electricity Purchase (fixed costs)	3,8	8,6	9,2	12,7	12
O&M	23,5	19,6	20,2	22,3	34,8
Personnel	11,0	13,9	18,7	19,6	18,4
Taxes and assimilated	5,9	5,3	5,7	5,9	5,8
<b>EBITDA</b>	<b>-2,0</b>	<b>6,5</b>	<b>16,4</b>	<b>-17,8</b>	<b>-43,5</b>
Depreciation	10,7	15,3	15,5	16,2	15,2
<b>Operating Income</b>	<b>-12,7</b>	<b>-8,8</b>	<b>0,9</b>	<b>-34,0</b>	<b>-58,7</b>
Net interest charges	1,0	2,8	6,2	6,7	10,5
Operating Subsidy	0,0	7,7	0,0	25,9	32,9
<b>Net Income (in FCFA bn)</b>	<b>-13,7</b>	<b>-3,9</b>	<b>-5,3</b>	<b>-14,8</b>	<b>-36,3</b>
<b>Net Income (in EUR m)</b>	<b>-20,9</b>	<b>-5,9</b>	<b>-8,1</b>	<b>-22,6</b>	<b>-55,3</b>

# Sectoral Framework

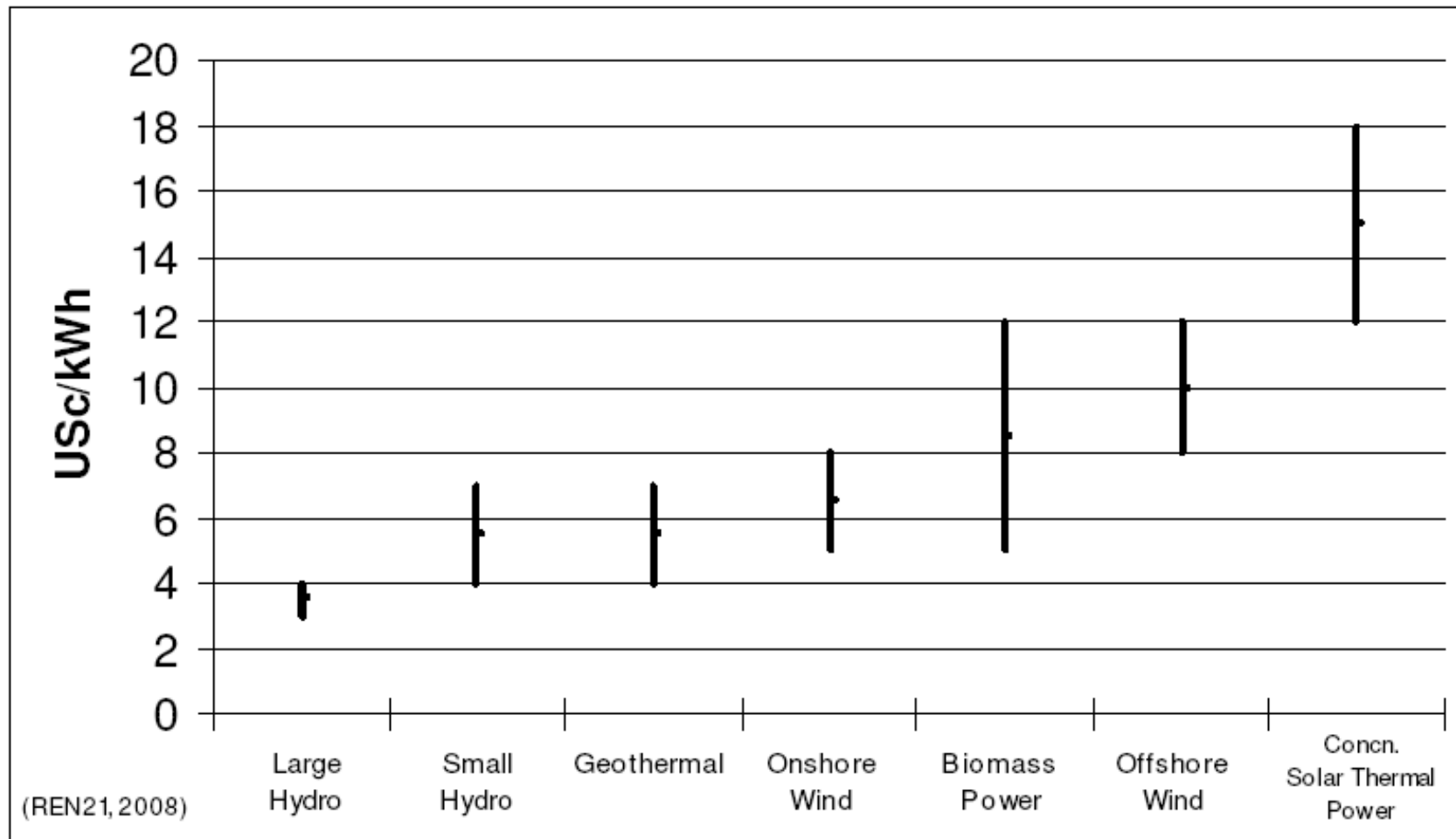
## Fiscal Deficits caused by shortcomings in the Power Sector



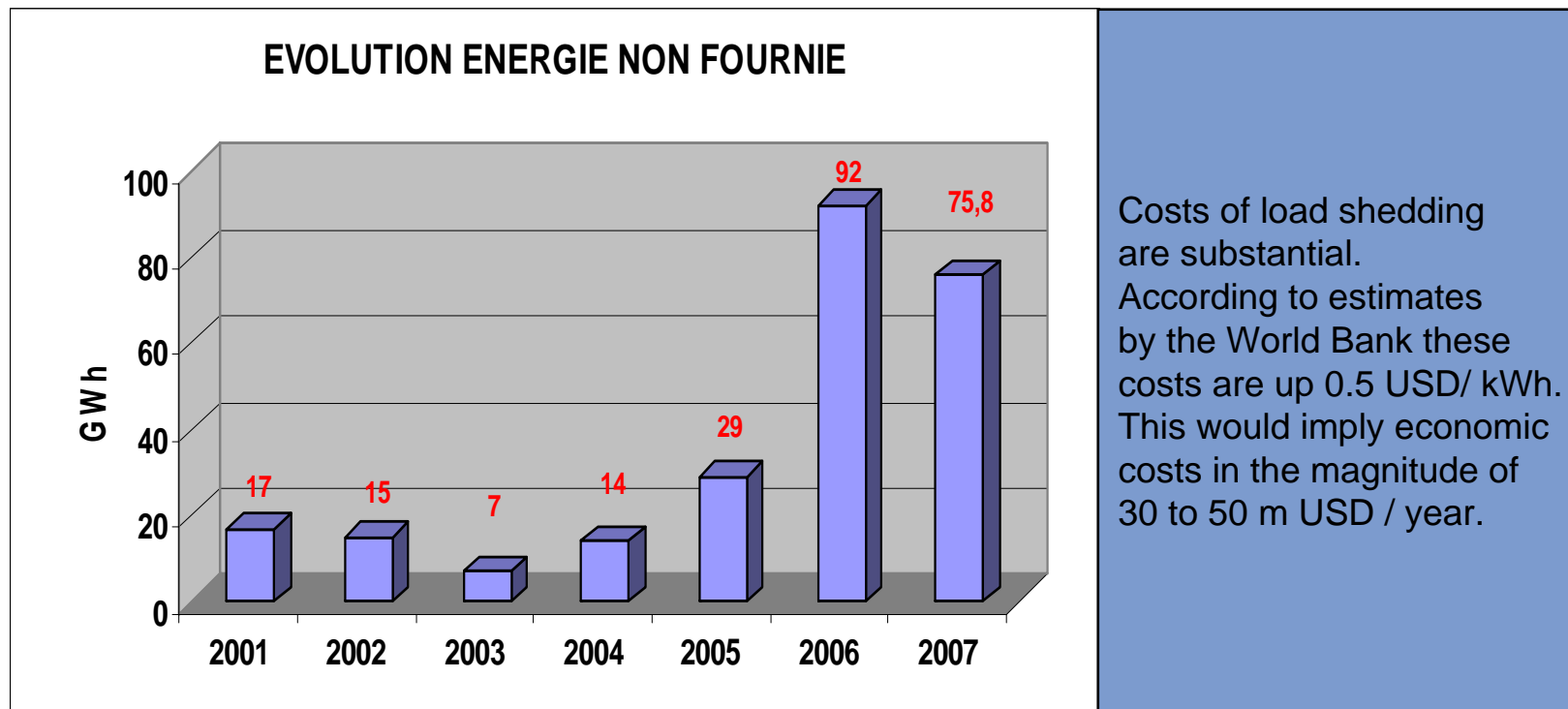
## Economic Options



## Economic Options



## Supressed Demand a substantial indirect economic cost



Source: Senelec

## Support to the Power Sector in Senegal

### Our Approach



- Co-operation with all interested parties under the **leadership of GoS** (orchestrated efforts with other DFI, World Bank, GTZ, private sector)
- **Division of Labour** (WB, AfD: support to the plan d'redressement of Senelec, Germany, WB: RE, rural electrification, broad consortium: regional integration measures – transmission).
- **Neutral viz. technology** – BUT concessionary funding be geared towards renewable energy or energy efficiency measures
- **Policy Advisory** measures by GTZ: energy efficiency, RE feeding-in policy, preparatory measures for wind parks,
- Preparation of the first two projects:
  - **Wind Park at St. Louis** – 20 MW (initial) - finally up to 50 MW at estimated costs of some EUR 35 m (1st phase); PPP with a Franco-Senegalese company
  - **7 MWp PV power plant** based on a PPP with a German investor – total cost some EUR 30m - probably close to the least cost option for the island grid of **Ziguinchor** (Casamance Region)
- Participation in **Regional Hydro Power** and transmission projects in the context of OMVG and OMVS. Regional least cost option BUT capital intensive, complex, and with high transaction costs

**Thank you for your attention.**

**Questions?**

**Contact Information:**

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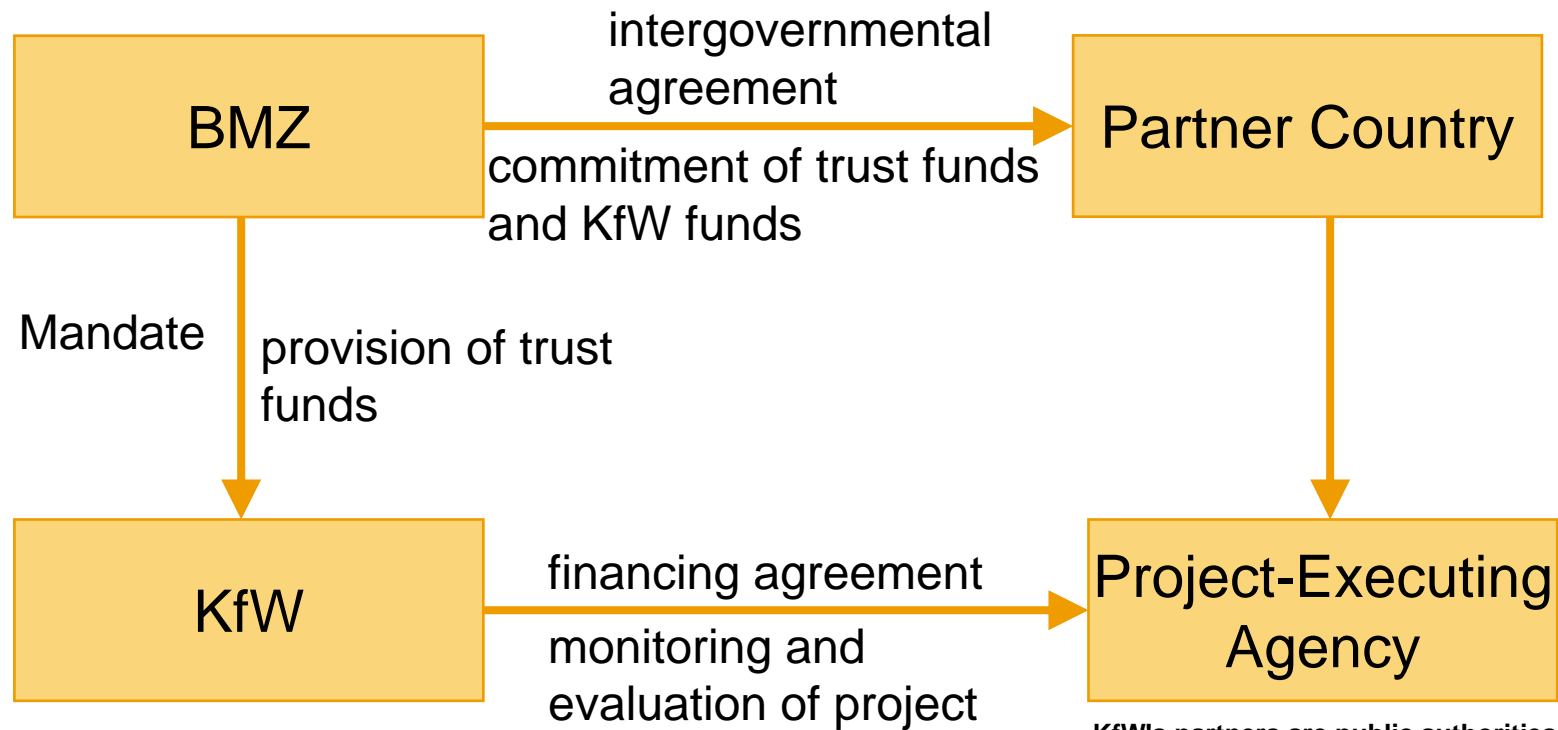
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# Relationship between BMZ and KfW

From the intergovernmental agreement to the financing agreement.



KfW's partners are public authorities or state-owned enterprises