REAL TIME LOAD CONTROL OF LITHUANIAN POWER SYSTEM

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Introduction of Lithuania as a country

Lithuania:

Population – 3.38 million

Ethnic groups:

- Lithuanians – 82%,
- Poles – 6.7%,
- Russians – 6.3%,
- Byelorussians – 1.2%,
- others – 3.8%

Area – 65.3 thousand square km

The structure of electricity power sector in Lithuania

PRODUCTION

2 production companies

3 CHPs owned by district heating companies

Few private mini HPP

Few industrial power plants

2 Wind parks

DISTRIBUTION

Two distribution companies (one private)

TRANSMISSON

One Transmission System Operator company – **Lietuvos Energija AB**

Lietuvos energija AB is responsible for

- Maintenance and development of the transmission grid
- Secure and reliable operation of the power system
- Operation of electricity market

Lithuanian transmission grid is a part of BRELL transmission system ring

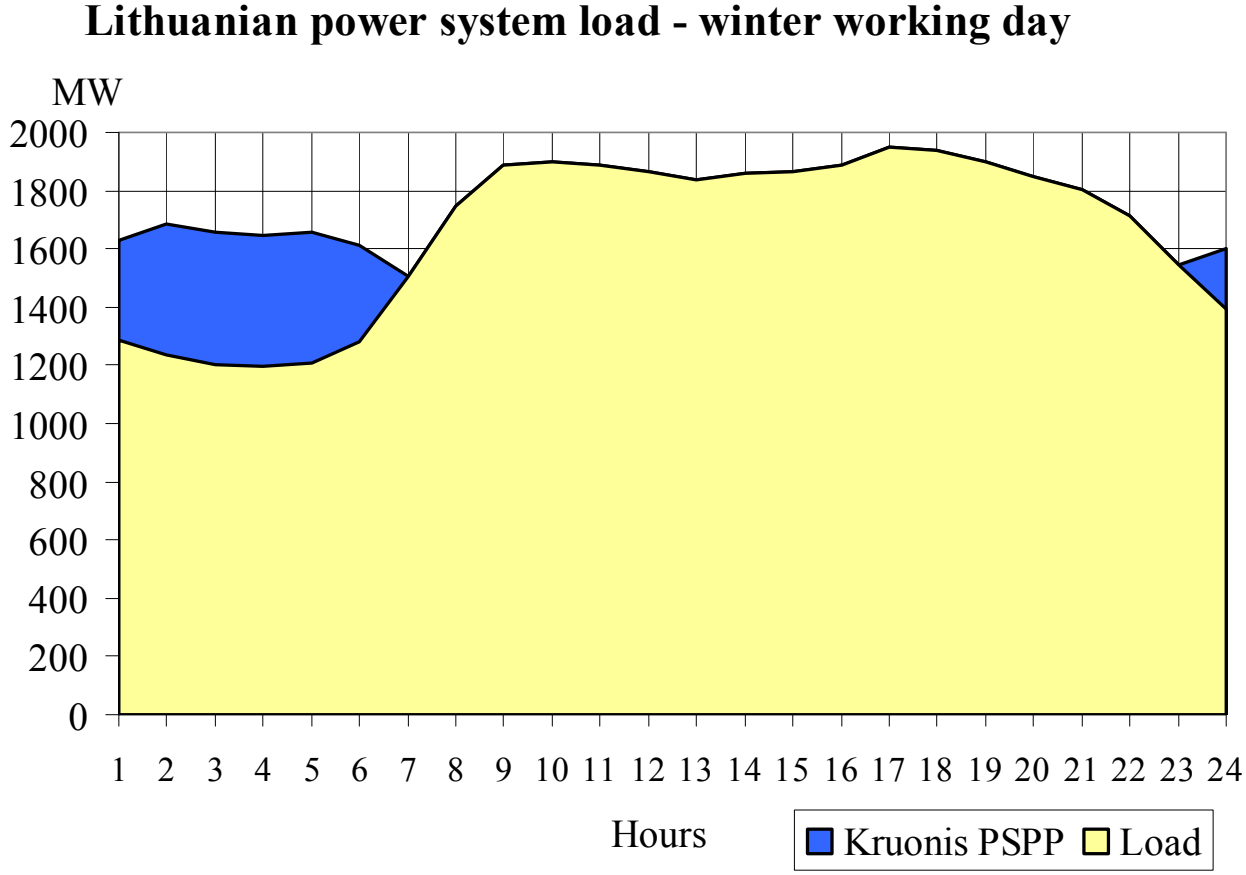
Structure of wholesale electricity market in Lithuania

- Producers (sellers) – 8
- Suppliers (buyers) – 22 (6 public and 16 independent)
- Eligible customers – all consumers since July 2007
- One TSO and MO (market administrator)

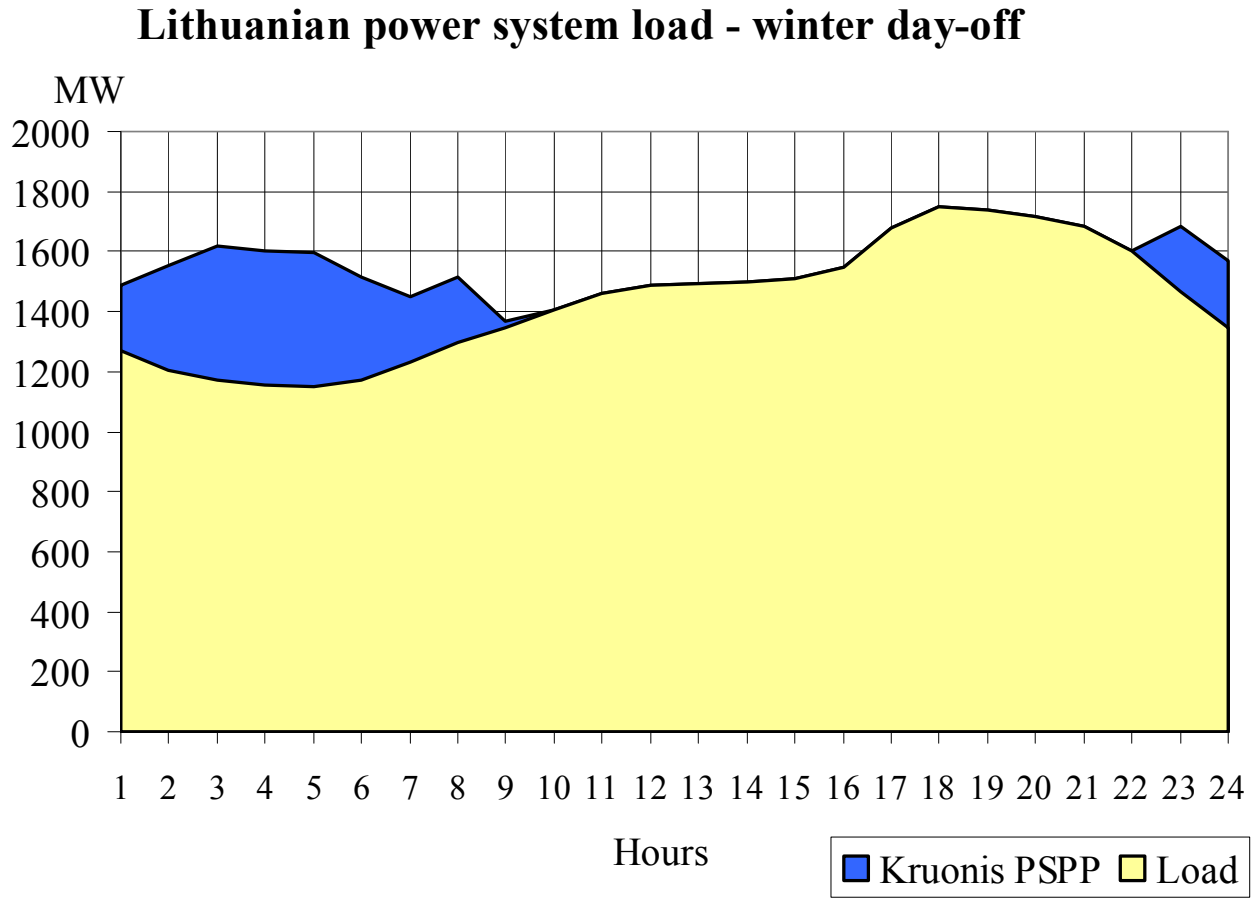
Public service obligations in Lithuania

- Electricity produced from renewable energy resources and waste incineration
- Electricity produced in CHPs, when heat energy is supplied to the urban district heating systems
- Electricity produced in power plants designated by the Government to provide reserve for power system reliability and to secure safe operation of the NPP
- Load shedding up to 47% of the peak load

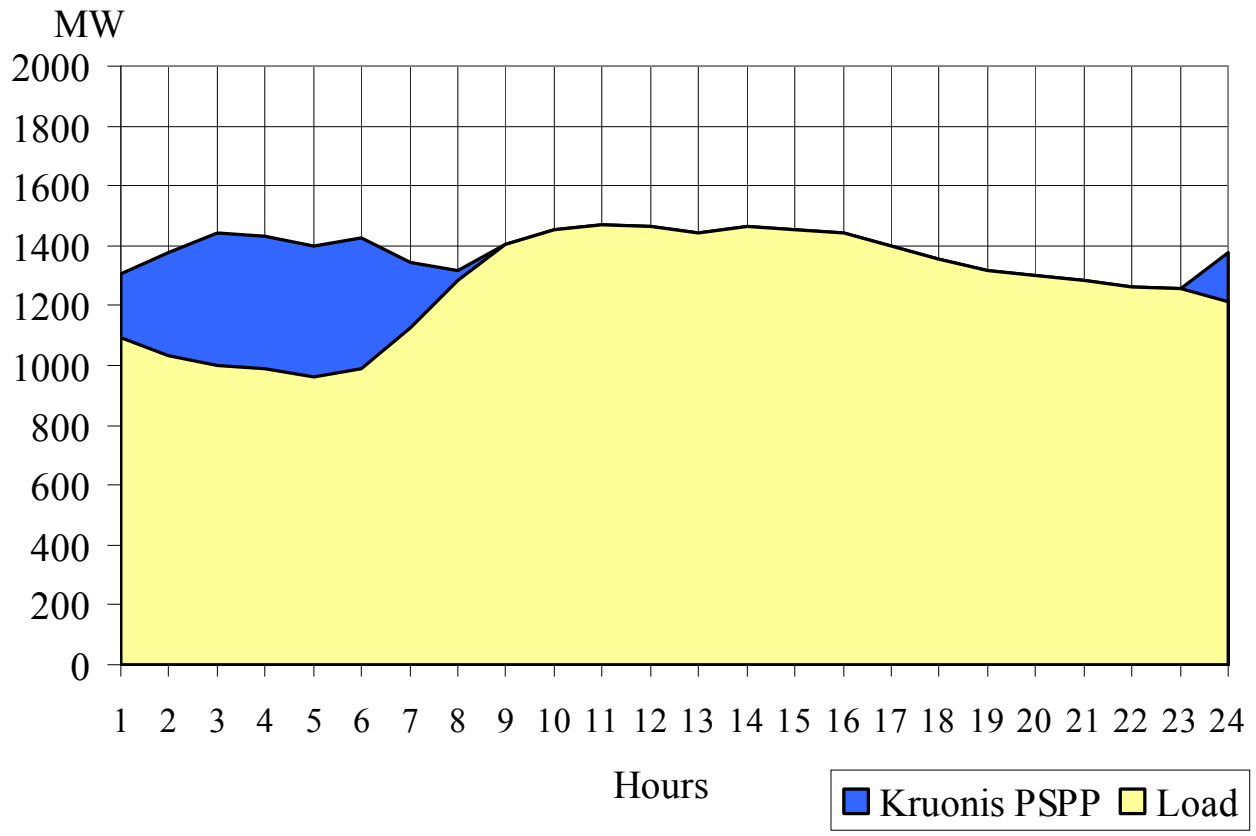
Typical load curve
Winter working day



Typical load curve
Winter day-off

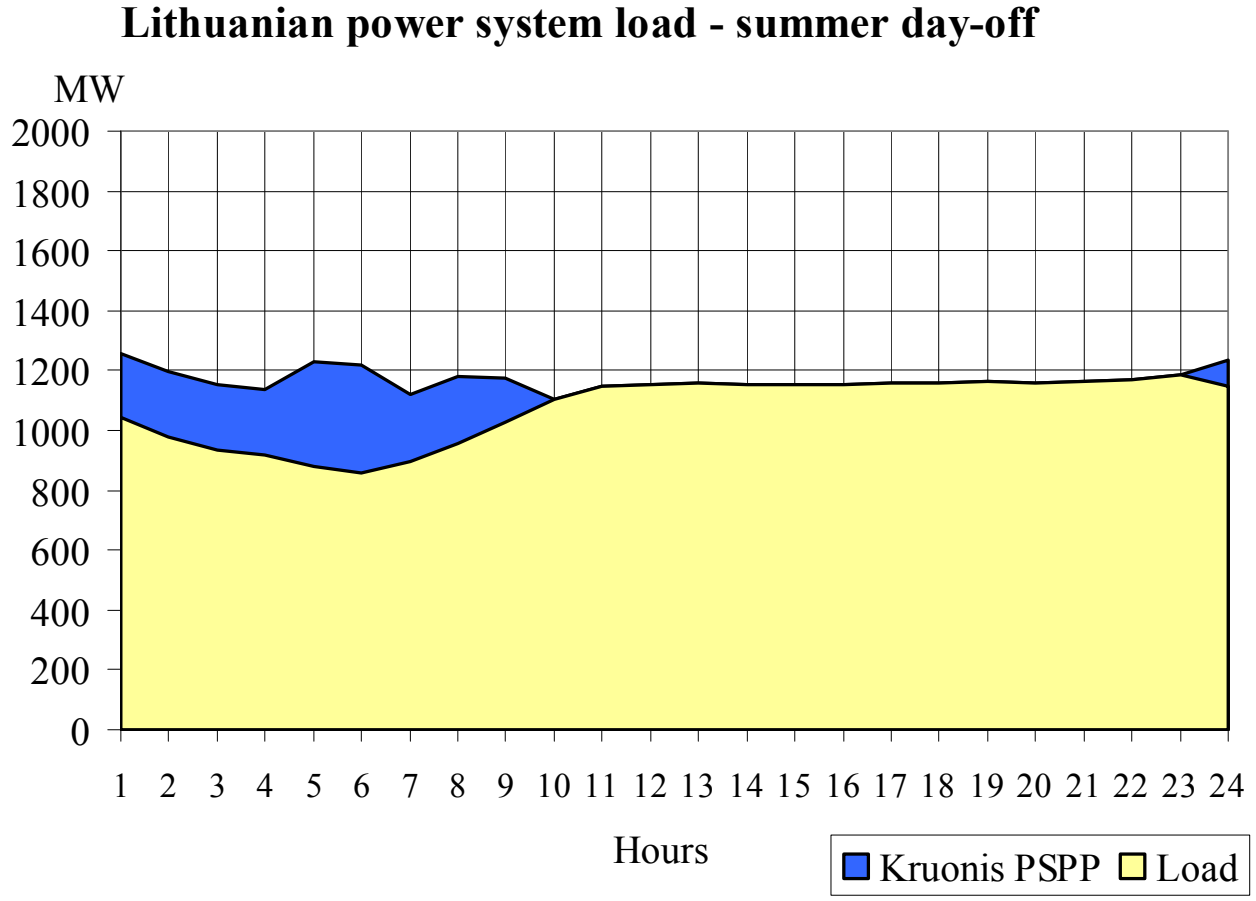


Typical load curve
Summer working day



Typical load curve

Summer working day-off



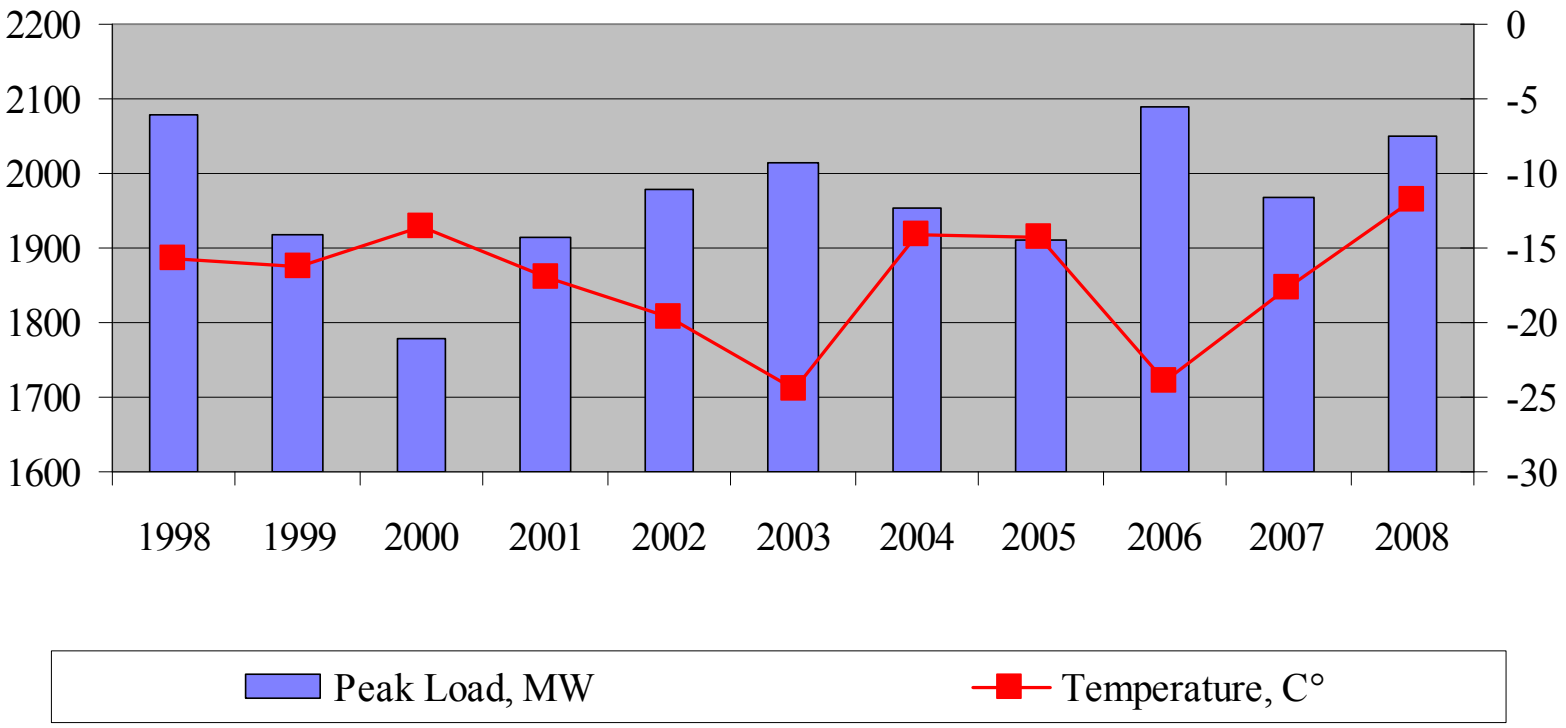
Typical load curve

Pump Storage Impact

		Summer		Winter	
		working day	day-off	working day	day-off
Without PSPP	MW	508	328	752	599
	%	43%	29%	39%	65%
With PSPP	MW	212	156	440	379
	%	17%	12%	23%	32%

Load Maximum statistics

Peak Laod and Outdoors Temperature in Lithuanian Power System since 1998



SOLID-DER Demand Side Management Strategies and possible risks (1)

№	Strategy	Description	Task	Status of implementation in Lithuania	Predictable problems from TSO point of view
1	Efficiency improvement	End user efficiency improvement	To reduce load	According programs approved by government	-
2	Time of use tariffs	Different tariffs during the day and week	To smooth load curve	Implemented	-
3	Critical Peak Pricing	High prices during peak hours which have to be published day ahead	Critical situation management	Not implemented	Big risk that customers could accept high prices
4	Direct load control	Direct end user load control from system operator dispatch centre	Critical situation management	Not implemented	Huge amount of controllable sources, big risk of control system fault

SOLID-DER Demand Side Management Strategies and possible risks (2)

№	Strategy	Description	Task	Status of implementation in Lithuania	Predictable problems from TSO point of view
5	Interrupt ability contracts	Reducing of end user load in minutes or hours by system operator requirement	Critical situation management	Implemented for energy, and power. (Based on public service obligations requirements approved by government)	Big risk that customers could ignore requirement. Could be reasonable to combine with *direct load control* (4) to maintain power
6	Demand markets	End user propose to reduce load for some price	Critical situation management	Not implemented	-
7	Back-up generators start up	Companies, which has generators for own needs, could increase generating capacity	Critical situation management	Not implemented	Control of companies generators availability, necessity of obligation to provide such services for operator
8	Fuel substitution	Incentives to change electricity to other energy source (e.c. to gas)	To reduce load		

Distributed generation impact

- Benefits for the system:
  - Industrial PP reduce load concentration
  - “Smooth” network load (if are wide installed)
- Negative assumptions:
  - “I can stop generation at any time”
  - “I’m working solo, not for or in the system”
  - “Don’t require nothing from me – I’m so small”
  - “Primary control!? What's that?”

LIETUVOS ENERGIJA

Thank You for Attention !