



Asset Management / Gestion de Patrimoine:

Analytiques pour la
Fiabilité et Valeur des Equipements

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Asset Management Director

ALSTOM
Shaping the future



Gestion de Patrimoine: Quels objectifs ?



1- Perspective Equipements

- Comment développer la meilleure stratégie de **maintenance** ?
- Comment développer la meilleure stratégie de **remplacement** ?



2- Perspective Opérations

- Comment **maximiser l'usage** des équipements existants?
- Comment opérer le réseau avec une **vision des risques** ?



Gestion de Patrimoine : Les besoins Client



Fiabilité

Eviter les désastres liés aux défaillances
Améliorer la qualité de service et réduire les pénalités



Economie

Minimiser l'impact des équipements au bilan
Minimiser les risques au bilan
Optimiser globalement les coûts (CAPEX et OPEX)



Stratégie

Définir la stratégie de maintenance et remplacement
Etablir les plans multi-annuels et objectifs de performance
Justifier les investissements avec Actionnaires & Régulateurs

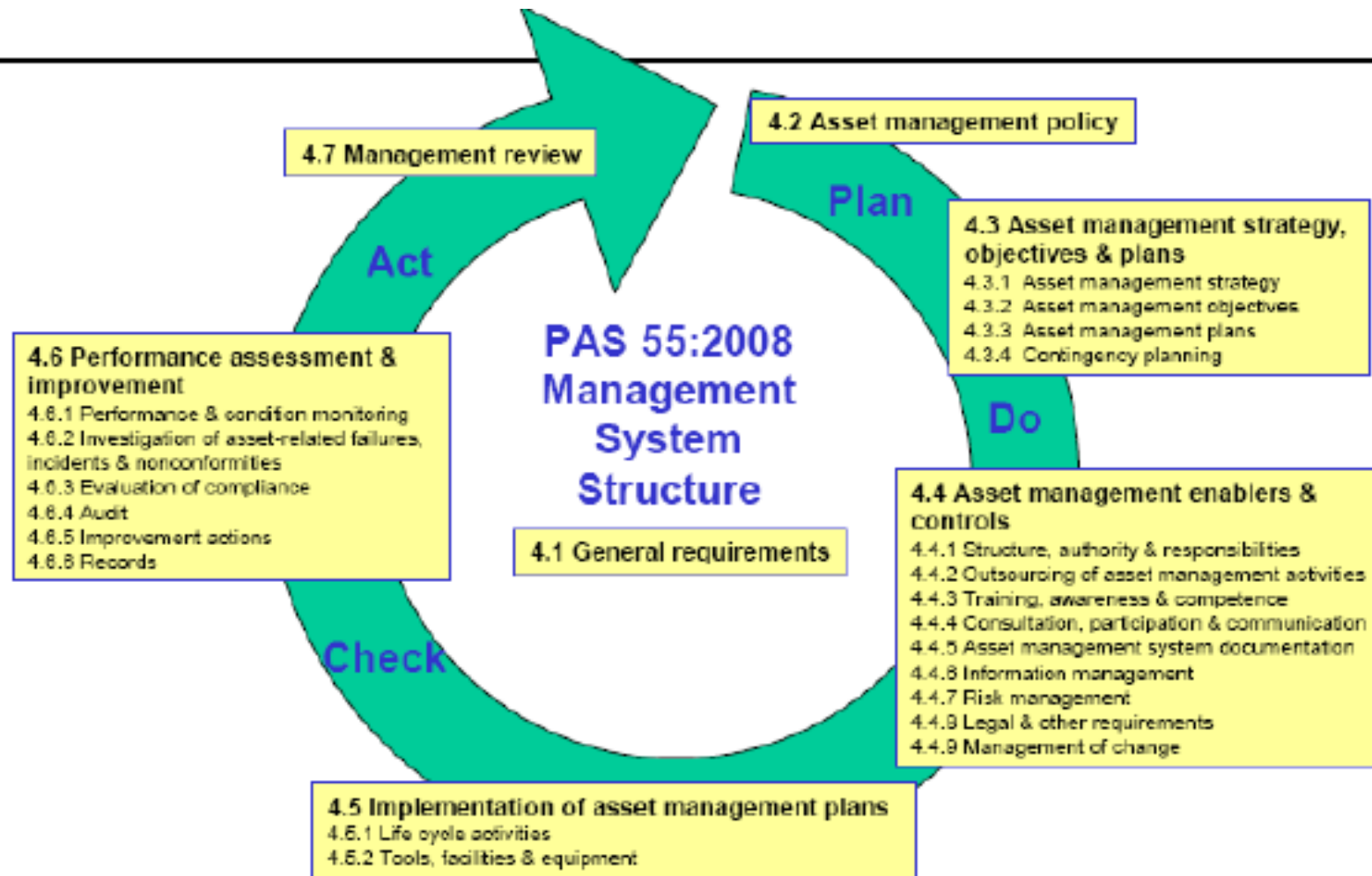


Organisation

Coordonner les fonctions – selon la norme ISO 55K
Capitaliser les connaissances et augmenter l'expertise
Maximiser la valeur des données & systèmes existants

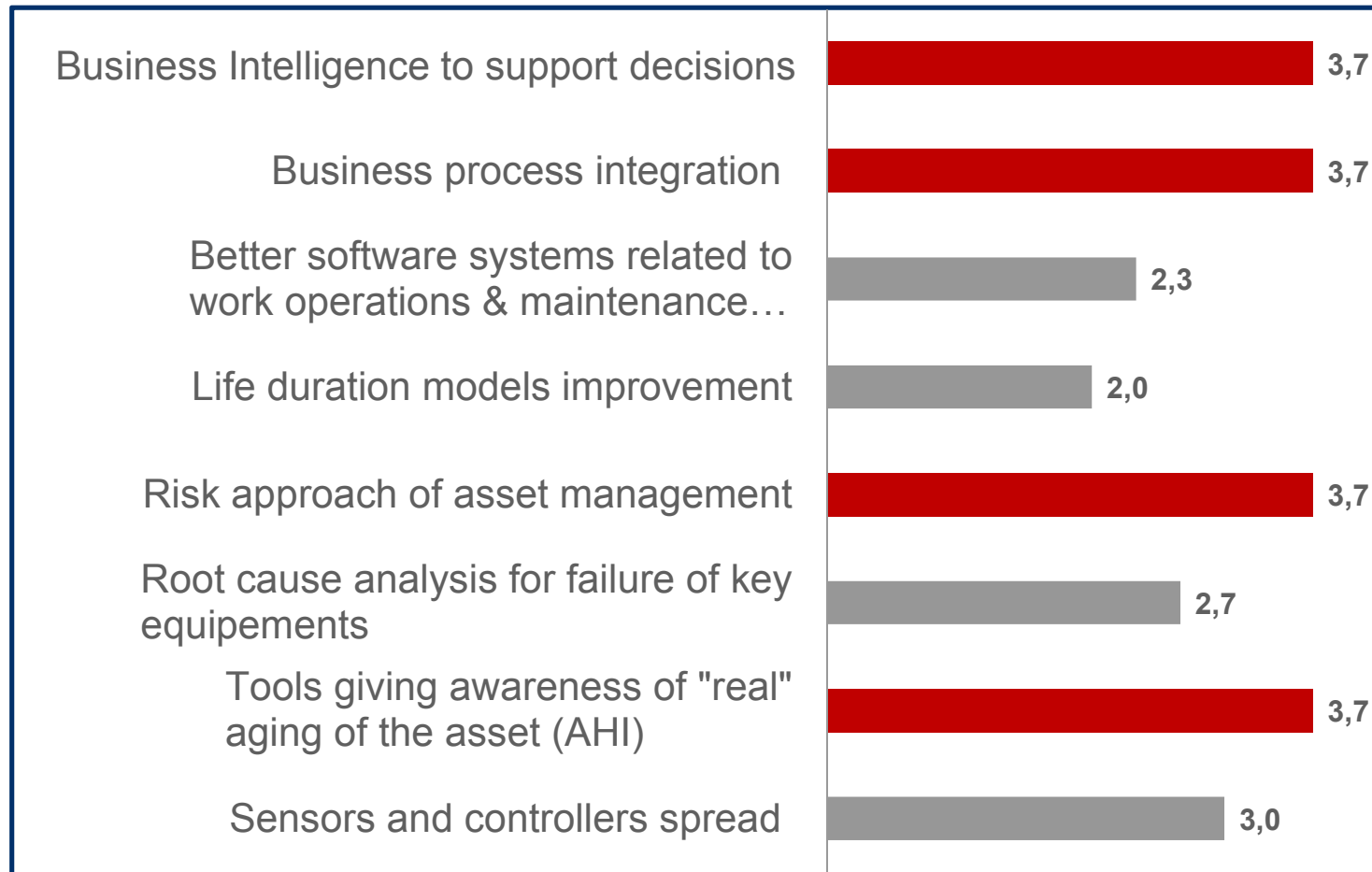


La norme PAS 55 / ISO 55K: Le cadre de mise en place





Enquête Asset management : Les priorités d'investissement des Electriciens

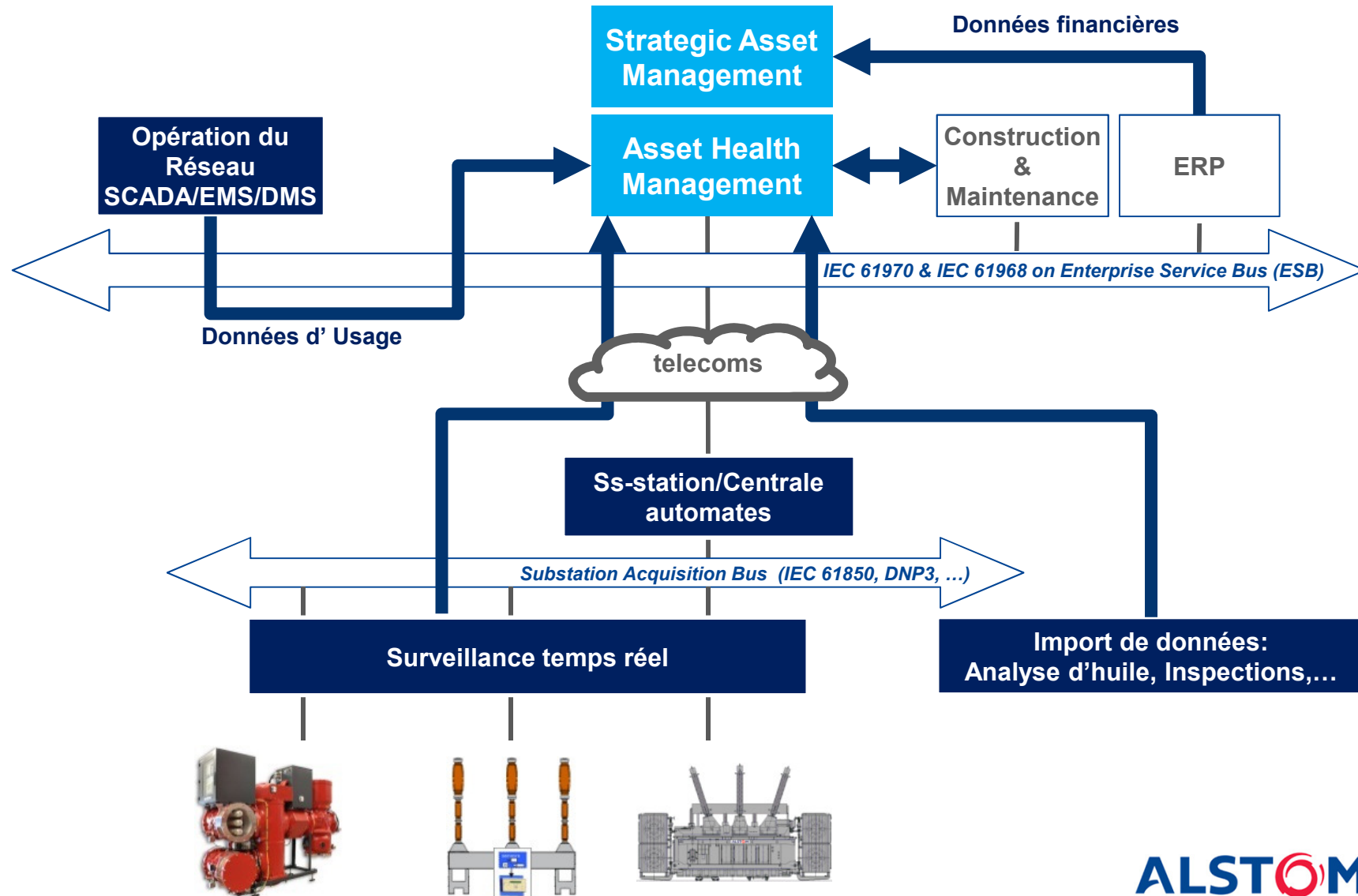


Source: Alstom Grid survey

0 1 2 3 4

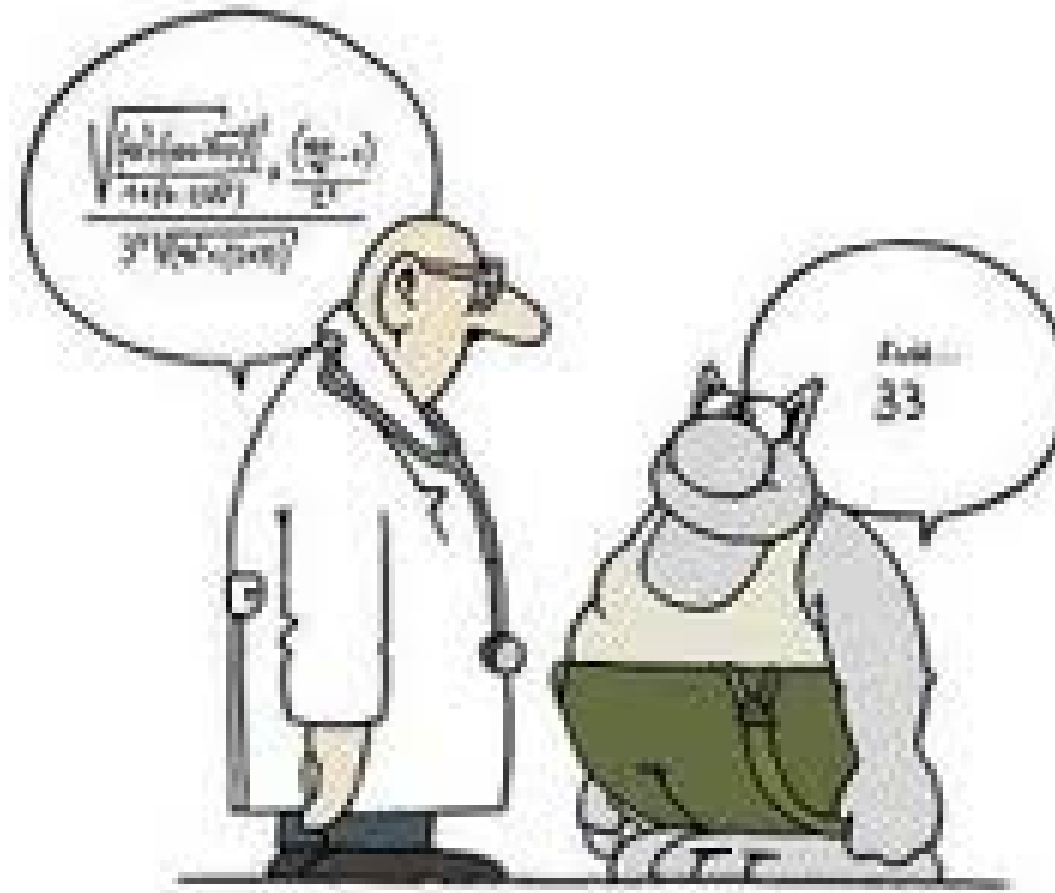


De la collecte de données à la décision d'Entreprise





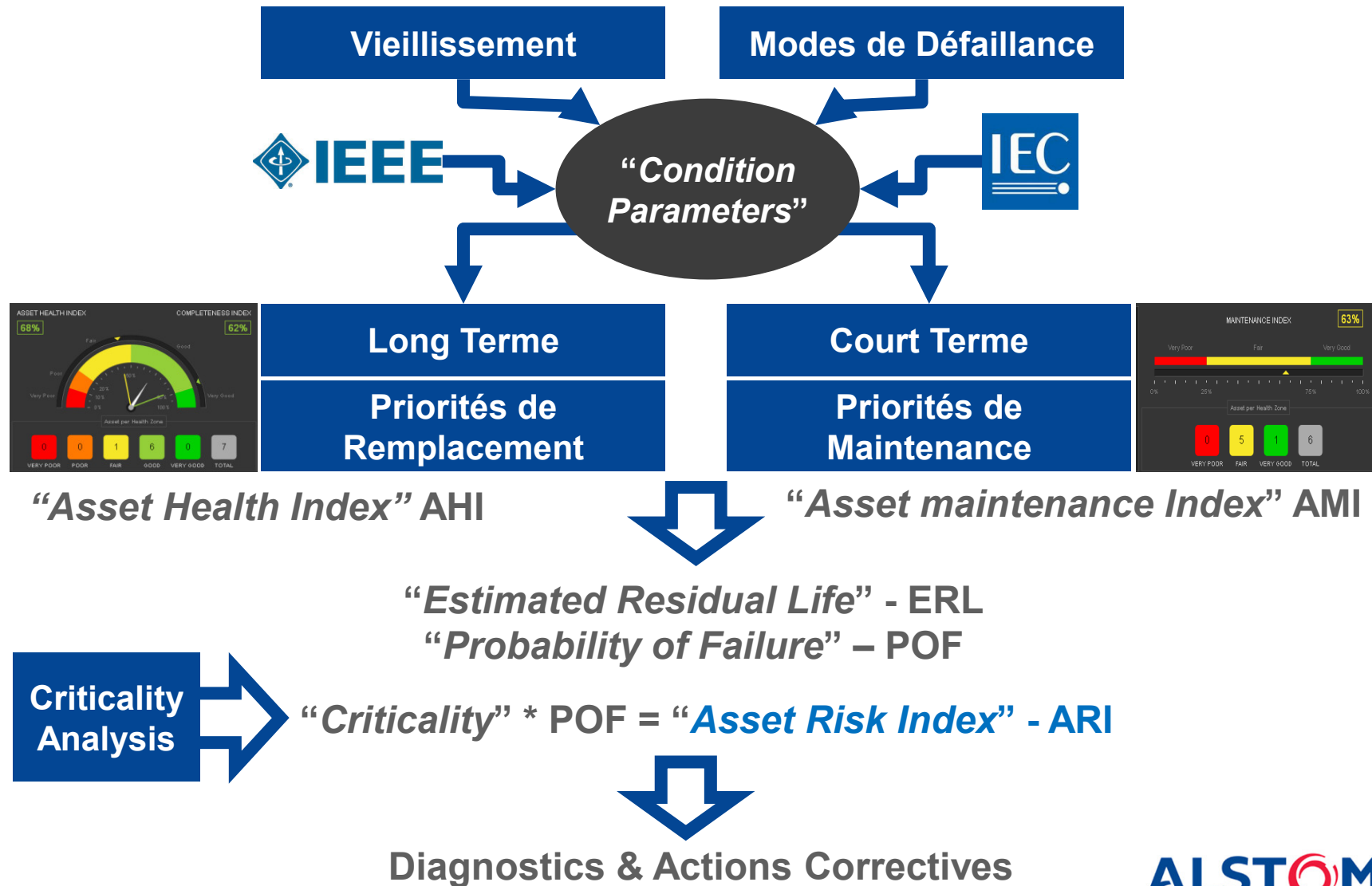
Santé des Equipements: les Analytiques





Condition des Equipements

La méthodologie e-terraassetcare



Navigation Tree

Filter | Sort | Options

- GRID
 - EAP
 - NEPOOL
 - EAST
 - NORT
 - SOUT
 - GOLDEN
 - CB
 - TR
 - GOLD-EDG TC5 H409593
 - JVILLE
 - MTOWN
 - WALDEN

Map

A map view showing the geographical location of the asset. A blue icon labeled 'GOLDEN' is visible on the map, indicating the asset's location within the grid.

Health Summary

ASSET HEALTH INDEX

86%

Very Poor | Poor | Fair | Good | Very Good

Condition Parameter 2 per Health Zone

1	0	12	3	41	57
VERY POOR	POOR	FAIR	GOOD	VERY GOOD	TOTAL

COMPLETENESS INDEX

90%

RESIDUAL LIFE

1972 - 2031

16.7 Yr

CRITICALITY

100 - 10 - 1 - 0.1

9 M\$ | Set

POF

0.2%

RISK

10 - 1 - 0.1 - 0.01

0 M\$

DIAGNOSTIC LABEL

AH-1 | *Diagnostic*

GOLDEN > TR > GOLD-EDG TC5 H409... | 2014 Apr 15

Investigate Measurements show some abnormality

Due Date: 2014 May 15

N/A

N/A

By: Fabien Ribourg, 2014 ...

MAINTENANCE INDEX

14%

Critical/Urgent | Non-Urgent | Normal

0% 5% 15% 40% 100%

Condition Parameter 2 per Health Zone

0	1	0	1	2
CRITICAL	URGENT	NON-URGENT	NORMAL	TOTAL

Charts

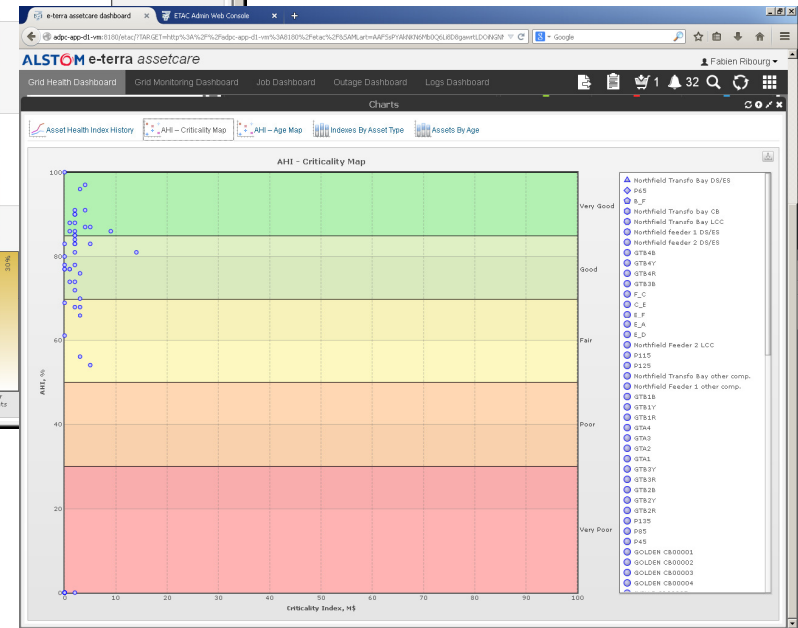
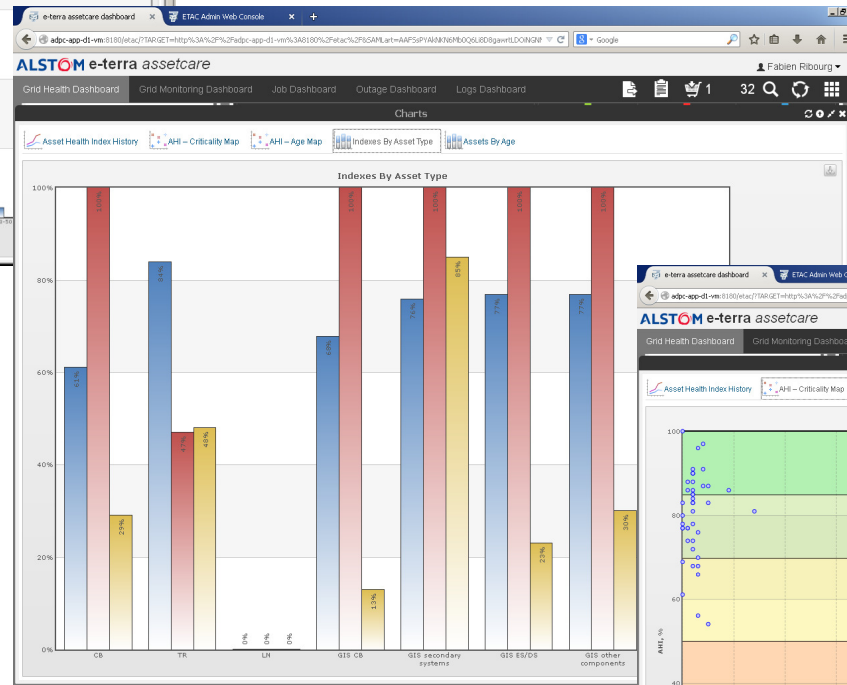
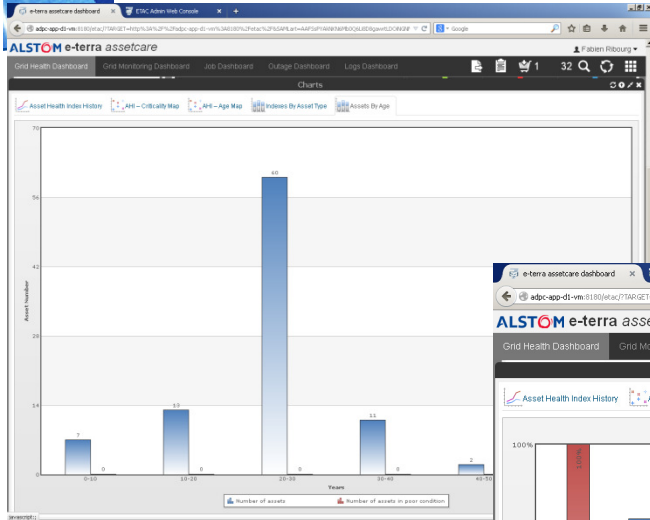
Asset Health Index History | Completeness Index History | AH-1 Condition Parameters Spider | AH-1 - Criticality Map | AH-1 - Age Map

AHI - Age Map - GOLD-EDG TC5 H409593

The chart displays the historical trend of the Asset Health Index (AHI) percentage. The y-axis represents the AHI percentage from 60% to 100%. The x-axis represents time. A red line shows the trend, which starts at 100% and gradually declines. A blue vertical line highlights the current AHI value of 86%, which falls within the 'Very Good' health zone.



Histogrammes des Ages, indices, criticité, ...



Alertes: les évènements à suivre

e-terra assetcare dashboard | ETAC Admin Web Console

adpc-app-d1-vm:8180/etac/?TARGET=http%3A%2F%2Fadpc-app-d1-vm%3A8180%2Fetac%2F&SAMLart=AAF5sPYakNKN6Mb0Q6Li8D8gawrtLDOINGM

ALSTOM e-terra assetcare | Fabien Ribourg

Grid Health Dashboard | Grid Monitoring Dashboard | Job Dashboard | Outage Dashboard | Logs Dashboard

Navigation Tree: Filter | Sort | Options

- GRID
 - EAP
 - NEPOOL
 - EAST
 - NORT
 - SOUT
 - GOLDEN
 - JVILLE
 - MTOWN
 - WALDEN
 - TP
 - SECA
 - CRETE

Unacknowledged Alerts

25 of 32 shown | Refresh

Alerts: 32 UNACK

COND	HGH	MED	LOW	Totals
COND	17		10	27
GRID				
JOB	2	2	1	5
Totals	19	2	11	32

Ack.	Alert	Role	AHL	Cart	Note	Issuan...	AHI, %	CPLI-H...	AMI, %
✗	Critical	P85	CHANIA	⚙		2014 J...	69	85	0
✗	Critical	P125	CHANIA	⚙		2014 J...	33	81	0
✗	Motor ...	P85	CHANIA	⚙		2014 ...	65	80	
✗	Fair	P85	CHANIA	⚙		2014 ...	65	80	
✗	Fair	P85	CHANIA	⚙		2014 ...	66	80	
✗	Fair	P45	CHANIA	⚙		2014 ...	61	56	
✗	additio...	P115	CHANIA	⚙		2014 ...	33	76	
✗	Fair	P115	CHANIA	⚙		2014 ...	66	13	

Map

GOLDEN

Acknowledged Alerts

9 of 9 shown | Refresh

Alerts: 9 ACK

COND	HGH	MED	LOW	Totals
COND	5		2	7
GRID				
JOB	1		1	2
Totals	6		3	9

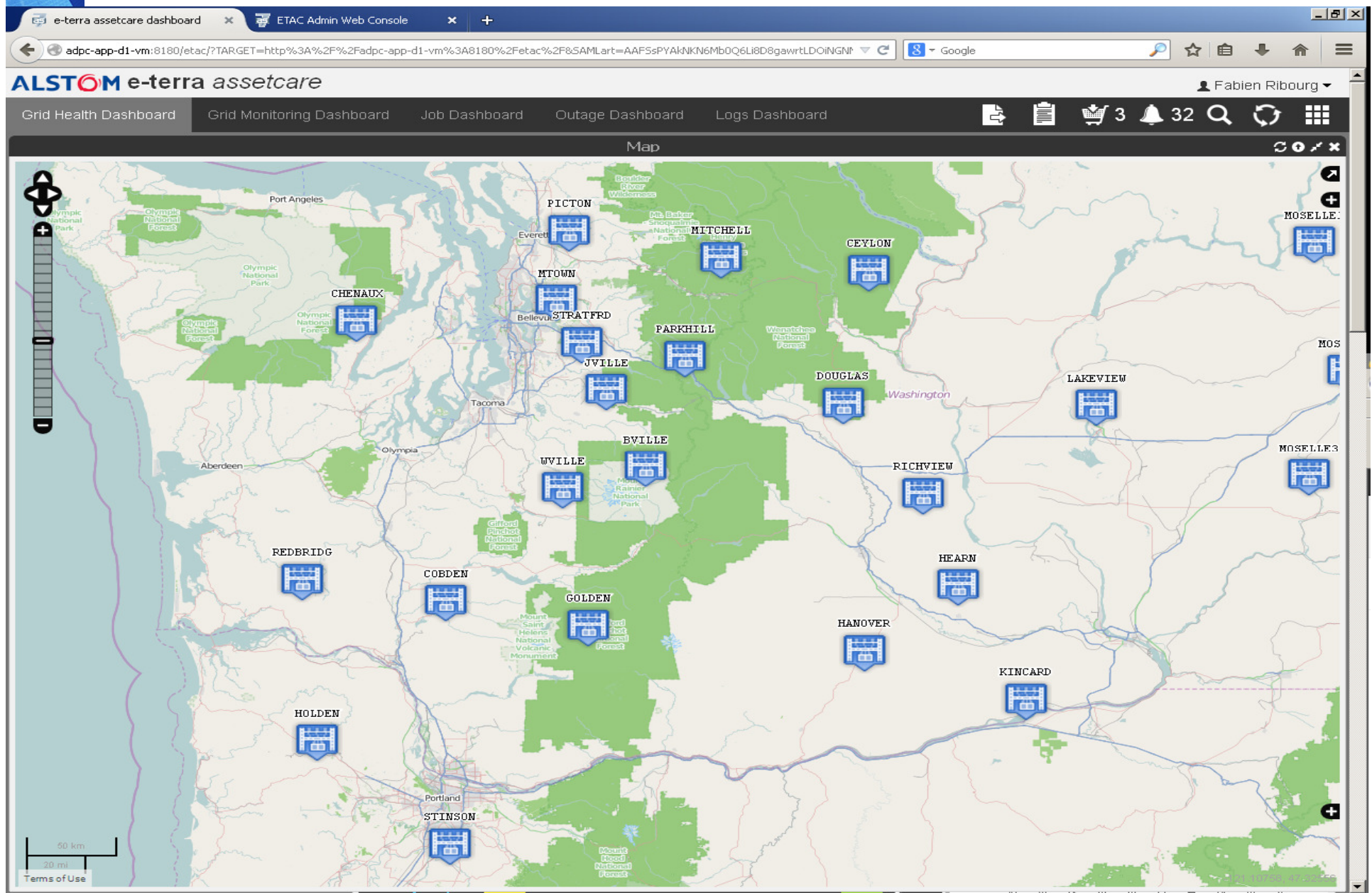
Del.	Alert	Role	AHL	Cart	Note	Issuanc...	A...	Ackno...	A...	C...	A...
✗	SF6 leak !	P65	CHANIA	⚙		2014 M... T...	2014 Ju...	77	5	0	
✗	Critical	KINCAR...	KINCARD	⚙		2014 M... t...	2014 M...	75	5	0	
✗	Critical	KINCAR...	KINCARD	⚙		2014 A... F...	2014 A...	75	5	0	
✗	Normal	KINCAR...	KINCARD	⚙		2014 A... F...	2014 A...	75	5	0	
✗	Normal	KINCAR...	KINCARD	⚙		2014 A... F...	2014 A...	75	5	0	
✗	SF6 Gas...	Northfi...	Transfo ...	⚙		2014 A... D...	2014 M...	65	10	0	
✗	Critical	KINCAR...	KINCARD	⚙		2014 A... F...	2014 A...	75	5	0	
✗	Critical	KINCAR...	KINCARD	⚙		2014 A... F...	2014 A...	82	10	0	

Assets History

+ Add | Edit | Delete | Export

Search... | Refresh

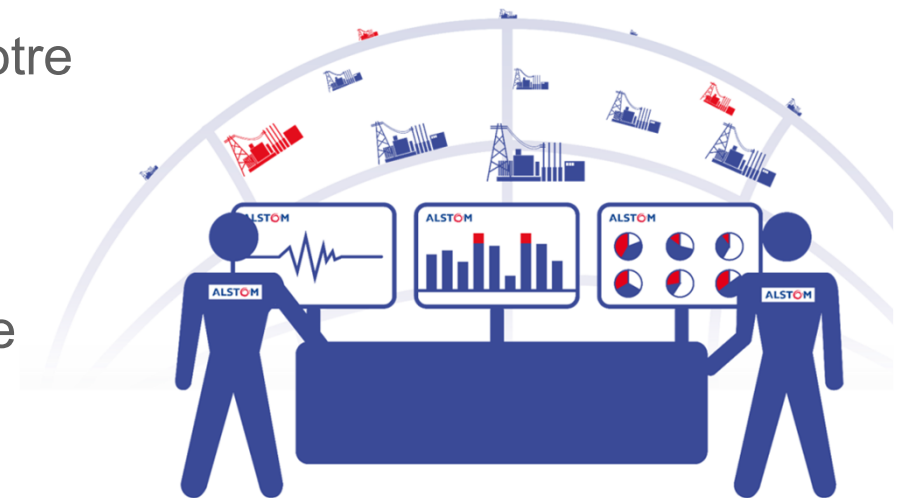
Equipements, Sous-stations, Alerts, ... sont geolocalisés





Les Analytiques pour la gestion de patrimoine: **Fiabilité et Valeur** des Equipements

1. Toutes les données sur **l'état des équipements** en **1 lieu unique**
2. **Tous types d'équipements**, avec votre propre expertise en complément des modèles Alstom, pour produire vos **indices de santé** et de **risques**
3. Une **méthodologie** cohérente pour le **support à la décision**, combinant les vues **financières et techniques**
4. **Integration** du processus d'Entreprise du terrain jusqu'au Système d'Information





Analytics for Asset Management

QATAR GTC501 Case Study

May, 2015

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Asset Management Activity Director

| *Shaping the future*



QATAR GTC 501

Customer requirements

- Business Objectives:
 - maintain high level of **reliability** for the Distribution grid
 - fix **priorities** for condition based maintenance / repairs
 - enhance personnel & equipment **safety**
- Required process:
 - Assess **in live state** the current condition of the equipment, insulation, performance (probability of failure) and risk
 - Maintain a database
 - Enable asset management decisions to be made based on an accurate understanding of asset condition.
 - Identify the equipment that needs corrective action.
 - Suggest corrective action to eliminate possible failures



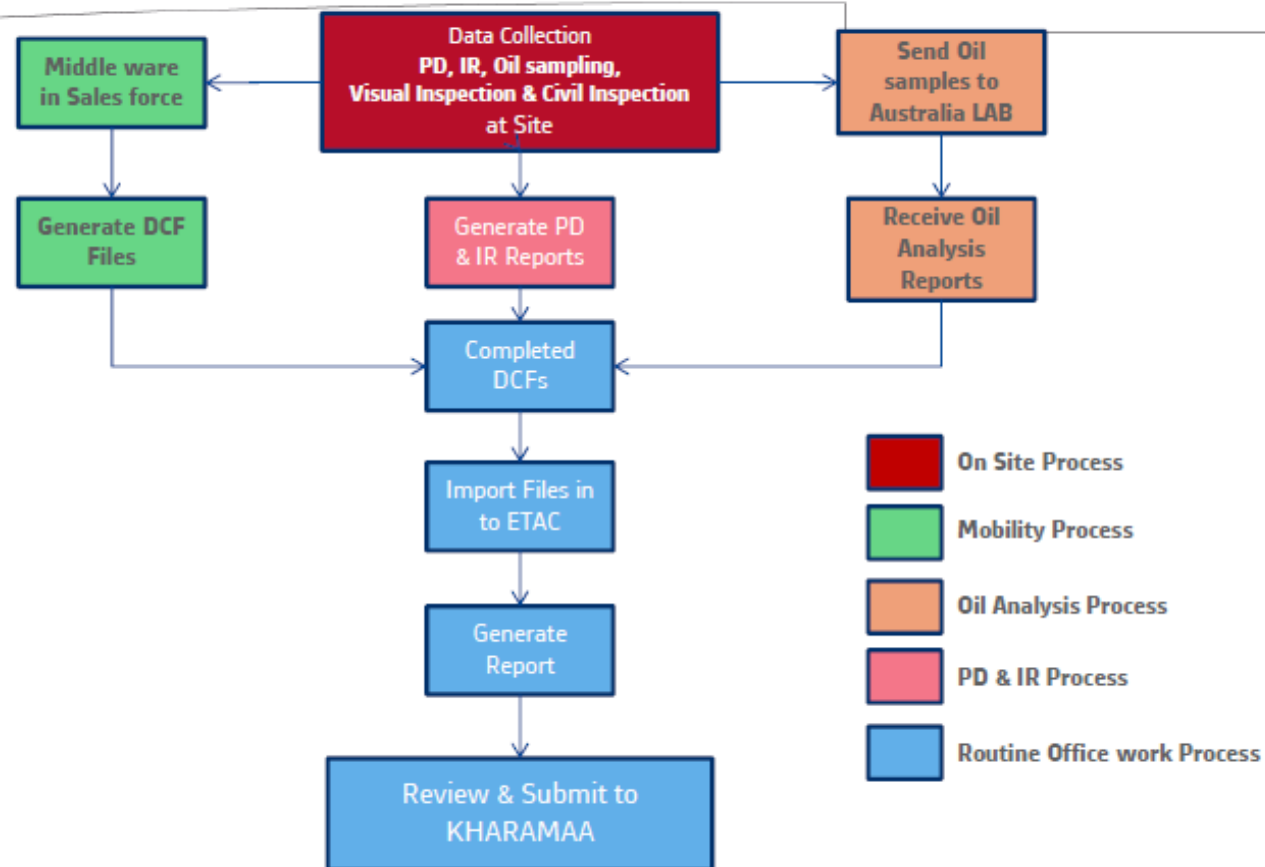
GTC 501

Scope of Works

- Identification and Condition Assessment of assets in 11,300 substations:
 - 3,800 Indoor substations
 - 7,200 Outdoor substations
 - 300 Package units
 - Sized for 150,000 assets
- Scope:
 - Asset data collection
 - Nameplate static data
 - Visual inspections, leakage detection (SF6, oil, ...), ...
 - Transformers Oil sampling and DGA Analysis
 - Partial Discharge testing
 - Infra-Red thermography
 - Complete methodology and analytics for Condition and Risk-based Maintenance
 - Evaluation of results and suggestion of Remedial Measures
 - Training of Utility staff



GTC501 – Main data & process flow

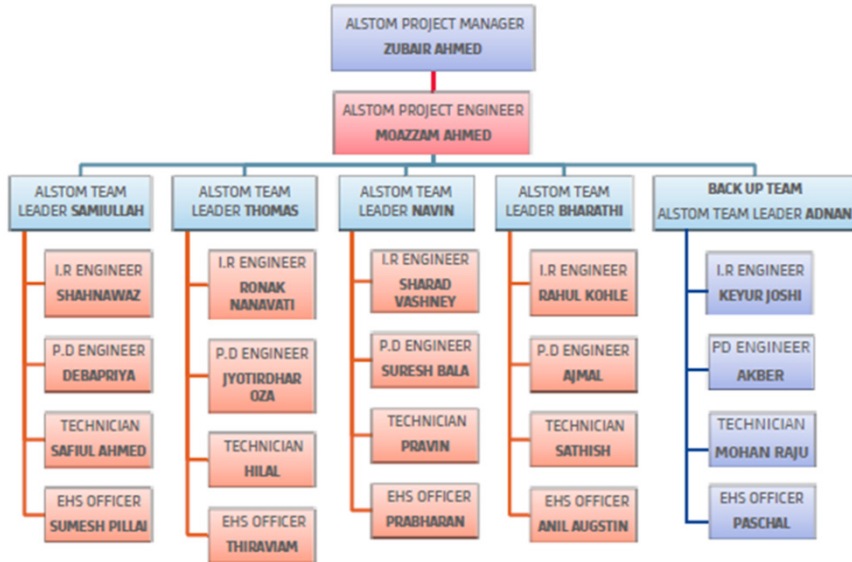


GRID

ALSTOM



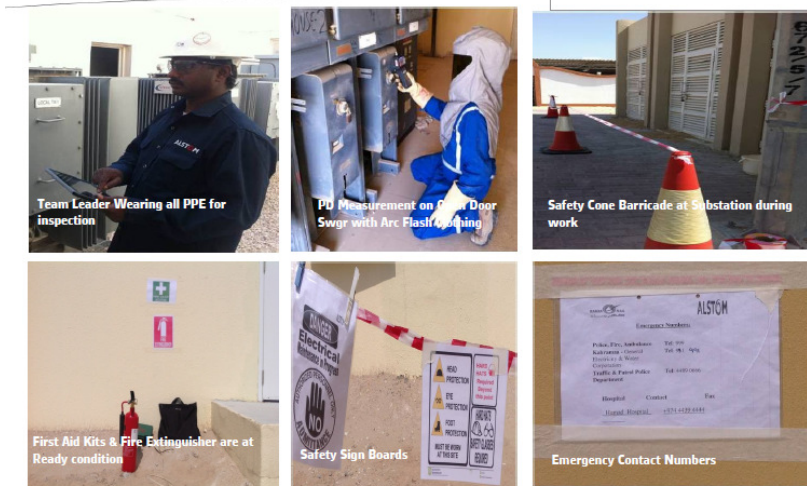
Site Inspection Teams: Safety and Quality first



On Site Routine Activities Photographs



Compliance to Safety Rules






Quality & Continual Improvement Department
Quality Assurance and Control Section

SITE QUALITY CONTROL INSPECTION

Good Points:

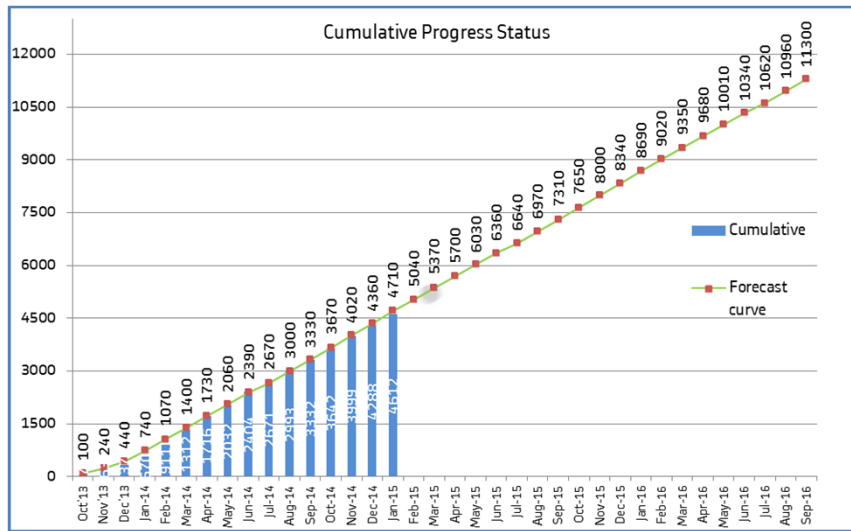
1. Conduct of safety briefing and orientation of the inspection and test to be performed.
2. Strict in the implementation of PPE at the site.
3. M/s Alstom have specialized personnel for the test to be implemented.
4. Good planning and execution of the inspection and test (photo #3,4,5)
5. M/s Alstom High management involvement of the works.
6. Implementation of Automated inspection and data gathering.

Sr. QCE:	Mario Solang	Signature:		Date:	11.01.2014
QA/QC HOS	Hesham Ali Hassan Al Allah	Signature:		Date:	01.01.2014

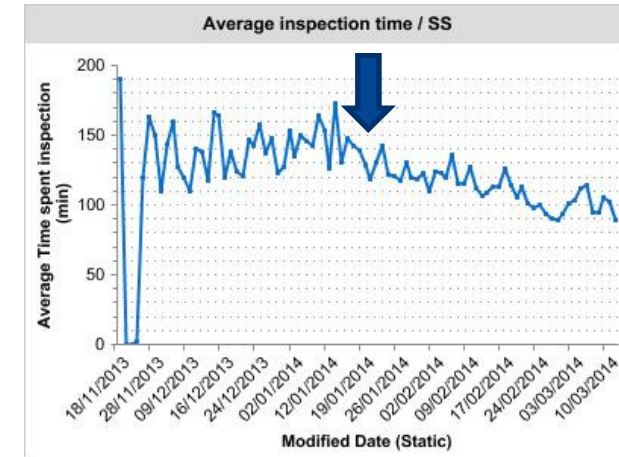
Presentation title - 09/03/2014 - P-16



Progress of Inspections: Tablet applications are a key enabler

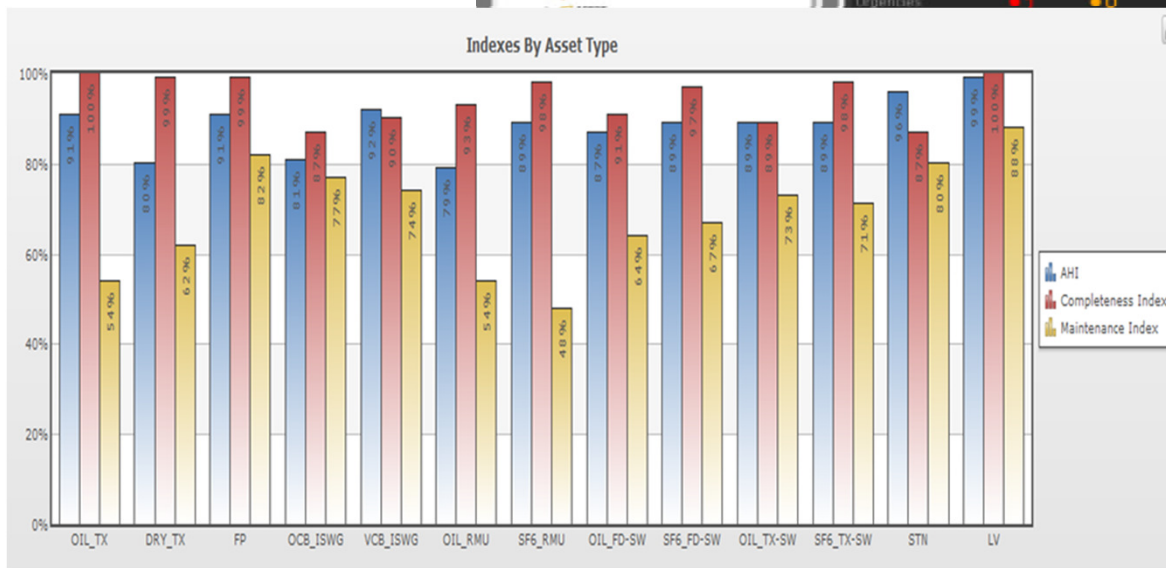


30% productivity improvement





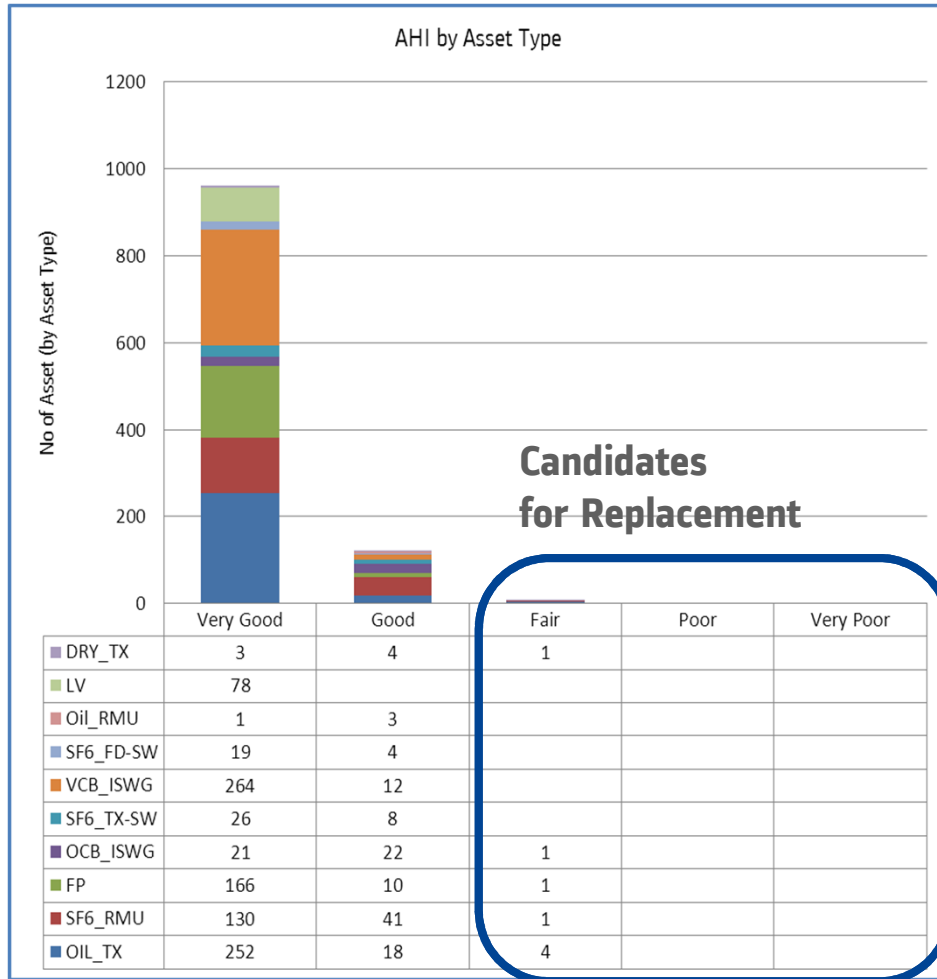
Analytics: Ex of Dashboards & Charts



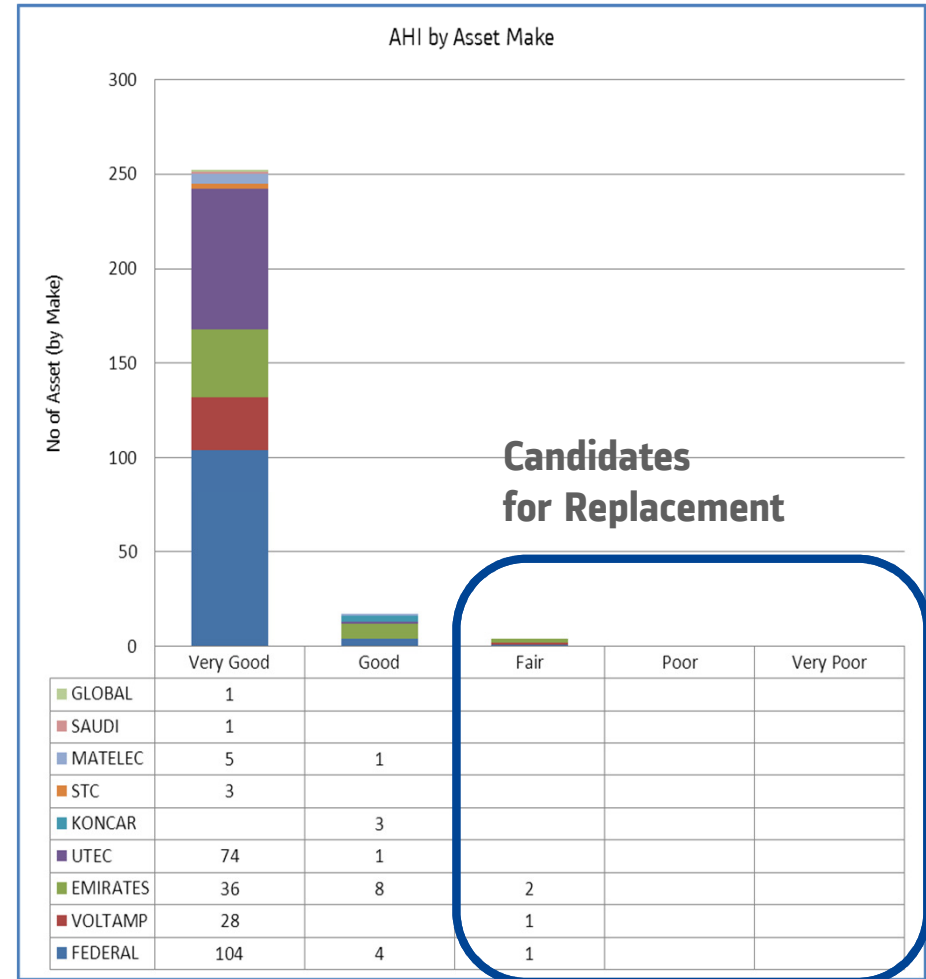


Customer Report / Monthly recommendations Replacement Candidates (AHI)

All Inspected Assets - per Asset Type



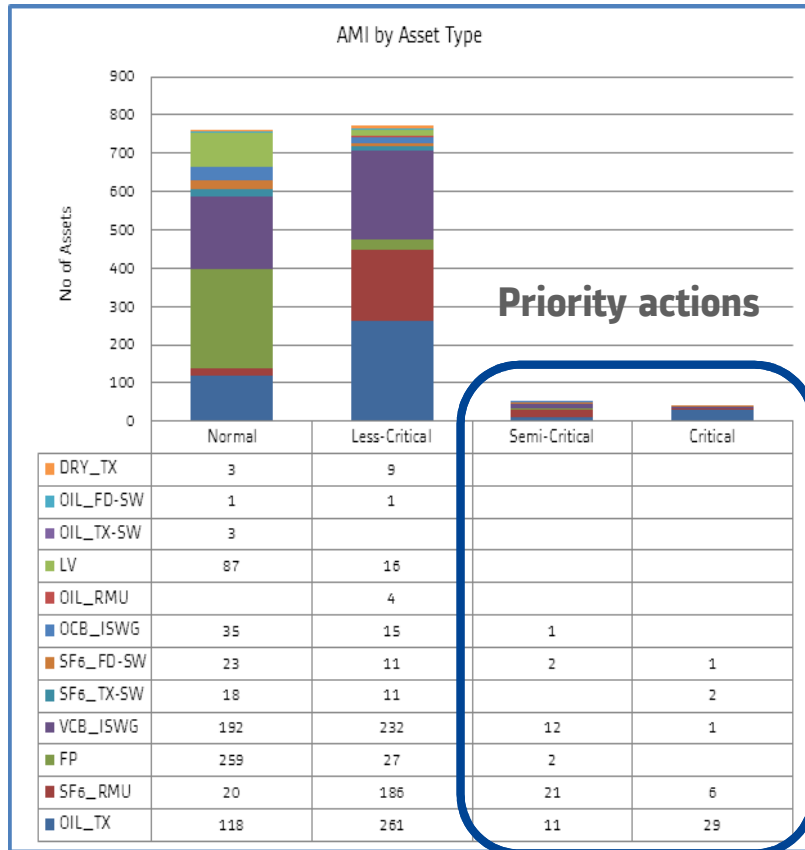
Inspected Oil Transformers - per Make



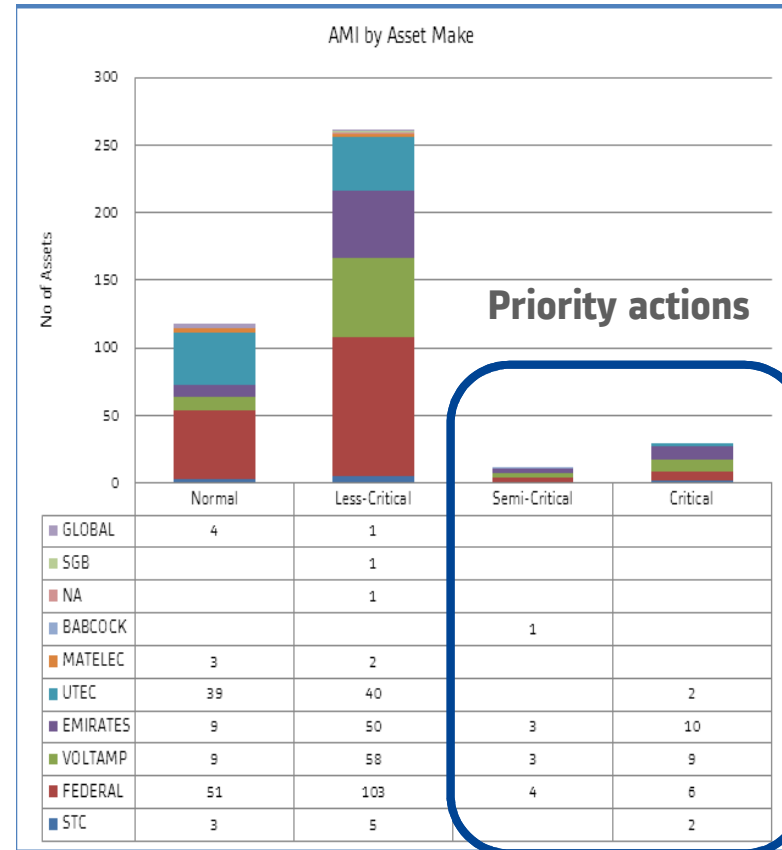


Customer Report / Monthly recommendations Maintenance Priorities (AMI)

Maintenance Index - per Asset Type



Maintenance Index - per Asset Make





Project Execution Status Summary as of 2Q2015

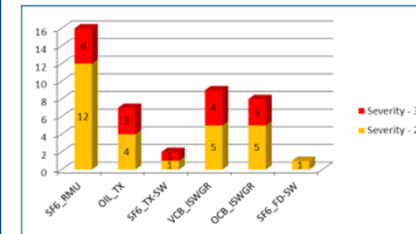
- Site inspections are executed at the planned rate
 - Tablet-based Mobility Application was essential
- No EHS incident, QA process compliant
- Analytics deployed successfully
 - Asset Health Models applied on thousands of assets
- Priorities for Interventions submitted periodically
- Good practices identified for Big Data projects
 - Define a solid **Data Dictionary** and **project glossary** as early as possible
 - Assign a **Chief Data Analyst** position as early as possible
 - **Train & support** project team (Concepts, Design, Health Model)
 - Split the **data flows in phases** with well identified **Interface** points
 - **Teamwork between Service & Software Solutions** is key



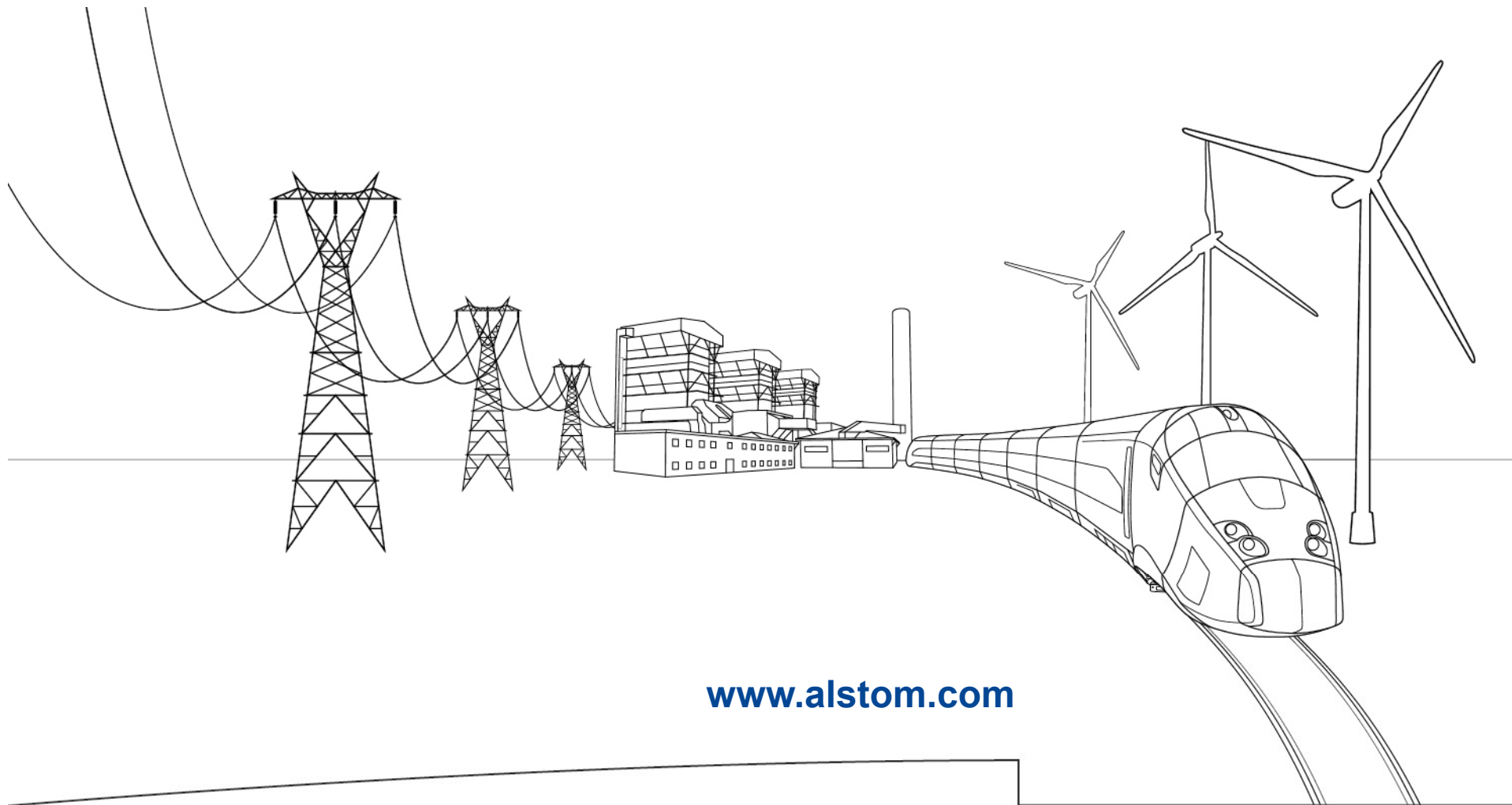
Benefits for Customer

- Comprehensive information on the whole grid
 - Correct static description of assets
 - Detailed assessment of condition
 - Central, modern web based tool for sharing data
- Objective, reliable assessment of overall situation and urgencies for intervention
 - Effective scheduling of priorities
 - Decisions shared throughout the company
 - Methodical evaluation of global performance
- **Avoided Failures** acknowledged by Customer - via:
 - List of critical maintenance actions
 - List of recommended replacements

- **Very High ROI**



Sr No.	SS No	Substation Name	SS Type	YOM	SR NO	MFG	Replacement Date
1	488	NEW SALATA 3	ID	2006	813628	Volta mp	09-02-2014
2	488	NEW SALATA 3	ID	2003	3280	Federa l	09-02-2014
3	3065	N.D.-16	OD	1984	135288	South Wales	19-03-2014
4	10778	NEW WAKRAH SOUTH	ID	2006	8813919	Volta mp	12-01-2014
5	4427	Bahama HSQ South-3	ID	2007	8914323	Volta mp	20-03-2014
6	4008	Najeeva West-11	OD	2004	15183	Federa l	18-02-2014
7	1981	Najeeva Sports Club	ID	2007	8813706	Volta mp	19-03-2014
8	3639	Fariq Blouch No -09	OD	2008	8816195	Volta mp	12-02-2014
9	3000	Doha Motor Showroom	OD	2006	18047/11	Emirates	20-03-2014
10	1034	Ghanim Garden 2	ID	1996	1895708	Emirates	26-01-2014
11	1049	Fahad Bin Abdullah	ID	2006	1701018619	Emirates	21-01-2014
12	1051	Montaza School-1	OD	2007	8814080	Volta mp	19-01-2014
13	3954	FERIQ BALOUCH 10	OD	2007	8814925	Volta mp	12-02-2014
14	2987	TRADE GALLERY	ID	1993	122884-56	Babcock	18-03-2014
15	20	SH FB Jassem-B	ID	NA	8813058	Volta mp	02-02-2014
16	16412	IH COMPLEX-4 S/S-4	ID	2000	1852304	Emirates	30-03-2014
17	2809	BANI HAJIR - 18	ID	2009	8817203	Volta mp	23-03-2014



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