Improvement of Electric Motor Systems in Industry (IEMSI)

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Abstract

In March 2011, the Swiss government decided to withdraw from the use of nuclear energy in the long term. In its "Energy Strategy 2050", the federal government defined a variety of measures, in particular aimed at increasing the production of electricity from renewable sources, significantly reducing energy consumption and stabilising electricity consumption. For the past five years, statistics have pointed to a decrease in annual overall energy consumption in Switzerland, while electricity consumption has remained more or less stable. In Switzerland, industry accounts for a large proportion of electricity consumption, particularly for motor systems. A survey conducted between 2010 and 2014 encompassing more than 4,100 industrial motor systems revealed that more than 50 percent of the motors in use had by far exceeded their technical service life. Although such systems can still perform and fulfil their function, they are nevertheless outdated, and in many cases are also oversized and inappropriately controlled. The same survey revealed that only 20 percent of the motor systems are equipped with variable speed drives, and that two-thirds of them have a load factor below 60 percent. For all these reasons, the Swiss Federal Office of Energy (SFOE) decided to launch a new programme called "Improvement of Electric Motor Systems in Industry" (IEMSI). This programme is to broaden the existing "topmotors.ch" (TM.ch) programme that was launched in 2007 with the main aim of reducing the energy consumption of motors and drive systems through information, education, networking and promotion of premium motors. It costs around 2.0 million euros and its impacts were evaluated in 2014. The results of the evaluation showed that it achieved its objective, but that the range of its impacts was limited. In view of this, the IEMSI programme was developed as a strategy focusing on the extensive implementation of recommendations and voluntary measures aimed at reducing the electricity consumption of motor systems in industry, based on:

- Active communication
- Tools for spot checks, as well as for detailed analysis
- Events
- Market survey

The programme is planned for a 5-year period with a budget of over 3.0 million euros, and its impact is to be monitored through market data, as well as the annual Swiss energy statistics, which include a separate category for industrial motor systems. The paper presents the four instruments of the IEMSI programme in detail, together with its monitoring tools.

Introduction

The Swiss electricity production mix mainly comprises hydropower and nuclear energy (60 and 34 percent respectively).[1] The remaining 6 percent is produced in conventional thermal power plants (gas, oil and non-renewable waste incineration) and other renewable energies.

In 2011, the Federal Council and Parliament decided that Switzerland has to withdraw from the use of nuclear energy on a step-by-step basis. The existing five nuclear power plants are to be decommissioned when they reach the end of their safe service life, and will not be replaced by new ones. As a result of this decision and various other profound changes (e.g. low electricity prices) that have been observed for a number of years, in particular in the international energy arena, the Swiss energy system will require successive restructuring in the period up to 2050. In view of this, the Federal Council developed a long-term energy policy ("Energy Strategy 2050") based on the revised

[1] Schweizerische Elektrizitätsstatitisk 2015 (Swiss Electricity Statistics for 2015), Swiss Federal Office of Energy, July 2016, p. 3.

energy perspectives.[2] At the same time, it produced an initial package of measures aimed at securing the country's energy supply over the long term.

The initial package of measures concerns three sectors: households, services and industry. The statistics show that the industry sector accounts for almost one-third of the country's electricity consumption and that electric motor systems account for more than half of electricity consumption in the industry sector. Furthermore, an extensive survey in the industry sector revealed that a large percentage of electric motor systems are oversized, too old and inefficiently operated. Based on the savings potential of electric motor systems, Switzerland's annual electricity consumption could be reduced by up to 5%.

The initial package of measures contains three instruments for the promotion of energy efficiency in order to facilitate the implementation of the efficiency potentials: a) regulation, b) voluntary measures without subsidies, and c) voluntary measures with subsidies. In this paper, and in order to limit the broad scope of energy efficiency, the focus is on electric motor systems and the "Improvement of Electric Motor Systems in Industry" (IEMSI) programme relating to the voluntary measures without subsidies, the main objective of which is to reduce electricity consumption in the industry sector.

This paper contains a brief description of the survey conducted in the industry sector, and of the "Topmotors" programme. It presents the IEMSI programme in greater detail, as well as tools for monitoring its impact, and concludes with a brief summary.

Starting point

The findings are based on the EASY financial incentives programme[3] regarding the age of the motor systems, as well as their effective load factor and their mode of control with manual adjustment versus the use of variable frequency drives (VFDs). Between 2010 and 2014, "Topmotors" was responsible for the EASY programme. Its main goal was to improve the energy efficiency of electric motor systems and obtain an overview of the electric motors currently in use in the Swiss industry sector, and in large buildings and infrastructure systems. More than 4,100 motors were analysed using a standard software tool:

- Application (pump, fan, compressor, etc.)
- Size
- Age
- Annual operating hours
- Use of variable frequency drive (VFD [yes/no]).

The focus on age, operating hours, size and type of drive (manual or VFD) is based on the following rationale in the industry sector: "old" motors can be easily improved because they are amortised and are usually in a low-efficiency category. Also, motors with long operating are applicable for being improved profitably because they have higher cost effectiveness and the additional cost for premium motors can be amortised more quickly. Medium-sized and large motors are responsible for a larger share of energy use and are thus targeted primarily in a company-wide improvement concept. Motors without VFD driving pumps and fans tend to possess significant efficiency potential. With these four categories, a large share of efficiency improvements can be identified and realised.

The results illustrate the importance of improving the efficient use of motors by choosing efficient components with the right size and smart controls, as well as the need for further action.

Motor system age

The age of all motors was analysed in order to obtain an overview and determine whether any correlations exist between age and output size. The actual age of the motors (from their purchase and installation date) was compared to a standard operating life expectancy, i.e. the expected service life until a replacement is necessary. This is based on "Ecodesign" motor studies and defined as:

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[2] Botschaft zum ersten Massnahmenpaket der Energiestrategie 2050 (Dispatch to Parliament concerning the initial package of measures relating to Energy Strategy 2050), Swiss Federal Office of Energy, September 2013.

[3] EASY, Efficient energy use in motor systems, pilot programme for financial incentives in 2010 to 2014. Link: http://www.topmotors.ch/Easy/

- < 1 kW 10 years
- 1-10 kW 12 years
- 10-100 kW 15 years
- > 100 kW 20 years

The results show that, overall, 56% of all analysed motors were older than their “operating lifetime expectancy”. On average, these “too old motors” were 99% too old. This means they were almost twice as old as expected.

Variable frequency drive (VFD)

All motor systems in the sample were checked for the use of a VFD. Very few are equipped with VFD today. In fact, only 19.8% of all the motor systems in the survey were already equipped with a variable frequency drive. The findings of several “Topmotors” projects in the industry sector showed that approximately 60% of all motors can be operated with a VFD and the speed can thus be automatically adapted to the variable load of the process. This is an indication that, in many cases, energy can be saved through the proper use of a VFD to modify the speed of the motor to the actual requirement. If properly used, a VFD can reduce energy consumption by between 30 and 60% in a closed loop pump or fan application.

Load factor

In the course of the EASY programme, from the more than 4,100 motor systems that were included in the survey, a sample of 104 with high savings potential were selected to be metered in greater detail. Here, various factors such as electrical input, load fluctuation, starting conditions, operating hours, interruptions, etc., were recorded. The measured data were evaluated in order to draw conclusions concerning the necessary size and load of the motors. The average load factor of all measured motors was 52%. Motors with an average load factor of less than 60% are generally considered oversized if special starting torque requirements do not apply. In this case, 68% of the motors were found to be oversized. Today, motors indicate an even efficiency curve at loads of between 100 and 60%, with the peak at around 70 to 80%. With longer periods of use below 50%, the efficiency of the motor is lower. A low average load factor thus indicates an efficiency rate below the nominal level.

“Topmotors” programme (TM.ch)

The goal of the “Topmotors” programme (www.topmotors.ch) is to generate and disseminate knowledge about efficient motor systems, applications (pumps, fans, compressors, etc.) and their correct use and adaptation to the mechanical needs of a process. The target audience is factory personnel, energy efficiency consultants, manufacturers and their sales staff, universities, public officials engaged in MEPS, etc. This knowledge is presented in a variety of ways, including fact sheets, workshops, software tools, newsletters, websites, etc.

The impacts of TM.ch since its launch in 2007 were evaluated in 2014 based on its three main strategic goals: information and education, networking and promotion of premium motors.

With the products it has developed and introduced over the years, TM.ch has succeeded in reaching several different target groups. However, around half the energy-intensive companies were not aware of the existence of the programme, and the same applies to the OEM companies. This was identified as an area in need of improvement for the next programme through the adoption of a broader and more systematic approach to the target groups.

With respect to the second strategic goal, namely to network participants and market players in order to accelerate the development of more efficient motor systems, the evaluation revealed that TM.ch has been providing opportunities for them to meet, exchange ideas and network at workshops, as well as during international and national events such as motor summits.

The third strategic goal concerns the promotion of premium motors. Here it appears that TM.ch did not have a direct impact on the strategy of motor manufacturers and OEM suppliers. However, on the demand side (manufacturers’ and suppliers’ customers) it was able to play a certain role by making users aware of the benefits of purchasing premium motors and thus exerting pressure on the manufacturers and suppliers. By applying its “spot-check” method in order to assess the savings potentials, “TM.ch” was able to establish direct contact with companies. However, the “spot check” was mostly suitable for large companies, but not for extensive deployment among small and medium-sized firms. Although TM.ch had a certain impact and created some awareness, its reach was not extensive, particularly among OEM manufacturers and suppliers. Nevertheless, it was able to initiate

and generate a strong impulse for promoting efficient electric motor systems, and during its first period of seven years its activities included:

- The development of two numeric tools, as well as a standard protocol for measurements
- The publication of 13 technical manuals and information sheets
- The publication of 17 technical papers
- Mailing of newsletters (up 3 per annum)
- Organisation of 9 workshops and 4 motor summits.

The evaluation report strongly recommended the continuation of the programme, but also cited some weaknesses that need to be addressed, e.g. the need to define a strategy for broader implementation. The findings therefore provided the main inputs for the development of the IEMSI (Improvement of Electric Motor Systems in Industry) programme that is the topic of the next section.

Alongside the IEMSI programme, a variety of research, education and technical projects are currently in progress within “Topmotors”, including further education for industrial energy optimisation and the development of a “motor test” box for quick integrated audits. These go beyond the scope of this paper, but still deserve a mention.

IEMSI programme

The main goal of the IEMSI programme is to extend the TM.ch programme and thus to achieve a broader implementation and increase the number of targeted groups. As mentioned in the evaluation report, the IEMSI programme can operate with similar activities and approaches to those of TM.ch, but with a broader impact.

In Switzerland there are more than 90,000 small and medium-sized companies with an annual electricity consumption ranging from 100 MWh to more than 20 GWh. The IEMSI programme has to be set up for these companies and contribute towards the attainment of the following objectives:

- 15% of the companies to be made aware of the IEMSI programme via the Internet, technical papers or special events
- Downloading of at least one document by 10% of the companies
- Analysis carried out by 5% of the companies
- Implementation of efficiency measures by 2% of the companies
- Cost efficiency ratio of the programme to be lower than 5 cents per kWh (accumulated electricity savings over the duration of the measures).

The IEMSI programme comprises four blocks: a) communication, b) tools, c) events and d) market, and has a duration of five years and a budget of 3.0 million euros.

Communication

Communication should be designed to motivate the companies to implement efficiency measures by providing them with information via:

- Newsletters (4 times per annum)
- Technical booklets and information sheets (at least two per annum)
- Success stories (at least two per annum)
- Technical papers (at least two in German and one in French per annum)

As the “Topmotors.ch” brand has become well established over the years, it has been decided to keep it for the IEMSI programme, and all the documentation will be available and downloadable directly from the www.topmotors.ch website, which will be revamped to meet the state of the art in web design

with enhanced functionalities and be available in at least in three languages: German, French and English. The structure of the website is depicted in Figure 1.

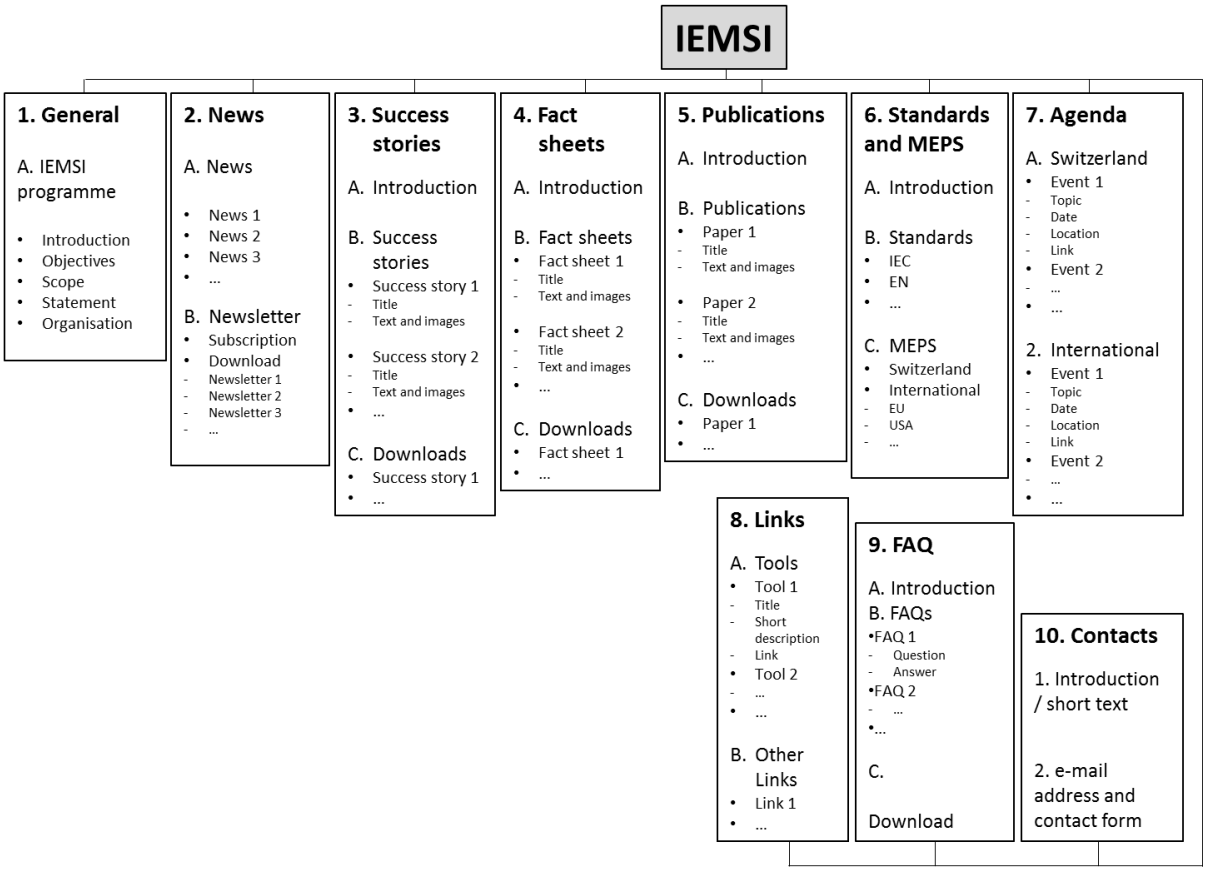

Figure 1: Structure of the IEMSI website.

Tools

The evaluation indicated that the “spot check” is suitable for large companies, but not yet for broad implementation by small and medium-sized firms. This aspect is to be addressed in the IEMSI programme. Furthermore, there are several software tools available for estimating the savings potential for electric motors, pumps, fans, etc. The range of existing software tools can be confusing, and in view of this a uniform analysis method and associated tools still need to be developed. The analysis method has to support a system-based approach while taking the complete system into account, from the power supply through to the corresponding process. It should also proceed on a step-by-step basis, where the first step is to perform a spot check which will enable the company to decide within a few minutes whether or not it is worth taking further steps to estimate the savings potential. The next step would be to make a more detailed assessment of the savings potential:

- Spot check with 4 to 5 questions to be answered within less than 5 minutes as a GO/NO-GO decision-making tool
- Preliminary analysis (2 hours up to a maximum of 3 days) to obtain an initial assessment of the savings potential, with a margin of error of between 20 and 50%
- Detailed analysis (up to a maximum of 10 days) to obtain a more detailed assessment of the savings potential, with a margin of error of less than 10%

The company can abort after each step if the savings potential is either negligible or too expensive to implement. A company can already benefit immediately upon completion of the preliminary analysis by implementing those efficiency measures that do not require a more detailed analysis.

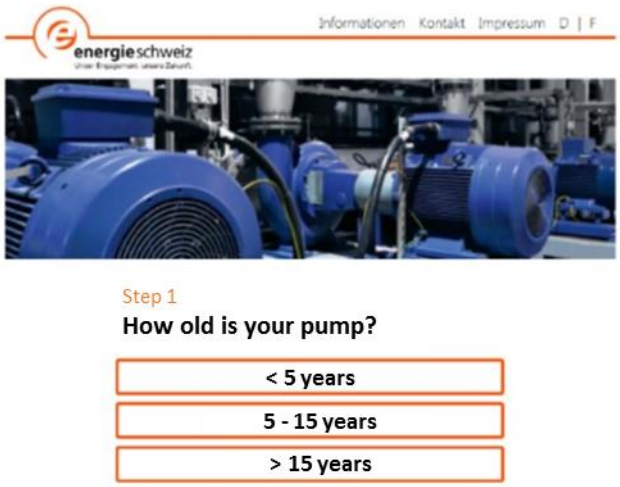

Figure 2: Spot check for pumps.[4]

The analysis method will be implemented in an "all-in-one" downloadable software tool for electric motor systems such as pumps, fans, and compressors for compressed air and cooling. Figures 2 and 3 show an example of a spot check and preliminary analysis for pumps, based on a web tool and an excel sheet.[5] Companies of all sizes should be able to perform the spot check and preliminary analysis by themselves, but they may need the assistance of an external energy consultant for the detailed analysis, depending on the size of the company and the experience of their employees.

Preliminary analysis tool for efficient pump systems

Detailed results

Electricity price: 16 cents per kWh

							Savings potential		Recommendations
No.	**Identification**	**Other identification**	**Location**	**P**	**t**	**Year**	**Total**		**Detailed analysis**
				[kW]	[h/a]	Construction year	[kWh/a]	[EUR/a]	
2	Pump mixer Nr. 3	A2		10'000	3'000	1900	5'825'023	932'004	Detailed analysis highly recommended
5	Pump cooling section B	B2	Workshop	100	2'000	1990	49'225	7'876	Detailed analysis highly recommended
7	Circulation pump Nr. 1	C21		10	8'000	2010	12'339	1'974	Detailed analysis recommended
3	Circulation pump offices north and west	A3		250	100	1980	10'724	1'716	Detailed analysis recommended
8	Vacuum pump workshop	C22		9	8'000	2010	2'160	346	no action needed
1	Pump mixer Nr. 2	A1		10	2'000	2010	1'839	294	no action needed
9	Pump cooling section A	C23		10	2'000	2010	1'839	294	no action needed
4	Circulation pump office south	B1		3	5'000	2014	1'228	196	no action needed

Figure 3: Result of a preliminary analysis for pump systems based on an EXCEL tool.[6]

Special events

In order to increase access to the target groups, three types of events are planned: a) international and national motor summits, b) workshops and c) webinars.

The motor summits take the form of two-day international and one-day national conferences held on an alternating basis every two years and intended to attract between 100 and 200 participants (technicians, engineers, managers, policy makers, etc.). They focus on topics relating to electric motor systems, ranging from regulations and policy to technology.[7] By contrast, the workshops and webinars focus on a specific topic. The workshops are half-day events that are held three times a year (two in German and one in French) for a maximum of 40 participants (mainly technicians and engineers). The

[4] *Efficient pump systems: spot check*. Link: http://www.proepa.ch/

[5] *SwissEnergy campaign for efficient pump installations*. Link: www.effiziente-pumpen.ch

[6] *Efficient pump systems: preliminary analysis*. Link: http://www.proepa.ch/

[7] *Motor summits 2016*. Link: www.motorsummit.ch

webinars are a new type of event that takes the form of a 45-minute presentation on a single topic. Here the main objective is to provide an opportunity for those who are unable to attend a motor summit or workshop to learn more about efficient electric motor systems. Four webinars are planned per annum (three in German and one in French).

Market

Sales data

Electric motors account for around half of Switzerland's annual electricity consumption with motors with an output ranging from less than 0.12 kW to over 1,000 kW. (what does this mean?) In Switzerland's industry sector there are more than 2 million electric motors. In 2014, Switzerland tightened its regulations governing electric motors between 0.75 kW and 375 kW based on EU Directive (EC) No. 640/2009:

> With effect from 1 January 2015: IE3 (7.5 kW – 375 kW) or IE2 with VSD
> New, with effect from 1 January 2017: IE3 (0.75 kW – 375 kW) or IE2 with VSD

However, at the moment no data are available for quantifying the impacts of the new regulations. With the initiation of the IEMSI programme, however, specific market data for Switzerland will become available (cf. data acquisition table shown in Figure 4). The sales data will make it possible to monitor the development of the various motor efficiency classes based on their nominal power, and thus to assess and quantify the transition from IE2 to IE3 and higher efficiency classes.

Number of electric motors sold in Switzerland								
Nominal power (kW)	IE1 (IEC 60034-30-1)		IE2 (IEC 60034-30-1)		IE3 (IEC 60034-30-1)		IE4 (IEC 60034-30-1)	
	4-pole only	All other poles	4-pole only	All other poles	4-pole only	All other poles	4-pole only	All other poles
0.12 to <0.18								
0.18 to <0.25								
0.25 to <0.37								
0.37 to <0.56								
0.56 to <0.75								
0.75 to <1.1								
1.1 to <1.5								
1.5 to <2.2								
2.2 to <3.7								
3.7 to <5.5								
5.5 to <7.5								
7.5 to <11.0								
11.0 to <15.0								
15.0 to <18.5								
18.5 to <22.0								
22.0 to <30.0								
30.0 to <37.0								
37.0 to <45.0								
45.0 to <56.0								
56.0 to <75.0								
75.0 to <90.0								
90.0 to <110.0								
110.0 to <150.0								
150.0 to <185.0								
185.0 to <220.0								
220.0 to <250.0								
250.0 to <1000.0								

Figure 4: Data acquisition table for the annual sales data of electric motors in Switzerland.

Producer and supplier data

In the same way as in the “TM.ch” programme, producer and supplier data will continue to be available in the form of a price estimation based on the nominal power in euros per kW for motors and VSD ranging from 0.12 kW to 1,000 kW where available in the supplier/producer product range. Figure 5 shows an example of an information sheet for motor prices, which can serve as a useful tool for calculating investment costs as well as the pay-back time following the replacement of an old motor with a premium or super premium model.

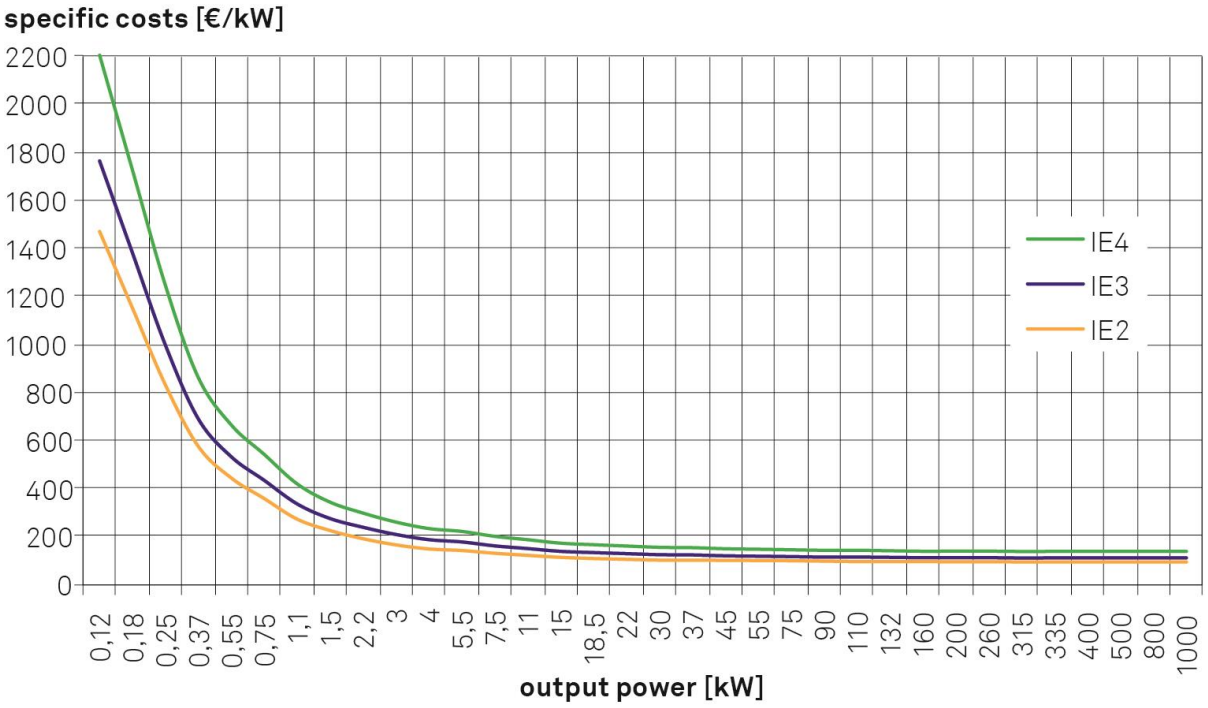

Figure 5: Specific electric motor prices by efficiency class and nominal power.[8]

IEMSI programme as a first step towards implementing efficiency measures

The implementation of efficiency measures is the last step in a four-step process, as depicted in Figure 6, starting with a) information and rising awareness, followed by b) advising, c) quantification and d) implementation.

Figure 6: The four-step process for implementing efficiency measures.

The Swiss energy policy system specifies mandatory requirements, e.g.

- MEPS (Minimum Efficiency Performance Standard) for circulation and water pumps, fans and electric motors[9]

[8] Information sheet 10: Motor prices, Topmotors, October 2014. Link: http://www.topmotors.ch/Download/

- Audits, agreements on energy reduction targets and energy monitoring for companies with an annual electricity consumption ≥ 0.5 GWh[10]

The aim of the audit is to identify profitable efficiency measures with a payback time of less than 4 years, in order to reach agreement on energy reduction of either 2 percent per annum over 10 years or 15 percent in 3 years. The MEPS, audits and the agreements on energy savings are part of the quantification and implementation steps.

Although the legal framework conditions have helped to stabilise and even decrease Switzerland's energy consumption since 2008, especially of combustibles (fuels),[11] more needs to be done regarding the reduction of electricity consumption, especially by motor systems. The legal framework conditions only permit the implementation of a certain proportion of the full efficiency potential. For this reason, Switzerland's energy policy also supports voluntary measures based on a system-related approach from the initial process through to the electricity injection point within the system, instead of just improving the efficiency of single components (e.g. electric motors, pumps, etc.). However, producers, OEM suppliers and users need to be informed and their awareness has to be increased, which actually corresponds to the first step in the four-step process described above. In fact, this is what the IEMSI programme is designed to achieve.

Regarding the other three steps (advising, quantification and implementation), there are also other programmes, based on voluntary measures, in addition to the mandatory MEPS and audits. One of these is the platform for advising and quantifying the energy saving potential among small and medium-sized companies based on a subsidy programme,[12] and the other is a competitive tenders programme that provides subsidies through an auction process that rewards efficiency measures with the best cost-efficiency ratio.[13]

The IEMSI programme has been designed to support the objectives defined in Switzerland's Energy Strategy 2050 regarding the target levels for the reduction of electricity consumption: minus 3 percent and minus 13 percent in 2020 and 2035 respectively.[14] Furthermore, the following section describes how the impact of the IEMSI programme will be monitored in order to assess its impact.

The IEMSI programme has some similarities with the IEA 4E Electric Motor System Annex (EMSA), but has a stronger focus on the market and the implementation of efficiency measures.

Impacts of the IEMSI programme

All four blocks of the programme will be monitored and static data will be made available, e.g.:

- Number of downloads (tools, success stories, technical booklets and information sheets)
- Number of visitors to the website
- Number of mailed newsletters
- Number of participants at events (workshops, webinars)
- Market statistics
- Feedback forms

This will make it possible to quantify the size of the reached audience, as well as to estimate the number of preliminary and detailed analyses that have been carried out.

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[9] Energy Ordinance, Appendices 2.10, 2.13, 2.17 and 2.19, last revision January 2017. Link: https://www.admin.ch/opc/de/classified-compilation/19983391/2017010101 000/730.01.pdf

[10] Leitfaden zur Unterstützung der Kantone bei der Umsetzung des Grossverbraucherartikels, Swiss Federal Office of Energy, May 25th 2009. Link: http://www.bfe.admin.ch/dossiers/03848/index.html?lang=de

[11] Schweizerische Gesamtenergiestatistik 2016, SFOE, July 2017, p. 2. Link: http://www.bfe.admin.ch/themen/00526/00541/00542/00631/index.html?lang=de&dossier_id=00763

[12] PEIK: Platform for energy efficiency in SMC, Swiss Energy program, SFOE. Link: www.peik.ch

[13] Swiss Competitive Tenders Efficient Motor Systems, Dr. Richard Phillips, EEMODS'15, September 2015, Helsinki, Finland. Link: http://www.eemods15.info/programme/

[14] Energy Strategy 2050 after the popular vote, SFOE, 29 May 2017, p. 6. Link: http://www.bfe.admin.ch/energiestrategie2050/index.html?lang=en&dossier_id=06702

It may also be possible to make a pre-evaluation at mid-term or a full evaluation at the end of the programme to get more precise information about its impacts.

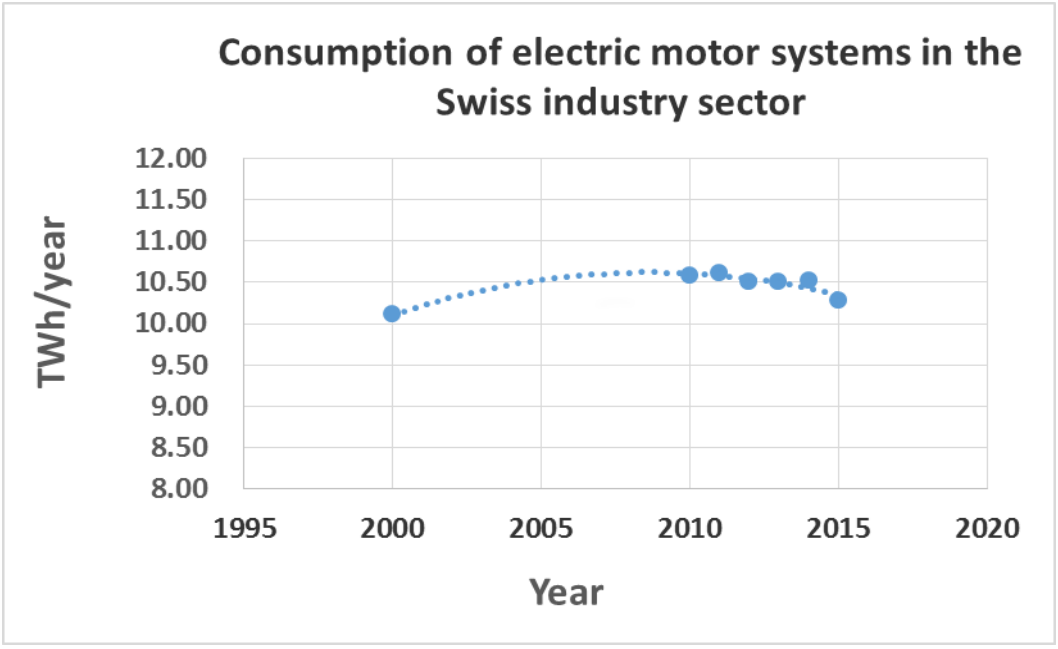

Figure 7: Development of electricity consumption of electric motor systems in the industry sector since 2000.[15]

The Swiss Federal Office of Energy also publishes annual electricity statistics by sector as well as application, together with statistics concerning competitive tenders.[16] These provide an overview of the development of electricity consumption during the year. They also include a category for electric motor systems. Figure 7 shows the development of their electricity consumption in the industry sector since 2000: as we can see, following a steady increase in the period from 2000 to 2010, consumption stabilised, and even decreased slightly, from 2011 onwards. This confirms the positive impacts of the efficiency measures that have been implemented in recent years through regulation and policy, as well as programmes such IEMSI which over the next five years will continue to help stabilise and reduce electricity consumption in the industry sector.

Summary

Based on a survey encompassing more than 4,100 electric motors, the findings regarding the age of the motor systems, as well as their effective load factor and their mode of control, show that a) 56% have exceeded their operating life time expectancy, b) only 20% are equipped with a variable frequency drive (although experience has shown tha approximately 60% of them could be operated using a VFD) and c) 68% are oversized.

Based on these findings, the “Topmotors” programme is to generate and disseminate knowledge about efficient motor systems and their correct use and adaptation to the mechanical needs of a process. The target audience is factory personnel, energy efficiency advisers, manufacturers and their sales staff, universities, public officials engaged in MEPS, etc. The programme was launched in 2007 and cost around 2.0 million euros. Its impacts since its launch were evaluated in 2014 based on its three main strategic goals: information and education, networking and promotion of premium motors. The results of the evaluation were fairly positive in that they confirmed that “Topmotors” was in fact able to initiate a strong impulse for promoting efficient electric motor systems. The report strongly recommended the continuation of this programme, but also cited some weaknesses that need to be

[15] *Analyse des schweizerischen Energieverbrauchs 2000-2015 nach Verwendungszwecken (Analysis of Swiss energy consumption by application, 2000-2015)*, table 4-16, p. 64. Swiss Federal Office of Energy, October 2016. Link: http://www.bfe.admin.ch/themen/00526/00541/00542/02167/index.html?lang=de&dossier_id=02169

[16] Results of Swiss competitive tenders since 2010. Link: http://www.bfe.admin.ch/prokilowatt/06034/index.html?lang=de

addressed, for example the need to define a strategy for broader implementation, and its findings were adopted as the main inputs for the development of the IEMSI programme.

The main goal of the IEMSI programme is to extend the activities of “Topmotors” and thus achieve broader implementation and increase the number of target groups. As noted in the evaluation report, the IEMSI programme can pursue similar activities and approaches to those adopted by “Topmotors”, but with wider-ranging impacts. The IEMSI programme has therefore been divided into four blocks: a) communication, b) tools, c) special events and d) market, with a duration of five years and a budget of 3.0 million euros.

Communication should be designed to motivate companies to implement efficiency measures by providing them with appropriate information. As the “topmotors.ch” brand has become firmly established in the past few years, it was decided to retain it for the IEMSI programme, and all the documentation will be available and downloadable directly from the www.topmotors.ch website, which is to be revamped to meet state of the art web design with enhanced functionalities, and will be made available in at least three languages: German, French and English.

A uniform analysis method and associated tools are to be developed based on a solution that supports the entire system, from power supply through to the corresponding process. It should be implemented on a step-by-step basis, with the first step taking the form of a spot check that enables the company to decide within a few minutes whether or not it is worthwhile investigating the savings potential in greater detail. The next steps should permit an assessment of the savings potential, thus enabling companies to obtain immediate benefits by implementing the efficiency measures as soon as possible.

In order to increase access to the target groups, various events are to be held: a) international and national motor summits, b) workshops and c) webinars. The webinars are a new type of event that takes the form of a 45-minute presentation, the main objective of which is to provide those who are unable to attend a motor summit or workshop with an opportunity to learn more about efficient electric motor systems.

Electric motors account for around half of Switzerland’s annual electricity consumption with motors with an output ranging from below 0.12 kW through to more than 1,000 kW. In 2014, Switzerland tightened its regulations based on EU Directive (EC) No. 640/2009. However, no data are available as yet for quantifying the impacts of the more stringent regulations. With the initiation of the IEMSI programme, specific market data for Switzerland will be made available, thus making it possible to monitor the development of the various motor efficiency classes. As far as the “Topmotors” programme is concerned, the producer and supplier data will still be available in the form of a price assessment based on the nominal power as a tool for calculating the investment costs, as well as the pay-back time for the replacement of an old motor with a premium or super premium model.

In order to assess the impacts of the IEMSI programme, all four blocks will be monitored and static data will be made available (e.g. number of downloads, number of visitors to the website, number of participants at the various events). The Swiss Federal Office of Energy also publishes annual statistics by sector and application which provide an overview of the development of electricity consumption during the year. The statistics include a category for electric motor systems showing the development of their electricity consumption in the industry sector since 2000 and confirming the positive impacts of the efficiency measures that have been implemented via regulations and policies, as well as by programmes like IEMSI which will continue to help stabilise and reduce electricity consumption in the industry sector over the next five years.

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