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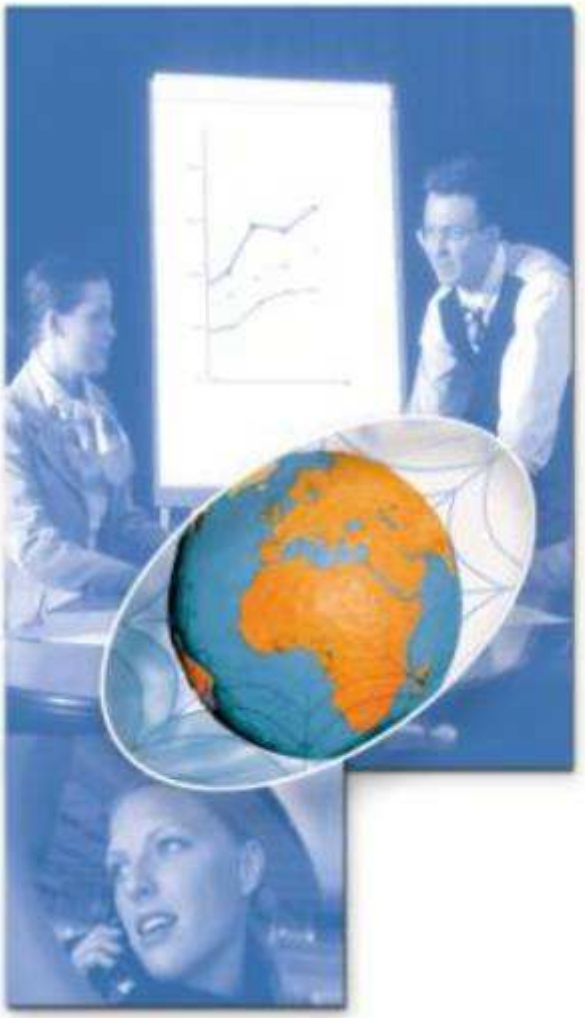
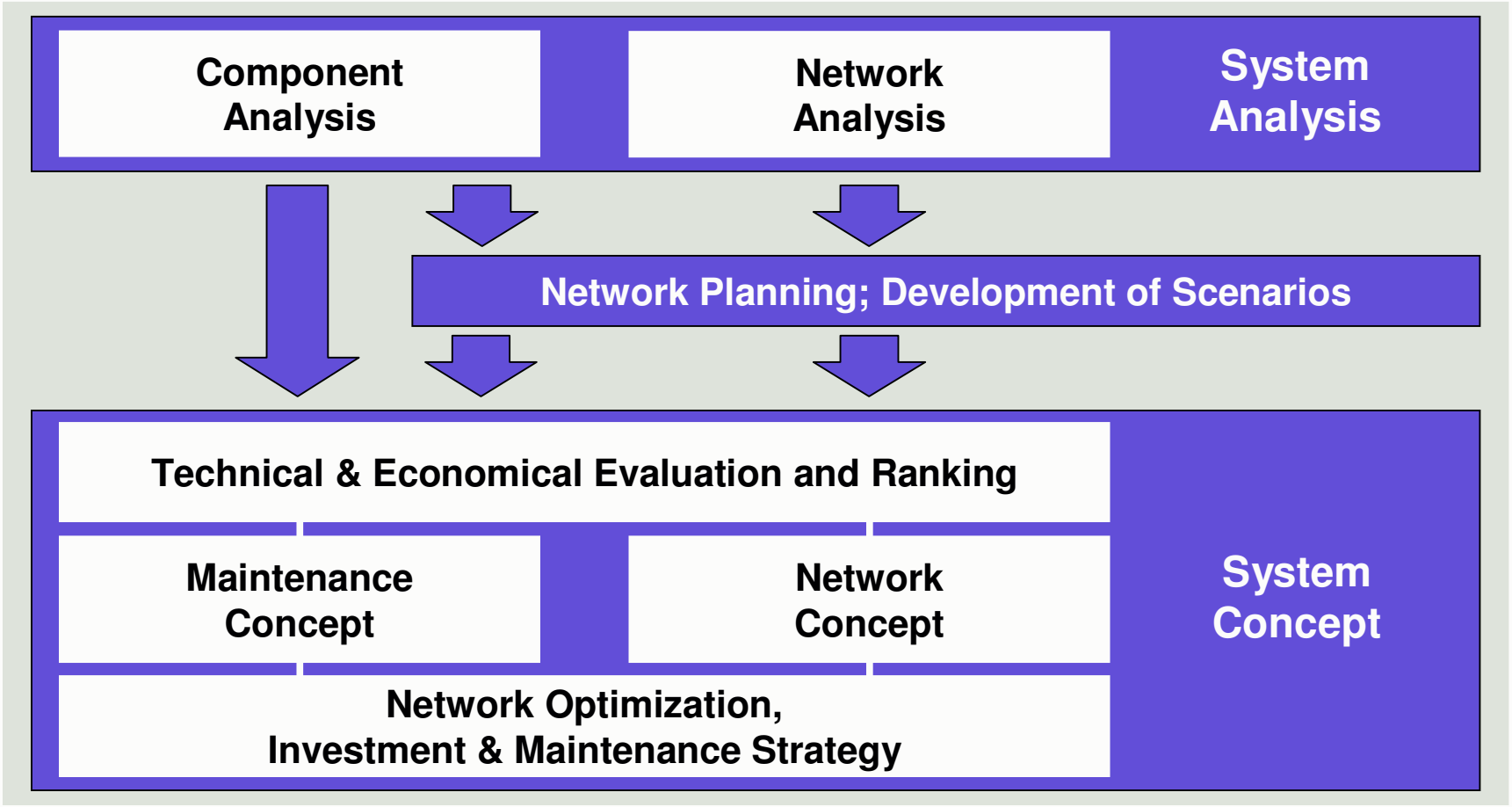
Power Systems Consulting for Utilities and Industry

Power Systems Consulting

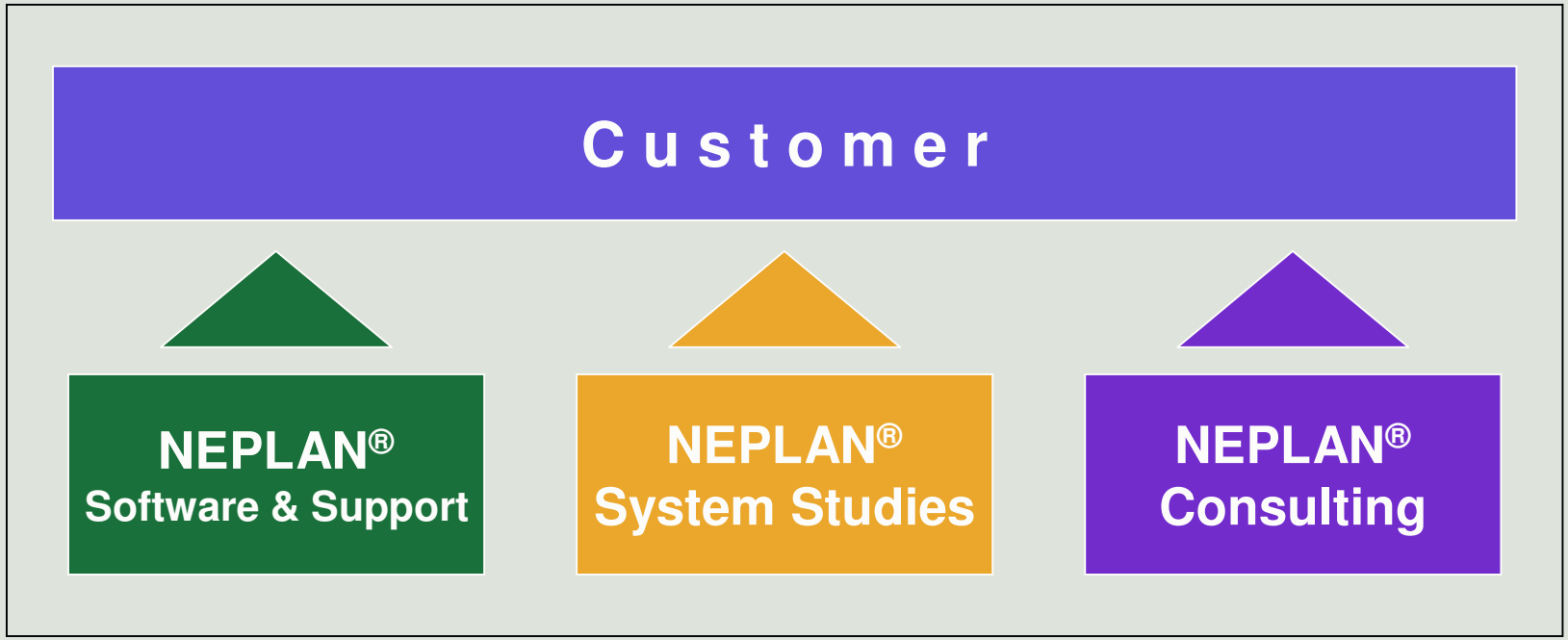


- Power Systems Consulting is part of ABB's Power Technologies Division and operates globally. In Germany we are an expert team with
  - references about more than 800 performed system studies
  - for transmission & distribution systems
  - for utility & industrial networks
- We have more than 30 years of experience and a unique knowledge about the electric power systems all over the world.
- Our mission is to enable our customers plan and operate their electric systems more economically and reliably.

System Consulting Approach

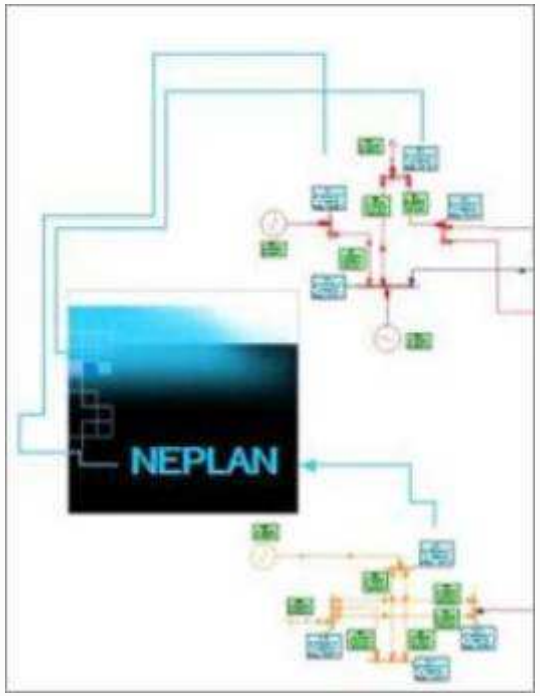


Market Approach



Tailor-made service solutions with focus on system optimization and cost reduction!

NEPLAN® Software & Support

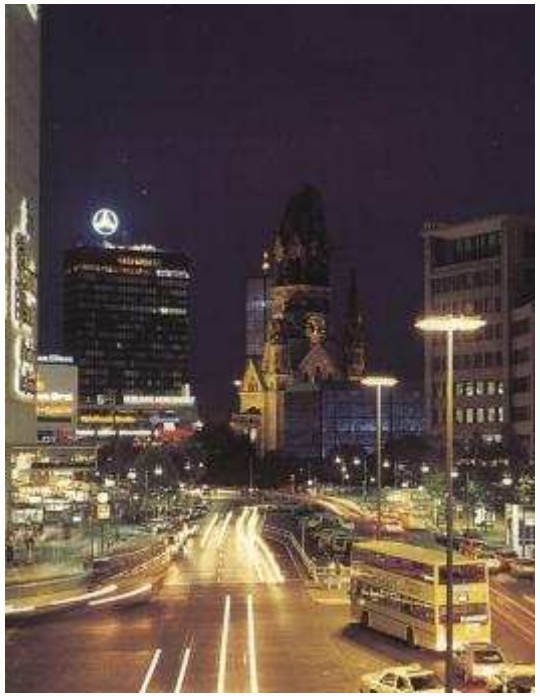


NEPLAN Functions (Extract):

- Interactive graphic for equipment, topology & GIS data
- Load flow, transient stability, short circuit
- Motor start, harmonic analysis
- Protection design & selectivity analysis
- Reliability calculations for distribution networks
- Cable sizing, earthing computation
- All AC voltage levels
- Unlimited number of nodes
- Interfaces to common databases and GIS

NEPLAN® – The planning & information system for electric, gas, water and district heat networks!

NEPLAN® System Studies



- Analysis, planning & optimization of electrical transmission, distribution & industrial networks
- Reliability calculations, investment & risk management
- Wind farm grid connection studies
- HVDC & FACTS applications
- Asset maintenance strategy consulting
- Project execution at a fixed price

NEPLAN® System Studies for technical & economical system optimization!

NEPLAN® Consulting

- NEPLAN® software deliveries & support
- Network calculation, analysis & optimization
- Consultancy & know how transfer (e.g. reliability analyses, risk management, investment planning, …)
- NEPLAN® training
- NEPLAN® interfaces & integration
- Project execution at a fixed price

NEPLAN® Consulting – maximized profitability for the customer!

Customers Benefit

- **Total cost savings**
  by technical and economical system optimization
- **Investment cost savings**
  by optimum system reliability and power quality
- **Operational cost savings**
  by intelligent use of modern secondary equipment
- **Maintenance cost savings**
  by reliability centered maintenance

Typical Projects

Electrical Network Analysis

- **Task:**
  Integration of two historically grown networks
- **Solution:**
  System study; technical and economical evaluation of alternative scenarios; identification of an optimized network concept; investment planning

Identification of a 150 MEUR saving potential compared to the original planning!

Typical Projects

Electrical Network Planning

- **Task:**
  Planning of an efficient distribution network for the extension of a metropolis in Asia (115 / 33 / 13.2 kV))
- **Solution:**
  Basic and detailed planning (reliability analysis and weak-point assessment); economic evaluation of different network automation levels

Technical and economical optimized network concept taking into consideration penalties, availability level, etc.!

Typical Projects

Extension & Investment Planning

- **Task:**
  Extension planning & improvement of the quality of power supply for a regional utility in Asia
- **Solution:**
  Analysis of the high voltage & medium voltage network; development of a reliability centered extension & re-investment strategy for the next 20 years

Optimization of network costs and increase of the quality of power supply up to western developed countries level!

Typical Projects

Reliability Centered Network Renovation

- **Task:**
  Development of a re-investment strategy due to a great amount of aged assets; simplification of the network structure
- **Solution:**
  Analysis of actual system reliability; development of planning scenarios for removal and replacement; reliability analysis of the planning scenarios

Savings of 10 MEUR compared with a 1:1 replacement by nearly the same system reliability!

Typical Projects

Network Connection Concepts

- **Task:**
  Reinforcement of the network connection for an industrial consumer due to diversification of production
- **Solution:**
  Reliability calculation and weak-point assessment of different network connection alternatives; cost effectiveness study

Most cost-effective network connection alternative with additional increase of reliability for the industrial customer!

Typical Projects

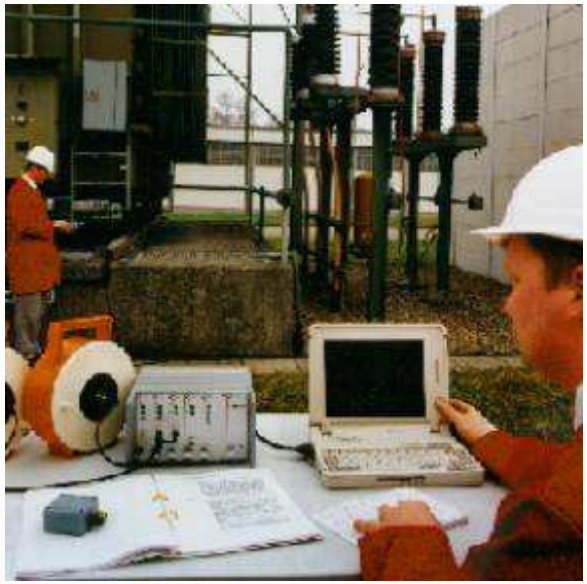
Power Quality Studies

- **Task:**
  Re-design of the network connection for a steel mill after omission of the 220 kV network
- **Solution:**
  Load flow and short-circuit current calculations; harmonics and flicker analysis; technical and economical investigation of different reactive power compensation solutions

Reduction of flicker level under allowed limit values at optimal costs; compensation of reactive power fluctuations!

Typical Projects

Reliability Centered Maintenance



- **Task:**
  Optimization of asset maintenance strategy; starting basis: time based maintenance (TBM)
- **Solution:**
  Asset condition assessment; reliability analysis for asset importance determination; implementation of an reliability centered maintenance (RCM) methodology

Lower maintenance costs by nearly the same network reliability!


ABB