IMPLEMENTATION OF ISO 55.000 AT MITNETZ AND LEAN MANAGEMENT PROCESSES

all: MITNETZ STROM – Germany

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ABSTRACT

The energy transmission, the pressure of regulation on grid fees and the expectations of customers and shareholders set difficult targets for the grid operator. A process to deal with these targets is described in ISO 55001; more specifically ISO 55001:2014 comprised the requirements at asset management as management systems.
MITNETZ STROM and MITNETZ GAS are among the first companies worldwide to implement this international standard and combine it with elements of the famous "Toyota Way", now mostly known as lean management. This paper presents the approach of Mitnetz facing the necessary challenges of ISO 55000 in accordance with the implementation of an industrial managing process. ISO 55000:2014 is the superordinate norm giving an overview and describing the principles.

INTRODUCTION

Since its publication, ISO 55001:2014 increases relevance for distribution system operators (DSO) and municipal utilities. Asset managers in Germany analyse the standard and begin to implement relevant elements of the ISO 55001 with or without external help.
The request that your own "Asset management supports the realization of value while balancing financial, environmental and social costs, risk, quality of service and performance related to assets" [1] should be inherent.
In the past, two CIRED-Papers [2-3] have already depicted the theory of ISO 55000. The following paper updates the previous approaches and it describes the implementation of the asset management at MITNETZ.

THE WAY OF MITNETZ TO ISO 55001

In recent years, MITNETZ has developed his own vision of practical realisation of the standard. Participation in the external study 'International Distribution Asset Management Study 2012' was the starting point of MITNETZ. This study tested distribution system operators of all kinds with the requests of the PAS 55, predecessor of ISO 55001 [4], in the fields "Operating Modell", „Processes", „Information & Technology" and „Culture & Competences". [5]

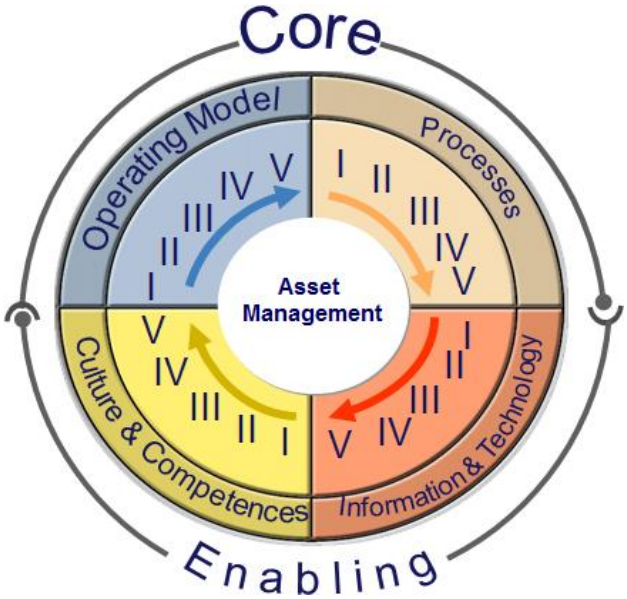

Figure 1 – The 4 core elements of the benchmark

The final report of the study revealed MITNETZ´s strengths and weaknesses: missing business values and lack of Key Performance Indicators (KPI) were identified. [5] In addition, recommendations on important processes in asset management were formulated:
„Areas for improvement […] elements of risk management – risk register, specific risk descriptions, decision making skills, Optimization of CAPEX/OPEX, especially considering risk mitigation. […]" [6]

After the study asset managers searched for appropriate measures for improvement. Two options for the implementation of ISO 55000 were identified:
1. implementation to fulfil the formal requests
2. 'complex' implementation of the norm and the organisation with the intention of sustainable improvement.

MITNETZ decided for the second option. Since 2016 the requests of the ISO 55001 have been implemented holistically as part of a company-wide project so called 'NETZ'it'.

GOALS OF THE IMPLEMENTATION OF ISO 55000/55001

The **goals of ISO 55000** are:
1. **Improving the financial performance:** Reducing the costs while maintaining the asset value (Doing right with the necessary means)
2. **Improving the decision-making:** systematizing the decision making, mirror it on clear criteria and thereby shorten it
3. **Making Management decisions transparent:** Making decisions based on transparent criteria and facts
4. **Identify, evaluate and counter chances and risks in relation to as-sets:** to actively manage chances and risks in accordance with the expectations of stakeholders
5. **Increasing stakeholder satisfaction:** meet or exceed the expectations of consumers and stakeholders
6. **Improving our reputation:** through increased customer satisfaction, stakeholder perception and trust

At the beginning of the process we define the goals of grid operation together with different stakeholders, e.g. owners of the grid, municipal utilities, customers. This includes the value system (finance, legal compliance, image, quality and safety), and sets clear borders for risks to be taken as well as chances to be realised.

This ensures the asset management performed by MITNETZ is carried out the interests of the stakeholders. At the same time, measures of success can be agreed and presented transparently.

Just as all producing industry worldwide we organise our work in cycles. This is copied from the lean management theory which was first developed by TOYOTA. Our complete process consists of 11 cycles (Figure 2).

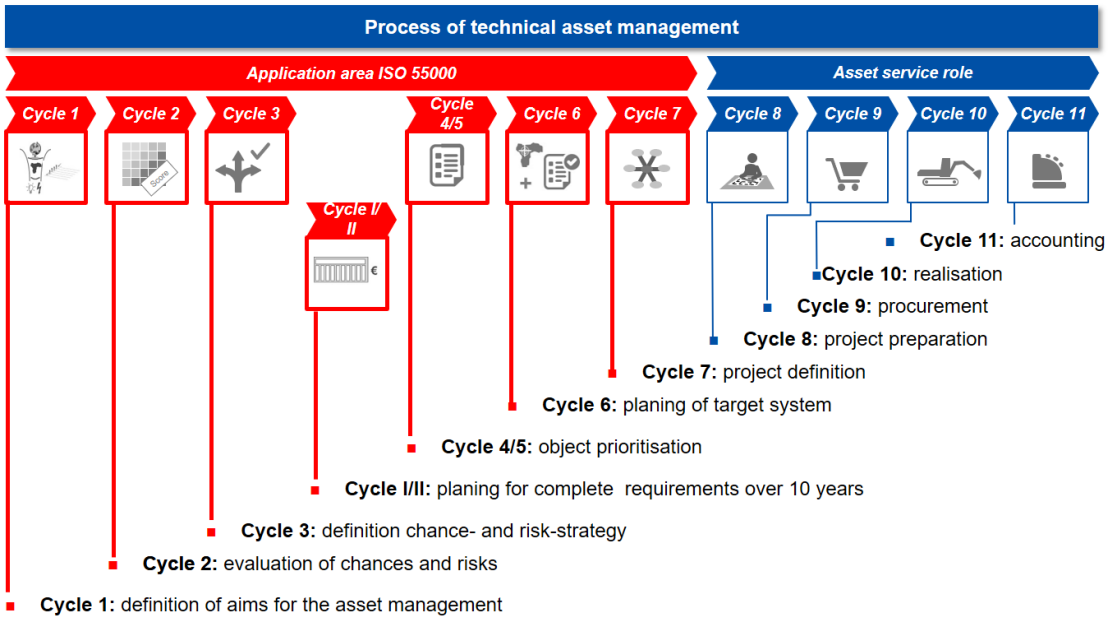

Figure 2: Process organisation MITNETZ

In the following cycle 1 we analyse the development of the respective status of assets, the legal, political and regulatory environment as well as customer requirements.

In cycle 2 we assess the effects of these chances and risks on the assets in a solution-neutral and transparent manner using the classification in the risk matrix (Figure 3) agreed with the stakeholders.

		probability					
		almost impossible (not known in the industry)	unlikely (known in the industry)	possible (occurs in your own network area)	annual	monthly	on a daily basis
		>0,001/a	>0,01/a	>0,1/a	>1/a	>10/a	>100/a
impact	marginal	1	2	4	8	16	32
	low	2	4	8	16	32	64
	moderate	4	8	16	32	64	128
	significant	8	16	32	64	128	256
	high	16	32	64	128	256	512
	disastrous	32	64	128	256	512	1024

Figure 3: Risk matrix MITNETZ

Grid operator and stakeholder agree on the guidelines for dealing with the identified chances and risks. On this basis we realise stakeholders ambitions to develop the assets in terms of corporate values such as finance, legal compliance, image, quality and safety.

All identified chances and risks are firstly evaluated on the risk matrix regarding the five corporate values. They are mapped in the matrix.

In cycle 3 measures for all chances and risks are examined. Each of the measures realises a chance or avoides a risk, and has specific costs.

In the next steps all measures will be compared and a strategy (preferred option) for dealing with this chance or risk is derived. At this point, transparency of the combined resources, competences and necessary time restrictions is created. These are the basis for transparent demand planning and the early recognition of any necessary coordination or action requirements - in short 'planning security'.

Afterwards it is necessary to prioritise measures to objects in cycle 4/5, as well as to compare them with existing or new target network plans in cycle 6 before MITNETZ defines projects in cycle 7 and the 'What?' as asset management.

From this point we are able to share financial requirements of the grid with the commercial planning department for the next 10 years (cycle I/II); different notation with roman numbers due to the difference in the task.

The output of cycle 7 is a project list, in our word 'project-cockpit step number 1': this is a short description of all the needed projects including the information from cycles 1-7 for at least the next 3 years.

This defined projects will first be structured in cycle 8, called portfolio management and planning. This means that all projects are broken down by their priority according to time, scope, budget and the required internal and external resources. For topics that cannot be planned, such as disruptions, flat-rate bundle projects are mapped (Figure 4).

As a result, projects are divided into the current year and the following years, to which all required resources are assigned. The projects are also checked for spatial and temporal overlap in order to determine any further synergies or dependencies in the course of processing or to avoid unnecessary expenditure - e.g. on maintenance for a planned replacement of plant components - or to identify synergies from the processing of cross-media and cross-divisional projects.

An essential task is to compare current and planned projects with the financial, timely and personnel resources available. If deviations are detected, they have to be analysed and countermeasures taken. **The requirement, however, is that a portfolio management system and thus an optimisation system have sufficient storage (projects to be implemented in cycle 7).** This ensures optimal resource utilisation as well as the complete realisation of all commissioned projects or enables early escalation in the event of non-controllability.

This process at MITNETZ completely covers the area of application of ISO 55001. The processes were developed according to the 'pull principle' (the following cycle determines the content and quality at the transfer point) to avoid waste (Figure 5)

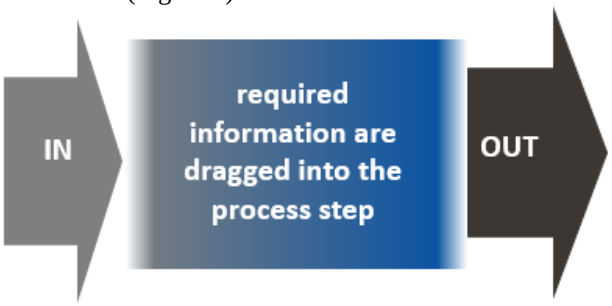

Figure 5: Pull principle

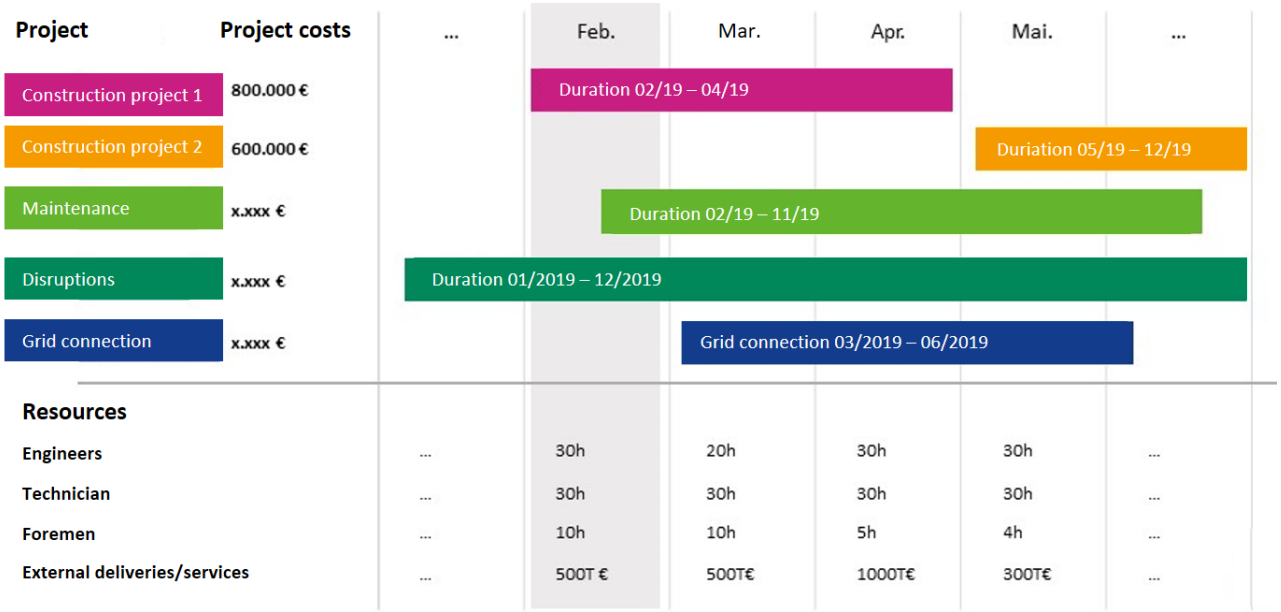

Figure 4: Exemplary representation of project and resource list

THE IMPLEMENTATION OF LEAN MANAGEMENT AT DISTRIBUTION GRIDS

At MITNETZ we will face the future questions together with ISO 55.000 and lean management methods. Looking to other industries we found three interesting topics for us: cultural change, the implementation of quality management according to ISO 9001 and lean management.

The first challenge was our directive, single-unit oriented culture, such as in most distribution companies. MITNETZ was merged in 2013 as a large DSO from 5 former companies. We still had partly different processes and responsibilities depending on the voltage level, and differences between gas and power. Different processes require different IT-solutions. Since 2013 we have merged some of the IT – Systems, the SCADA System, the GIS-System and some further systems for power and gas. But still not all Systems and sub-processes were the same, so our IT-costs had potential for reduction.

The major task for processes and following IT and organisation is a consistent and full approach of all IT-Systems, and more a full use of quality secured data in all processes. We were very early introducing GIS – Systems in the beginning of the century, and have IT-Systems (geographical, Workforcemanagement, grid data and SCADA as well as commercial systems) fully interoperable with each other. And after working with the data for so long we have reached high quality of data. This allows us to go the full way from asset management, over planning of projects, purchasing, to realisation of projects and finally the accounting.

The next challenge was a cultural problem. For a working quality management and lean management system we need measurements of processes and results, and a common understanding of improvement. But first of all we needed transparency about or work and we had to share this knowledge between each other. Every employee should know why we want to implement a standardisation, how we want to do it and how the results are. That was not usual in our company. So there was a lot of resistance, not only between our employees, but also in the management.

In 2015 we started a program of cultural change, called ad.am – „Anders Denken, Anders Machen“, in English „New Ways of Working“. We implemented new ways of leadership, new ways of working together and a new mindset of process management.
At the same time we implemented our new asset management processes and thinking – risk oriented management with detailed projects as an result instead of budgets for different units.

But that was not enough. Our new ideas together with our „old“ processes and directive single unit leadership structure did not bring the expected results. So we decided to develop a new process for all our technical tasks and convert all our existing processes and even our structure to this one new process. We did not find any comparable processes and ideas inside the energy sector, so we searched for help in another very successful industry – the automobile industry. With the help of Porsche Consulting we developed the idea of one ‘assembly line’ for all our productive tasks. There was a lot of resistance and misunderstanding of employees and leaders in this time – nobody could believe, that the work of a grid operator could be organised like a normal factory in one single process.

But we developed one process, starting from the risk management decision via planning, procurement and execution until the final accounting (Figure 6).

Figure 6 – One ‘producing’ process for the whole DSO

According to this process, we changed our structure into a process-oriented one. Every part of the process has one responsible ‘owner’, for the whole process one manager is responsible for interface management, process flow and support of the ‘working’ units.

We implemented quality gates on all important process interfaces and implemented KPI for the single processes and for the outcome of the process.

In 2018 our Asset Management started to define projects for the next one and a half year. Our goal for end of this year is to define projects already for the next 3 years, so we can improve our planning together with the municipalities in our grid area.
On January 1st 2019 all of our processes started based on one project list from our asset management. We implemented a new portfolio management unit which defines the beginning and finalisation of every project, controls the progress of the projects and plans all of our resources for regulated and non-regulated business.
Also in 2019 we started with the same processes for our electricity and gas business. Only with this standardisation we are able to develop IT solutions only once.

In 2018 we adopted our IT systems to the new processes. Starting in 2019 we implement a continuous IT-landscape for the whole process. The most important parts are:
- Our Graphical Information System and facility information system, which today already contains all information about all our facilities, their specifications and the actual condition of every unit. Actually we improve the system and connect these information with the risk information from ISO 55000, so that we can see the risk

on every single unit. Our next step will be the implementation of an automatic grid-planning tool.
- A portfolio management software for all projects at MITNETZ. This tool enables us, to control every project for at least the next 3 years and to plan the necessary resources including our staff and our service provider.
- A new dashboard in which every manager and first of all our colleges can see their detailed performance. This is based on six KPIs for every part of the process: throughput time, processing time, working stock, output, number of quality complaints and process costs. So every member of the process is able to see its performance and possible improvements for the future.
- A new workflow managing software. This software works as a middleware and connects information of all projects and IT systems. The workflow manager enables us to guide our projects virtually through the process, so that no information has to be entered twice. It also delivers us a lot of the KPIs we need.

Already today we can confirm, that a common understanding of roles and processes makes the IT development a lot faster and more target-oriented and predictable.
Every member of the process already today knows his process, his role and can fulfil the requirements for his IT system. Today we work in agile teams to develop these new functions. The output is very good and very fast, but we had to learn, it is also very time consuming.

Based on this new process, we want to further improve our quality, our daily doing and the training of our employees. With all the basic changes we made until now we want to compare our new processes to the requirements of ISO 9001 and ISO 55000 and want to get both certificates until the end of 2019.
For the next years our goal is to enable all of our employees to work in this new processes and IT systems and first of all improve them day by day.
According to this, our next step in our internal project are the connection to our customer processes and the implementation of the next lean management tools to improve our process flow.
The whole project will go on for some years, but the results are worth it and we are on a good way. Starting in 2019 we expect the first improvements so we can assign colleagues from the former regulated business to new business areas and improve the quality of our customer contacts. These improvements must go one in the next years, but the basics are set.

VIEW OF EXPERIENCES AND IMPLEMENTATION

The first ideas for this project started in 2014. It has been a long way to get to where we are today and we still have 2 or 3 years to go.

Our greatest challenges and experiences are:
- The development of an idea of this change all over the management. It started in a small circle of top managers and took some years to spread through our organisation.
- The impact on the culture is one of the greatest challenges. There were a lot of discussions “Why do we have to change?”, “Why do we have to standardise?”, nobody wanted to measure and to be measured. Fortunately, we had started a program about cultural change in 2014, so the idea of change and how to work together was existing. Now we see the next experiences we need. We want every college to be responsible for his work and its improvement in the new processes. But that is a cultural change again, first of all in the management.
- One big challenge is the need of resources we have in process management, IT development, project management and improvement of the processes.

We know our way is worth the effort.
We expect improvements in our working together, especially more engagement and responsibility at every employee of our company. We expect continuous improvements on every part of the process for the future. We expect a much faster development of our IT and according to this much deeper digitalisation of the whole process. First we want to improve the quality that we can deliver to our customers. Our response times have to decrease, our service level will be improved and we want to improve our technical availability.

Moreover we expect great financial impacts:
- we want to invest less money and get a lot better results by using risk based investment decisions,
- we want to develop IT systems only once for only one process and decrease required budgets and
- we want to reduce the number of employees engaged in our standard business so we can develop new businesses with this people.

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[5] UMS Group, 2013, Final Report MITNETZ, International Distribution Asset Management Study 2012 Page 21
[6] UMS Group, 2013, Final Report MITNETZ, International Distribution As-set Management Study 2012 Page 23