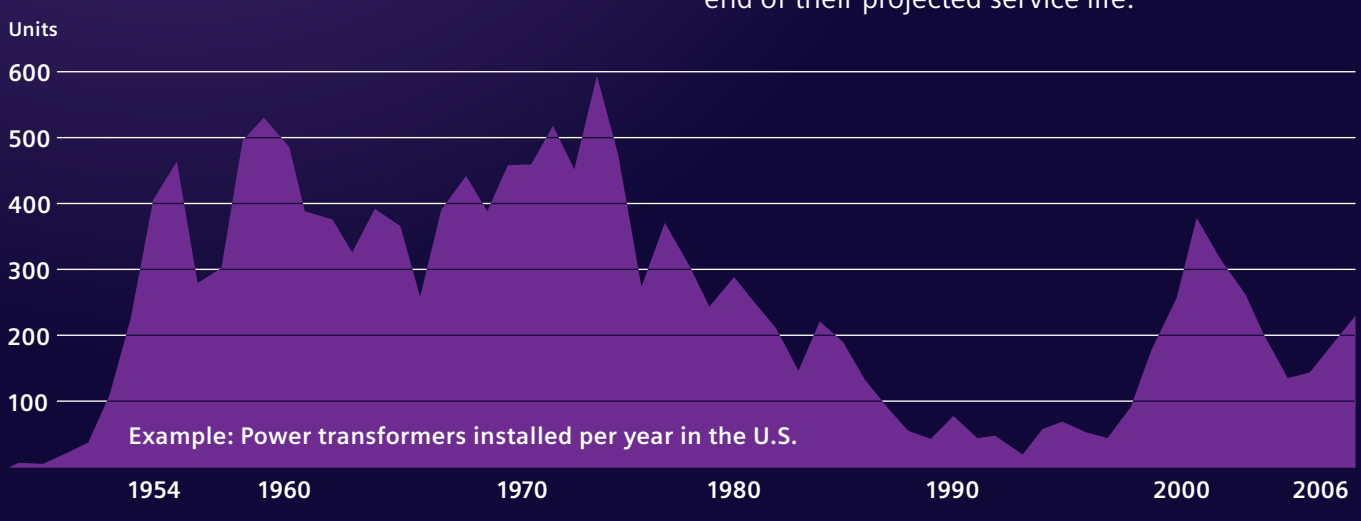
Pretact® – React in advance. Grid resilience along the entire energy value chain

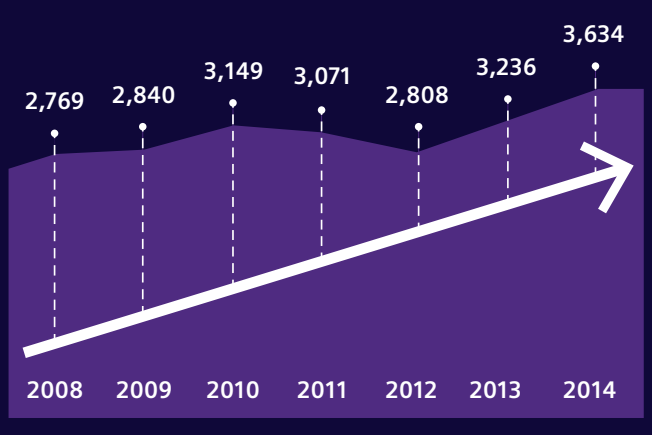
Power transformer case

The problem: ageing assets in a strained grid infrastructure

A large portion of the installed power transformers within the U.S. were installed in the 1950s, 60s and 70s and are now reaching the end of their projected service life.



Example: Power outages in the U.S.



As a result, power outages in the U.S. are becoming increasingly more frequent and it is feared that their number will continuously increase as equipment ages.

Causes of transformer failures in the U.S.

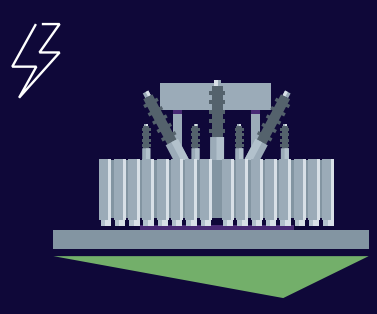
28 %	Electrical disturbances
27 %	Other
13 %	Lightning
9 %	Insulation
6 %	Electrical connection
4 %	Overload
4%	Foreign objects
4%	Moisture
3%	Line disturbance
2%	Stress or fatigue

Most power transformers fail in operation, but natural disasters and other forced outages do occur and harm the equipment.

More than half the power transformer outings are due to electrical disturbances, natural disasters (e. g. lightning), insulation failures, and other forced impacts.

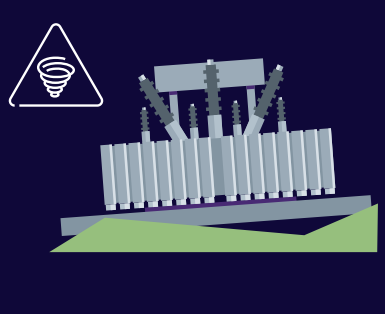
Risk factors for grid resilience

Operational issues



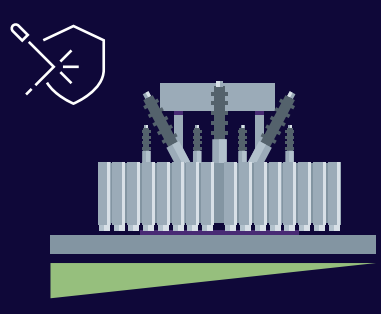
- Network failures
- Incorrect operations
- Aged fleet
- Load balancing

Natural disasters



- Earthquakes
- Storms
- Flooding
- Fire
- Geomagnetic storms

Other forced outages

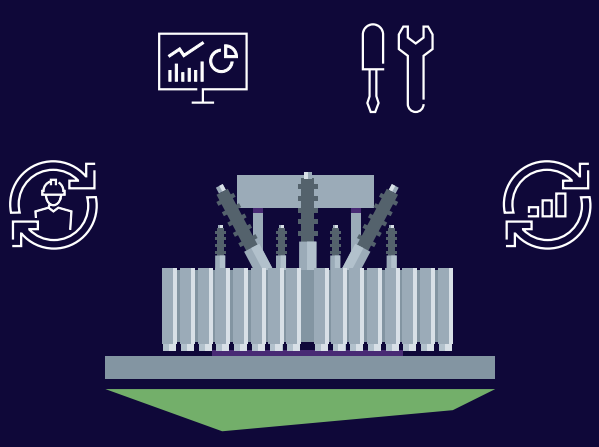


- Physical impacts
- Cyber impacts

Pretact® – Siemens Energy grid resilience concept

Most of the aged transformers will need to be replaced by standard power transformers. However, there is a strategy beyond replacement. Siemens Energy Transformers' cutting edge concept gives operators peace of mind.

Prevent operational risks

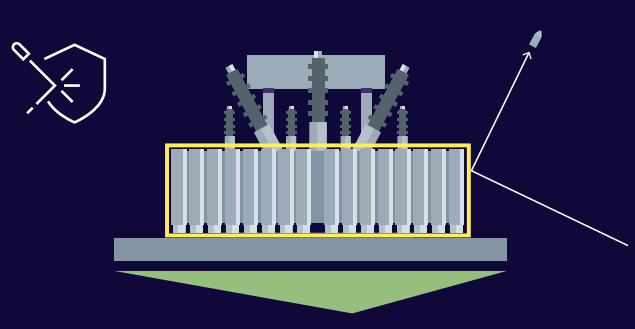


- Transformer lifecycle management
- Condition monitoring
- Repair and retrofit
- Prevent component failures (e.g. bushing service)
- Long Term Program

GIC*-safe transformers
- Avoid critical heating
- Up to 200 A extra DC-capacity
- Non-magnetic steel inserts
- prevent overheating

* **Geomagnetically induced current**

Protect against natural disasters and forced outages



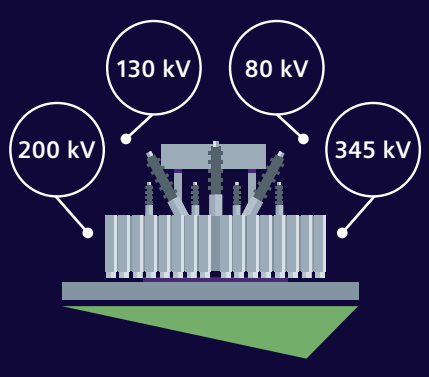
Bullet resistant transformers
- Special shielding with bulletproof materials
- Up to VPAM Cl. 9 and UL752 Lvl. 13
- For new transformers and as retrofit.

React to emergencies and temporary outages

Mobile

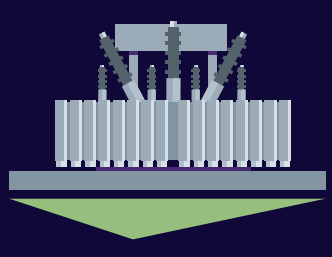
Compact & lightweight design

Versatile



Covering different ratings

Rapid installation



Plug & play connections and bushings

Long term service agreements for storage, transport and maintenance of spare units.