DECEMBER
2014

SESEC

ENERGY EFFICIENCY FOR EUROPEAN APPAREL & TEXTILE COMPANIES

SESEC

Contents

Foreword

The International Energy Agency[1] highlights how **energy efficiency** can capture **multiple benefits** for those willing to address it, both in public policy making and in private business.

Resource saving, costs reduction, better environment and higher industrial productivity may be just a few of the more shining of such benefits. Many barriers, however, are also observed to limit the uptake of energy efficiency opportunities.

The "information failure" is clearly one of those barriers which prevent an option to turn into a measurable concrete result.

Thanks to the support of the European Union[2], the SESEC collaborative project has sought to address such type of information failure in a broad sense and chiefly from the perspective of European apparel manufacturing companies, whose business and expertise are not energy-focused but serve to dress, protect and fashion people.

Where is energy used in my company? Where is it lost? When and Why? What are the options and how long will it take to repay the investment? What indexes can be considered? What my competitors or partners do across the street or beyond the border? These and more questions were addressed by the SESEC experts teams coming from no less than 11 organisation in 8 European countries.

In two and half years SESEC has worked closely together with some 50 European clothing companies and it has collaborated with an even greater number of companies and organisations to pursue energy efficiency. Energy audits, benchmarking, self-assessment, training and an intensive communication exercise were carried out in different yet harmonised manner across Europe with focus in Italy, Portugal, Belgium, Germany, Lithuania, Bulgaria, Romania and Croatia.

This document provides insights of the results achieved and, hopefully, it offers points of consideration for new collaborations to start over the next years, also under the umbrella of the Euratex led Energy Made-to-Measure campaign.

1. IEA, International Energy Agency, "Capturing the Multiple Benefits of Energy Efficiency" September 2014
2. Financial support provided by the Intelligent Energy Europe of the European Union and managed by the executive agency of the European Commission named EASME as of January 2014

Why energy efficiency in the European apparel industry

In the EU 28 there are about 113,000 clothing companies[3] which employ 1.06 million people, generate €74 billion of turnover. These companies are mostly located in southern and eastern EU member states where they play a considerable role, or in some areas even a crucial one, for the national or regional economy. This is especially the case in Bulgaria, Romania, Portugal and Italy.

About 99% of such companies are Small and Medium size Enterprises (SMEs) which means they are relatively "small" companies managed with light flexible organisational structures, they are creative and very quick in reacting to the market needs. However the "small" size also implies that these companies often can hardly afford the costs of engaging an energy auditor or employing an energy manager.

The European textile industry supplies fabrics, knitting yarns, sewing threads and other materials to clothing manufacturers accounts for 49,000 companies (732,000 employees and €83.5 billion turnover) which shares important similarities with the clothing industry, such as the predominance of SMEs, knowledge requirements and common energy efficiency issues within factory environments. In textiles the energy consumption cost component is far greater than in clothing.

In previous years, the combined textile and clothing sector ranked among the first seven industrial sectors for energy consumption with 7Mtoe[4].

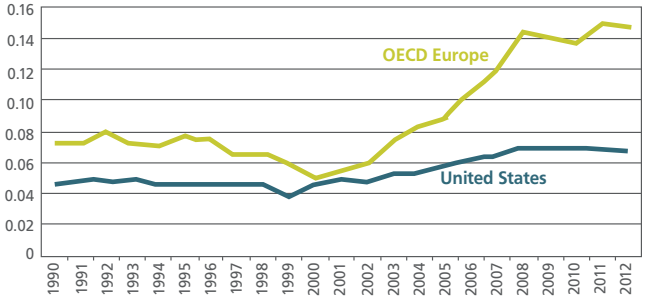
The clothing industry and its textile suppliers face significant economic pressures including rising energy costs[5] and fierce competition mostly from far-East countries. This and other economic challenges have triggered since 2005 an industrial modernisation process in which innovation, care for resource efficiency and cost reduction is placed at the centre of most companies' strategies. In essence the importance of efficiency is greater than ever before.

Industrial modernisation requires the necessary knowledge, guidance and ready-to-use technological and organisational solutions for **entrepreneurs to make the right choices and to optimise their investments**.

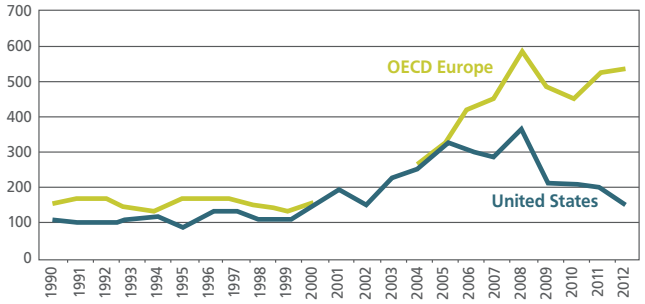
To help realising a significant untapped energy efficiency potential combined with the large size of the European clothing industry represents the unique value proposition of SESEC in terms of efficiency, environment benefits and increased competitiveness.

The SESEC project is designed to address the energy efficiency needs of the European clothing industry (primary target) and of its upstream part of the value chain: the textile industry (secondary target).

As the full textile and clothing industry accounts for almost 1 out of 10 of all the EU manufacturing companies, the economic and social impact of a more energy efficient industry is huge.



INDUSTRIAL USER ELECTRICITY PRICES IN $/KWh (Source IEA)



INDUSTRIAL USER NATURAL GAS PRICES IN $/Kcal (Source IEA)

3. Source EURATEX based on Eurostat 2012 data elaboration
4. Eurostat, 2007 data

5. In Europe natural gas prices for industrial users quadrupled and electricity prices for industrial users more than doubled in nominal terms between 1990 and 2012. Source: IEA International Energy Agency

What is SESEC

Objectives

In May 2011 in response to precise requests from the clothing manufacturing industry Euratex submitted a proposal to the Intelligent Energy Europe scheme[6] to support SESEC, a collaborative action tailored to help European clothing, and to a lesser degree also textile manufactures to appraise and achieve better energy efficiency.

The proposal as well as any further step was accomplished thanks to a close co-operation between nine leading organisations from seven European countries.

Ten months after proposal submission the SESEC project officially started and it pulled together expertise from leading apparel manufacturers, global consultants, national sectorial associations, energy experts, managers and researchers to:

- **Develop**, test and offer an energy efficiency tool, tailored for garment manufacturing companies and especially the SMEs ones;
- **Offer** training and support for companies to implement energy-saving measures considering cost-effectiveness;
- In the longer term, to **improve** opportunities for energy efficiency for the whole European clothing industry.

Approach

The project team chose to tackle the gap between saving potential and best practices on the one side and actual, every day operation in clothing manufacturing on the other side; lessons learnt from previous partners' initiatives formed the baseline. To achieve energy efficiency the average (SME) clothing company faces several restrictions such as no specific know-how, lack of dedicated personnel such as an energy manger, little awareness on the actual potential. To address these limitation the market has occasionally developed tools however these are hardly specifically designed by clothing experts, user friendly and available at large scale. Hence if a part of the problem lies with creating tools, another part consist of making those tools known and usable. The comprehensive work and dedication needed to use existing tools has driven many hesitating companies to abandon or not even try implementing of energy efficiency measures.

The SESEC team chose a methodology which can be easily implemented by the internal work force of a clothing company. Result oriented, simple to understand and based on the technical knowledge of company's work force, the methodology aims directly at company's objective: cost reduction.

The methodology follows the widely used PLAN-DO-CHECK-ACT (PDCA) principles with a hands-on approach, and tries to minimise any overwork.

6. The IEE scheme is funded by the European Union and managed by the executive agency of the European Commission named EASME as of January 2014

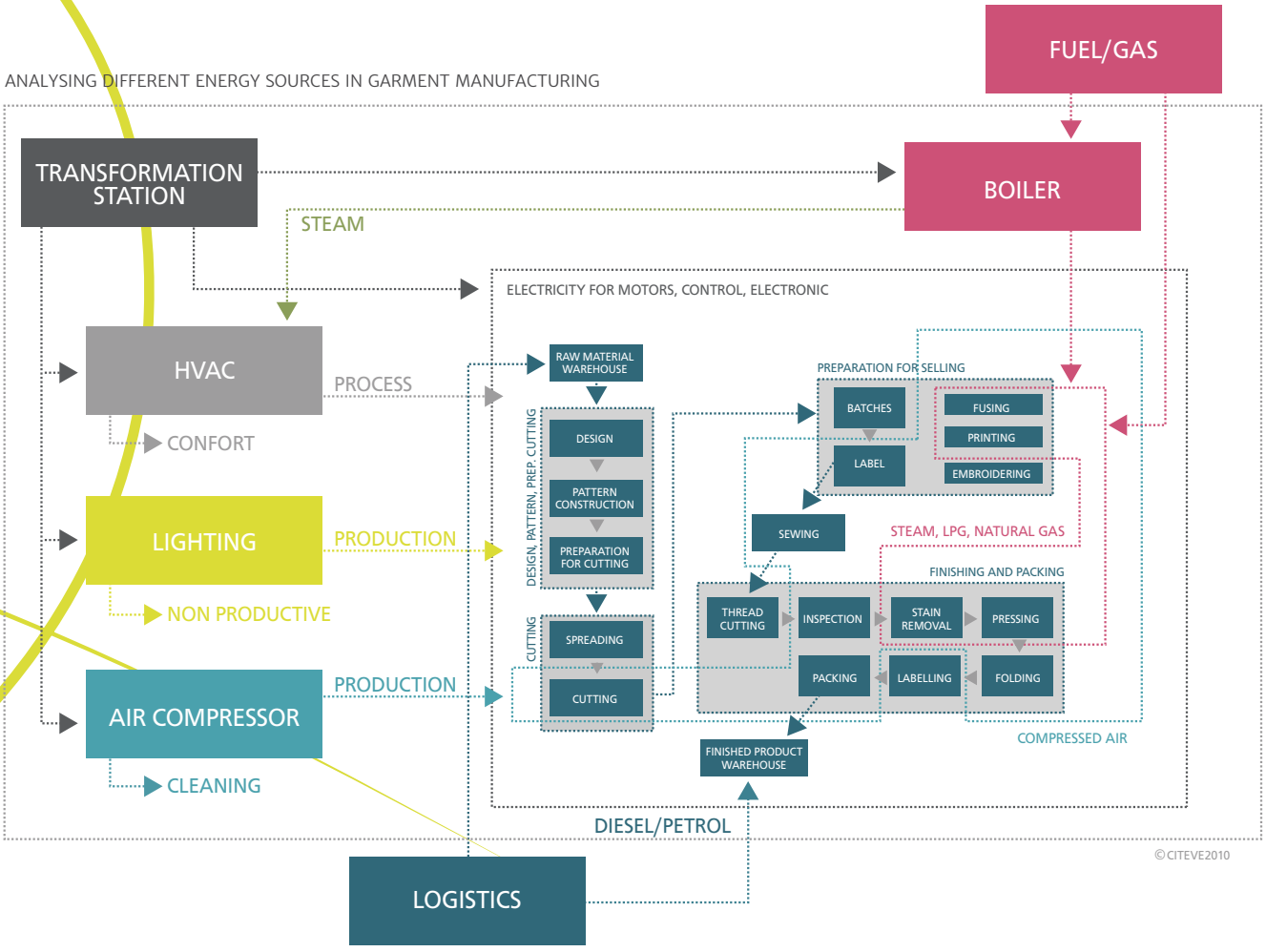
What has SESEC delivered

Benchmarks and energy saving opportunities

As very first step SESEC researched which areas of clothing manufacturing are responsible for the highest energetic consumption and where energy efficiency could be gained. All elements significantly influencing the consumption had to be identified and quantified by means of Energy Audits performed in several European companies and state of the art review.

This addressed production machines, building environment (e.g. lighting, air) and operations fluids (e.g. steam) and resulted in a structured database of energy consumption in a specific mill and which can be used for a large variety of analysis to calculate energy efficiency and for benchmarking. In particular the SESEC team analysed the energy consumption of 47 products of 7 catergories and identified a set of benchmarks used as baseline to allow comparison of production units within similar product groups.

This exercise provided values for six types of garments and based on reference **values per unit, per employee, per working minute** (which is quite common in the garmenting industry) **or per floor size**. The data collected are publicly available and, most importantly they were used to enable the ESS (Energy Saving Scheme) tool to pin-point the position of a company within range of comparable data.



The Energy Saving Scheme (ESS) tool

Having defined reference benchmarks and saving potential the team designed a methodology first and then an excel-based tool to apply such early outcomes at the company premises.

The results is the ESS hands-on tool based on three applications and which can be implemented in the company by just one or two types of company employees, notably the production manager and/or maintenance manager, with or without assistance by the SESEC team.

The ESS is available free of charge in 8 languages embedded in an online platform integrated within the main website of EURATEX, **www.euratex.eu/sesec**, this solution will extend the platform operative longevity far beyond the project lifetime.

The ESS is made up of three applications with original algorithms, it includes benchmarks and guidelines to facilitate the uptake of energy efficiency measures. The applications are:

- The **EDST (Energy Distribution Support Tool)** can be used if energy audit data is not available, the tool estimates energy distribution throughout the various processes and auxiliaries. It also allows **constant monitoring of consumption**;
- The **EMBT (Energy Management and Benchmark Tool) compares** the energy **consumption** data with the **production** data. It generates energy efficiency indices and it reports on the dynamics of consumption;
- The **SAT (Self-Assessment Tool)** is an instrument for **self-evaluation** which allows companies to identify the **most promising Best Practices** for energy saving for the company.

How does the ESS work?

The ESS is made up by three applications, EDST, EMBT and SAT, which can be downloaded and used independently based of what type of information the company management is interested in.

The SAT application allows companies to make a first assessment on its energy efficiency. By entering data on yearly production, energy consumption, etc. the company receives economical indexes benchmark position (based on developed benchmarks and Eurostat data), global energy type and production ratio, yearly specific consumption, recommended best practices list (includes average saving % on each measure and where it applies), potential energy savings estimation and economic analysis to support the selection of a specific solution for measure implementation.

The SAT application also has an embedded automatic feedback questionnaire for companies to provide important information, in anonymous and confidential manner, to improve the tool and to provide additional data to expand on benchmarks.

With the EDST application it is possible to collect and calculate consumption data of the machines in the company and for each production phase.

The application EMBT allows companies to compare on monthly basis the production with the energy consumption (in KWh and toe), green house, gas emission and the energy cost (in €). EMBT also enable analysis how energy consumption changes based on production changes and to represent it through a regression line.

EXAMPLES OF ENERGY SAVINGS FROM ACTIONS ON VENTILATION AND ISOLATION OR REACTIVE POWER

Best practices delivering quick results

A total of 85 best practices exist in SAT's database, each of those results from the application of an algorithm that elaborates on data previously introduced and provides a tailor made proposal for the company.

Some of the best practices proposed by the tools can deliver tangible results in short time:
- *Heat recovery from fumes of steam and hot water thermal generators;*
- *Heat recovery from dyeing and scouring water.*

Both of these best practices allow companies to achieve savings from 5% up to 30% of thermal energy consumptions, with a payback time of two years.

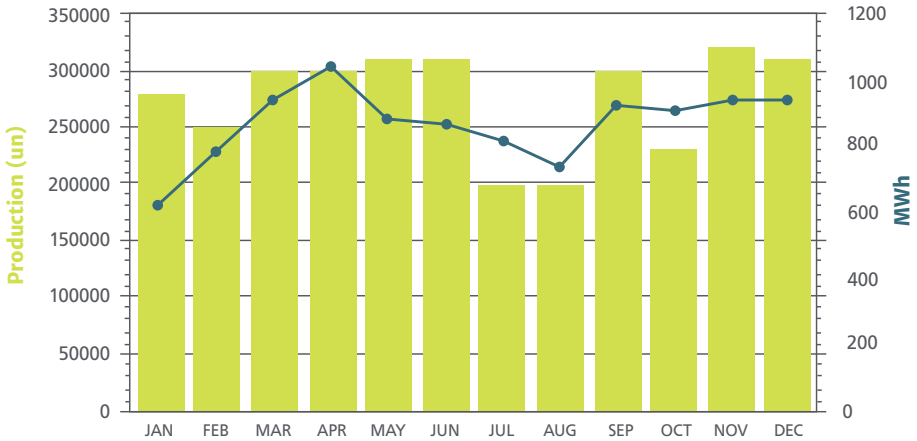
Training modules

The SESEC team released 14 independent training modules to help company qualified staff to realise the relevance of energy efficiency measures and to assess their feasibility.

The modules cover topics largely common to clothing and textile industry in the field of energy efficiency, such as lighting and heating (related to garment production), negotiation of supply contracts and shifting, use of machines in production processes, compressed air, heating, and lighting.

All modules are based on the widely used Microsoft power point format, use a length of 35–50 slides and follow a similar didactic approach touching upon: Introduction (motivation), Theory (physical, economic and technical background), Exercises (e.g. sentences with blank spaces), Business Case (real world examples with numbers that prove the efficiency), and Summary.

The modules are available in up to eight languages and are freely accessible on the SESEC platform[7].



MONTHLY PRODUCTION AND ENERGY CONSUMPTION (MWH)

7. www.euratex.eu/sesec

Informing and training companies

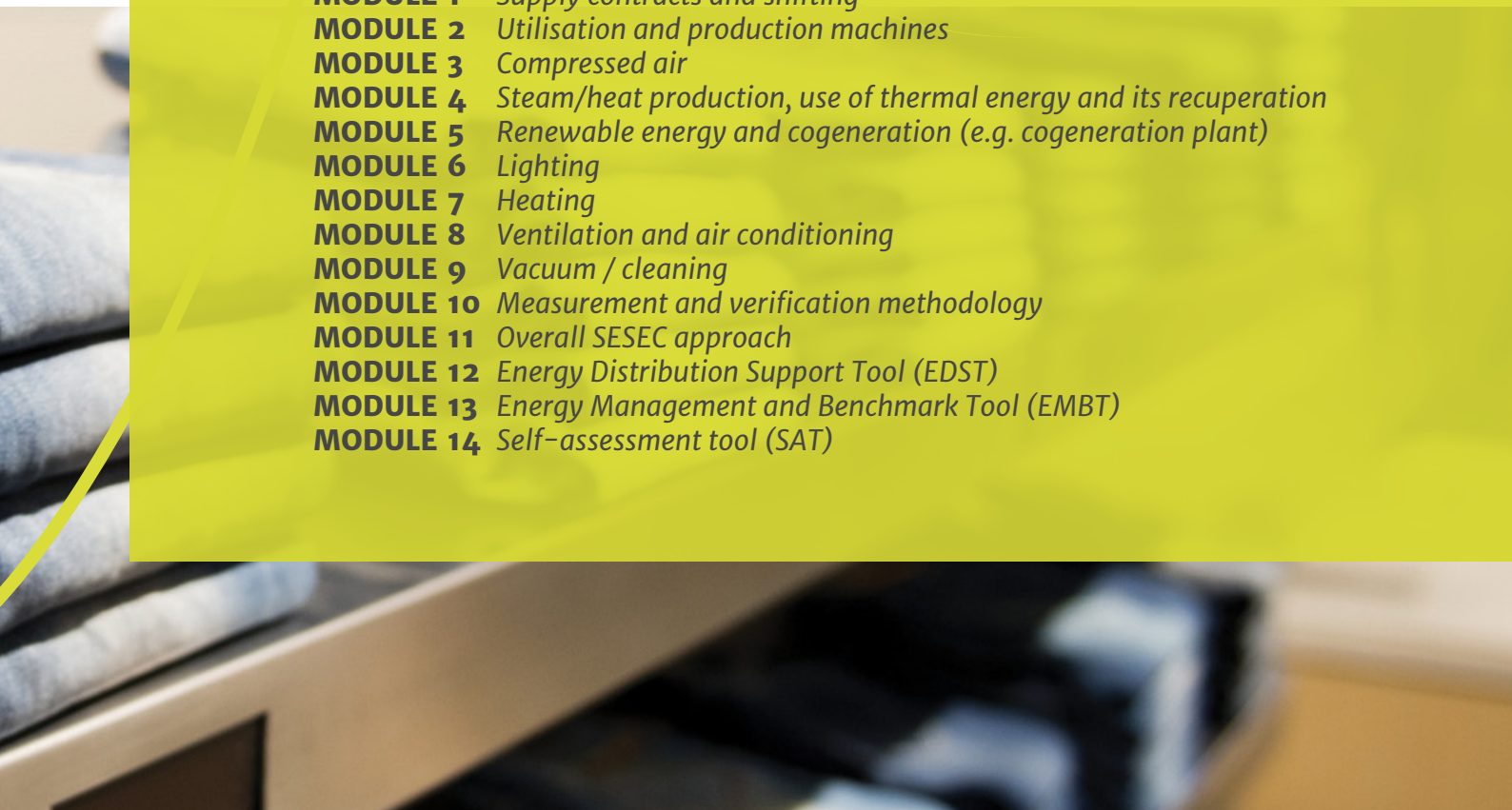
The SESEC partners organised and ran 20 training and informative events in eight countries to mobilise company managers and technical staff towards energy efficiency. The SESEC team explained how the ESS tool works, brought other companies' testimonials to tell successful business cases and generally stimulate thinking on energy efficiency based on real data and real tools available for the company.

The primarily addressed stakeholders were clothing and partially also textile companies, energy experts, universities, local support organisations, chambers of commerce and the future generations represented by students and trainees. The events were not only meant to bring usable knowledge to companies, but also triggered longer term cooperation, new contacts and possible follow-up activities. Some 200 feedback collected suggest that the awareness on energy efficiency were in general significantly raised and the SESEC results, notably the ESS were very well received.

The events unveiled unexpected issues such as excessive length of time needed for fashion managers to assess and react on what was generally perceived to be a complex topic. Most importantly companies are normally aware of how much is spent on energy yet, with few valuable exceptions, managers or employees are largely unware of how, when and where energy is used, or worse lost. Another **lesson learnt** highlights the positive role trainees or students can play in supporting the company staff particularly on time-consuming data processing.

TRAINING WAS NORMALLY ORGANISED AROUND 14 TOPICS OR MODULES

MODULE 1 *Supply contracts and shifting*
MODULE 2 *Utilisation and production machines*
MODULE 3 *Compressed air*
MODULE 4 *Steam/heat production, use of thermal energy and its recuperation*
MODULE 5 *Renewable energy and cogeneration (e.g. cogeneration plant)*
MODULE 6 *Lighting*
MODULE 7 *Heating*
MODULE 8 *Ventilation and air conditioning*
MODULE 9 *Vacuum / cleaning*
MODULE 10 *Measurement and verification methodology*
MODULE 11 *Overall SESEC approach*
MODULE 12 *Energy Distribution Support Tool (EDST)*
MODULE 13 *Energy Management and Benchmark Tool (EMBT)*
MODULE 14 *Self-assessment tool (SAT)*



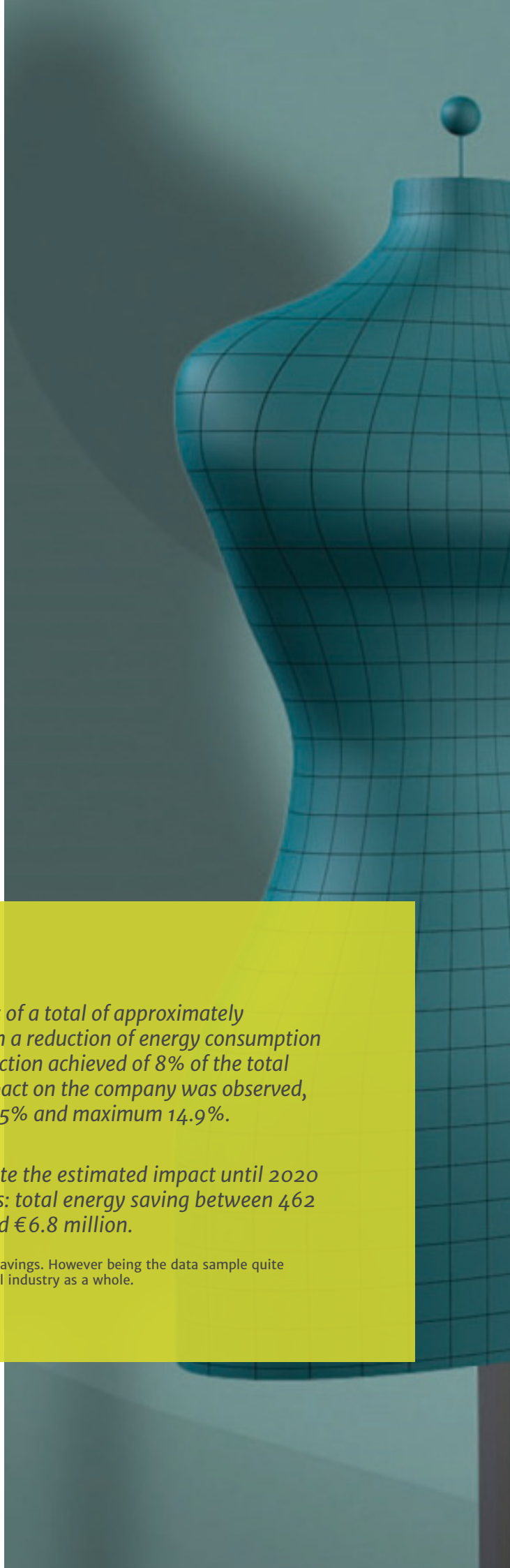
The business response

The SESEC team spent a considerable amount of efforts in bringing results directly to companies, which proved to be instrumental to trigger theirs actions.

Cooperation with local organisations and synergies with national sectorial associations was indispensable to this purpose; in most cases these joint actions had such a positive response from local companies that created the condition to keep promoting energy efficiency for the sector well beyond the SESEC project duration.

The project team sought to understand what impact SESEC had in local companies after, on average, one year after the first contact was established.

Most energy efficiency measures are considered, planned, (co-) financed and implemented in time frames which largely exceed the SESEC direct support activity and the scope of the present rapport. However and in spite of short time frame, the data provided directly by the supported companies and the early results gained by companies indicate a very positive impact was achieved.



Performance indicators in Portugal

Figures provided by companies report direct investments of a total of approximately ***€480.000*** *in the considered timeframe which resulted in a reduction of energy consumption achieved in one year of 259.000 KWh with average reduction achieved of 8% of the total consumption. Extreme diversity of interventions and impact on the company was observed, individual reductions reported between a minimum of 3.5% and maximum 14.9%.*
The resulting energy saving are of about 60 toe/year.

The availability of some data allowed CITEVE to calculate the estimated impact until 2020 of its action under SESEC with Portuguese companies as: total energy saving between 462 Toe and 849 Toe; investments between €3.7 million and €6.8 million.

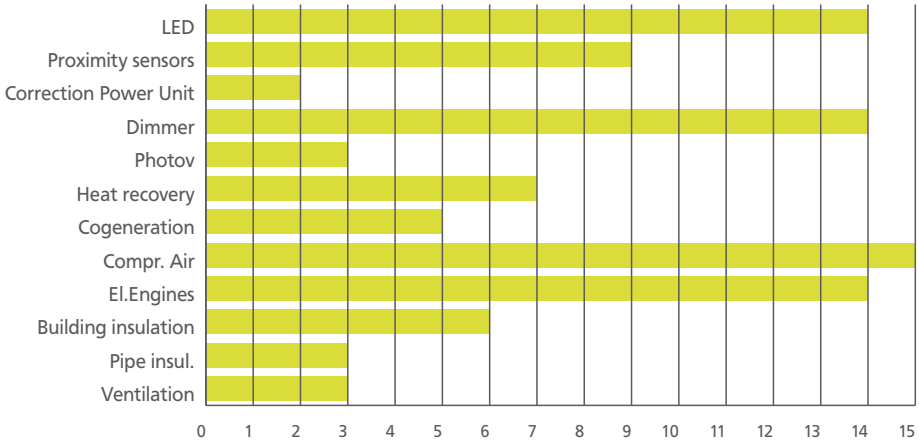
Disclaimer note: the above data are calculated based on real consumption and savings. However being the data sample quite limited, the conclusions presented cannot be generalised to the national apparel industry as a whole.

SESEC in Portugal

The leading Portuguese textile research centre CITEVE managed the complete action launched in Portugal to boost energy efficiency for local companies. Initially seven Portuguese companies received a complete energy audit, followed by 10 companies which tested the ESS tool and were assisted in the national language in using its applications. A larger share of companies joined the informative/training events.

The CITEVE team organised and performed two training and informative events in the cities of Vila Nova de Famalicão and Covilhã, areas where the bulk of Portuguese clothing industry is concentrated. These events featured presentations on SESEC, hands-on training on how to use the ESS tools and success cases were explained by companies' delegates to peers companies. Topics discussed with the audience touched on the role of energy in sustainability, how to manage and to implement saving measures. Overall the sessions had 92 participants, representatives companies, trainers, trainees, teachers and university & technical students.

The second event was co-organised by AFTEBI, the Association for Technological and Professional Training of Beira Interior, early on the testing phase it was supported by ATP, the national Portuguese Textile Association. An independent energy consultanting company which tested the ESS in non-clothing companies concluded that the model is easily transposable to other sectors. A delegate of CITEVE enabled direct training on the ESS for Lithuanian companies in Vilnius in two separate events. The apparel company Twintex, Indústria de Confecções, Lda supported by CITEVE granted an interview in ad-hoc video.



MOST FREQUENTLY RECOMMENDED ENERGY SAVING MEASURES (SAMPLE OF 15 AUDITED COMPANIES)

Size of the hole (mm)	Flow rate at 7bar (l/s)	Power loss (kW)	Total energy loss (KWh)	Total costs[1]
1	1.2	0,4	3200	480
3	11.1	4	32000	4.800
5	31	10,8	86400	12.960
10	124	43	344000	51.600

ESTIMATED POWER LOSSES AND COSTS €, CAUSED BY SMALL LEAKS IN AIR COMPRESSED PIPES
1. Assuming operating 8000 hours/year and energy cost of 15c€ KWh

MICO MINEIRO

Country Manager, TWINTEX Industria de Confecções LDA

Was the SESEC energy audit useful for your company?
"In Twintex we take the issue of energy efficiency very seriously. We have introduced a number of actions to make our production 'greener', to use less energy and electricity. The audit made by the SESEC representatives was very useful for us, it allowed us to see different areas where we can improve and we have been following its useful advice."

Where the ESS tools provided by SESEC used in full effect?
"Among ESS tools the one with the most impact for us was SAT. The SAT showed us based on our production reality where we should adopt the new measurements and where we should take action to improve our energy efficiency."

Based on CITEVE survey, the SESEC impact in companies has been very positive in spite of the country's negative economic framework between 2012 and 2014. The impact of SESEC was more thoroughly analysed in four companies with key results of direct investments of a total of approximately €480.000 in the considered timeframe which resulted in a reduction of energy consumption achieved in one year of 259.000 KWh.

The energy efficiency measures considered, started or already completed included (in random order): replacement of fluorescent lighting with LED tubes, installation of photovoltaic panels, installation of solar water panels (preheat boiler water), insulation of steam valves and fittings, insulation of condensate deposit, installation of Variable speed drive on automated cutting machine, reduce leaks in air compressor network.

Outlook to next activities indicates 10 out of the 17 companies which were actively assisted by CITEVE have effectively used or are being using the ESS. With regards to future actions, feedback forms used at events reported 27 participants claiming they will use, partially or fully, the ESS.

SESEC in Italy

The national research organisation ENEA managed the complete action launched in Italy to boost energy efficiency for local companies. The ENEA action with SESEC in Italy resulted in eight Italian companies receiving a complete energy audit, about 20 companies were assisted in understanding and using the ESS tool and about 100 companies were addressed in a very wide and carefully planned communication action performed in the national language. The latter brought ENEA engineers to ***preach*** energy efficiency and the SESEC results in virtually all the major Italian apparel textile districts with seven informative/ training events run across the country: Prato (Tuscany), Biella (Piemonte), Schio (Veneto), Busto Arsizio and Como (Lombardy), Carpi (Emilia-Romagna) and Fasano (Puglia)[8].

These events were the first launched under the promotional umbrella of the Energy Made-to-Measure campaign and the very first SESEC events. A standard "SESEC agenda" was prepared, applied and improved based on feedback to be proposed to all other future events. The agenda included presentations on SESEC, hands-on training on how to use the ESS tools, specific lectures on topics of greater importance (e.g. HVAC, cogeneration etc.). The success cases explained by companies' delegates to the participating companies kept motivation high and provided evidence of energy efficiency actions successfully adopted.

The events were organised with support of 18 city or province level organisations close to the apparel and textile industry and were attended by 182 participants, representatives of companies, industry associations, trainees, university and technical students. The ENEA team has been also instrumental in performing SESEC actions in Romania and Croatia.

ENEA has surveyed the impact of its SESEC actions with companies which has been very positive and has returned explicit acknowledgements. A cumulative savings of up to 7.650.000 KWht/year has been estimated (ref. box in this page).

Performance indicators in Italy

Based on the information provided by four companies the measures implemented or expected generate the following results.

*Cumulative savings of up to **7.650.000 KWht/year**, largely thanks to expected or implemented installation of cogeneration, installation of heat exchanger for recovering waste heat, installation of heat exchanger for recovering waste heat from smoke, recovery of process heat.*

Data allowed to calculate the expected reduction summing up at between 16% and 23% of a given company total thermal energy consumption and between 1% and 12.5 % of the total electrical consumption. In one extreme case total thermal energy consumption can be eliminated entirely.

Disclaimer note: the above data are calculated based on real consumption and savings. However being the data sample quite limited, the conclusions presented cannot be generalised to the national apparel industry as a whole.

Approximately 27 companies' delegates joined ESS simulation sessions, 16 companies have tested the ESS and have been assisted directly by ENEA.

8. The events run in Prato and Biella and featuring SESEC were co-financed by the FP7 programme ARTISAN research project, part of the Energy Made to Measure campaign.

BERTRAM ROLLMANN

General Manager, PIRIN-TEX EOOD

Do you consider energy efficiency to be an important factor of competitiveness of a clothing company?

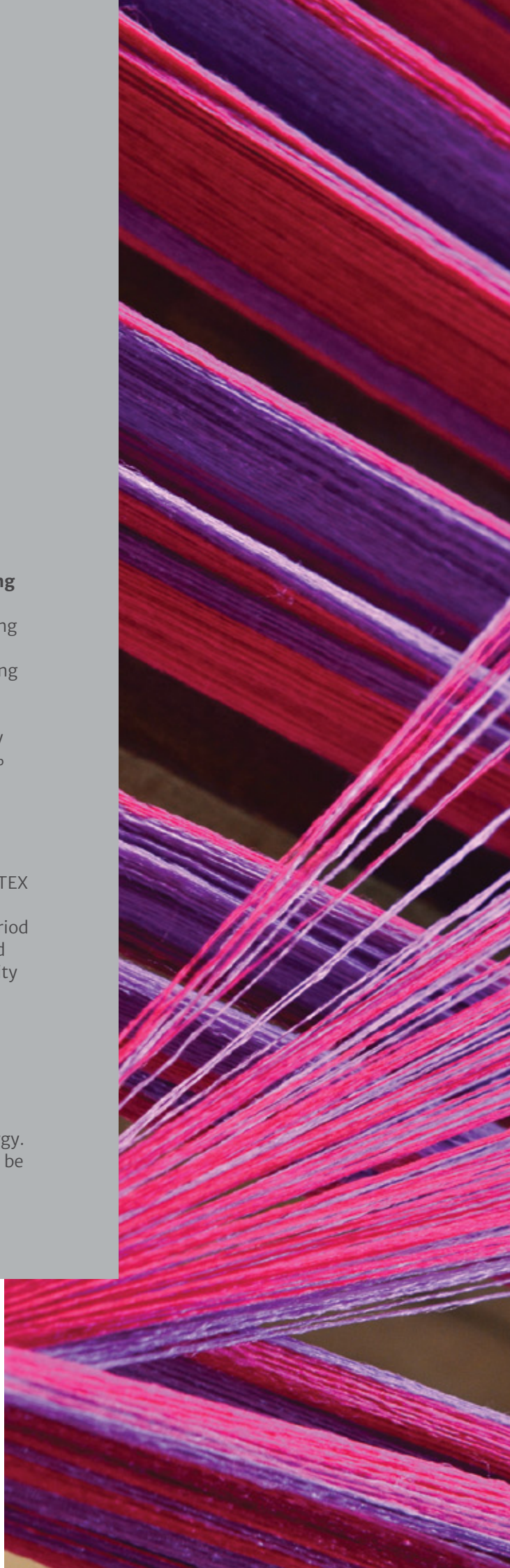
"Energy efficiency is a crucial element of functioning of the modern enterprise that needs to be competitive. Since ten years we have been practicing regular energy auditing and monitoring. With these activities you can identify measures that are necessary to increase efficiency and in our industry at a quite short term it can bring more than a 50% improvement."

What results did you achieve installing LED lightening in your company?

"In line with the recommendations of SESEC tools, about nine month ago we have installed in PIRIN-TEX LED lighting in separated area which covers about 20% of our production facility. This is a testing period of this new lighting and so far we are very satisfied because of the increase of the economy of electricity consumption for about 58%. It had no negative influence on the microclimate and improved the quality of the working conditions."

Which other energy efficiency measures did you introduce?

"In every our plant we have installed power factor correction units to reduce the price of electric energy. Without this our cost for the electric energy would be 10-12% higher."



SESEC in Bulgaria

The national sectorial association BAATPE and the leading apparel manufacturer Pirin-Tex joined forces to perform the SESEC actions in Bulgaria, motivating and boosting energy efficiency in national apparel production. Under the Pirin-Tex supervision, external independent services performed seven complete energy audits for Bulgarian companies, further 15 companies were assisted by the partners to test and apply ESS tool in Bulgarian language.

The Bulgarian SESEC team organised two events in the areas of Borovetz and Kyustendil which were attended by 70 delegates among which about 27 of professionals received direct training on specific modules and on how to use the ESS. While the National association focused on results promotion and SESEC-events organisation at national level the partner company was committed to add its insider (industrial) point of view also on development tasks in SESEC notably on analysis of the energy consumption within the clothing manufacturing process and feedback, from an end-user view point, on the ESS tool.

Companies' first hand indications suggest that benefits may have been also achieved on financial savings only, in the order of 10%-15% of the costs thanks to change of supplier.

The impact of SESEC was more assessed in 5 companies which all presented indication of implemented / planned measures resulting in a reduction of energy consumption of 325.000 KWh per year.

Performance indicators in Bulgaria

*Figures provided by companies reported a reduction of energy consumption achieved in one year of **325.000 KWh**.*

Significant diversity on interventions and impact on companies was observed with reductions reported as 10% of lighting and below 10% in energy consumption.

Disclaimer note: the above data are calculated based on real consumption and savings. However being the data sample quite limited, the conclusions presented cannot be generalised to the national apparel industry as a whole.

The energy efficiency measures considered, started or already completed included (in random order): managing the use of lighting, resetting steam generator and boiler, replace equipment, use 20-25% from biomass consumption, machineries setting, insulation.

The action in Bulgaria opened new collaborations in the field of energy efficiency and management. The company Pirin-Tex's relevant role in SESEC and its experience with benefits already gained has offered relevant examples for the whole value chain.

SESEC in Romania

The national research centre INCDTP managed the SESEC activities in Romania with additional technical support by ENEA. The strong cooperation resulted in joint-teams composed of personnel of both organisations which in the first project phase assisted a first group of companies and performed five energy audits. In the following phase INCDTP autonomously performed all activities including direct support to companies with actions throughout the country. This exercise proved to be a good opportunity to identify energetic errors, reactive consumptions and to spot loses to be reduced or eliminated. Most companies appreciated a costly and high added-value service offered at no cost and mark it as starting point for continuous monitoring of energy consumption. The ESS tool was tested in Romanian language by 18 companies which reported a documented positive feedback.

The companies' responses and participations in three national training and informative sessions were extremely positive and largely exceeded the expectations, with 81 participants attending 3 events and which generated collaboration with two national clusters to train Romanian companies on energy saving modules and use of the ESS application.

The companies' response to the action allowed INCDTP to collect some well documented data, the company SC Datsa Textil had even granted an interview on the SESEC support in a video produced by the project and shared on the internet. Overall four companies reported measures already implemented within the SESEC time frame and which saved energy for 120.000 KWh/ per year with further 100.000 KWh per year to be gained upon implementation of scheduled measure adopting of a power factor in a company. Measures refer to lightening, isolation, reduction of power consumption, photovoltaic.

Performance indicators in Romania

Investments in equipment to achieve energy efficiency have been reported for a value over ***€ 1 million****.*

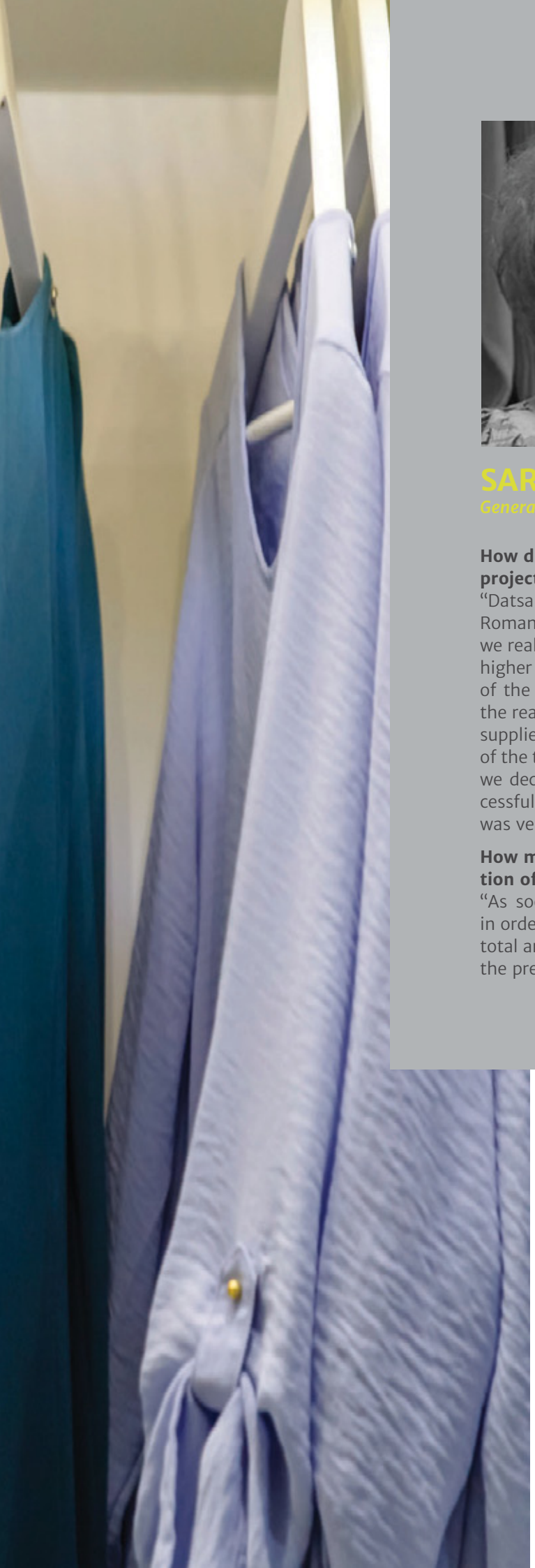
The companies' response to the action allowed INCDTP to collect some well documented data, such as the Romanian company SC Datsa Textil identified a series of actions which saved 26.66% of the electricity costs.

The reactive energy has been reduced by 65.6% compared with the same period last year. Another company (name is confidential) has applied energy efficient measures to reduce the electric consumption by 3% through reactive energy compensation and reduced power consumption in non-productive areas. Other companies adopted efficient LED lighting to reduce the electricity consumption by 5%.

Measures implemented within the SESEC time frame saved energy for 120.000 KWh/year further 100.000 KWh expected upon implementation of scheduled measures.

Disclaimer note: the above data are calculated based on real consumption and savings. However being the data sample quite limited, the conclusions presented cannot be generalised to the national apparel industry as a whole.

About 22 of the companies addressed were assisted in using the ESS tool, further 11 declared intentions to consider future use.



SARA WECHSLER

General Director of DATSA TEXTIL SRL

How did your company benefit from the SESEC project's audit?

"Datsa Textil was among the first companies in Romania audited by the SESEC project. Due to the audit we realised that our electrical power invoice was much higher that the figures we previewed. The conclusion of the SESEC power audit was that it was mentioned the reactive energy on the invoice issued by our power supplier. The amount of the reactive energy was 10% of the total electrical power consumption. At the result we decided to find a more trustful supplier and successfully renegotiated our energy supply contract what was very beneficial for us."

How much energy have you saved with the adoption of the new power factor correction unit?

"As soon as we installed the power correction units in order to compensate the reactive consumptions the total amount that was reduced is by 20% compared to the previous invoice."

SESEC in Croatia

At the peak of SESEC promotion the Croatian national employers association, HUP, also member of Euratex, expressed interest in the energy efficiency topic and to apply some of the SESEC results in its country. Thanks to this keen interest HUP in collaboration with Euratex and other partners has succesfully managed to enable Croatian companies to access in national language the Self-Assesemnt Tool application and a number of training modules. In late September 2014 a public event took place in Zagreb to mobilise companies towards energy efficiency and to train on the selected tools.

The event received high visibility and several companies joined including most of major national brand and relevant national authorities, notably: the Ministry of entrepreneurship and crafts, environmental protection and the Fund for energy efficiency.

Planned and executed within only a few months the collaboration in Croatia represents a remarkable example of how to apply key project results to companies based in new countries with a relatively minor amount of efforts. Follow up is expected as of 2015 to address the explicit request from some local companies to deliver training in their premises.

SESEC in Germany

In Germany important occasion of promotion were provided by the industry fair Texprocess on 11-13 March 2013 and later on by a joint event organised in Messe Frankfurt in collaboration with the national sectorial association. The former is the world leading event where companies from across the globe come together chiefly for business purposes but also to understand trends, networking and work on collaborations, SESEC was represented mostly through the DITF and Euratex manned booths.

In 2014 the seminar and training session "Information day Energy for the Textile and Clothing Industry" was organised by the German Textile and Fashion Industry Association "textile + mode" (t+m) in Frankfurt, in the framework of the Energy Made-to-Measure campaign. The event marked the first step to promote energy efficiency and synergies with SESEC in the country. 20 representatives from eight German clothing and textile companies joined the event.

SESEC in Lithuania

Thanks to keen interest of LATIA, the Lithuanian Textile and Clothing Association, also member of Euratex, options to extend the impact of some of the SESEC actions into the Baltic country were considered, discussed with the EASME officials and eventually implemented. The collaboration was triggered by the evolving energy scenario in Lithuania which raises interest in energy matters, but also from the sizeable and active industry fabric operating in the country.

As a result LATIA started joining technical meetings as of 2014, its resources familiarised with the SESEC way of working, operational goals and jargon. In June and September 2014 two seminars and training sessions took place in Vilnius under the titles "Energy Efficiency Saving in the Lithuanian Clothing Sector" and "Increasing Energy Efficiency in the apparel sector: best European practice".

These events featured contributions from two SESEC partners notably Euratex and CITEVE who assured coherent presentation of, respectively, the SESEC scope and mid-term goals for opportunities and energy efficiency best practices with the ESS tool applications. Overall 28 representatives from 20 Lithuanian clothing and textile companies took part.

The type of collaboration and short time available to operate did not allow an accurate review of the SESEC impact in the country even though the majority of participants' feedbacks were encouraging. This collaboration has also proved instrumental to foster further and stronger collaboration under actions promoted by the Energy Made-to-Measure campaign.

10 things to do to save energy

The list refers the most promising energy efficient measures in apparel manufacturing. Different measures offer higher benefits in textile manufacturing.

1. ***Installation of high-efficiency motors***
   Replacing old standard-efficiency engines with new high-efficiency ones (reference: IE3/ IE4) can bring consumption savings between 10% and 30% while generating the same power.

2. ***Compressed air: reduction of network leaks***
   All pipe networks distributing air compressed usually have leaks; no leaks above 5% should be tolerated. Air compressed leaks often account for as much as 30% of the volume transferred. This means loss of thousands, or even tens of thousands of euro.

3. ***Compressed air: decrease of the temperature of intake air and decrease pressure***
   Lowering the air temperature and pressure reduces the amount of energy necessary to pomp air in the net.

4. ***LED lighting***
   On average, replacing previous generation lighting system with LED lights may offer payback in time of as little as 18 months.

5. ***Install inverter (VSD's) on motors with variable regimens***
   Devices (inverters) reduces the engines' speed to guarantee the minimum amount of energy is used, for instance to ventilate rooms.

6. ***Cold Storage***
   Colling system can use stored cold water (7° degrees) which is cooled down when energy is cheaper. When energy prices changes throughout the day, it may be convenient to cool large amount of water, store it and use it in a time when the energy price is at its highest.

7. ***Insulation of steam pipelines***
   Appropriate isolation of pipes can reduce heat losses by 90-95%.

8. ***Power factor correction***
   While functioning electrical engines generate reactive energy which is to be neutralized by power factor correction, this can be done either by the energy producer or by the company using energy. Costs to address this point can be very high in some countries and can be avoided if companies install power correction devices.

9. ***Replace flat belts with V belts***
   In electrical engines V belts are more efficient than flat belts.

10. ***Install low-loss transformers***
    Efficient electrical transformers can minimise loses due to constant power supply.

SESEC in Energy Made-to-Measure

Throughout 2014 the SESEC results and its numerous public events across Europe were actively promoted through Energy Made-to-Measure (EM2M)[9], the information campaign pursuing energy efficiency in the textile and clothing sector until at least 2016.

Energy efficiency is a subject of critical importance for the textile and clothing (T&C) industry, for other sectors and for the society in general. There is no wonder that in Europe and globally, many high quality actions are launched by competent organisations and companies to address this matter. These actions create tools, define best practices and find innovative solutions which can bring real benefits to many other companies with similar needs.

However spreading even high quality results on energy efficiency at large scale can be severely affected by many factors such as geographical borders, different languages, limited financial resources, time constrains and the natural limits of usual business networks.

The Energy Made-to-Measure campaign is launched in February 2014 to provide European T&C companies with high quality information and tools to appreciate and exploit energy efficiency.

The campaign promotes synergies between relevant initiatives, projects and other forms of actions, at national and European level, to maximise the impact of any valuable action.

Energy Made-to-Measure does not create original contents but brings together outcomes of successful actions to provide companies with access to: energy saving best practices to evaluate actions, self-assessment software tools to make first steps toward actions, access to training for the staff, examples of successful business cases made by peers/ competitors, concise information on the results of relevant research and innovation projects, news and information about financial support opportunities on energy and relevant for the sector, alert on relevant meetings and events across Europe, a dedicated LinkedIn group[10] for quick access to the latest info and info sharing among over 180 registered professionals.

ARTISAN, SESEC, SET and more

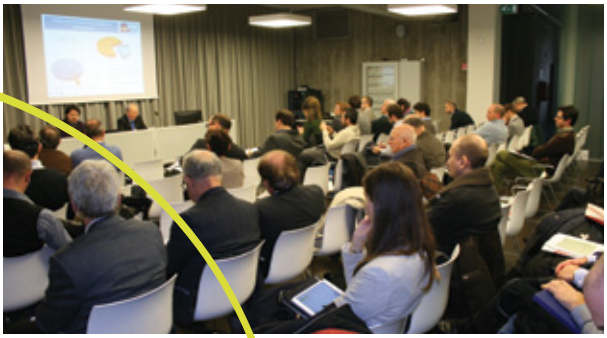
Under the Energy Made-to-Measure brand two different projects (ARTISAN and SESEC) with common partners and with similar objectives have relies on the respective networks and events to promote complementary results.

The SESEC tools and best practices to assess energy consumption in the (garment) factory environment has been brought to the attention and tested by textile manufactures. Likewise the ARTISAN methods and tools to optimise production taking into account energy consumption have been widely advertised with SESEC training and information session throughout 2014 and in many European countries.

The new SET project coordinated by Euratex is building up on the previous projects' experience and it shall support further promotion of results.

9. www.euratex.eu/em2m

10. LinkedIn Group is named "Energy Made-to-Measure, in Textile and Clothing industry"



Picture from company SC Sorte SA, events in Prato and Como

SESEC was present at

Modtíssimo, stand at the Portuguese Textile & Clothing Exhibition in Porto September 2012, EURATEX Resource Efficiency Conference, Brussels November 2012, BAATPE General national Assembly, Sofia 2013; SESEC Final Conference Brussels, September 2014, international conferences TEX – TEH V October 2012, Bucharest; Conference of Research and Innovation in Bucharest October 2013; CORTEP 2014 September 2014 in, Research Saloon, October 2014, Bucharest; MODEXPO 2014 fair September 2014, Bucharest; International Fair Romanian Fashion Trends and Brands 2014 October 2014 in Bucharest. Texprocess, March 2013, Frankfurt; Euratex General Assembly and annual report 2013 and 2014; EM2M events in Prato and Biella; SESEC events in Schio, Busto Arsizio, Como, Carpi, Fasano, Gotse Delchev, Bucharest, Porto, Lovech, Vilnius, Wevelgem area, Buzau, Romania, Focsani & Panciu, Vilnius, Frankfurt, Dornbirn, Brussels, Zagreb, Covilhã.

SESEC has appreciated cooperation with

AFTEBI, the Association for Technological and Professional Training of Beira Interior; ATP, the Portuguese national textile association, SMI, Sistema Moda Italia, OTIR2020, Next Technology Tecnotessile, Provincia di Prato, Camera di Commercio di Prato, citta studi Biella, Po.In.Tex Polo Innovcazione Tessile, Biella, F.lli Piacenza SpA, Marchi & Fildi, Fondazione Centro Produttività Veneto, Friend Europe, Confartigianato, Apindustria, Confindustria and CNA of Vicenza, Centrocot, Unione degli Industriali of Provincia di Varese, Unindustria Como, Gruppo Filiera Tessile Como, Confindustria Modena, Apulia Fashion Makers, Università di Bergamo, Romanian Textile Concept cluster, TMV South Est Cluster, FLAIC, I Musicanti non dormono mai, IVGT Germany, German Textile and Fashion Industry Association “textile+mode” t+m, Germany.

SESEC as of 2015

Encouraged by the successful response given by many textile or clothing companies, the SESEC team promotes access to results far beyond the planned contractual end date of the action (September 2014).

Hosted in constantly updated website, the SESEC results remain fully available for companies,support organisations and independent professionals to consult data, to assess potential or to get inspiration on new energy efficiency measures. In Italy, Portugal, Germany, Bulgaria, Romania, Croatia, Lithuania partners appoint at least one member of the staff as single contact person to address at national level matters on the use and further promotion of the SESEC results. To keep contents up to date and reflect changes in energy prices across Europe, upgraded versions of the most effective applications of the ESS will be released as of 2015.

The new SET project (**www.euratex.eu/set**) which addresses energy efficiency in textile, the upper part of the clothing manufacturing supply chain, will undoubtedly provide opportunities to bring the SESEC results further to more companies in more European countries.

The growth of the Energy Made-to-Measure campaign is expected to provide a framework as well as concrete opportunities to promote the SESEC most performing results and team up with textile and clothing key international stakeholders, including organisations and initiatives.

Aware of the importance of achieving **critical mass** to support energy efficiency in SMEs, Euratex is actively pursuing cooperation with stakeholders. At the time this report is concluded Euratex is in particular addressing the European Technology Platform for the Future of Textile and Clothing **www.textile-platform.eu**, the Blue Competence initiative of VDMA, Germany, (**www.bluecompetence.net**) the Sustainable Technologies project of ACIMIT, Italy, (**www.acimit.it**) and other international organisations.

Who did it

EURATEX

The European Textile and Apparel Confederation, Europe

Euratex is the official body representing and promoting the interest of the European textile and apparel industry at international level, notably with the institutions of the European Union. The Euratex' membership is primarily composed by the official national sectorial associations in countries of Europe and of its neighbourhood area.

Euratex has initiated SESEC and it has then played the double role of project coordinator and leading organisation to support results transfer throughout Europe. In the latter capacity Euratex has been in charge of the SESEC communication activities and has extensively collaborated with its Members. Euratex is also initiator of the Energy Made-to-Measure campaign. EURATEX appoints two contact persons to support the use of SESEC results and create new synergies for energy efficiency in the sector across Europe (updated contact details are published on the website).

BMS vision

Belgium

BMS is a leading supplier of Manufacturing Execution Systems (MES) for the textile industry with extensive know-how in data collection, monitoring and ERP integration.

The global company has brought into the consortium its know-how about Energy Management software systems, as well software design and programming. Its long experience in supplying software solutions for use in industrial environment proved very valuable for the development of the SESEC's ESS tools and for promoting SESEC results across the industry. BMS's focus on the complete textile production process has carried some of the SESEC results beyond its original focus of clothing manufacturing into textile manufacturing.

BAATPE

Bulgarian Association of the Apparel and Textile Producers and Exporters, Bulgaria

BAATPE is the Bulgarian national textile and clothing association which promotes the interests of its member companies located in Bulgaria.

The association has played a crucial role in engaging with the companies to transfer the SESEC results, in the early project phases the association has facilitated direct engagement with representatives of companies necessary for data collection. Using its network BAATPE engaged with seven clothing companies in Bulgaria which were first audited and later tested the ESS tool. At later stages BAATPE has transferred SESEC outcomes by means of ad-hoc presentations, materials and events. BAATPE also organised, with the support of Pirin-Tex, two public events in which companies were trained to apply the SESEC tools and modules. BAATPE appoints a contact person to support the use of SESEC results in Bulgaria and to create new synergies for energy efficiency in the sector (updated contact details are published on the website).

CITEVE

Technological Centre for the Textile and Clothing Industry of Portugal, Portugal

CITEVE is the leading research centre for textile and clothing Industry based in Portugal and also recognised worldwide for its outstanding competences and strong cooperation with the industry, to which it enjoys privileged access.

In SESEC it has played an important technical and coordination role. CITEVE was deeply involved in the state of the art survey, it has performed energy audits in Portugal, collecting and harmonising data. It has assessed the energy savings potential and critical energy saving areas, ultimately developing the ESS methodology. Its team has developed, maintained and currently upgrades two applications of the ESS tool, the EMBT and EDST. The centre has facilitated testing and optimisation of the SESEC energy efficiency tool. CITEVE has coordinated and performed the promotion campaign in Portugal, including production of the SESEC video and it has implemented training activities both in Portugal and Lithuania. CITEVE appoints a contact person to support the use of SESEC results in Portugal and to create new synergies for energy efficiency in the sector (updated contact details are published on the website).

CEA

Croatian Employers' Association, Croatia

CEA and its branch association, Textile and Leather Industry, have joined the SESEC project's activities at its later stage to promote energy efficiency in the clothing sector at national level. CEA work has enabled its member companies to appreciate and use in the mother tongue the main ESS application to analyse energy consumption as well as to use training contents and the best practices identified during the project.

CEA appoints a contact person to support the use of SESEC results in Croatia and to create new synergies for energy efficiency in the sector (updated contact details are published on the website).

DITF

German Institutes for Textile and Fiber Research Denkendorf, Center for Management Research, Germany

DIFT is one of the major research and innovation centres for the textile and clothing sector in Germany and it is strongly connected to the national industry.

In SESEC the Center for Management Research has provided expertise in researching and developing tools for the direct benefit of the national and international fashion companies. DITF has played an important role in the project's coordination, development and technical aspects. The main technical contributions were crucial to help designing the ESS applications, to develop the SESEC training kit, to set-up and operate the SESEC platform. DITF also co-organised the dissemination events in Germany.

DITF appoints a contact person to support the use of SESEC results in Germany and to create new synergies for energy efficiency in the sector (updated contact details are published on the website).

ENEA

Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Italy

ENEA is the Italian national agency for new technologies, energy and sustainable economic development and the national body most competent on energy matters. It is also the national Agency for Energy Efficiency.

The ENEA's branch department of Bologna has used its peculiar expertise in energy efficiency and its field-experience with textile/clothing production companies to play several major roles in SESEC, both technical/ operational and in coordination. ENEA has performed energy audits in Italy and Romania with joint teams, it has analysed results and supported benchmark definitions. It has made a considerable contribution in training modules and it has developed, maintained and currently upgrades the SAT application of the ESS tool, also based on the experience made with the ARTISAN project. In 2014 it has supported the video production in Italy, it has steered and implemented the promotion campaign in Italy to mobilise and train Italian companies, in cooperation with the national and local organisations. ENEA has launched together with Euratex the Energy Made-to-Measure campaign. ENEA appoints a contact person to support the use of SESEC results in Italy and to create new synergies for energy efficiency in the sector (updated contact details are published on the website).

Gherzi group

Europe

Gherzi is one of the major international consulting companies in the textile and clothing sector in Europe. Gherzi offices in many European countries provide advice and assist directly the European sector companies to improve their business processes and performances.

In SESEC the partner has led analysis and identification of sources of energy efficiency and energy saving in clothing industry. It has coordinated the benchmark process, developed, analysed and updated the benchmark values. Thanks to the group extensive expertise in working with companies of all size across the globe, Gherzi has been instrumental in aligning the SESEC progress with companies operational needs.

INCDTP

National Research & Development Institute for Textiles and Leather, Romania

INCDTP is the Romanian textile and clothing association and a national reference point to support manufacturing companies in innovating and performing testing and applied research.

In SESEC the partner main role was to facilitate the cooperation with the clothing companies in Romania and to align the project activities with companies' operational needs. It has deployed join teams in cooperation with ENEA at companies premises to enable energy audits and testing of ESS applications. INCDTP has enabled data collection for energy audits, took an active and very effective role in promoting the SESEC results for the benefit of Romanian clothing companies. It has supported the production of SESEC video, established links with national academia and bridging with local clusters it has organised training events on energy efficiency for Romanian clothing companies. INCDTP appoints a contact person to support the use of SESEC results in Romania and to create new synergies for energy efficiency in the sector (updated contact details are published on the website).

LATIA

(Lithuanian Apparel and Textile Industry Association, Lithuania)

Latia aims to build professional links among apparel and textile community in Lithuania and Europe. The main Latia's input in the SESEC project was promotion of the project's findings and results among the Lithuanian textile and clothing companies. For this purpose Latia facilitated translation of the energy efficiency self-assessment tools and promotional materials into the Lithuanian language. Latia supported organisation of training events in Vilnius and acts as the project's contact point in its country. LATIA appoints a contact person to support the use of SESEC results in Lithuania and to create new synergies for energy efficiency in the sector (updated contact details are published on the website).

Pirin-Tex Eood

Bulgaria

Pirin-Tex is one of the biggest clothing manufacturers in Europe producing men's wear through its sister companies and has an outstanding daily capacity of more than 3000 suits. It produces for some of the leading European fashion brands and also runs its own trademark in Bulgaria.

Pirin-Tex has initiated SESEC based on its pioneering works and long history of actions to improve energy efficiency in garment production. In SESEC the company first-hand knowledge of production needs and experience has always been instrumental to tailor the SESEC solutions towards the real needs of companies as well as to improve the results exploitability by peer companies. Pirin-Tex had enabled and coordinated energy audits in Bulgaria, it has supervised full project implementation with its industrialist point of view on benchmarking, definition of energy saving areas, and application of the ESS. Pirin-Tex has actively supported promotion campaign in Bulgaria, it has used its imagine as testimonial in international events, fairs and in the SESEC video.

Conclusions

"Indeed, air is for free, but compressed air is NOT" this and similar sentences were occasionally exchanged over informal talks between SESEC teams and companies' staff. Working together to figure out how to best achieve energy efficiency may sometimes require a mix of complex algorithms, in depth analysis and unpretentious chatting around what may seem obvious, and yet it was never really taken care of.

The activities performed under SESEC, and widely promoted with the Energy Made-to-Measure campaign, have already offered a tremendous opportunity to boost the energy efficiency in clothing companies across Europe.

Several facts suggest that while many companies have already gained benefits, more are still to be achieved in the coming years.

SESEC has brought awareness and use of field-tested tools to the attention of hundreds of companies' managers, for them to take action either autonomously or with help of external professionals. Small or mid-size (€1mln) investments have been made on energy efficiency, notwithstanding the gloomy economic outlook lingering on the old continent. Real changes in the everyday way of working have been made and some of these have even been quantified in quite a short period of time.

In some countries joint teams with different expertise, roles and cultures were brought directly to companies, new competences have been created and ultimately the (new?) topic of energy efficiency has been pushed higher up in the agenda of companies and industry clusters. This presented a different perspective in which energy is not just a paper bill or a costly challenge but it is also a, quantifiable, opportunity.

"Energy efficiency is not a party" said a partner's manager to remind, if at all necessary, that results come at the price of staff commitment and time consuming exercises. If on the one side initiatives like SESEC can facilitate companies to take informed decisions and undertake steps, on the other side commitment is surely requested to those who ultimately cash in the benefits of more energy efficient production.

In its capacity of SESEC coordinator Euratex has been impressed by the results notably by gains of some companies, as testified by several willing CEOs.

None of these results would have been possible without the support of the European Union and without the SESEC partners' real commitment and care to meet the objectives, whose outcomes have globally largely exceeded the initial expectations.

The Energy Made-to-Measure campaign, new synergies, and the complementary new SET project are evidences of how the SESEC legacy will be exploited further in the next years, for the benefit of the European industries and the environment they work and live in.

Mauro Scalia
Euratex Project Manager

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