Concerns of Aging Infrastructure

- Switchgear and Breakers are beyond a reasonably expected life
- Existing breaker technology is old and unreliable
- Replacements parts are difficult or impossible to locate, and costly
- Arc Chutes may contain Asbestos and can not be safely maintained
- Mechanisms are complicated and difficult to lubricate effectively without a comprehensive overhaul
- Operator safety is in question – arc flash hazards
- Customer is facing forced outages poor equipment reliability
- Maintenance support – workforce attrition
LV & MV Service Solutions

- Aftermarket components (nuclear)
- Breaker Refurbishment
- Replacement breakers
  - RiR, Retrofits, Legacy breakers
- Match in line switchgear
  - HK & KLine
- Protection & Control Service & Upgrades
- Engineering Studies, Assessments
- Training
- Safety Upgrades
- Field Service
  - Installation & Commissioning
  - Maintenance
  - Turnkey Projects
  - Disaster Mitigation
Who is ABB?
Authentic Replacement Aftermarket Components

- Replacement parts for the full line of ABB switchgear and power circuit breakers
  - Contacts, supports, operating mechanisms, trip units, control components, hardware, etc
  - Plated bus, relays, panels, instrument transformers, etc
- Extensive inventory of most common parts for fast shipment
- Factory-based resources assure exact replacement parts are supplied to original equipment standards
- Nuclear & non-nuclear
Roll-in Replacement Breakers

- Cost effective
- Life extension for aging switchgear
- Improved safety
- Nuclear & non-nuclear
MV Replacement Breakers with AMVAC

- Operating mechanism rated for 100,000 no-load operations. 10 times normal!
- Virtually maintenance free
  - 10 year maintenance interval
  - Minimized lubrication requirements
- 90% less parts
- Interrupter assemblies rated for 30,000 load operations or 100+ short circuit operations.
- Operate on a multitude of different control voltages without component changes
- Provide consistent and reliable operation
ABB Low Voltage Replacement Circuit Breaker

- GE AKR-30
- Cradle in a Cradle Type Replacement
Factory Circuit Breaker Refurbishment

- ABB provides refurbishment and repair of MV & LV breakers
  - On-site engineering expertise
  - Factory certified technicians
  - Excellent synergy between factory knowledge & field experience
  - Loaner breaker program for many ratings
- Nuclear & non-nuclear
Service: Overview

- Structured to provide support for our products and our customer’s assets. Our service portfolio includes…
  - Technical supervision
  - Turnkey Projects
  - Project Management
  - Preventative and corrective maintenance
  - Upgrade and retrofit services
  - Engineering services
  - Service contract & extended warranties
  - Safety upgrades
  - Emergency Response
  - Training
  - Approved Service Partner Network
Turnkey Capabilities

- **Typical Project Scope**
  - Replacement of switchgear or other equipment
  - Installation & commissioning of large package

- **MVS Capabilities**
  - Procure all materials
  - Coordination of multiple LBU activities
  - Project Management
  - Manage subcontractors including construction work
  - Demolition of existing equipment – Installation of new
  - Acceptance Testing and Commissioning
  - Operational / Maintenance Training
  - Follow on Service and Maintenance contracts
Asset Assessment & Engineering Studies

- Asset Assessment
  - Phases of Assessment
    - Data Gathering
    - Data and System Analysis
    - Risk Mitigation & Contingency Plan
- Equipment Assessed
  - Medium Voltage Switchgear
  - Low Voltage Switchgear
  - Medium Voltage Motor Control
- Engineering Studies
  - Arc Flash study
  - Short Circuit Analysis
  - Relay Coordination
  - Power factor correction
  - Load balancing
  - Revenue Metering Verification
Relay Services

- Maintenance, retrofit, testing and calibration services
- Relay and protection services
  - Provide full line of maintenance, testing, calibration services
  - Support upgrade and replacement projects
  - Support ABB and other OEM products
- Equipment upgrades
- Relay Panels
- REA Installations
- Engineering study capabilities to complement relay services
- Nuclear & non-nuclear
Match & Line Legacy Switchgear

- Supporting add on frames to installed legacy switchgear
- Complete line-ups with turn key services
- 26” wide frames with Amvac technology
- Indoor and outdoor applications
  - HK
  - HKII
  - KLine
The REA Arc Flash Mitigation Relay Features

- REA 101 Arc Protection Relay
  - Fast trip time (< 2.5 ms)
  - Unique fiber optic sensor technology with self supervision
  - Current supervision for secure and reliable arc detection
  - Easy to configure via front mounted dip switches
  - Suitable for existing LV / MV switchgear installations or new applications
  - Minimize potential risk of injury or death while increasing reliability
  - Includes standard 12 year warranty
REA - upgrade existing equipment

- What ABB can offer:
  - Service Group can offer Arc Flash Calculation
  - We can design and install the REA system for customers
  - We can design and train customer to install the REA system
  - Customers can and have installed systems themselves
- The REA has been tested in some of the vintage air magnetic breaker type switchgear with more testing scheduled
  - ABB 15HK
  - GE AM
  - Westinghouse DHP
  - All MV vacuum breaker switchgear
Power and productivity for a better world™