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# **Congestion management and existing bottlenecks in Lithuania**

**National Dispatch centre**



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# Routine To Foresee Network Congestion

## I Step Collection of information

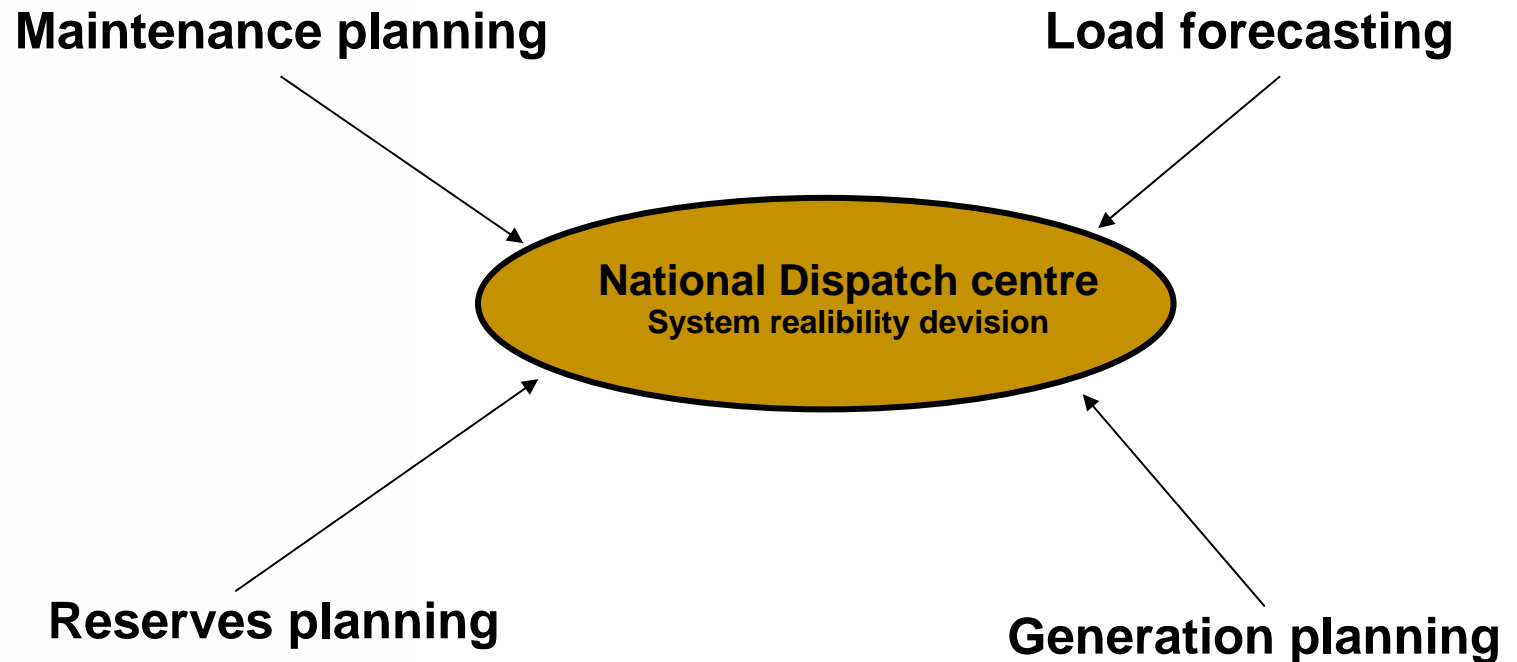
**Maintenance planning**

**Load forecasting**

**National Dispatch centre**  
System reliability deviation

**Reserves planning**

**Generation planning**





## II Step Transmission System Reliability Analysis

### Load flow analysis

(PSS/E, Mustang)

- power system has to withstand any single fault ( N- 1- criteria)
- after applying criteria N-1 power sytem has to stay within static stability limits( voltage, lines load)

### Dynamic analysis

(PSS/E, Mustang)

- Three – phase fault could not cause dynamic instability



# Interconnection Transfer Capacity Calculation

The **Interconnection Transfer Capacity (ITC)** is defined as:  
$$\text{ITC} = \text{TTC} - \text{TRM}$$

- **Total Transfer Capacity (TTC)** is the maximum exchange program between two *adjacent control areas*
- **Transmission Reliability Margin (TRM)** is a security margin that copes with uncertainties on the computed TTC values arising from:
  - *Unintentional deviations* of physical flows during operation due to the physical functioning of *secondary control*
  - Emergency exchanges between TSOs to cope with unexpected unbalanced situations in real-time
  - Inaccuracies, e. g. in data collection and measurements



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# Interconnection Transfer Capacity

## Lithuania → Latvia

$$\text{ITC} = 1700 - (120/2) = 1640 \text{ MW}$$

## Latvia → Lithuania

$$\text{ITC} = 1600 - (900/2) = 1150 \text{ MW}$$

## Lithuania → Belarus

$$\text{ITC} = 2200 - (200+300/2) = 1850 \text{ MW}$$

## Belarus → Lithuania

$$\text{ITC} = 1400 - (900/2) = 950 \text{ MW}$$

## Lithuania → Russia

$$\text{ITC} = 700 \text{ MW}$$





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# Interconnection Capacity Plan

## ■ Interconnection capacity for planning week

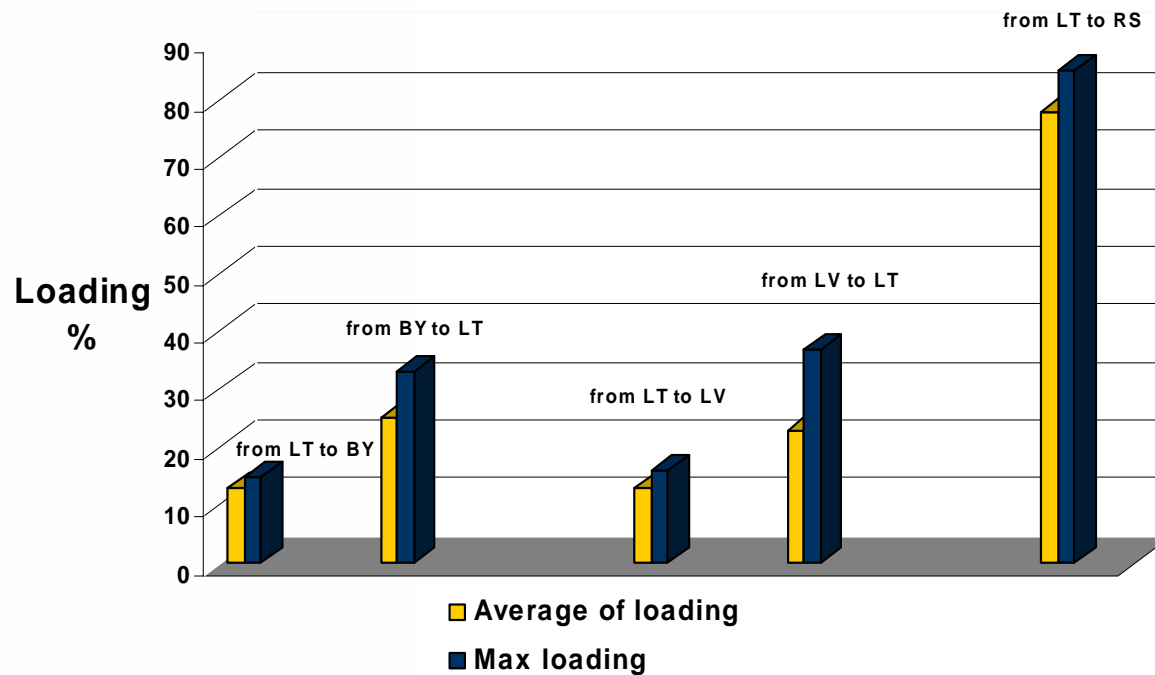
Day	Week	With Belarus				With Latvia				With Russia	
		ITC (MW)		Loading (%)		ITC (MW)		Loading (%)		ITC (MW)	Loading (%)
		From LT	To LT	From LT	To LT	From LT	To LT	From LT	To LT	From LT	From LT
1		1850	950	10	33	1640	1150	12	26	700	75
2		1850	950	10	33	1640	1150	12	26	700	75
3		1850	950	13	31	1640	1150	9	37	700	78
4		1850	950	13	31	1640	1150	9	37	700	78
5	I	1850	950	13	32	1640	1150	6	33	700	75
6		1850	950	13	32	1640	1150	6	33	700	75
7		1850	950	13	32	1640	1150	9	37	700	79
8		1850	950	14	20	1640	1150	14	17	700	72
9		1850	950	14	20	1640	1150	14	17	700	72
10		1850	950	13	25	1640	1150	14	21	700	73
11		1850	950	13	25	1640	1150	14	20	700	73
12	II	1850	950	13	24	1640	1150	14	20	700	73
13		1850	950	14	19	1640	1150	14	17	700	74
14		1850	950	14	21	1640	1150	14	18	700	75
15		1850	950	13	19	1640	1150	15	17	700	72
16		1850	950	14	23	1640	1150	14	20	700	71

ITC- interconnection transfer capacity



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## Interconnections Loading 2005 January





# Congestion Management Phases

- **Preplanning phase** ( more then one week before operational week )
  - import/ export deliveries
  - network configuration (lines disconnection plan)
- **Planning phase** (last week before operational week)
  - operational plan for Kruonio pump-storage power plant and Kaunas Hydro power plant
  - network configuration
  - **Day before operation**
    - operational plan changing for (Kruonio PSPP) and (Kauno HPP) by selling/buying energy in additional energy auction
    - network configuration
- **Operational phase** ( at operational day)
  - redispatching generation by regulation power market
  - reserve activation
  - network configuration