

Advanced IT Applications Supporting Gas Supply Security

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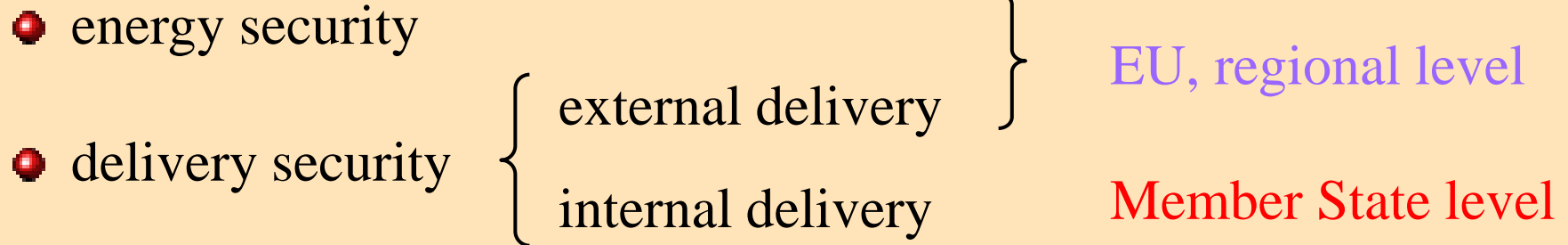
Public Utilities Commission of Latvia

The basic postulates:

- Gas supply system – a unified complex connecting gas field with consumer.
- The supply chain is only as strong as its weakest section.



Supply security: need for internal aspects

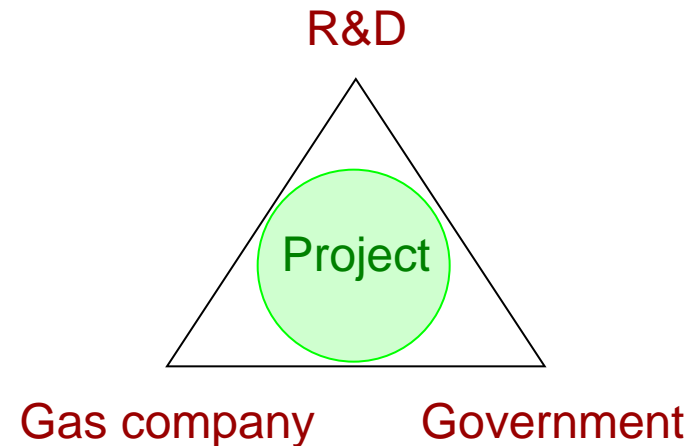


- **N-1**: technical capacity of production, storage, border entry points, LNG terminal, in comparison with **consumption**;
- **Ramboll SoS**: gas production, storage, supply routes, transit, LNG terminal, **capacity diversification**, gas substitution possibility;
- **Stockholm Economic School**: import dependency and diversification, political stability (3rd countries), **economic impact**, easy of switching;
- **Cambridge University**: **number of aspects of gas substitution**;

| | <i>N-1, 2009</i> | <i>N-1, 2012</i> | <i>Ramboll, 2009</i> | <i>Stockholm, 2009</i> | <i>Cambridge, 2010</i> |
|--------|------------------|------------------|----------------------|------------------------|------------------------|
| EE | 144 | 60 | 2 | 0,097 | Limited |
| LT | 57 | 27 | 1,1 | 0,05 | Near limited |
| LV | 163 | 154 | 12,3 | 0,048 | Very limited |
| Baltic | | 130 | | | Limited |

Implementation of the scientific support

- national gas transmission and distribution backbone networks – critical infrastructure, issue of national security;
- trilateral cooperation in the framework of the Baltic Energy Security Research Platform as the activity of national interest;
- content of the BESRP – concrete projects to avoid the most probable security problems (the weakest sections):
 - technological accidents;
 - distant impact with economical and/or physical goal;



Joint risk assessment of security of gas supply: need to overcome national shortages (2012)

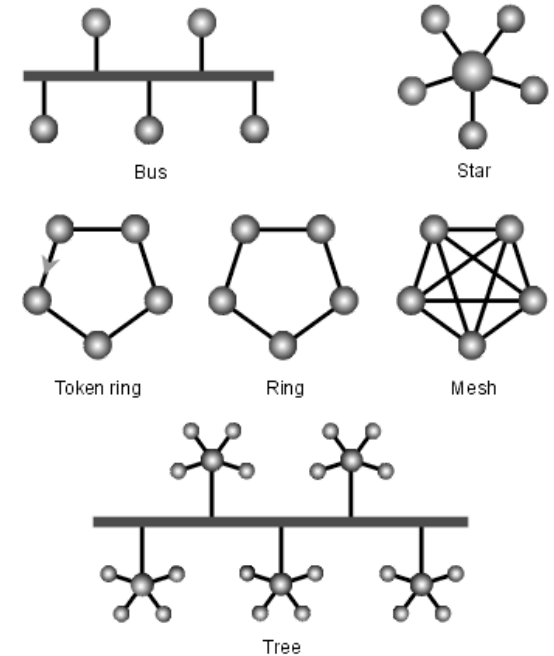
1. Expansion of Incukalna storage;
 2. Enhancement of interconnection Latvia – Lithuania;
 3. Enhancement of interconnection Latvia – Lithuania;
 4. Connection Liepāja – Palanga;
 5. Connection Daugavpils – Visagins;
 6. Hydraulic calculation software for management and supervision (including database) for gas transmission network system;
 7. LNG terminal.
- * PCI / BEMIP projects



Source: Lietuvos Dujos AB, Latvijas Gāze AS, Eesti Gaas AS

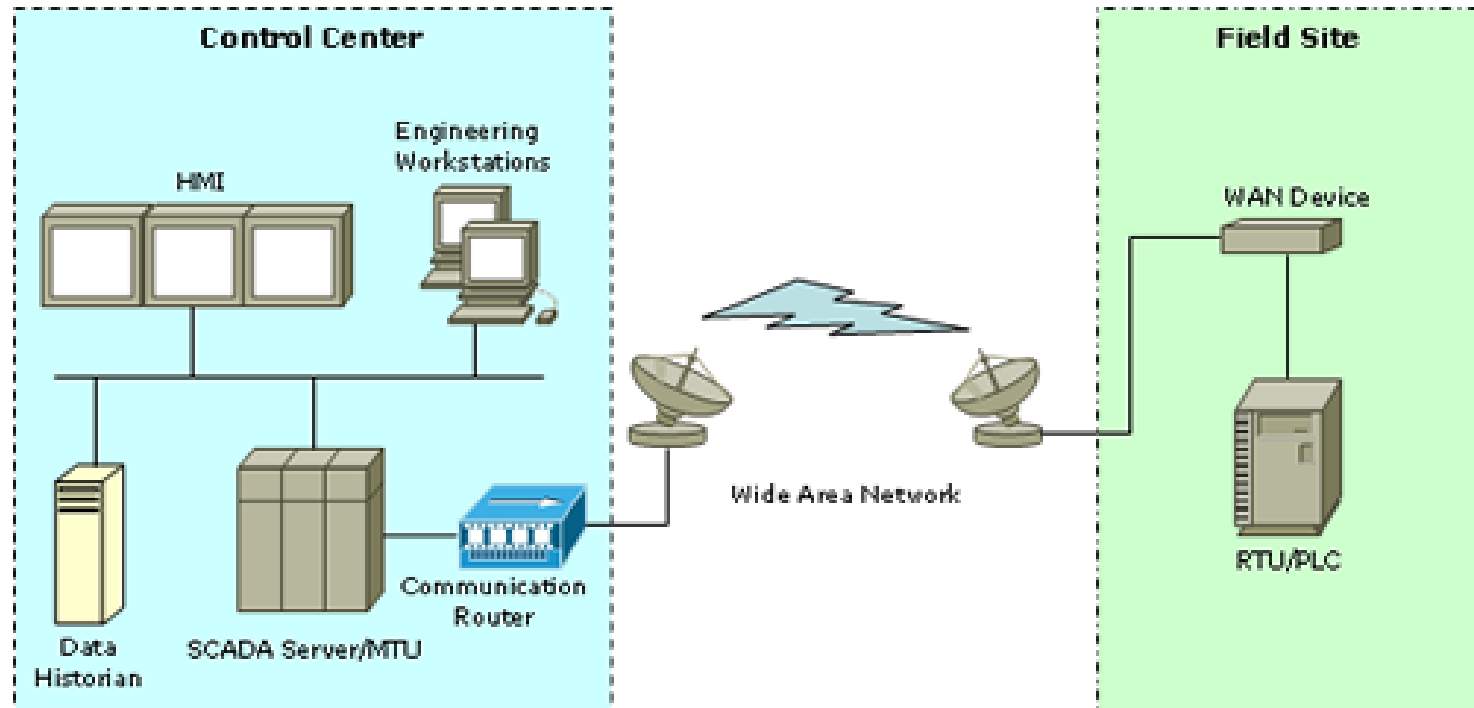
Modelling of national/Baltic gas system

- development of mathematical model and simulation of the national / Baltic natural gas supply infrastructure under different future scenarios;
- growing dynamism, source and load changes:
 - back-up of RES (wind, solar);
 - liberalization and diversification;
- static regime – network topology, energy balance, physical flows;
- dynamic regime – hydraulic transition processes;
- detection of vulnerabilities, shortages, bottlenecks, weaknesses, threats.



Recommendations for enhancement and modernization
of internal gas systems

ICS/SCADA: Industrial control system / Supervisory control and data acquisition



- monitoring and control of dispersed assets;
- development from standalone to networked TCP/IP based systems;
- growing capacity – remote terminals, external data connections;
- increasing vulnerability – external device, network, smartness;
- from individual hobby to economical & political hacking.

Cyber attacks on critical infrastructure

Activities

- high flow of information requests, overload;
- infiltration of spies for data collection;
- remote control over computers;
- change of planning, control, actions.

Goals

- destroying;
- commercial espionage.

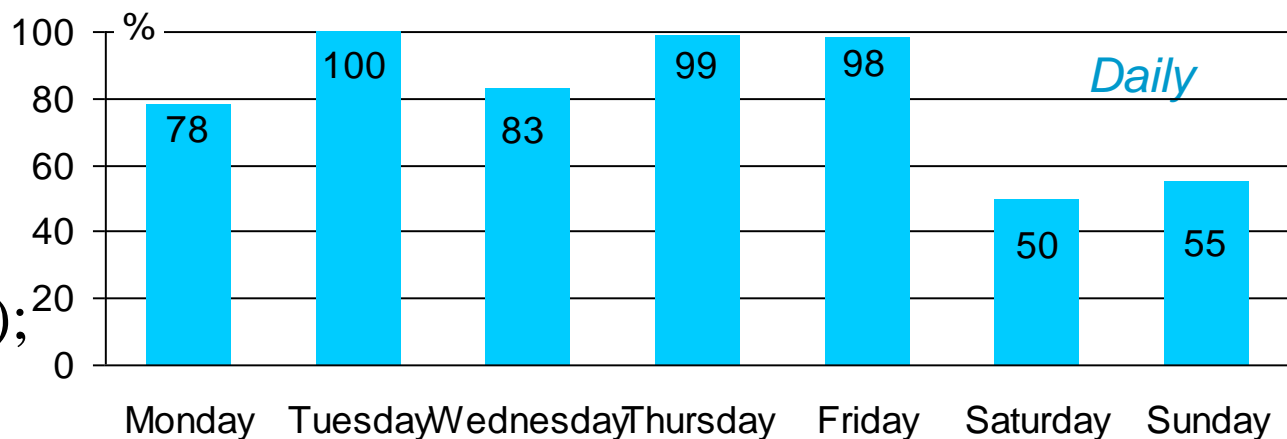


Yearly

Energy sector

- Aurora (2007);
- Stuxnet (2010);
- Duqu (2011);
- Night Dragon (2011);
- Flame (2012).

Cyber attack frequency patterns

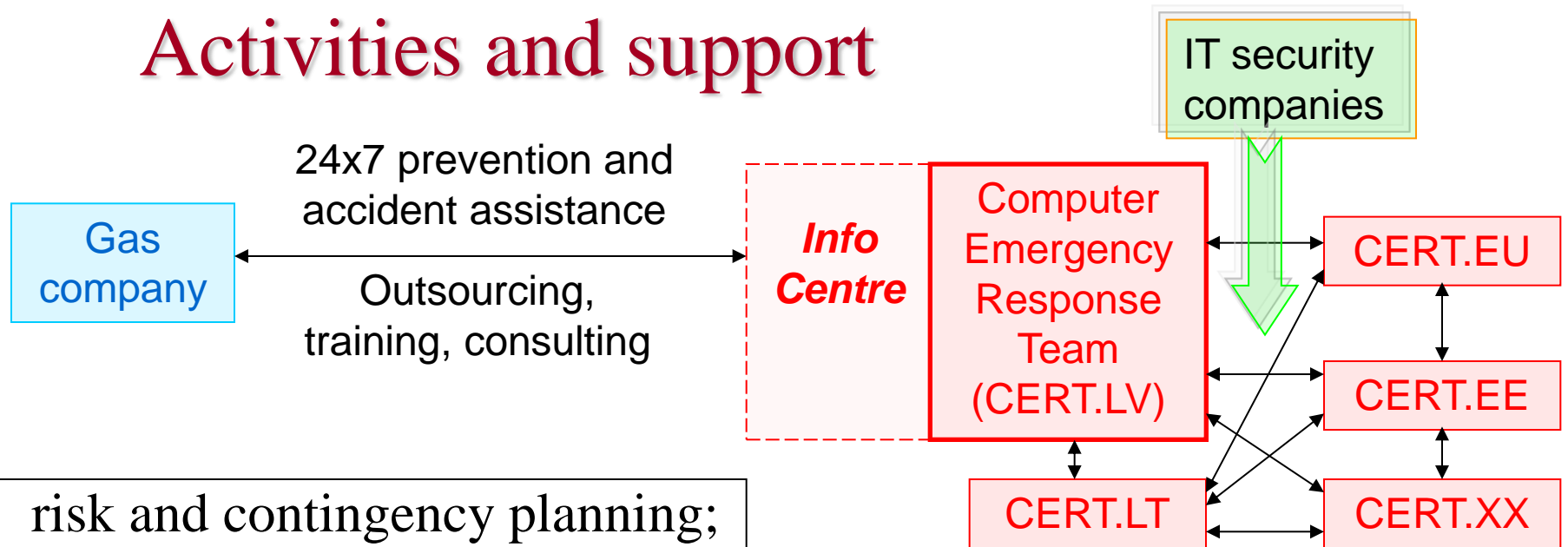


Daily

Risk assessment: high impact, high probability

Source: Analysis Intelligence

Activities and support



- risk and contingency planning;
- regular everyday control;
- regular update of software;
- firewall and encryption – necessary but not a sufficient technological measures;
- assessment of usage of wireless communications and cloud computing, connection with public networks, Intranet, Extranet and Internet, etc.

- investigation of vulnerabilities of equipment, networks and information systems;
- threat analysis and modelling;
- incident reporting;
- cyber security engineering;
- insider threat analysis.

Final postulate:

Concentration of the competence is a crucial issue in small countries.

- Modelling of national gas transmission and distribution backbone networks.
- Increasing cyber security of ICS/SCADA of gas systems.



Thank you for attention!