

MORE Final event – Panel discussion notes

From 2013 to 2017, MORE has developed indicators to measure resource efficiency of chemical production plants during daily operations and implemented optimization methods into 4 industrial plants. The developments have now enabled to optimize plant operations towards resource efficiency – in environmental and economic terms. The aim of the MORE project workshop on “Real-time Monitoring and Optimization of Resource Efficiency – From Measurements to Optimal Operation” that was held on 15-16 February 2017 in Frankfurt, Germany, was to share results and to discuss them with a broad audience of experts from different process industry sectors.

After several presentations on MORE achievements, a panel with experts from the process industry discussed the applicability of the MORE approach in other industries.

Panelists:

- Kai Dadhe, Evonik – ISP member
- Alex van Delft, DSM – ISP member
- Martin Jenke, CEMEX
- Stefan Krämer, INEOS – ISP member
- Günther Windecker, BASF
- Martin Winter, CEFIC, A.SPIRE

Moderator: Sebastian Engell, TUDO

Guiding questions:

- *In your view, what is the potential of real-time resource efficiency monitoring?*
 - *How do you see the applicability to your company/industry?*
 - *In which plants can or should they be applied, and in which ones presently not?*
 - *How long will it take to implement such solutions on a broad basis?*
- Kai Dadhe, Evonik, MORE ISP member:
- First, I would like to state that I found it impressive that the project was capable of addressing a broad range of issues and then going into concrete applications of the methods in the chemical industry.
 - I think that the proposed solutions are applicable in other companies and if I evaluate how long the implementation of solutions may take, I would estimate only some days or weeks, depending of the infrastructure you have in your plants. You don't need to apply the methods everywhere at the same time, the process can grow naturally according to the needs of the company and the available personnel.
 - When speaking about operating staff, I feel it is very good that you can show something convincing through the visualization.

Sebastian Engell: Do agree to the curves on efforts and benefits shown by Stefan Krämer before?

- K. Dadhe:

- I fully agree. We don't have a lack of data. You need to be able to show to people where improvements can be possible – visualization methods are very important to convince them.
- Alex van Delft, DSM, MORE ISP member:
 - I need to say that at the beginning I was doubtful about how we could benefit from these methods that are mostly developed on petrochemicals, as DSM works mainly in the life sciences and materials sciences sectors and batch processes play a major role for us. Resource Efficiency Indicators (REI) are quite important to us as well – and now I see that the MORE approach is indeed relevant for the diversity of processes we have in the company – the total conceptual approach will be of high benefit for us
 - I am very pleased to see also that the “people” aspect has rightly been taken into account, as engaging staff (operators) is very important.
 - I am very happy with the methodology and think that the concept of the tools can be applied – still, I think from our side we have a long way to go.
- Günther Windecker, BASF:
 - From the BASF side, we have been involved in the MORE project with the PCN site in Düsseldorf, but I am looking forward to implementing a pilot on the basis of the MORE approach at the main site of BASF in Ludwigshafen.

Sebastian Engell: How long do you think it would take to implement a prototype?

- G. Windecker:
 - You first need to find the pilot site and convince the relevant people, from then onward I would expect it to take about one year. The most difficult part is to deal with the IT management.
- Martin Jenke, CEMEX:
 - I discovered the achievements of MORE today and found it very impressive and very useful.
 - In particular, I appreciate the concentration on useful indicators for plant managers and operators. Normally, KPIs are very aggregated, and proposing something useful for the operators in MORE is a very good idea.
 - The implementation in a cement plant would seem to me quite simple and I think the MORE approach could be implemented within a year. What is needed is the possibility to show exactly the outcomes, even though this can be difficult before having implemented an approach.

Sebastian Engell: Do you think you would get the necessary budget for this from the plant management?

- M. Jenke:
 - Yes, I think so, but you would need to show them the benefit.

Sebastian Engell: I think technically we all agree that implementation is feasible, but let us look at this from a business point of view. For the implementation of REI calculations and decision support, you have two options: either you implement the approach with your internal staff or you work with a service provider. Do you think there is a market (e.g. for work of LeiKon)?

- G. Windecker:
 - I think there is a market, but I think at BASF we would rather define and execute a project ourselves in the beginning. As said, you will first need to define the business case and this has to be done internally. Maybe the implementation on the plant level can be given to contractors.
- A. van Delft:
 - I think what is most important is to be able “to speak the language of the persons you interact with”.
- K. Dadhe:
 - I agree that the IT aspect has to be dealt with. I have been working on KPIs in my last position and saw the need for consistent KPI definition. Also, a KPI itself does not optimize anything - you need to incorporate the indicator into your daily routine. And there is still room for improvement.
- Stefan Krämer, INEOS:
 - I heard several of you say that you think you could implement the approach even within days and I would strongly disagree on this, unless you already have the structure available (e.g. in your PIMS system). As Kai Dadhe said, implementing the approach into the daily routine is the most difficult part and this takes more time. I think there is a market, but I think that, e.g., LeiKon should not only sell a tool, but also the service as a package.
- Martin Winter, CEFIC & A.SPIRE:
 - As a general comment from my perspective, working with both CEFIC and A.SPIRE, I would like to say that we have understood how important digitalization is. At A.SPIRE, we are currently working on integrating this aspect into the Horizon 2020 work programmes and projects like MORE help us a lot on this matter.
 - There will most likely be calls in the SPIRE work programme on aspects of plant operations and on interaction with the operators.
 - In general, SPIRE focuses most on projects targeting TRL4-7. It is important for me to understand what needs to be done in a follow-up of MORE to implement solutions on a broader base.
 - CEFIC is striving for making available funding for projects on higher TRLs to help companies overcome the bottleneck of the investment that currently exists because of long payback periods.

Question from the public: Is your interest in the MORE project part of a broader interest about working towards an industry 4.0? For example, would you be ready to put your data in a cloud?

- K. Dadhe:
 - Digitalization is a broad topic and it is not only about bringing data to the cloud. We do not have the network bandwidth to bring all production data to the cloud and in fact I have the impression we are currently moving rather a bit backwards, avoiding bringing all data to the cloud for various reasons. A project like MORE can push for digitalization, it's a piece in the big digitalization puzzle.
- A. van Delft:
 - Recently, I was asked to write a position paper on digitalization for my company. Digitalization is about tools but what's equally important is the work process part. In

MORE I have seen that understanding the work process for implementation is key. It can be a lengthy process – and this is why it is also said in our position paper: start with pilots.

- S. Krämer:
 - MORE uses technology that has been available to us for a long time. The decision on putting data into the cloud depends on what you need the data for. For a long time, the cloud was seen as not being safe, but I believe that today's cloud service providers can handle data in a safe way. I have the impression there is a new way of thinking. Companies, for example, move email servers to cloud servers. Some hybrid solution will probably be the final result.
- G. Windecker:
 - BASF has also outsourced emails to the cloud. But process data is needed in the plant, so we consider it's important to keep it on the ground.

Question from the public (C. Maul, Covestro): It is a big problem to keep advanced solutions alive. How will this be done in your companies?

- G. Windecker:
 - Yes, it is a problem. Operators need to be taken into account – it is important to bring the awareness to the people that the new solutions are useful and will help them in decision support. Then there is an incentive to keep the solutions alive.
 - S. Krämer:
 - It is an effort to implement something, but the same effort is needed to maintain it. Any complicated solution needs one person dedicated to and responsible for it.
 - S. Engell:
 - One of the issues with “keeping alive” is to adapt to the continuously ongoing changes in the plant. Automatic configuration as developed by Leikon in MORE is a major contribution to run the solution over long periods of time.
- *What are the obstacles for the application of the technologies developed by MORE?*
- *What can be done to overcome them?*
- *Which challenges should be addressed by future projects?*
- A. van Delft:
 - I'd like to see more follow up projects on batch and mixed batch-continuous processes and I would like to see more the people aspect taken into account as well.
 - G. Windecker:
 - Automation continues to be an important issue.
 - K. Dadhe:
 - I agree on the importance of batch and continuous processes. I would like to point to broadening the view to other aspects of the value chain, e.g. the supply chain and plant engineering, bringing different hierarchies together.
 - M. Jenke:
 - I think communication of different tools, but also to different sectors is important – industrial symbiosis is key.

- S. Krämer:
 - o I have seen over the last years how much technology is available, but not much of it is really applied in the industry. I'd very much like to see an overview and also what potential gains the different technologies could bring to industry.
- M. Winter:
 - o Companies do not join EU-funded projects only for the funding, but also for the access to powerful high quality innovation ecosystems. I think we might have less projects in the future but maybe with larger funding and going to a higher TRL-levels creating real economic impacts for our companies in Europe.
 - o Given the high importance of digitization for the process industries, CEFIC strongly supports funding calls in this field in the upcoming H2020 and SPIRE PPP work programmes covering all aspects of cognitive plants including interaction and skills of the required plant operators and engineers.

Sebastian Engell: We have very little information on how operators really see their plants. There is a broad range between those who propose that there should only be one button, to switch on or off, and those who would proposed advanced visualization, gamification etc. to keep operators interested and involved.

Comment from the public (R. Gonzalez, Petronor): The major difficulty was to identify the REI – and that is what we have done in MORE.

- M. Jenke:
 - o It is extremely difficult to find the common indicators between different sectors. I hear from the policy side that they want to do this, but it is very difficult.
- S. Krämer:
 - o The aggregation of “currency” as it is suggested by MORE is something that could be done in all different plants and also on a cross-sectoral level. We have on the website <http://more.bci.tu-dortmund.de/wordpress> published a whole list of REIs, I invite all of you to take a look and provide comments to them.

Sebastian Engell thanks the whole panel for their contributions and closes the discussion.

MORE project website: <http://www.more-nmp.eu/>

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About the MORE project:

MORE is supported by the European Commission under the FP7-NMP programme.

Start Date: 1st November 2013

Duration: 40 months

Total budget: 3,919,174 €, including a contribution from the European Commission of 2,815,572 €

MORE consortium members:

	<p>inno TSD, France – one of Europe’s leading innovation management consultancy firms, specialised in helping major private and public stakeholders design and implement R&D and innovation projects. http://www.inno-group.com/</p>
	<p>PETROLEOS DEL NORTE SA, Spain (Repsol group) – the biggest petroleum refinery in Spain with a deep knowledge of petro-chemical processes. http://www.petronor.com/</p>
	<p>INEOS Köln GmbH, Germany – operating the INEOS petrochemical site in Cologne, Germany, and part of the INEOS Group. The INEOS Group is one of the leading world scale chemical companies. http://www.ineoskoeln.de/</p>
	<p>BASF Personal Care and Nutrition GmbH, Düsseldorf, Germany – a global supplier of nature-based specialty chemical products and nutritional ingredients and one of the most important European research locations for personal care products worldwide. http://www.basf.com/</p>
	<p>LEIKON GmbH, Germany – an innovative company working in the area of MES (Manufacturing Execution Solution) and process control engineering. http://www.leikon.de</p>
	<p>VTT, Technical Research Centre of Finland – the largest multidisciplinary research organisation in Northern Europe, providing high-end technology solutions and innovation services, and having extensive knowledge in sustainability assessment and standardization. http://www.vtt.fi/</p>
	<p>TECHNISCHE UNIVERSITÄT DORTMUND, Germany – a leading German technically oriented research university with strengths in chemical engineering and in the operation of chemical processes. http://www.tu-dortmund.de</p>
 <p>Universidad de Valladolid</p>	<p>UNIVERSIDAD DE VALLADOLID, Spain – a European university with an excellent research group in chemical process operations. http://www.uva.es</p>
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