Modular mobile transformers for 345kV, 400kV and 525kV transmission utilities provide fast deployment, quick and simple transportation and multi-voltage polytransformer capabilities.

ABB’s high voltage mobile transformer concepts support utilities’ strategic contingency plans for emergency situations. A mobile transformer is an answer for quick restoration of service in critical high voltage transmission substations during contingencies, supporting system stability and helping utilities to guarantee the continuity of the supply.

A modular approach overcomes transportation and dimensional limitations for transformers up to 345 kV, 400 kV, and 525 kV systems. The application is intended for contingency planning providing a very significant reduction of the response time when compared to other traditional methods.

Applicable to large transformers for HV transmission, it is based on a:

- Modular approach.
- Reduction of transformer size and dimensions including:
  - Single phase units.
  - Shell type technology:
    - Compact dimensions for large size units with a form fit tank.
    - Low height profile with a lay down transport option, allowing a better optimization of the transformer design.
  - Standard or hybrid insulation. Possible use of high temperature insulation to reduce dimensions and weight.

Fast deployable mobile 345 kV, 400 kV or 550 kV transformers
- Contingency planning.
- Quick reaction, meaning cost and time savings.
- Simple road transportation with reduced profile and weight.
- Flexibility: Fully customizable modules to replace 1 ph and 3 ph units.

Compact size and reduced height profile in HV applications
- Single phase shell transformer horizontally laid out.
- Standard or hybrid insulation.

Several advantages for contingency planning
- Response time drastically reduced to days from months or weeks.
- Risk mitigation, reduction of insurance premiums.
- Company image with customers and administrations.

These high voltage and high capacity mobile transformers are customized to the needs of the utility for contingency, being available up to 550 kV. They are transported by road and include a contingency plan so they can be mobilized and installed quickly. The contingency plan provides details on how to arrange, install and connect the units to the substation, which helps utilities respond fast to restore service in emergency situations.
Features
- Quick and simple transportation by road.
  - Very low shipping profile (height/width) and reduced weight to allow road transportation with minimum or reduced number of permits.
- Modular concept for 345 kV, 400 kV and 550 kV:
  - One or two units to replace single phase transformers.
  - Three units to replace three phase transformers.
- Fast deployability.
- Possible multivoltage units to cover additional number of voltages (polytransformer).
- Customized design to minimize any disassembly work.
- Contingency plan including final assembly works.

Advantages
- Quick reaction during contingencies:
  - Days compared to weeks and months.
  - Recovery of service in days (including transportation), compared to 2-3 months to ship and install a traditional spare.
  - No need to remove the existing transformer from pad.
  - Continuity of supply, network reliability.
  - Minimize loss of revenues.
- Transport:
  - Simple, by road, reduced number of permits.
  - Savings in associated costs.
  - Insurance premiums.
  - Administrative fines, customer complaints.

Applications
- Contingency plans:
  - Fast response in contingency and emergency situations.
- Other applications:
  - Planned maintenance.
  - Temporary installations.

Advantages and applications include: quick response and flexibility, temporary installations for maintenance activities, reduced insurance premiums and mitigation in the event of a blackout.

Case examples
Standard insulation
- 117 MVA, single phase polytransformer modules.
- 400 / 230-138 kV. 50 Hz.
- Total weight: 72.5 tons.
- Shipping weight: 60 tons.
- Dimensions (transport L x W x H): 7m x 2.7m x 3.4m.

Hybrid insulation
- 200 MVA, single phase polytransformer modules.
- 400 / 230-138-110 kV. 50 Hz.
- Tertiary with selectable voltage.
- Total weight: 90 tons.
- Shipping weight: 70 tons.
- Dimensions (transport L x W x H): 7.5m x 3m x 3.4m.

Contingency for wind generation
- 3 x 150 MVA, 400/220 kV mobiles to replace 450 MVA three phase wind collector transformers.
- Response time with HV mobiles: < 2 weeks.
- Response time with traditional spare: > 12 weeks.
- Savings in response time: > 10 weeks.
- Economical impact, saved loss of revenues: > 10 MUSD.
- Additional savings associated to transportation of single phase modules versus a three phase spare.

For more information please contact:
Asea Brown Boveri, S.A.
Escritor Conde Zamora, s/n
14004 Cordoba – Spain
Phone: +34 957 46 91 00
Fax: +34 957 46 91 92
www.abb.com/transformers

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