**Energy Efficiency in the Industry Sector**

**Strategy for Developing Human Capital**

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**24/05/2018**

# Why focusing on energy efficiency?

**Strategic & Energy Safety reasons** → Minimizing the dependence of EU member states upon oil and gas imports

**Economic reasons** → Reducing production cost and enhancing competitiveness
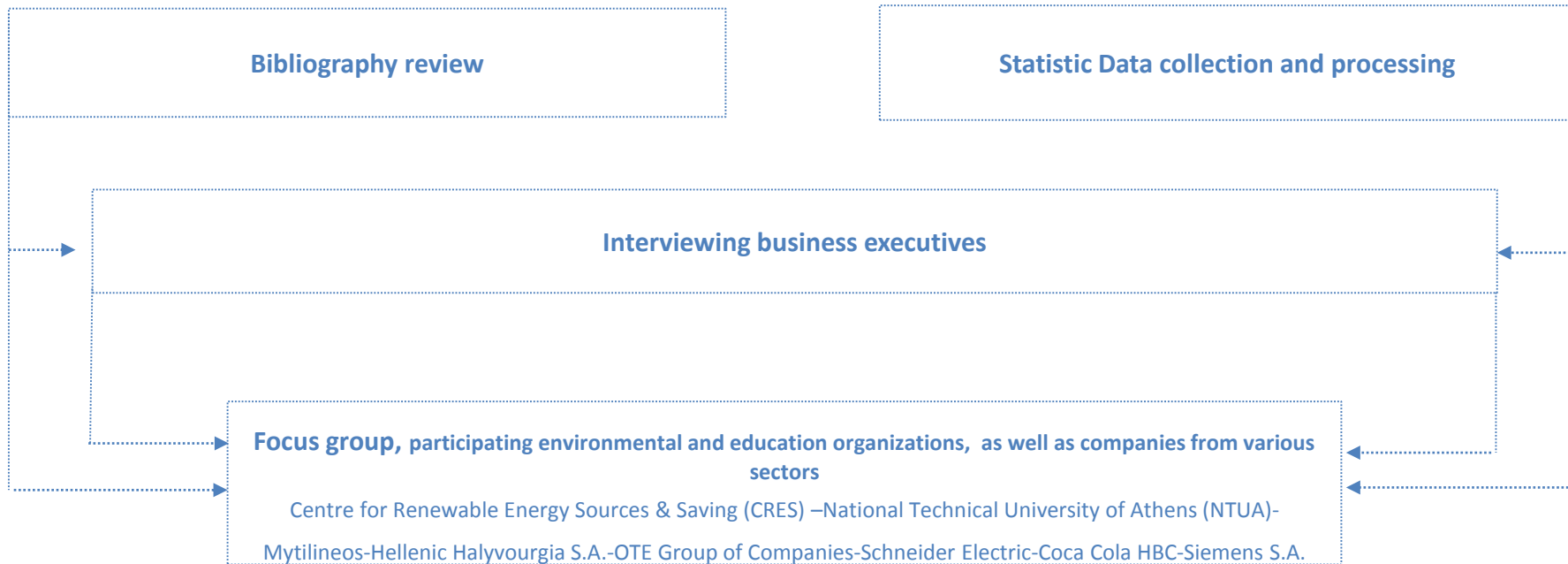
**Environmental protection** → Reducing CO2 emissions

In the past 20 years, there has been significant progress worldwide in saving energy in the industrial sector, especially in high consuming subsectors (steel, chemical, cement). Yet, surveys show that:

- ❑ Energy consumption in the steel industry could be reduced further, even by 40% worldwide (Best Available Techniques – BATs)

- ❑ Energy consumption in the cement industry could be reduced further, even by 20% (Best Available Techniques – BATs)

- ❑ Under certain conditions, $CO_2$ emissions could be reduced further, by 20%.

# Methodology

**Bibliography review**

**Statistic Data collection and processing**

**Interviewing business executives**

**Focus group,** participating environmental and education organizations, as well as companies from various sectors

Centre for Renewable Energy Sources & Saving (CRES) –National Technical University of Athens (NTUA)-

Mytilineos-Hellenic Halyvourgia S.A.-OTE Group of Companies-Schneider Electric-Coca Cola HBC-Siemens S.A.

**Economic changes and products' competitiveness**

❑ Economic crisis and restrictions in recent years resulted in a decline in final energy consumption in industry, as a means to keep production cost as low as possible

❑ Energy management in business aims primarily at increasing the added value of the products and hence the profitability of the company.

❑ At the same time, wise energy management helps to reduce energy consumption and thus reduce the environmental footprint

**Executives**

**Business Development – Sustainable Development– Energy Management – Change Management**

**Engineering Sciences**

**(mechanical engineers, electrical engineers and other engineers)**

❑ **Knowledge: Economic Analysis, Business, Production-Market Operation, Energy Management, Monitoring and evaluating energy data.**

❑ **Skills and competences: Management and problem solving, Cooperation-Team work, Communication Skills, Presentation and Negotiation Skills**

### Technology

❑ Artificial intelligence, robotics and big data are in the heart of Industry 4.0

❑ Adopting these technologies will significantly affect the labour market, as they will create the need for new skills

❑ As a side effect, automatization will lead to job losses

| Executives |
| --- |
| **Product application –ICT development–Software development** |
| **Engineering Sciences, including Computer Engineering** |

❑ **Knowledge: Solution design and development, Methods to improve energy efficiency using artificial intelligence, IoT, Collecting and processing energy data, Big Data, Digital Prediction Models.**

❑ **Skills and competences: Cooperation-Team work, Communication Skills, Reporting & Presentation Skills**

## Regulatory Framework-Best Available Techniques

❑ The Best Available Techniques (BATs) that an industry intends to incorporate are setting the conditions for its licensing (Directive 2010/75/EE)

❑ BATs (for the sectors defined in the Directive) consist in the implementation and maintenance of an Environmental Management System (EMS) and an Energy Management System

❑ At the same time, as far as Energy Management is concerned, there are specific techniques and a combination of them, based on energy efficiency standards (ISO 50001)

| Executives |
|---|
| **Business Development - Energy Management- Sustainable Development** |

| Engineering Sciences |
|---|
| **(mechanical engineers, electrical engineers and other engineers)** |

❑ **Knowledge: Regulatory Framework, Quality Assurance, Sustainable Development, Investment management.**

❑ **Skills and competences: Cooperation, Functional Teams, Organizational skills, Negotiation skills.**

## Data monitoring -energy analytics

❑ In many cases, energy data collection and processing is not a priority

❑ Changes and developments in the field of energy indicate the need for **systematic observation** of energy data for both industry and the other sectors of the economy

| Executives |
| --- |
| **Information Technology–Energy Statistics** |

| **Information and Communication Technology, Statistic Science** |
| --- |

❑ **Knowledge: Data Base, Software Development, Development of Control and Prediction Models**

❑ **Skills and competences: Cooperation, Agility, Reporting & Presentation Skills**

ΣΕΒ

*Σύγχρονες Επιχειρήσεις, Σύγχρονη Ελλάδα*

Technology

❑ Broad use of artificial intelligence and virtual reality

❑ Energy management will be affected more and more from the implementation of virtual models of processes, products, services (digital twin)

**Executives**

**Information Technology**

**Information and Communication Technology Sciences**

❑ **Knowledge:  Applying methods to improve energy efficiency using artificial intelligence, Digital twin, Digital prediction models.**

❑ **Skills and competences: Cooperation, Team Work, Agility, Adjustability.**

# Opportunities in energy management and energy efficiency (3/3)

## Changes in production models

❑ Production of customized products in the future will significantly affect industrial production, bringing changes across the supply chain and affecting energy management

**Executives**

**Change management–Product Development**

**Engineering Sciences**

❑ **Knowledge:   Product Design, Change Management, Energy saving, Human Resources Management.**

❑ **Skills and competences: Cooperation, Team Work, Communication, Agility, Flexibility**
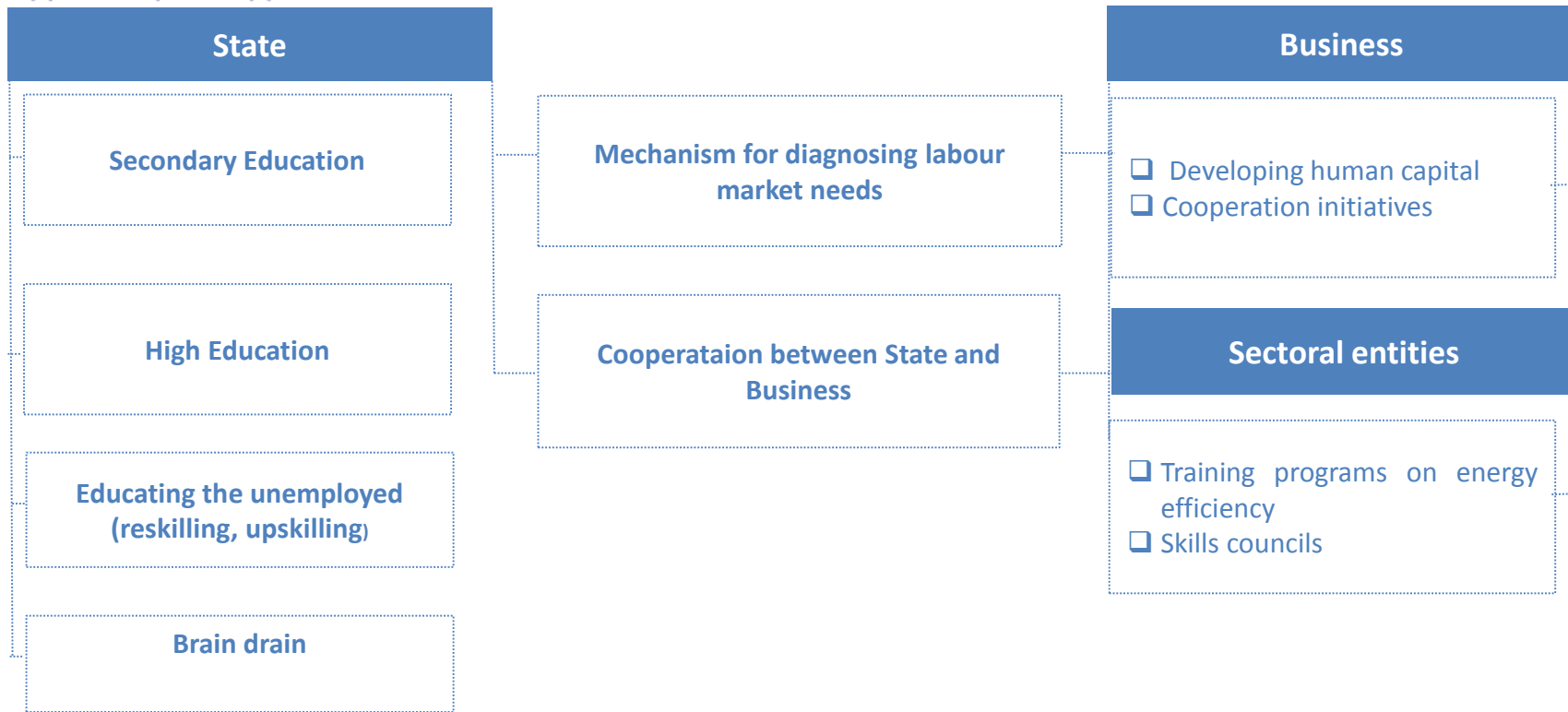
## Single Internal Market

❑ Establishment and operation of the Energy Exchange

**Executives**

**Energy brokers**

**Financial and Economic Sciences**

❑ **Knowledge: Market and Business, ICT.**

❑ **Skills and competences: Numerical skills, Agility,  Ability to work efficiently under pressure, Organizational and Communication Skills**

# Strategy for Developing Human Capital

## State

**Secondary Education**

**High Education**

**Educating the unemployed (reskilling, upskilling)**

**Brain drain**

**Mechanism for diagnosing labour market needs**

**Cooperataion between State and Business**

## Business

❑  Developing human capital
❑ Cooperation initiatives

## Sectoral entities

❑ Training programs on energy efficiency
❑ Skills councils

**Thank you**

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