

**International Energy Efficiency Forum
Workshop on Investments in Energy Efficiency and Renewable Energy Projects**

**POSSIBILITIES OF INVESTMENT IN ENERGY
EFFICIENCY AND RENEWABLE ENERGY
PROJECT IN THE
REPUBLIC OF MACEDONIA**

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**Energy Agency of the
Republic of Macedonia**

Macedonia is strongly energy import dependant.

It imports its entire demand for oil and petroleum products and natural gas, and, starting from 2000, electricity

The Republic of Macedonia has exceptionally low energy consumption per capita and exceptionally high energy consumption per unit of gross domestic product in all sectors.



The key economic problems that burden the energy sector of the Republic of Macedonia can be summarized as follows:

- low energy efficiency;**
- depressed price of energy;**
- increased energy deficiency;**
- high total losses of electricity;**
- unfavorable industry structure;**
- the depressed price of the fuels;**
- lack of complex programs for energy savings;**



Renewable sources of energy in Republic of Macedonia



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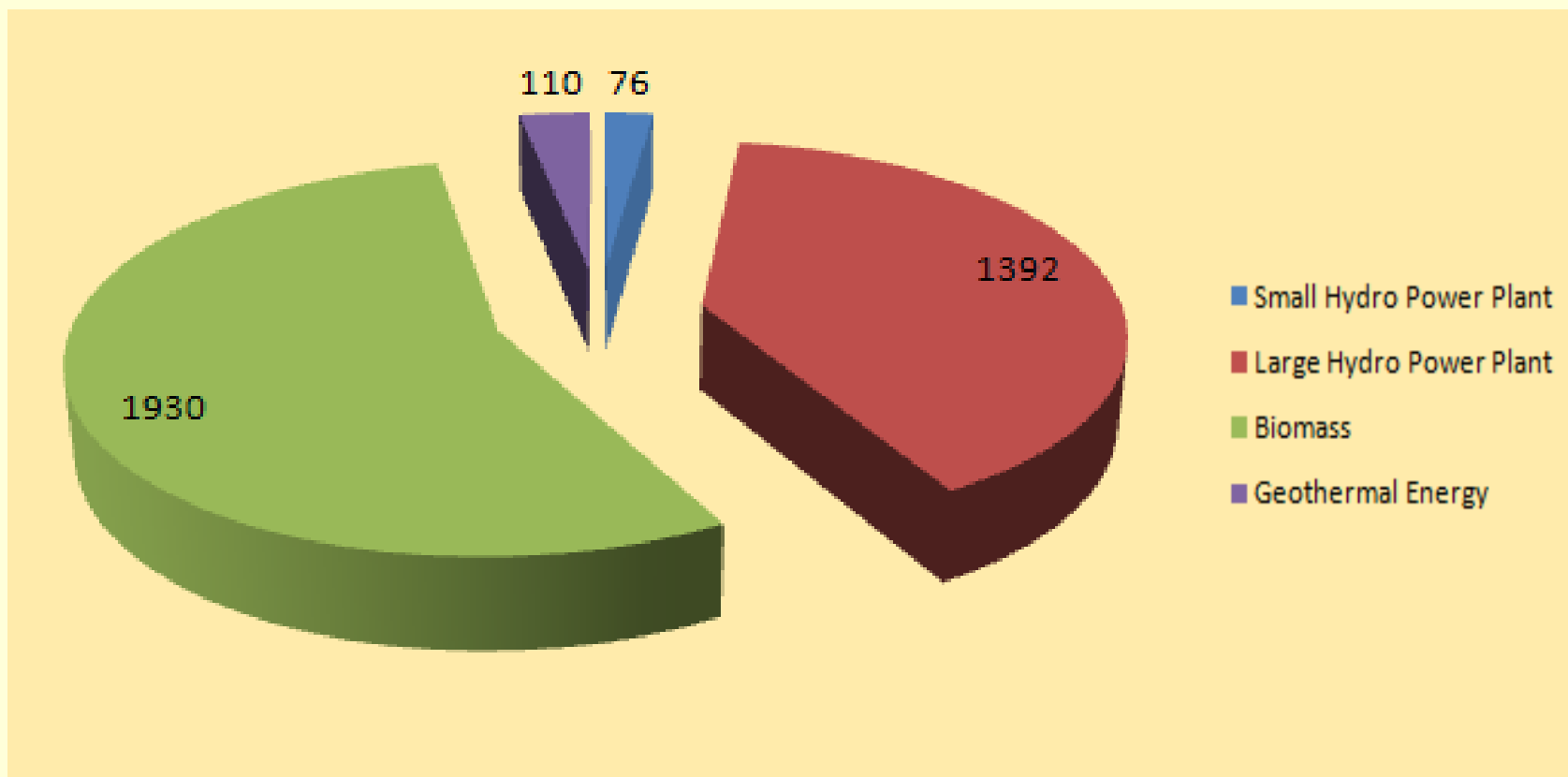
Republic of Macedonia has a large potential for exploitation of renewable energy sources

The renewable energy sources used in Macedonia include:

- *primarily hydropower (for electricity production),***
- *energy from biomass (mostly wooden mass in the residential sector),***
- *geothermal energy (mostly for heating greenhouses),***
- *some solar energy (in the residential sector).***



Renewable sources of energy in Macedonia in GWh



Potential of Renewable sources of energy in Macedonia

Unused hydro potential is 4130 GWh

The technical potential of biomass is estimated at 3361 GWh

The total potential of geothermal energy in Macedonia is 570 GWh

Potential annual solar energy value of 10 GWh

In Macedonia can be constructed wind power plants with total power of 150 MW to 180 MW.



Potential producers in R.Macedonia in RES power plants

Type of Power Plant	Number of potential investors	Total Install Capacity (MW)	Total Investment
Wind Parks	9	377	
Photovoltaic's	65	33.9	
Small Hydro Power Plants	18	7.59	
Other	1	2	
TOTAL	93	355.9	



Governmental decision for level of install capacity for RES

Type of power plant	Install capacity per plant	Total install capacity in RM
Small Hydro Power Plant	Up to 10 MW	Unlimited
Wind Park	Up to 50 MW	150 MW
Photovoltaic	Up to 50 kW=2 MW Above 50 kW=8 MW	10 MW
CHPP	Up to 3 MW	10 MW
Power plant on bio gas/bio mass	Up to 500 kW=2 MW Above 500 kW=8 MW	10 MW



Total envisaged investments in hydro power plant

HE	Q _{inst}	H _n	Q _{inst}	W _{year}	Investments
	(m ³ /s)	(m)	(MW)	(GWh)	(Mil.€)
Babuna	240	8.5	17	56.9	36.65
Zgropolci	240	8.5	17	55.5	39.80
Gradsko	240	8.3	17	66.6	44.34
Kukurica ni	240	8.3	17	79.5	43.88
Krivolak	240	8.3	17	80.0	43.88
Dubrovo	240	8.3	17	80.2	52.50
D.Kapija	240	12	24	116.4	61.90
Miletkovo	240	8.2	17	80.3	53.89
Gjavato	240	8.2	17	83.2	60.66
Gevgelija	240	8.3	17	85.1	48.50
TOTAL			177	783.7	486.01



Location for construction of wind power plants

	Height (above sea level)	Wind speed (m/s)	P (MW)	Lowest cost for connection with EES (Mil.€)
1	1896	8.41	25	2.02
2	2079	7.97	25	2.10
3	566	7.35	24.9	1.50
4	1994	7.63	25	2.00
5	2088	7.85	25	2.38
6	1159	7.53	25	3.76
7	1453	7.45	25.4	2.14
8	641	6.96	26.4	1.93
9	2511	8.06	25.4	2.55
10	2003	7.30	25	2.13
11	1998	7.43	25.9	3.05
12	2134	7.13	25	1.99
13	2319	7.29	27.4	2.92
14	1577	6.68	25.9	1.79

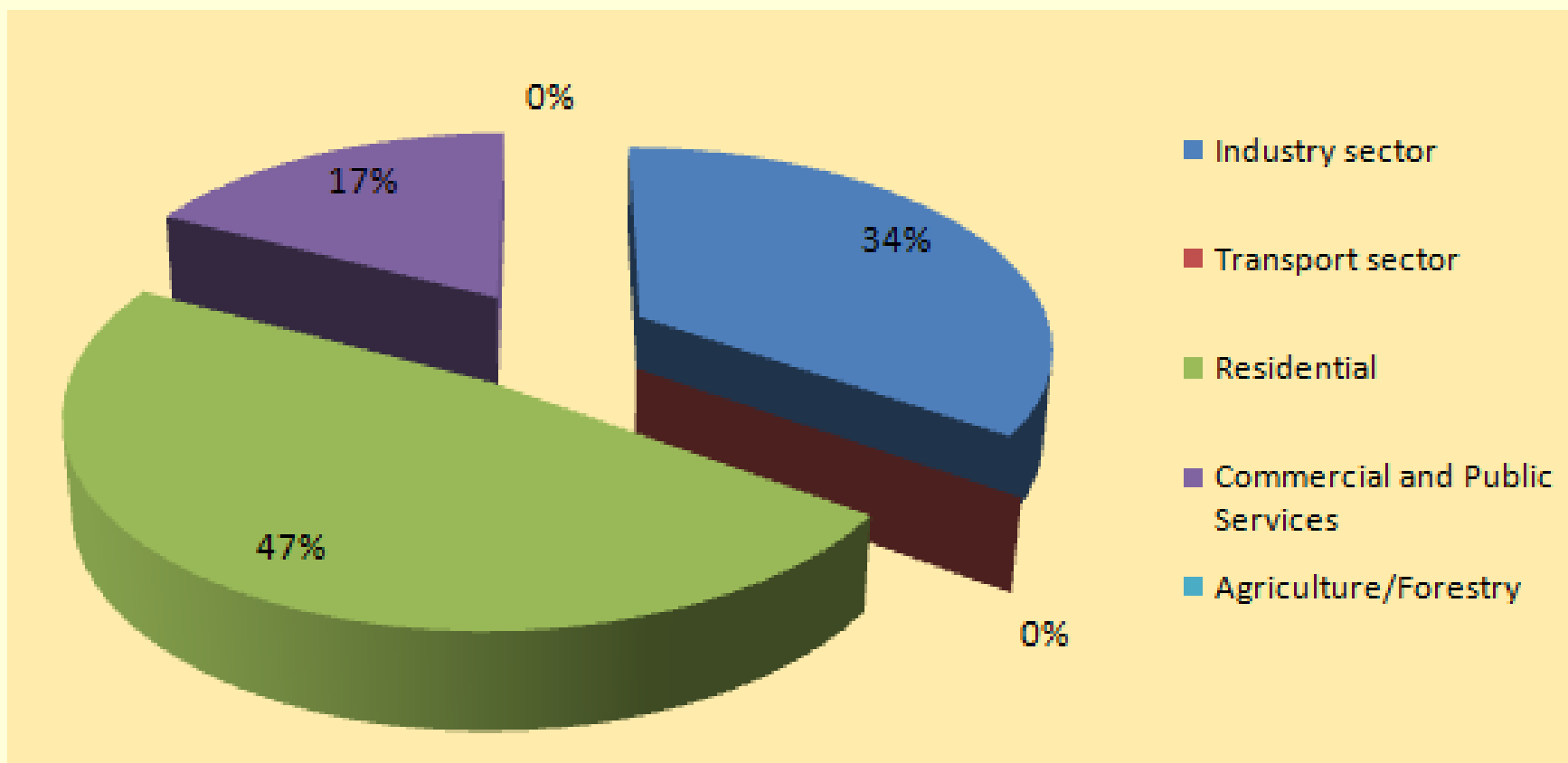


Energy efficiency in Republic of Macedonia



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Final energy consumption by sectors in Macedonia



Steps for increasing the Energy efficiency in Macedonia

Raise the public awareness

Sustainable development in economy

Legislation reforms

Access to financial funds

Technologies change

Environmental protection



Identifications of the potential for energy savings in time period 2010-2020

Sector	ktoe	Mil.€ / year	ktCO2
Residential	57,14	151,5	1407
Commercial	28,60	124,5	253
Industrial	91,09	613	3137
Transport	60,48	314,2	995



Governmental activities for increase of Energy efficiency and usage of Renewable Sources of Energy

Establishing the Energy Strategy

Establishing the Energy Efficiency Strategy

**Establishing the Strategy of Renewable Sources
of Energy**

**Support of projects for Energy efficiency and
Renewable Sources of Energy in cooperation with
the Energy Agency of the Republic of Macedonia**



Projects in Macedonia

GEF/World Bank “Sustainable Energy Project”

Feasibility study for a 50 MW wind farm by ELEM

Italy Ministry for Environment is identifying and proposing CDM project ideas for Italian investors

Austrian Development Agency (ADA) for introducing energy efficiency in buildings in Macedonia

GTZ Macedonia is supporting regional projects in energy efficiency and renewable energy



Donor Assistance

A credit and guarantee scheme is established through the state owned Macedonian Bank for Development Promotion (MBDP)

EE projects are financed up to \$500,000 per project

RES are supported up to \$4 million per project

Western Balkans Sustainable Energy Direct Financing Facility is providing €50million direct individual loans between €1 and €6 million for EE and RES projects

World Bank approved a credit line of US\$ 25 mil. To support municipal infrastructure projects in Macedonia, including energy efficiency projects



Governmental feed-in tariffs for specific technologies

		Feed in tariffs in Ec/kWh	Changes in Ec/kWh
	Small Hydro Power plants (kWh)		
I	1-1.020.000	12.00	
II	1.020.001-2.040.000	8.00	
III	2.040.001-4.200.000	6.00	
IV	4.200.001-8.400.000	5.00	
V	Above 8.400.001	4.50	
	Wind Parks	8.90	
	Electric Energy produced from bio gas		
I	≤500 kW	13.00	15.00
II	501 kW -2000 kW	11.00	13.00
	Photovoltaic – install capacity		
I	≤50 kW	46.00	38.00
II	51 kW – 1000 kW	41.00	34.00
	Electric Energy produced from bio mass		
I	≤1000 kW		11.00
II	1001 kW – 3000 kW		9.00



Thank you for your attention

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