



Strål
säkerhets
myndigheten

Swedish Radiation Safety Authority

Summary of SSM:s regulatory activities on electrical power system design

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Overview

- Nuclear power plant safety
 - Why is electrical power system a concern for SSM?
- SSM:s role in the game of nuclear power
 - *Why* and *what* do we do?



Why is electrical power system a concern for SSM?

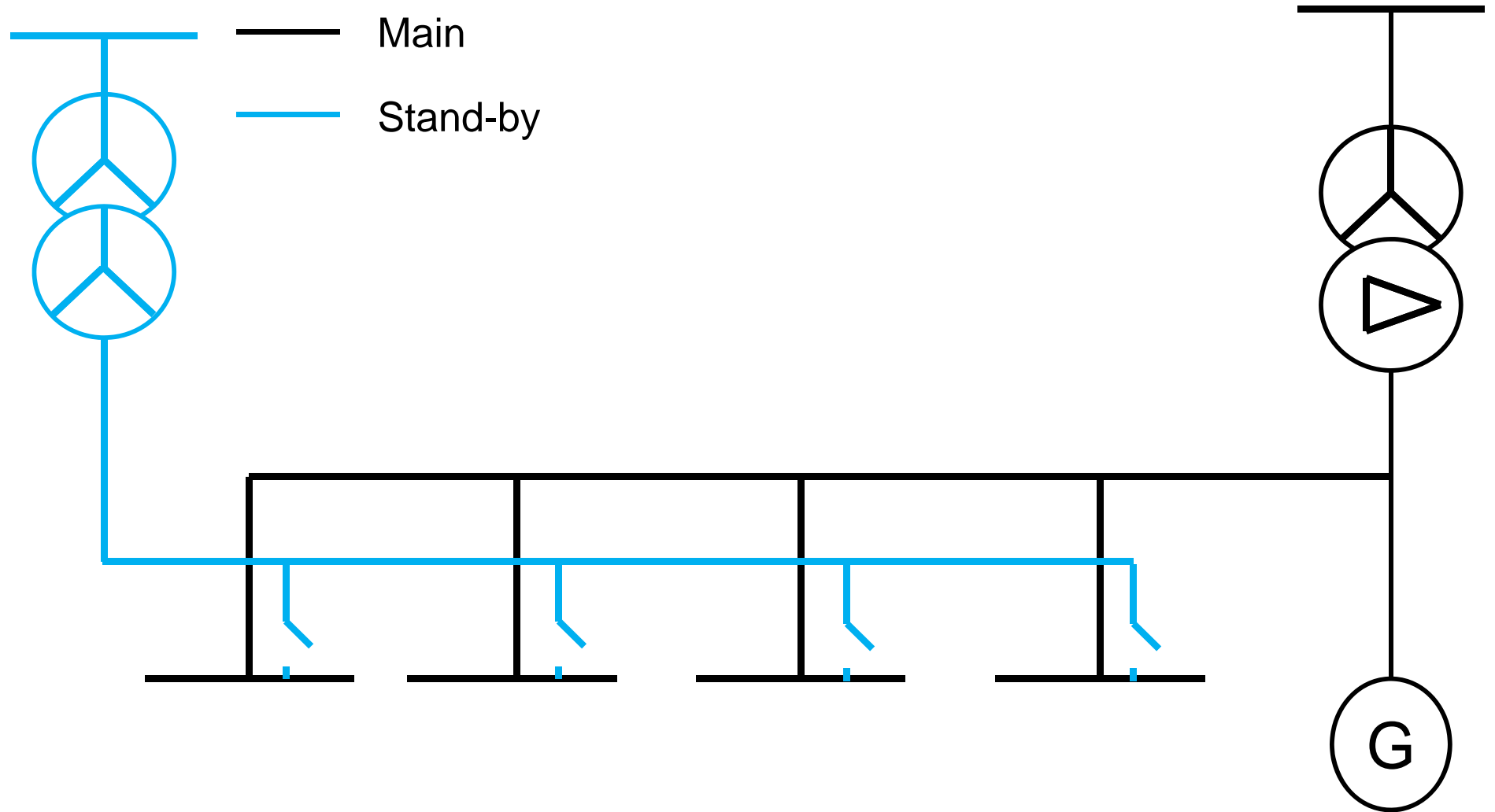
Safety functions are dependent on electrical power supply

more or less



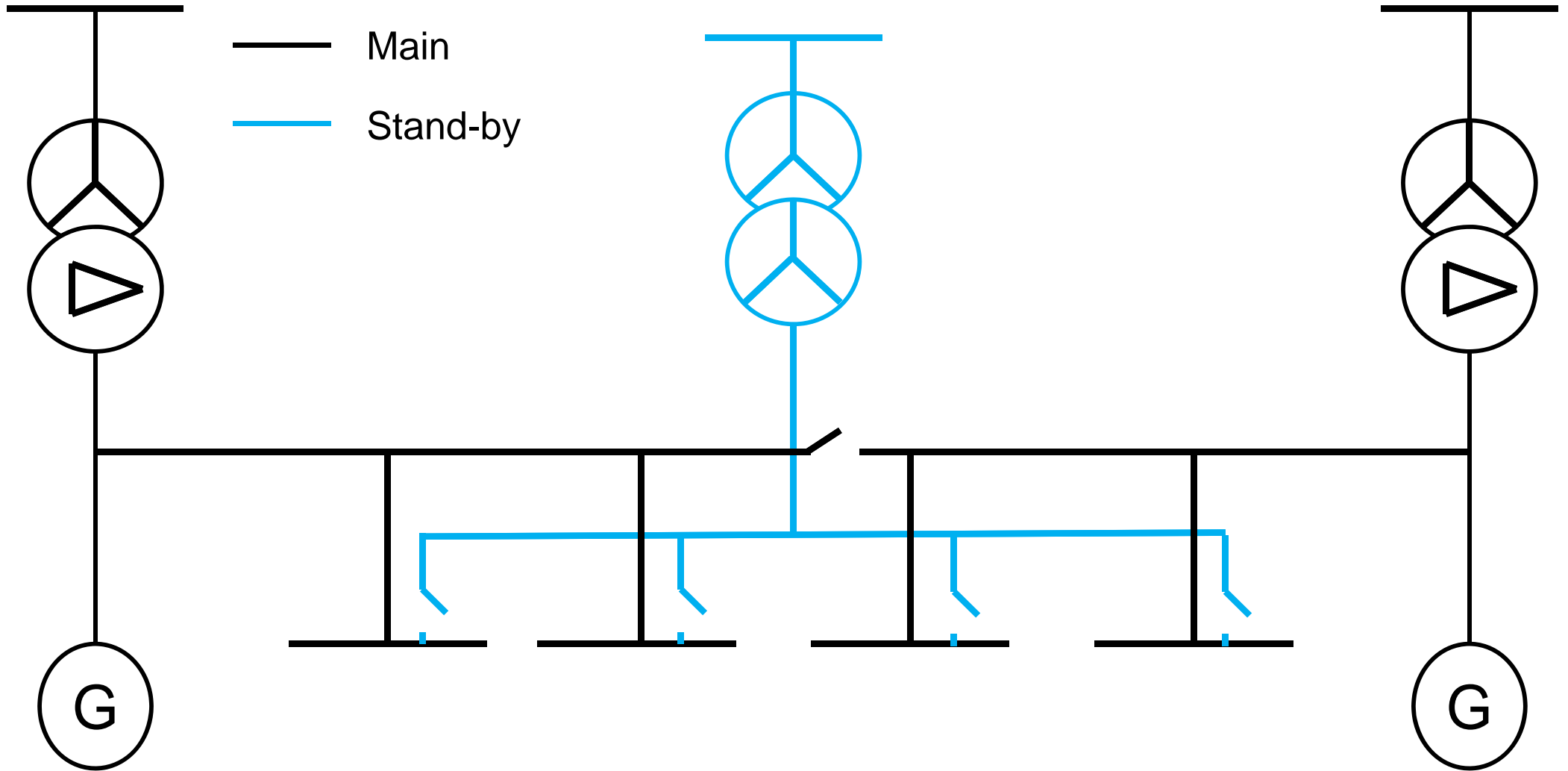


Electrical system - a part of NPP safety





Electrical system - a part of NPP safety





History of disturbances

➤ Examples:

- Forsmark 1 2006
- Dungeness (England) 2007
- Olkiluoto 1 2008
- Byron (USA) 2012
- Forsmark 3 2013
- Dungeness (England) 2014

➤ ... empiric validation of nuclear power plant safety is not OK

Vision:
Holistic approach



Regulatory activities

➤ Goal:

- Safe enough: Enhance robustness for NPP:s electrical power system

➤ SSM:s mandate

- Ordinance – develop safety, optimize work
- Nuclear technical law – “safe enough”
- Environmental code – reasonable, practical and achievable

➤ Boundary conditions

- Laws of physics (“ugly electricity”)
- “One solution to rule them all” is not an option



Regulatory activities

➤ Stakeholders:

- Licensees
- Politicians
- International communities; IAEA, OECD/NEA, EU etc.
- National power system (and consumers!)
- **General public of Sweden**

➤ Conclusion:

- Communication
- Innovation thinking is needed to improve safety
- SSM needs to enable workable conditions for Swedish licensees

How can we
do that?



Regulatory tools

Develop international requirements

Share information and experience

- IAEA
- OECD/NEA,
- EU etc.

”Forcing activities”

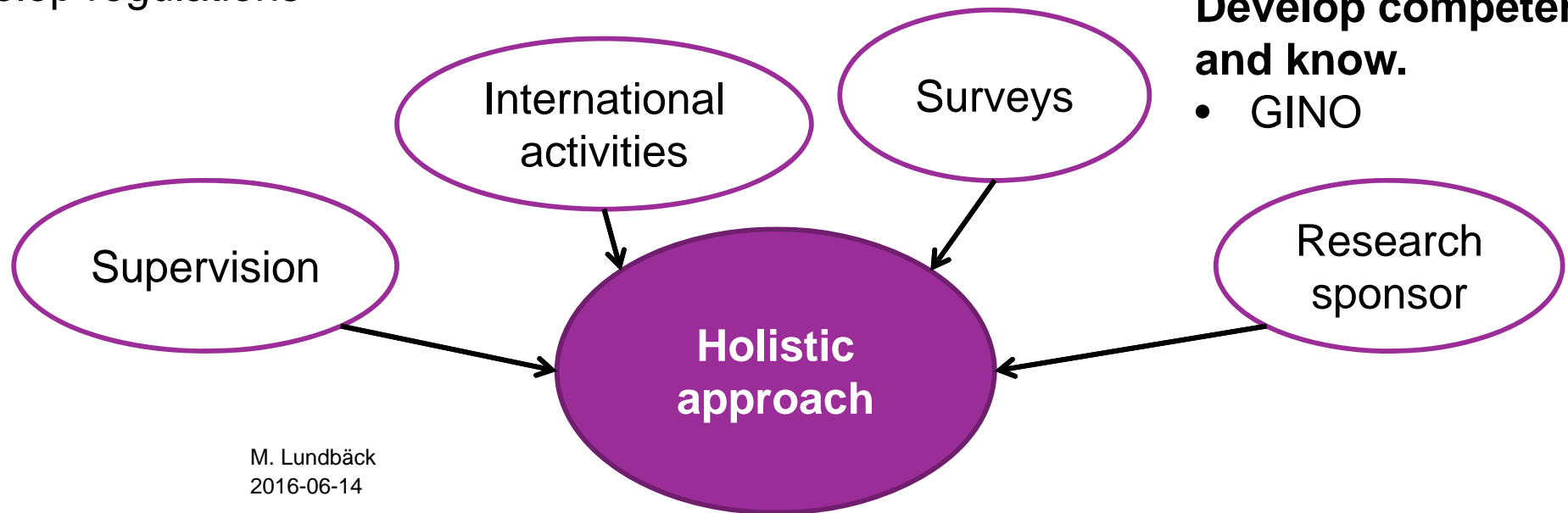
- Degraded Power Supplies – Assessment
- Normal Power Supplies – Onsite inspec.
- Develop regulations

Maintaining competence and know.

- Former designers from ASEA-ATOM

Develop competence and know.

- GINO





Example of regulatory tools

Degraded Power Supplies

- Injunction "Enforcing"
 - Assessment on electrical power supply impact on nuclear power plant safety
 - The power supply function:
 - Power sources
 - Power distribution
 - Power sinks (loads)
- Memorandum "Enabling"
 - Enlarge vocabulary – communications!
 - SSM:s expectations on "how to" improve safety



What about safety...?

- “Potential for technical improvements”
 - **Risk** of dangerous radiation release due to a electrical disturbance is low
 - **Best available technology**: can safety improvements be done to a reasonable and practical cost, then they shall be done



What about safety...?

- SSM has many tools, both “enforcing” and “enabling”
 - **Balance** between the “tools” is important
 - Goal focus: to enhance robustness and safety
- NPP:s are complex dynamic systems
 - Example: Better electrical quality for the internal power system when the main generator is in operation
 - Humility





What about safety...?

- Have we made any improvements?
 - We are talking about the electrical phenomena
 - Looking at history: Identified problem = solvable problem
 - A foundation for supervision within the technical area
 - “one step at a time”

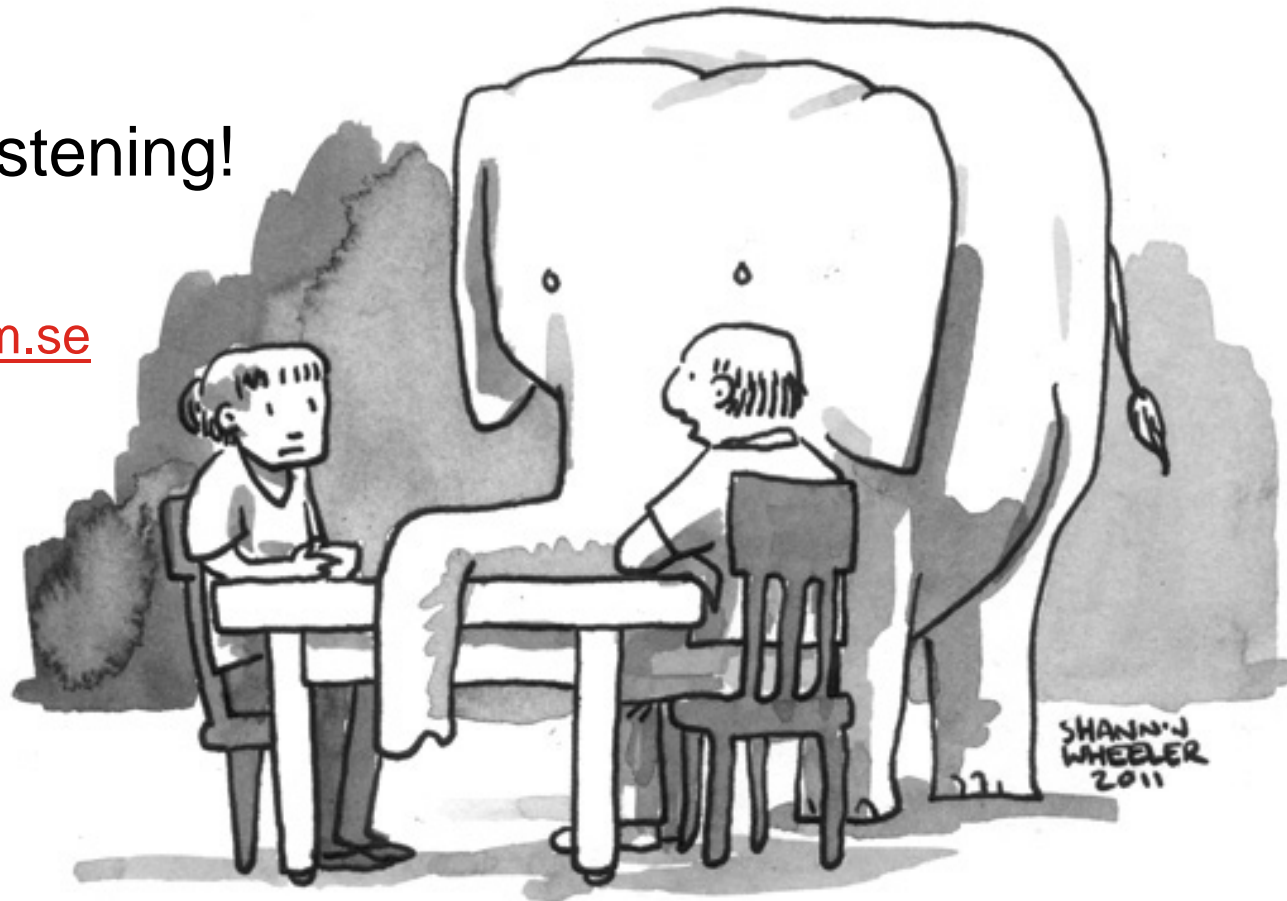
- In the near future, the electrical conditions for NPP:s will change due to a new electricity market with more intermittent energy production
 - We need to take this into account and act preventative
 - Knowledge is the key!



As a tradition, and to illustrate my own conclusion:
All we want is just to talk about the elephant...

Thank you for listening!
Questions?

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"HONESTLY? I PREFERRED WHEN WE
DIDN'T TALK ABOUT THE ELEPHANT"