ASSET MANAGEMENT PROVES TO SECURE SUSTAINABILITY

Benoît HOUSSARD
ORES Belgium
benoit.houssard@ores.net

Michel LEFORT
ORES Belgium
michel.lefort@ores.net

ABSTRACT

When implementing Asset Management process, it was chosen for building a robust system based on three separate processes consisting in:
- *defining the expected performance by asset type*
- *issuing technical policies for achieving the targets*
- *screening all work and investment proposals.*

Sustainability of investments is secured so far.
This approach is not challenged by the Smart Grids issue. However the network design rules that are referred to when scoring the individual projects are being revisited for coping with Smart Grids.

INTRODUCTION

Presentation of ORES

ORES is the second biggest Belgian DNO managing the energy distribution of 1.8 millions of electricity and gas clients in Wallonia (the South of Belgium). ORES operates the medium (<20kV) and low voltage network and the medium (<15b) and low pressure gas distribution network. ORES also operates all the required meters and manages the meter data and the clearinghouse processes in the major Walloon part of the Belgian energy market.

ORES	Electricity	Gas
# consumers	1,35M	0,45M
# municipalities fed	194	104
Length network medium	20.000 km	2.850 km
Length network low	30.000 km	5.050 km
# cabins	21.000	3.000
Energy supplied	36TWh	61TWh
Budget investment (yearly)	160M€	68M€
Workforce (FTE's)	2200	

Asset Management history at ORES

(Strategy development 2003-2006; implementation 2007)

The full liberalization of the energy market in Belgium reinforced the importance of a right estimate of the added value of all the investments the DNO's planned.
To optimize the allocation of the resources, it seemed mandatory to develop a robust and objective analysis of the needs of the network without losing the long term perspective and the cost management. Therefore we started a project at federal level, together with Eandis (the biggest DNO in Belgium) and an external consultant to define new processes, build IT applications and data model and obviously to design the new organisation with a clear split of the responsibilities between asset owner, asset manager and service provider. Those new processes were implemented at autumn 2007. The AM team evolves in maturity and in size and becomes accountable for the building of the investment's plan.

ASSET MANAGEMENT AT ORES

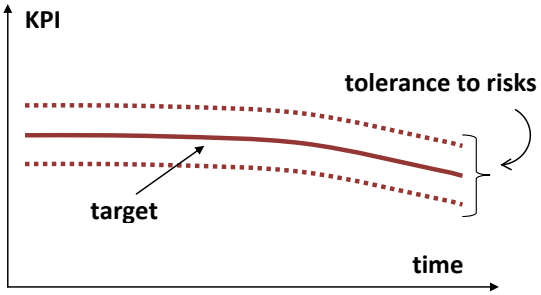
Fundamental choices

The asset management organization is resting on the following fundamental choices:

Strategy: the asset owner fixes a strategy that is lined up according to 5 axes (health & safety, quality of service, efficiency/costs, environment, corporate image). For instance, in many regions, the quality of service measured in customer minutes lost (CML) is considered as satisfactory; it is a strategic decision not to tend towards lower CML but to increase the safety.
Another strategic statement for instance is about the decommissioning of remaining LV voltage distribution bare copper lines on the façades.

Focus on KPI: the strategy is converted into KPI (key performance index) for identifying the asset types that are impacted by the strategy.

Risk management: risk matrices coupled with multiple KPIs appeared too complicated and unpractical. Risks are managed by evaluating the probability of deviation of a KPI over time. This allowed measuring the risk and the tolerance to risks still focusing on KPI's, setting boundaries on the expected performances.

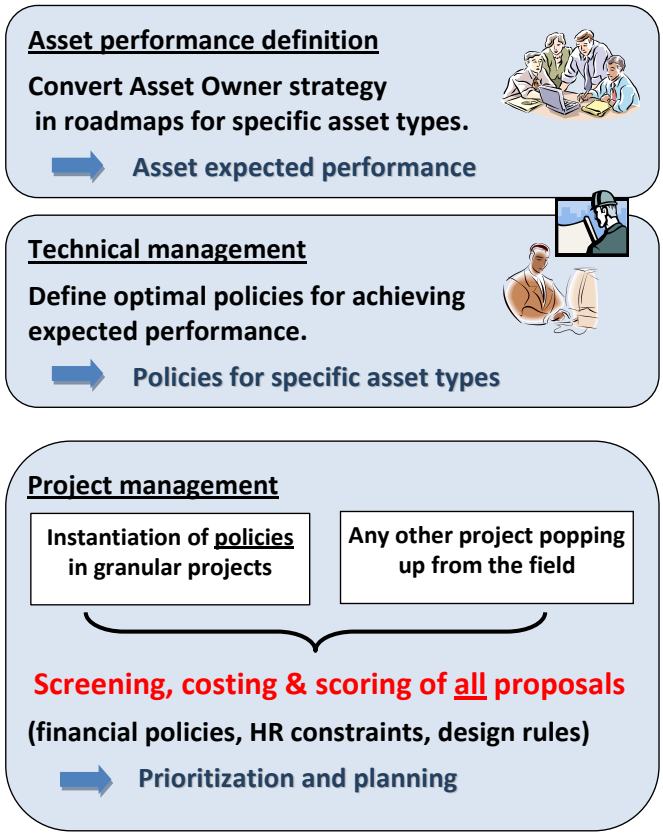


At asset performance analysis stage, asset types requiring a policy to be applied are pinpointed (roadmap).

Combining data with knowledge: Be it for defining the expected asset performance, be it for tuning aging models, available data sets are often insufficient. The team uses quantitative data sets when available, combining them with field and engineering knowledge into best, worst and average data points for avoiding starting an intensive data collection process.
The lack of established reference models, validated by literature and field experience, was also a reason for doing so. Without such a pragmatic approach, actual release of the program would have been unacceptably delayed.
When implementing the technical policies, all prospective locations are visited for enquiring about the actual state of the assets.

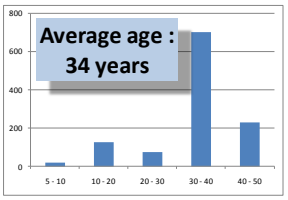
Robust process: It was chosen not to go for an integrated process but rather to go for a process built around independent modules. After developing a global vision, several independent software applications were bought, eventually from different suppliers. Step by step implementation and quick wins were sought and obtained.

No privilege project escaping the screening phase:
All projects, those resulting from the application of the asset management policies as well as those popping up from the districts for any reason have to pass the screening and scoring process for being prioritized and consecutively released or postponed.

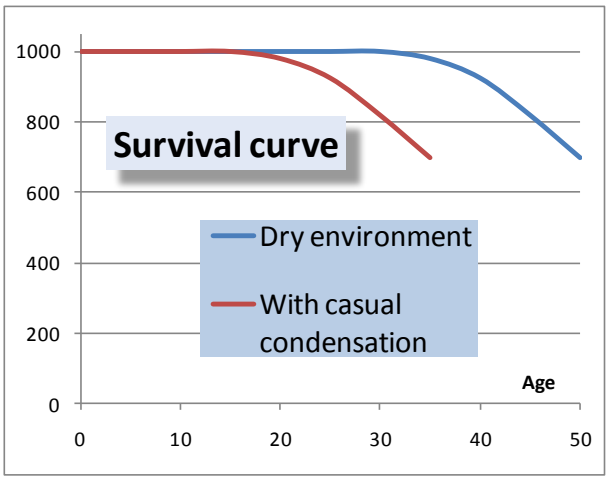


EXAMPLE OF TECHNICAL MANAGEMENT

The technical management will be illustrated by the example of compact insulation enclosed switchgear that was much used in the seventies. At first glance, it is a difficult case since the age distribution is quite unfavorable, with an average age of 34 years.



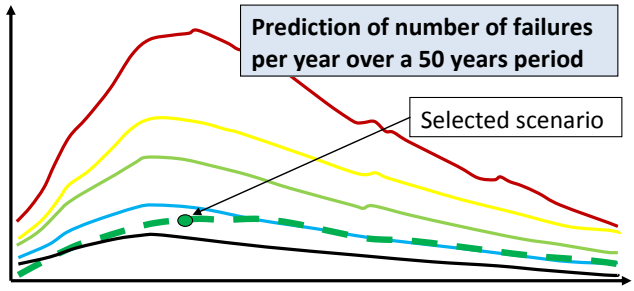
The first step is to adopt aging models. This is done by consultation of experts and field crews who agreed on lifetime curves ***that take the environment of the switchgear into accoun***t. Insulation enclosed switchgear is indeed quite sensitive to humidity and pollution; the kind of cabinet in which they stand has a strong influence on the lifetime.



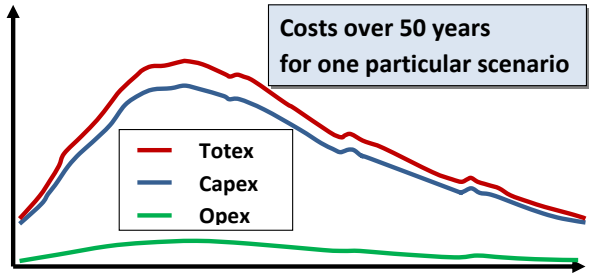
Example of "agreed" aging model

Experts and maintenance crews also listed the possible mitigation actions like cleaning, replacement of specific components or replacement as well as inspection techniques for condition based decisions. From this list they set up the various combinations of actions that are considered in the technical management scenarios.

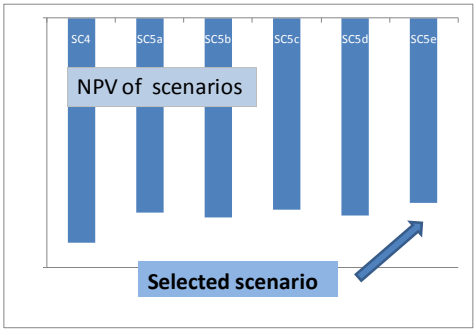
The software application that was developed allows to simulate and evaluate different scenarios and to produce failure prediction curves together with the calculation of the net present value (NPV) of each scenario.



For each scenario the total costs including the safety risks and the non delivered energy penalties is computed over the same time horizon.



The NPV over a time horizon of 50 years is calculated considering the total expenses (Totex) on one side and the revenues on the regulated asset base (RAB) on the other side. The NPV is negative and is driven by the operational expenses (Opex). Choosing the scenario with the highest NPV is equivalent to minimizing the Opex. However, the main driver in this case is to keep the failure rate within expected asset performances.



By iterated simulations it was possible to find a scenario that is quite satisfactory in terms of NPV and predicted failure rates. This scenario consists in a condition based, selective yearly replacement of 3% of the remaining units.

There is a regular follow-up of the technical policies and of the results achieved, chasing possible necessary adjustments.

In spite of the unfavorable age profile it was possible for this particular type of equipment to set up a policy that keeps performance within expectations and is all together economically efficient and financially sustainable.

LESSONS LEARNED AND OPINIONS

In this chapter, we bring some lessons learned as well as some tentative answers to questions raised in the call for paper.

Sustainability of investments: so far, no threatening wave of exceptional needs in investments or shortage of financial resources have been identified. There is a good continuity in the level of investment even compared with the situation of the utility before unbundling.

Aging infrastructure: It is often said that the big threat for the network owners is the ageing infrastructure. This is not the perception of ORES. The example given above shows that following a smooth investment plan over a long term horizon, the asset performance of an asset with unfavourable age profile can be properly managed.
Not all assets have a ill age profile, distribution transformers for example have a flatter age profile.

First concern is with switchgear: the example given here is quite representative. In capital investment, the MV and LV cables represent the largest part but the performance is such that they are second to switchgear in terms of asset management effort.

Constraints come often from human resources: when screening and scoring the projects for prioritization and planning it happens very often that projects are constrained by the availability of the required personnel for implementing the projects.

Capex versus Opex: In the prioritisation process, the total cost of each project is put in relation with its contribution in reaching the network performance objectives; this gives, for each of them, a (total cost / efficiency) ratio. Only those projects having ratios under a specific limit are accepted. By doing so, Capex and Opex weight equally in the final prioritisation process and quest for economical efficiency. This is aligned with the long term practice (even if previously informal) of the utility before the unbundling.

Balancing investments and service quality: as the service quality in terms of CML is considered as satisfactory and not liable for improvement, the target is to keep it at present level and in the scheme adopted by ORES, balancing the investments is driven by the targets assigned to the performance of the assets.

Short and long term balance: long term perspective is the rule at all stages of the process: KPI targets are defined on the long term, technical policies balance performance and investments on the long term an project prioritization is based on NPV on a long term horizon; however if unexpectedly, the performance of an asset is leaving the tolerance band, there is no other choice than launching a short term policy.

THREATS

Design of the network on the long term

The biggest threat on the sustainability of the Asset Management is the risk of inadequacy of the infrastructure for answering the needs of the power system in the years to come. The low carbon economy and new Smart Grids technologies are coming at a pace that is quite fast when observed on the time scale of 30 to 50 years that is relevant for the electricity distribution Asset Management.

In the approach taken by ORES, the asset management process itself will not need to change.

However the pressure is on the update of the design rules which give the vision of the network on the long term. Any work project is assessed with respect to those design rules. The right vision of the network on the long term horizon is the key for avoiding stranded costs.

POINTS OF CONCERN - ROADMAP

State estimation - hosting capacity

The operation of the distribution system becomes more complex since the vision of the network load is biased by the distributed generation. More sensors and IT tools are necessary for keeping a good observability of the network operating parameters (voltages and currents at any critical point). The same happens with the management of the hosting capacity. A deeper knowledge of the real time and prospective state of the network is necessary. The challenge is to do it in a smart and robust way, avoiding generating quantities of useless information and being resilient to unavoidable inconsistencies in the data bases.

Smart Metering

Smart metering may be a pre-requisite for efficient market operation and energy use but it is not a requirement for having an effective asset management.
Smart metering is expected to be imposed for reasons extraneous to Asset Management and could become a competitor diverting limited human and financial resources if not supported by additional revenues.

Active network management

For the moment, wide scale active network management is not considered as a general and systematic solution for increasing the hosting capacity of the networks but the matter is currently examined, with possibly demo cases, for determining in which cases and in which terms it can bring attractive alternative solutions to network re-enforcements.

Assessing the impact of active network management on the actual network design rules could be the most challenging task. The hope is that active management will introduce a bit of flexibility in the network development which is otherwise bound to rather incremental and irreversible adaptations.

CONCLUSIONS

The implementation of formal Asset Management practices is ensuring sustainability in the capital and operational expenses. As far as the objectives are concerned, they are not so different (in the ground) of those implicitly pursued in the past; the difference is however considerable in the sense that all decisions have been objectivised by assessing their benefits and relative order of merit in the context of clearly defined and regularly updated policies.

Building on simplicity and robustness, quick results could be caught.

As far as the new Smart Grids technologies and the needs of the low carbon economy are concerned, they are considered as a threat not on the Asset Management process itself but on the design rules which give the necessary guidance for shaping the network. The major threat is the one of infrastructure inadequacy with respect to the needs of the coming years.