The SOLID – DER Project Outputs, Distributed generation development in Lithuania

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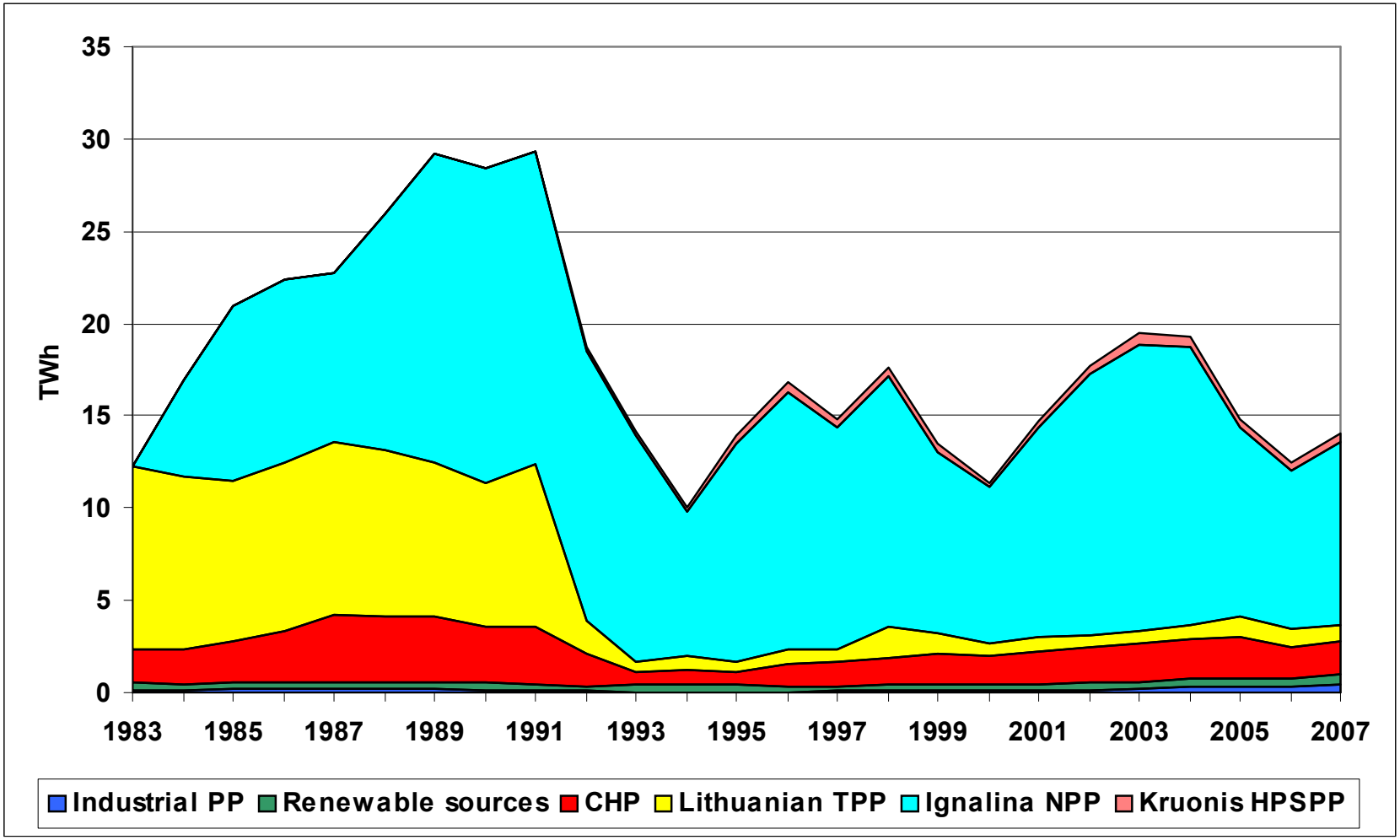
Presentation plan

- *Introduction*;
- Current status and expected changes in the power sector;
- Definitions of distributed generation;
- Support of RES;
- Problems for integration of DG;
- Conclusions.

Electricity generation in Lithuania



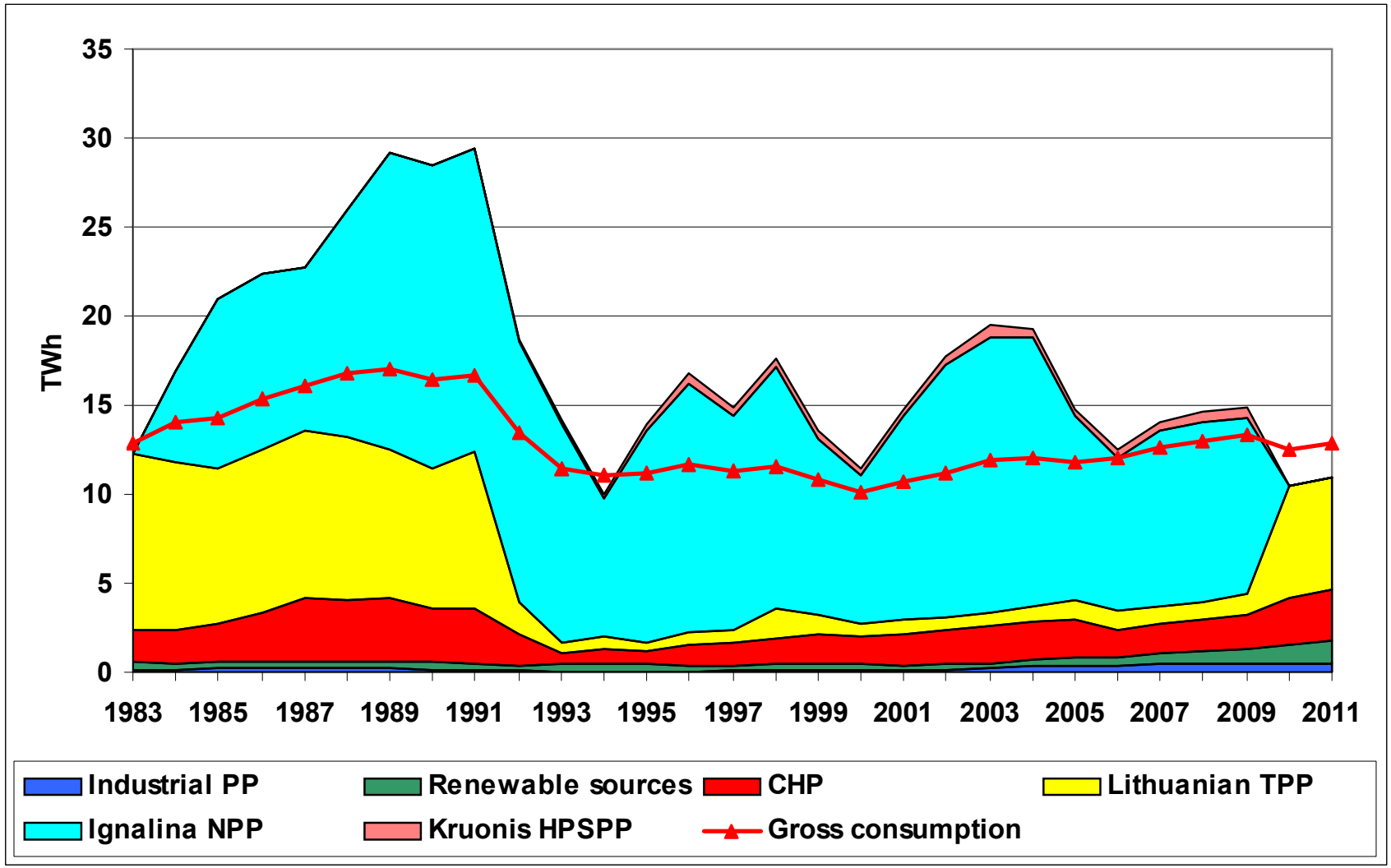
Average annual growth rates in 2000-2006

GDP	7.8
Primary energy	3.0
Final energy	4.1
Gross electricity	3.0
Final electricity	5.3
Oil products	3.7
Natural gas	2.9

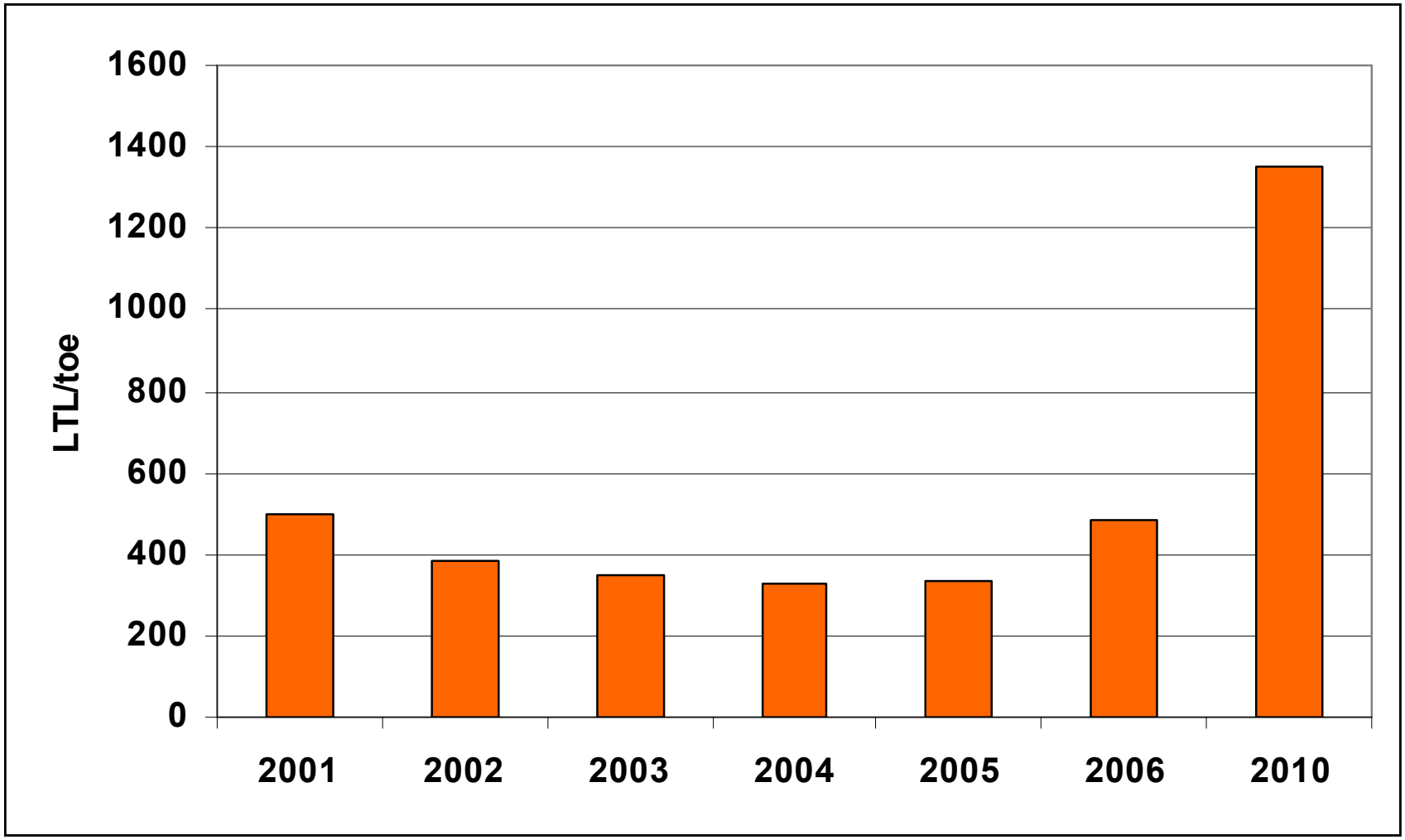
Average annual growth of electricity rates in 2000-2006

Industry	4.3
Construction	-0.8
Agriculture	0.8
Transport	3.1
Household	4.9
Commercial and public services	7.6
Energy sector	2.9
Own use of power plants	-3.9
Losses	-2.8

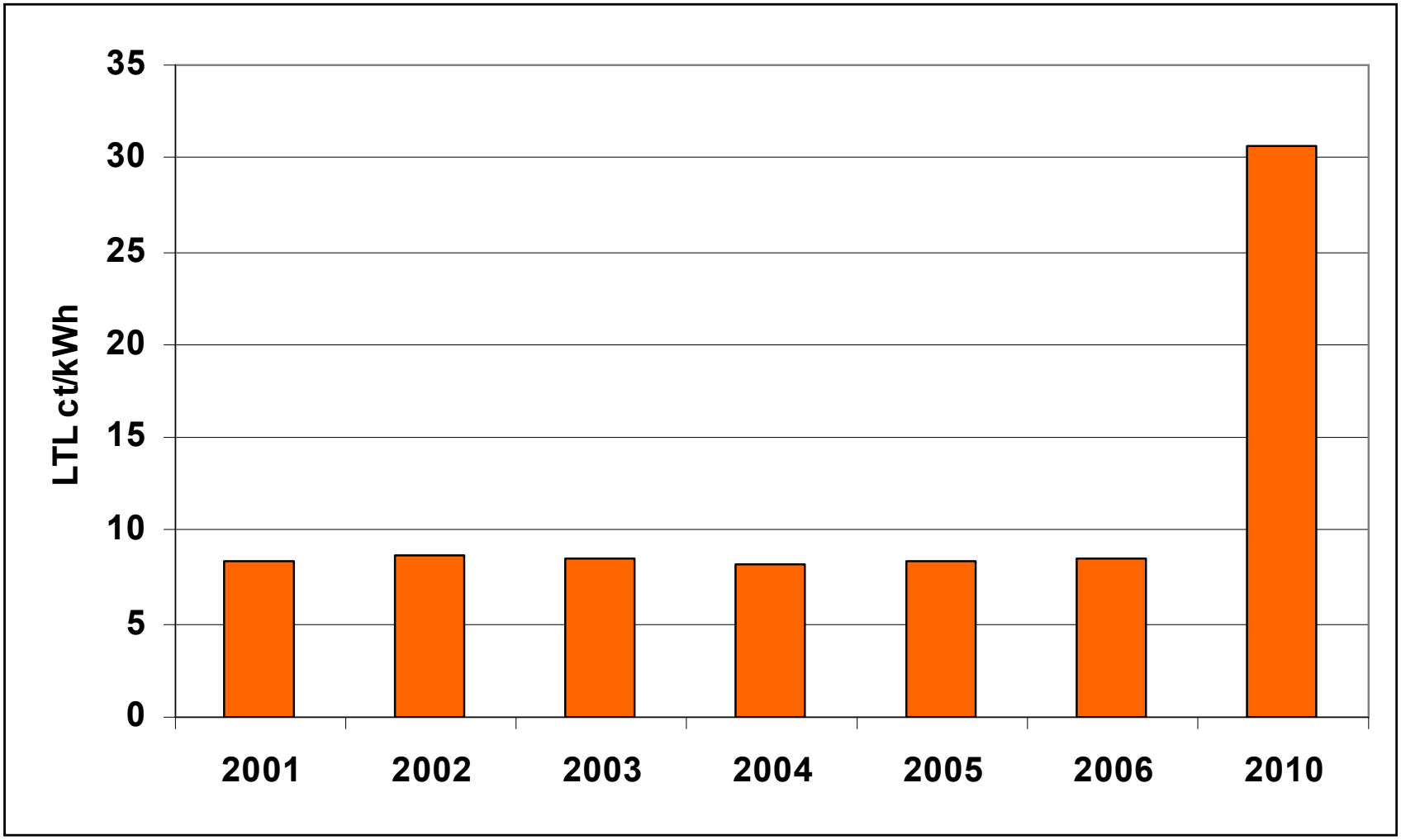
Electricity generation and consumption



Changes in prices of natural gas



Average electricity generation cost



Distributed Generation (DG)

- **Many definitions have been proposed to *describe power that comes elsewhere than from traditional large power plants* feeding electricity into the networks;**
- **The integrated or stand alone *small electricity generation sources*;**
- **Installed within *the distribution system* or at a *customer's side*;**
- **Intended to meet *specific capacity or reliability needs*;**
- **Applications that *benefit the power system, specific end-user or both.***

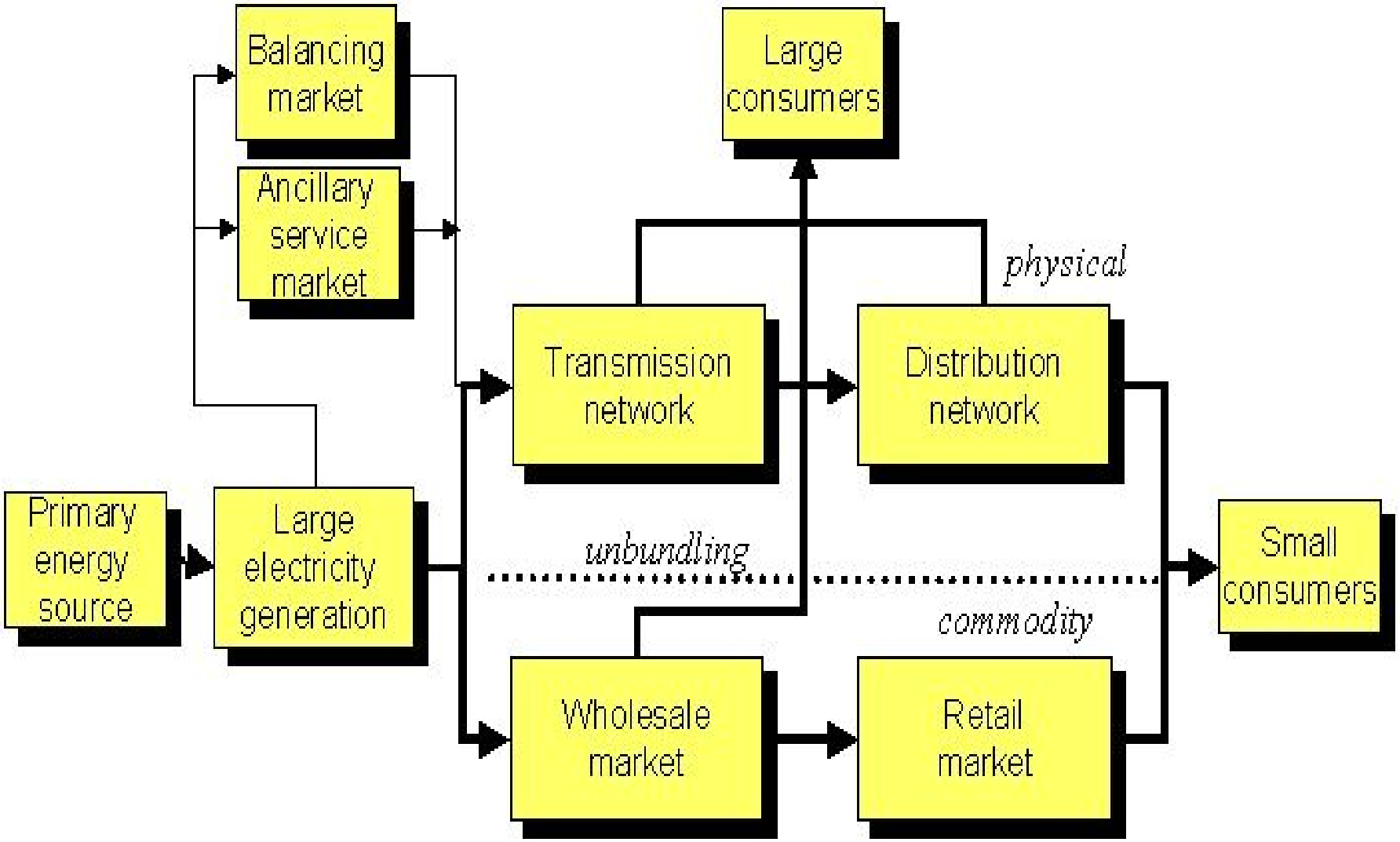
Distributed Generation (by technologies)

- **High efficiency combined heat and power plants;**
- **Small gas turbines;**
- **Fuel cells;**
- **Technologies supplying small scale power and using renewable energy sources (biomass, hydro, geothermal plants, photovoltaic, wind power plants, etc.).**

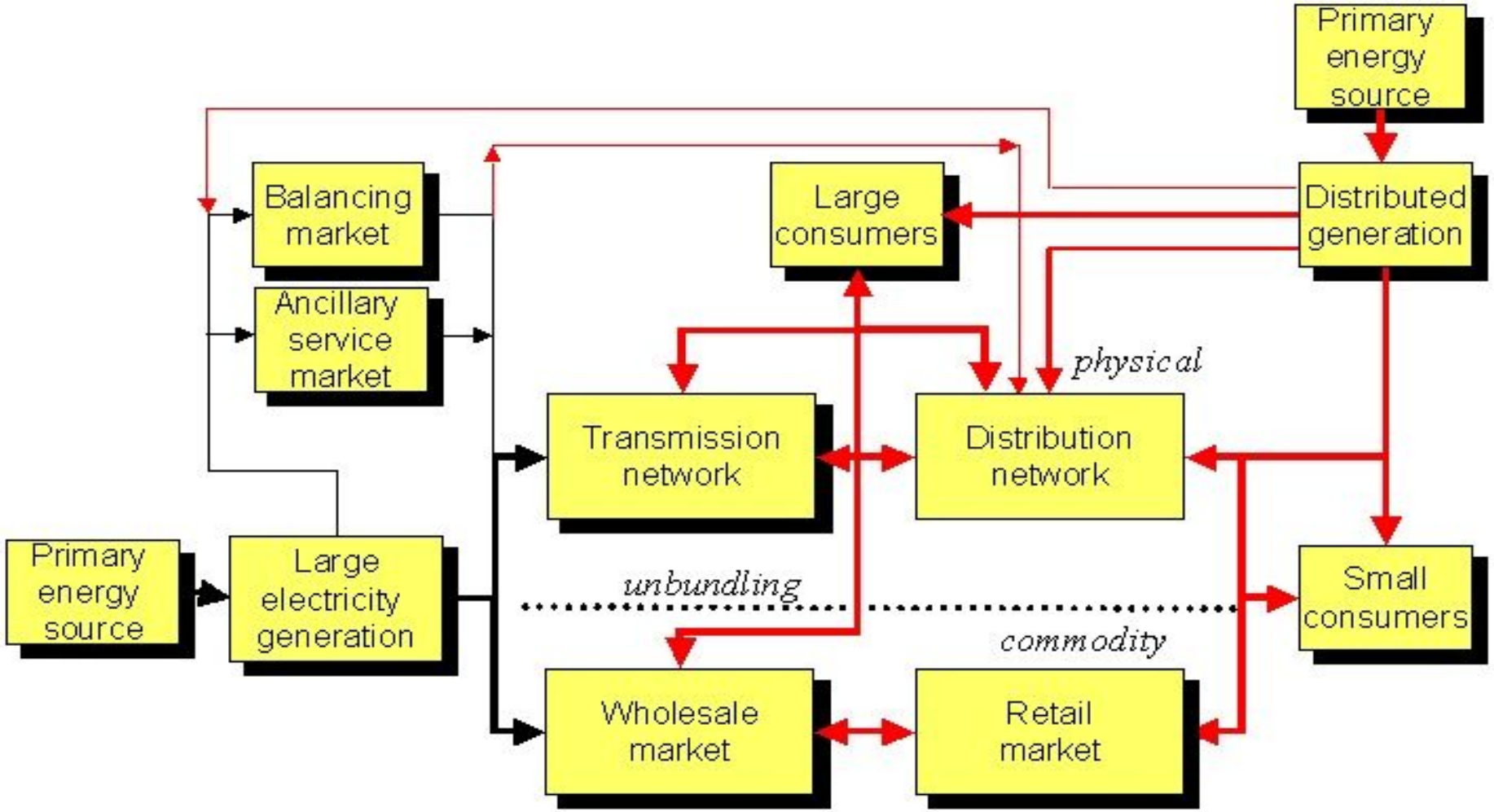
Other definitions

- **Distributed Power**, which means *DG plus energy storage devices*;
- **Distributed Energy Resources**, which means *distributed power plus demand side measures*;
- **Decentralised Power** – a broader concept which indicates *power generation sources available in specific location*, for instance off shore wind parks of any size and connected to transmission or distribution grid.

Power system in liberalized market



Power system with distributed generation



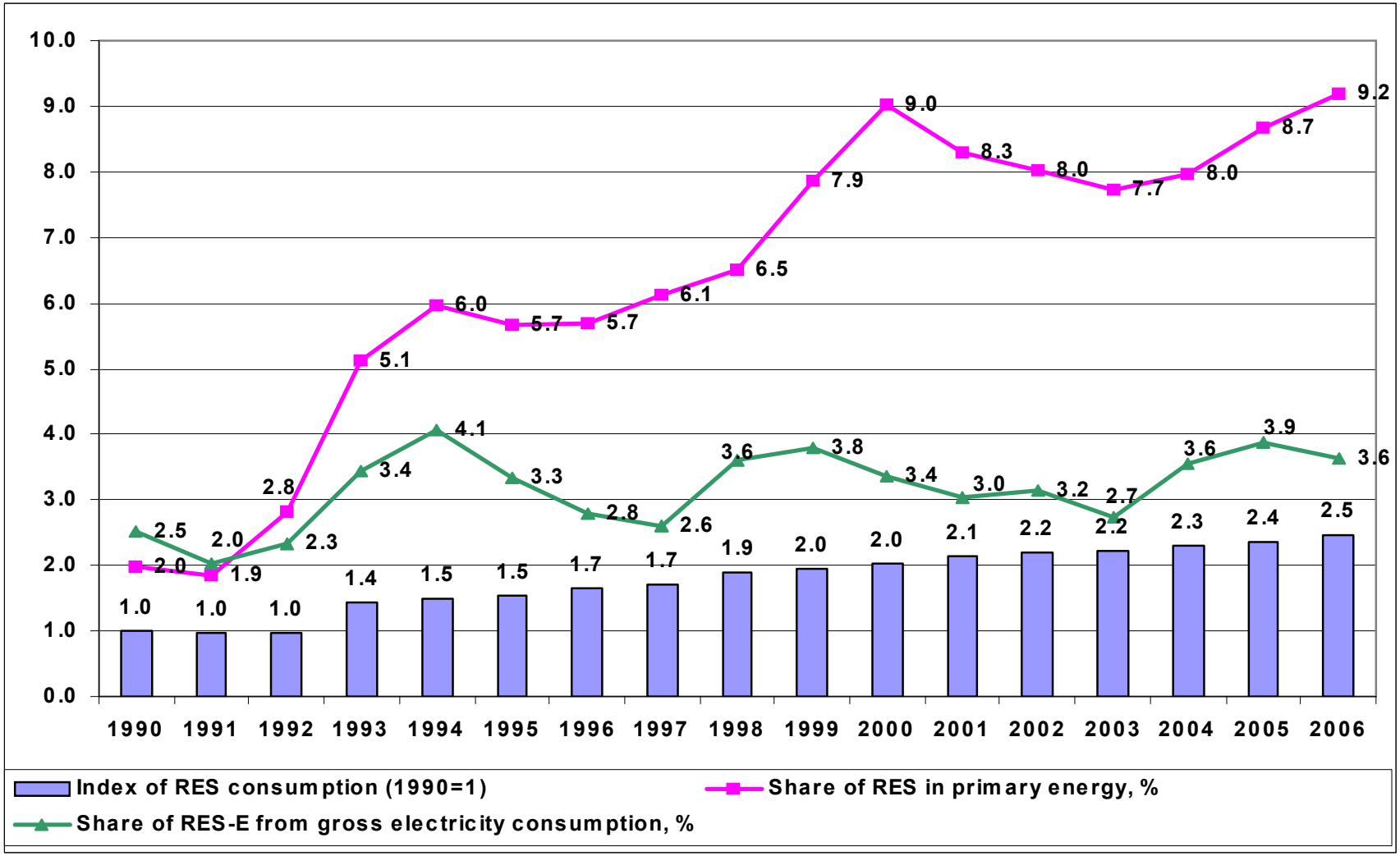
Penetration of distributed generation (DG) in Lithuania in 2007

Type of power plant	Capacity, MW	Number of power plants	Electricity generation, GWh
Small Hydro PP			**96**
<0.5 MW	**11.8**	**70**	
0.5 - 1MW	**4.6**	**7**	
>1 MW	**8.26**	**4**	
Small CHP			**568**
<1 MW	**4.9**	**17**	
1 - 5MW	**23.4**	**11**	
>5 MW	**88.5**	**5**	
Wind PP			**106**
<0.5 MW	**2.1**	**9**	
>0.5 MW	**50.2**	**24**	

Electricity generation by DG power plants

	2005	2007
Small hydro power plants, GWh	66.1	96
Wind power plants, GWh	1.8	106
Small CHP, GWh	587	568
Gross consumption, GWh	11818	12640
Share of DG, % of gross consumption	5.5	6,1

Contribution of renewable energy sources

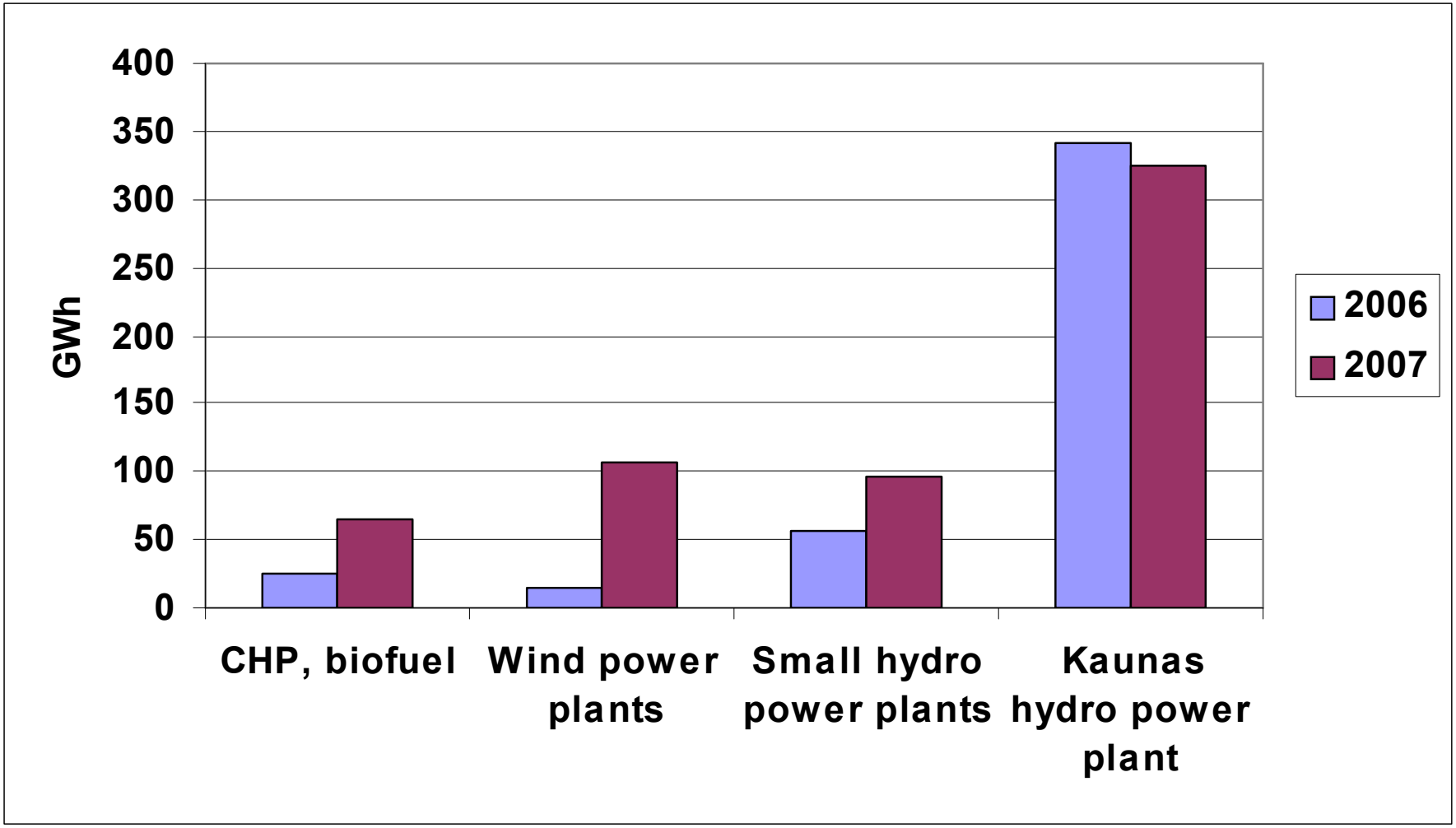


Support mechanism for DER

- New feed-in tariffs for electricity generated from renewable sources from 2008
- From 2021 generation of electricity from RES will be promoted by a green certificate system

	Tariff, LTL cents/kWh	Tariff*, Euro cents/kWh
Hydro power plants	20	5.79
Wind power plants	22 (30 since 2009)	6.37
Biomass PP (after 2008 01 01)	**22-24**	**6.37-6.95**

Electricity generation from RES



Maximum electricity volume for which the feed-in tafiff is guaranteed and actual production

	2006	2006 Fact	2007	2007 Fact	2008	2009
Wind power plants, GWh	96.2	13.7	182	106	259.6	320.4
Small hydro power plants, GWh	106	55.8	114	96	118	122
Biomass power plants, GWh	39.1	25.6	79.1	65	103.1	127.1

Existing problems for DER integration

- The share of distributed generation is quite low at the moment, and it doesn't significantly influence the system operation
- DG could become in the future a source of quality problems for the DSOs service in particular due to increasing contribution from wind power plants
- The big number of wind power plants could cause problems of regime management and electricity quality
- Small generators practically do not coordinate generation and maintenance periods with network operators
- Usually the distributed generation is not supervised, because in many cases small generators do not install the real time measurement devices
- In general, the generation of small generators influences the electricity consumption unbalance in the real time

DER participation in ancillary services

- Distributed generation is allowed to provide ancillary services
- However, small power plants do not provide any ancillary services at the moment
- If the amount of small generators will increase rapidly, the existing situation regarding DG as a provider of ancillary and network services should be modified

DER network access and connection charges

- Usually distribution system operators (DSO) apply deep connection charges in Lithuania; it means that a tendency is to include any cost for reinforcements of the existing network that is necessary for the new generator
- The DER issues that might postpone or reduce investments into network are not considered in actual planning of the Lithuanian DSO practices at the moment
- By contrast, it is expected that DER could become a source of quality problems for the DSOs service, in particular due to increasing contribution from wind power plants
- In order to avoid the technical problems, which could arise when big number of small generators will be installed, the new distribution network operation principles must be set

Conclusions

- Current legislation, regulatory environment and situation in the electricity market are not favorable for distributed generation development in Lithuania
- At the moment overcapacity in the electricity generation sector is one of the most important barriers for implementation of distributed energy resources
- In order to stimulate the development of DG, the new competitive regulation principles in electricity market and network services must be formulated, tariffs and motivation for distribution networks to accept DG should be introduced

SOLID-DER

Co-ordination Action to consolidate RTD activities for large-scale integration of DER into the European electricity market

First Announcement and Invitation

Final International Conference SOLID-DER project

"Large scale integration of RES and DG into the European electricity supply for meeting the EU RES targets of 20% for 2020"

-An Overview of the progress in RTD, policy and stakeholders experiences for more DER integration in the EU-

25 - 26 September 2008
Warsaw, Poland

SOLID-DER Co-ordination Action to consolidate RTD activities for large-scale integration of DER into the European electricity market

Registration

Project is supported by the European Commission so there will be **no admission** fee when registering before **1st of May 2008**. After this date a registration fee of **100 Euro** per person will be charged.
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THANK YOU !