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SAVE ENERGY IN TEXTILE SMES

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Abstract: *Efficiency and competitiveness in textile and clothing manufacturing sector must take into account the current and future energy challenges. Energy efficiency is a subject of critical importance for the Textile & Clothing industry, for other sectors and for the society in general. EURATEX has initiated Energy Made-to-Measure, an information campaign running until 2016 to empower over 300 textile & clothing companies, notably SMEs, to become more energy efficient. SET(Save Energy in Textile SMEs) a collaborative project co-funded within the European Programme Intelligent Energy Europe II helps companies to understand their energy consumption and allows them to compare the sector benchmarks in different production processes. SET has developed the SET tool,* ***Energy Saving and Efficiency Tool,*** *a free of charge tool customized for textile manufacturers. The SET tool is made up of 4 elements: a stand-alone software (SET Tool) for self-assessment based on an Excel application; an on-line part (SET tool Web) for advanced benchmarking and comparison of the performances across years; a guiding document for the companies and overview of financial incentives and legal obligations regarding energy efficiency. Designed specifically for small and medium enterprises (SMEs), the SET tool enables the evaluation of energy consumption and recommends measures to reduce the consumption. Prior to modifying the company's production processes and making investments to increase energy efficiency, textile SMEs need to get different type of information, including legal context, economic and technical peculiarities.*

Key words: *energy efficiency, textile industry, energy saving and efficiency tool, energy indices, energy made-to-measure*

1. INTRODUCTION

All Textile and Clothing (T&C) companies are energy sensitive and energy consumption is an economic, environmental and competitiveness problem. Energy efficiency is becoming an urgent issue in the European T&C sector for several reasons: regulation for energy efficiency is becoming

stricter; energy prices are increasing; staying competitive requires controlling and optimising energy cost. European T&C companies already strongly rationalized human resources. To further increase competitiveness, other sources need to be dealt with. Energy is a crucial one with still large potential, especially at SME level.

SET (Save Energy in Textile SMEs**),** a collaborative project co-funded within the European Programme Intelligent Energy Europe II by EASME (Executive Agency for Small and Medium-sized Enterprises), is launched to enable the European textile SMEs to improve their energy efficiency and achieve tangible and countable economic and resource-efficiency benefits [1].

The consortium, co-ordinated by EURATEX, includes CITEVE (Portugal), DITF (Germany), ENEA (Italy), INCDTP (Romania), ATOK (Czech Republic), CENTEXBEL (Belgium), IVGT (Germany), TMT (Hungury).

SET creates and deploys a unique **Energy Saving and Efficiency Tool (SET tool)** for SMEs of the European textile industry, **enables energy efficiency** for 150 companies by applying the tool at 50 companies premises, followed by training and assistance to further 100 companies, unlocks energy saving potential for **further** 350 companies and joins **the Energy Made-to-Measure (EM2M),** an information campaign lanunced and managed by the European Textile and Clothing Confederation (EURATEX) to provide Textile and Clothing manufacturers with tools, best practices and training to assess options and take informed decisions on energy efficiency measures [1].

2. ENERGY SAVING AND EFFICIENCY TOOL

A major outcome of the SET project is the **SET tool**, an Energy Saving and Efficiency Tool designed for textile companies to autonomously assess their energy consumption and performances in the production process, ultimately to improve their energy efficiency [2].

The SET tool (Fig. 1) is made up of 4 elements: a stand-alone software (SET Tool) for self-assessment based on an Excel application; an on-line part (SET tool Web) for advanced benchmarking and comparison of the performances across years; a guiding document for the companies and overview of financial incentives and legal obligations regarding energy efficiency.

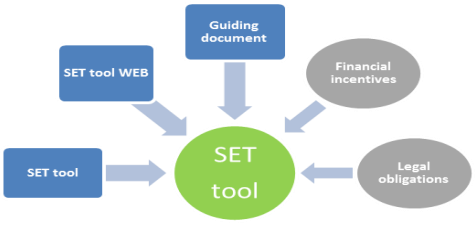


Fig. 1: *Elements of SET tool*

The **SET tool** runs on a Microsoft Excel file and is used to collect the company data on energy consumption and production. Based on this input the tool calculates the company's energy index and offers a selection of best practices, return on investment etc. The **SET tool Web** allows companies to benchmark, in strict confidentiality, its own energy performance data with data of comparable companies active in the same production processes. The **Guiding document** provides an overview of the data collection process and outcome. It is developed for companies' representatives to use and to be able to get the most from the energy efficiency tools [3].

In the SET project timeframe the SET tool application is supported by SET partners and is completed by a number of proposals to improve energy efficiency, taking into account the available financial support schemes and the legal framework [4], [5].

2.1 SET Tool

SET Tool (Fig. 2) has a multi-step session approach and collects data of one factory related to one year.

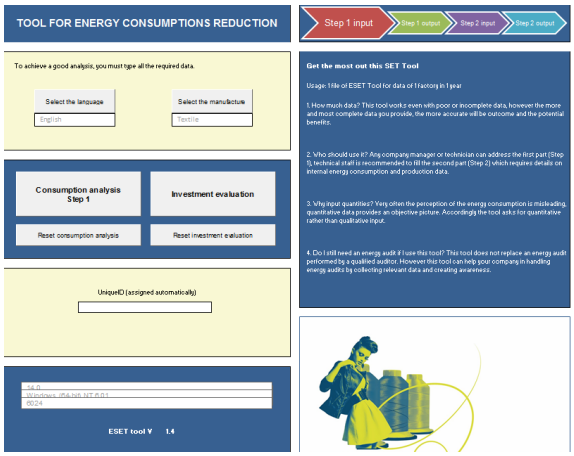
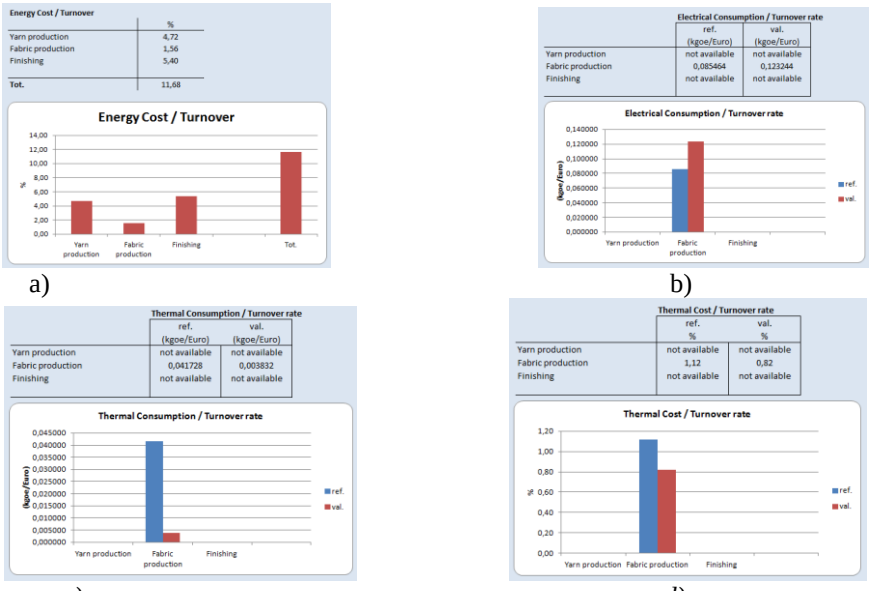


Fig. 2: *SET Tool*

In step 1 the application asks companies for basic yearly information about consumption and production and gives back as result some energy indices (energy cost/turnover, electrical consumption/turnover rate, electrical cost/turnover rate, thermal consumption /turnover rate, thermal cost/turnover rate) (Fig. 3) and some best practices (cross-cutting energy efficiency measures) [6].



a) b)

c) d)

Fig. 3: *Step1_Outputs – Global energy indices*

a) Energy Cost /Turnover b) Electrical Consumption/Turnover rate c) Thermal Consumption/Turnover d) Thermal Cost/Turnover rate

In step 2 the company is asked for more detailed and monthly data and description of the technologies used (Yarn Production, Fabric Production and Finishing). A wider set of Best Practices is evaluated (also related to the kind of machines) and more data, diagrams and indices describing the energy uses are showed (Monthly production and Electrical/Thermal Consumption graph, Electrical/Thermal Consumption vs Production - regression graph, Specific Electrical/Thermal Consumption vs Production- regression graph) (Fig. 4).

b)

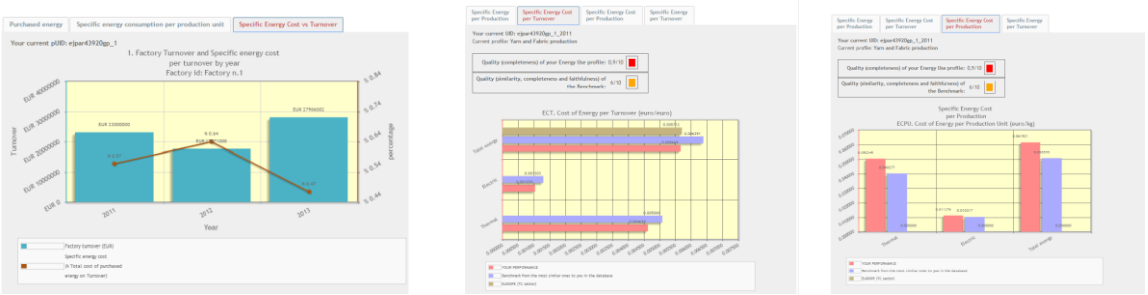
Fig. 4: *Step2_Outputs – Monthly variation*
a)Electrical Consumption vs Production b) Monthly Production and Electrical Consumption

In step 3 detailed data from machines is asked to build an electrical and thermal model of the company (Fig. 5) to compare against the macro values and obtain the shares of energy for the different uses.

2.2 SET tool Web

The SET tool Web is based on a constantly updated database and is a service free of charge for companies which contribute by sending confidentially their own energy data.
On the SET tool Web the **company can**

- Look at examples in the **demo** pages showing elaborations, graphs, benchmarks
- **Compare** own factory's energy performance with those of similar European companies (Fig. 6)
- Forecast **models** for energy consumption based on own technologies and production
- Compare own **progress** year by year.



a) b) c)

Fig. 5: *SET tool Web: Performance comparison*
a) Factory Turnover and Specific Energy Cost per Turnover by year
b) Specific Energy Cost per Turnover c) Specific Energy Cost per Production

1- Insert percentage of electrical energy for production (not considering energy of auxiliary systems) and production;

2– Data about your main production processes;

3- The tool estimates your expected specific energy consumption (red circle) based on the information of point 2 and compares it with your real value (green circle).

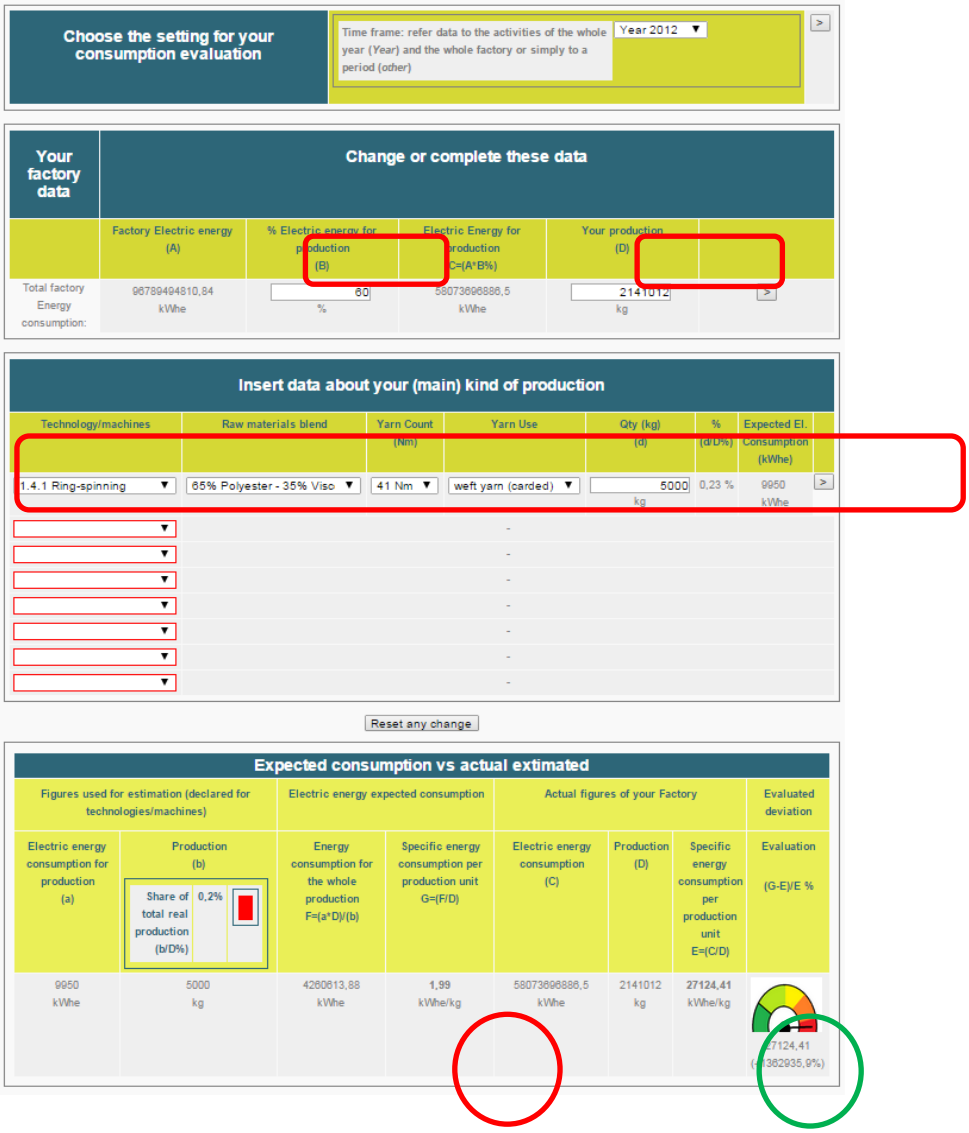


Fig. 5: *Technology based model for Yarn production*

3 APPLICATION OF SET tool

The SET tool, a self-assessment tool tailored on textile manufacturing processes has already been tested by over 50 companies selected along the three value creation steps: Yarn Production, Fabric production and Finishing, further 100 companies are planned to be supported in 2016. Application of SET tool on the companies was performed by the company itself with the help of SET partners. Based on the results of Application and Validation phases of SET tool there should be elaborated the Energy Consumption Rationalization Plan that contains the following items: Company characterization; Energy consumption and cost by type of energy (electrical and thermal); Energy indices provided the outputs of SET tool; Energy efficiency measures; Estimated savings and investments for each energy consumption of the selected measures; Estimation of energy consumption and energy indices after application of efficiency measures.

The implementation of a plan like this can be checked on a yearly basis using SET tool instruments to evaluate company's progress on energy consumption, since the web application of the tool allows the storage and presentation of data from several years.

The SET tool does not replace an energy audit performed by a qualified auditor. However this tool can help the company in handling energy audits by collecting relevant data and creating awareness.

4. CONCLUSIONS

Energy Saving and Efficiency Tool (SET tool) is a unique tool for SMEs to:

- Know and understand what legal obligations and financial incentives exist or are upcoming;
- What are the best practices in textile specific energy efficient measures;
- Evaluate energy consumption on specific textile processes;
- Calculate energy consumption per product;
- Benchmark the energy values;
- Get clear recommendation for energy efficiency measures;
- Evaluate the potential savings with recommended measures;
- Calculate economic profitability and the ROI (Return on Investment) of energy efficiency investments.

The SET project plans to support 150 European Textile SMEs to assess and effectively launch measures to reduce costs and become more competitive thanks to energy efficiency. Also, 350 European Textiles SMEs will receive all necessary elements (both technical and non-technical) to evaluate their options and to make well-informed decisions.

Prior to modifying the company's production processes and making investments to increase energy efficiency, textile SMEs need to get different type of information, including legal context, economic and technical peculiarities.

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