

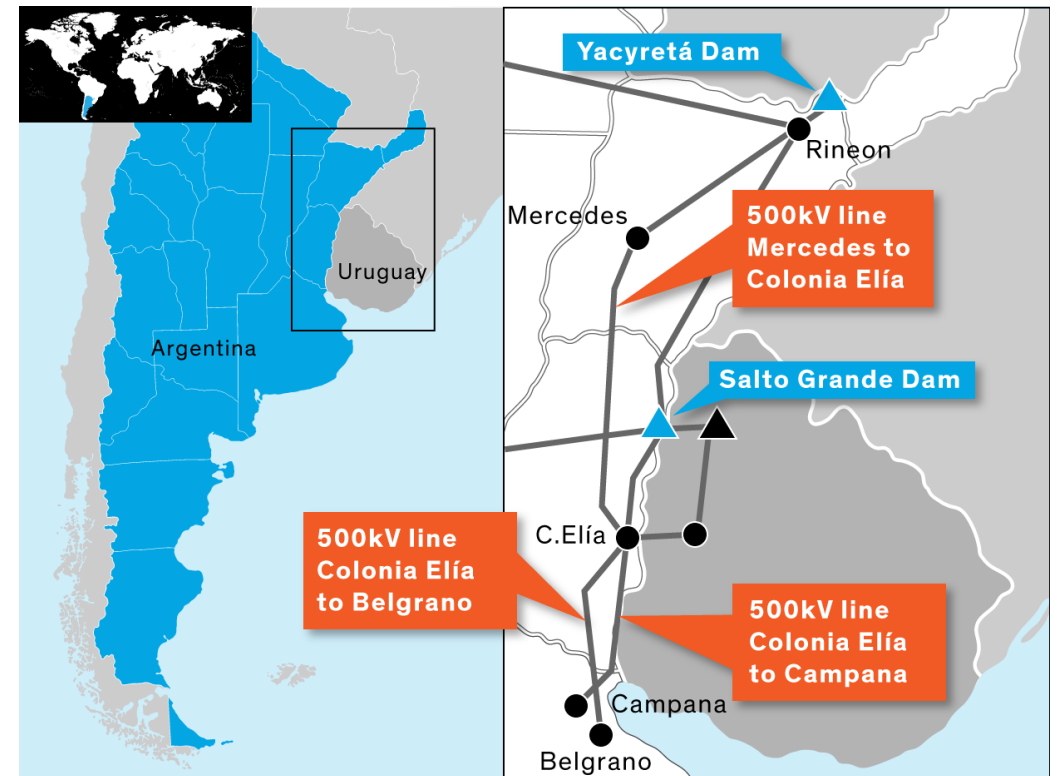
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# **POWER OUTAGES IN EUROPE AND SOUTH AMERICA: A COMPARISON**

**Stefan Schauer**  
**AIT Austrian Institute of Technology**  
**[Stefan.Schauer@ait.ac.at](mailto:Stefan.Schauer@ait.ac.at)**

# BLACKOUT IN SOUTH AMERICA

- Large blackout in Argentina, Uruguay and Paraguay in June 2019
  - Maintenance of one of three 500kV transmission line
  - Short circuit in another line
  - Automatic Generation Shutdown system operated on false data and disconnected third line
- Blackout had major impact on the water, health and transportation sector
  - Recommendation for reducing water usage in Argentina
  - Home patients needed to return to hospital
  - Local elections in Argentina were interrupted



Source: IEEE Spectrum

# ALMOST-BLACKOUT IN EUROPE

- Continental Europe power grid was separated into two parts in January 2021
  - Tripping of 400 kV busbar coupler overcurrent protection
  - Shift of electric power flows to neighbouring lines
  - Subsequent overload and further tripping of that lines
- Countermeasures immediately implemented in several states
  - Big consumers in France and Italy were disconnected
  - Production of a large generator in Turkey was reduced
  - Situation could be quickly restored



Source: [www.entsoe.eu](http://www.entsoe.eu)

# MAIN FINDINGS

## Technical Learnings

- **Automatic protective systems** are often installed in power grids
- **Misconfiguration** of those systems can lead to problems in the first place
- **Black-start capabilities** are an essential feature to recover quickly
- Hydro-electric power plants provide a good basis but **too diverse landscape** could be difficult

## Organisational Learnings

- Detailed **emergency response plans** are most valuable in crisis situations
- **Pre-contracted shutdown plans** for large consumers support quick reactions
- **Cross-national co-operation** is a core aspect in preventing large power outages
- Interplay of **digital systems and personal communication** proves to be successful

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## THANK YOU

**Dr. Stefan Schauer**  
*Senior Scientist*

AIT Austrian Institute of Technology  
Stefan.Schauer@ait.ac.at