NUMBER OF EUROPEAN COUNTRIES

EU COUNTRIES DEVELOPED THE RULES:
- DIRECTIVES
- NATIONAL ACTION PLANS
- ECO DESIGN

CANDIDATES FOLLOW THE EU RULES TO DEVELOP OWN EE REGULATIONS

OTHER COUNTRIES FOLLOW THE SAME FRAMEWORK AND POLICY
EU FRAMEWORK ON EE POLICIES

• **EMISSIONS TRADING DIRECTIVES** 2003/87/EC and 2009/29/EC

• **ENERGY EFFICIENCY DIRECTIVE** 2012/27/EU (EED)

• **PROVISIONS FOR THE INDUSTRIAL SECTOR IN EED**
  - Specific provisions for the industrial sector
  - Energy audits (Article 8)
  - Cross-cutting measures with relevance to the industrial sector
  - Energy Efficiency obligation schemes (Article 7)

• **ECO-DESIGN DIRECTIVE** 2009/125/EC

• **RENEWABLE ENERGY DIRECTIVE** 2009/28/EC

• **INDUSTRIAL EMISSIONS DIRECTIVES**

• **ROLE OF NEEAP MEASURES** 50% INDUSTRY

• **MEASURES BY IMPACT**

• **DYNAMICS AND INNOVATION OF POLICY DEVELOPMENT IN THE INDUSTRIAL SECTOR**
SECTORAL IMPACT ON ENERGY CONSUMPTION

- **Residential**: 40%
- **Transport**: 32%
- **Industry**: 26%
- **Others**: 2%

- **Industry**: 39%
- **Transport**: 30%
- **Residential**: 16%
- **Commercial**: 13%
- **Agriculture**: 2%

**Regions**
- **EU**
- **Canada**
THE MOST ENERGY-INTENSIVE INDUSTRIES TO MANUFACTURE PRODUCTS WE USE EVERY DAY

- ALUMINUM
- CHEMICALS
- MINING
- IRON & STEEL
- PETROLEUM REFINING
- FOREST PRODUCT
- GLASS
- METAL CASTING
# CONSUMPTION IN INDUSTRY

## SECTOR’s FINAL ENERGY CONSUMPTION IN EU28 2013

<table>
<thead>
<tr>
<th>Sector</th>
<th>KTOE</th>
<th>SHARE</th>
<th>HEATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEMICAL AND PHARMACEUTICAL</td>
<td>51,485</td>
<td>18.9%</td>
<td>58%</td>
</tr>
<tr>
<td>IRON AND STEEL(^2)</td>
<td>50,815</td>
<td>18.6%</td>
<td>75%</td>
</tr>
<tr>
<td>PETROLEUM REFINERIES</td>
<td>44,657</td>
<td>16.4%</td>
<td>84%</td>
</tr>
<tr>
<td>NON-METALLIC MINERAL</td>
<td>34,249</td>
<td>12.6%</td>
<td>74%</td>
</tr>
<tr>
<td>PULP, PAPER AND PRINT</td>
<td>34,265</td>
<td>12.6%</td>
<td>59%</td>
</tr>
<tr>
<td>FOOD AND BEVERAGE</td>
<td>28,353</td>
<td>10.4%</td>
<td>62%</td>
</tr>
<tr>
<td>MACHINERY(^1)</td>
<td>9,282</td>
<td>7.1%</td>
<td>40%</td>
</tr>
<tr>
<td>NON-FERROUS METAL</td>
<td>9,381</td>
<td>3.4%</td>
<td>32%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>272,487</td>
<td></td>
<td>66%</td>
</tr>
</tbody>
</table>

**SOURCE:** ICF - STUDY ON ENERGY EFFICIENCY AND ENERGY SAVING POTENTIAL IN INDUSTRY AND ON POSSIBLE POLICY MECHANISMS

\(^2\) Note that the EUROSTAT data presented for iron and steel sector group only covers the downstream steel making process; upstream iron making process is not reported under this figure.
THROUGHOUT THE MANUFACTURING PROCESS, ENERGY IS LOST DUE TO:

- EQUIPMENT INEFFICIENCY,
- MECHANICAL LIMITATIONS,
- THERMAL LIMITATIONS

OPTIMIZING THE EFFICIENCY OF THESE SYSTEMS CAN RESULT:

- SIGNIFICANT ENERGY AND COST SAVINGS
- REDUCED CARBON DIOXIDE & OTHER EMISSIONS

UNDERSTANDING HOW ENERGY IS USED AND WASTED, OR ENERGY USE AND LOSS FOOTPRINTS—CAN HELP PLANTS PINPOINT AREAS OF ENERGY INTENSITY AND WAYS TO IMPROVE EFFICIENCY.
ENERGY MANAGEMENT SYSTEM IS A VOLUNTARY FRAMEWORK OF INTERRELATED ELEMENTS FOR THE MANAGEMENT OF ENERGY IN ANY BUSINESS LARGE OR SMALL.

IMPLEMENTATION OF THIS STANDARD WILL ASSET ORGANIZATIONS IN REDUCING ENERGY USE THROUGH THE UTILIZATION OF BEST PRACTICES, MEASUREMENT AND REPORTING DISCIPLINES AND PROMOTING ENERGY EFFICIENCY THROUGHOUT THE SUPPLY CHAIN.

REDUCTION IN ENERGY LEADS TO REDUCED GHGs AND OPERATIONAL COSTS
ISO 50001 - KEY ELEMENTS

• CONDUCT AN ENERGY REVIEW
• ESTABLISH AN ENERGY BASELINE
• ESTABLISH ENERGY OBJECTIVES AND TARGETS
• ESTABLISH AN ACTION PLAN
• IMPLEMENT THE ACTION PLAN
• CHECK PERFORMANCE
• MONITOR, DOCUMENT AND REPORT ALL THE ABOVE

IMPLEMENT ENERGY MANAGEMENT INTO EVERYDAY PRACTICES
ENERGY SYSTEM OPTIMIZATION

- Motor system optimization
- Pump system optimization
- Fan system optimization
- Compressed air system optimization
- Steam system optimization
- Water supply system
- Heat system optimization
- Refrigeration & air conditioning optimization
- Renewable
- Carbon capture and storage
- Carbon capture and usage
- Storage of electrical energy
- Fuel cells
- Reduction of emissions of CO₂ and nanoparticles

CONSUMPTION & COSTS

NEW TECHNOLOGIES
BARRIERS TO ENERGY EFFICIENCY IN INDUSTRY

- TECHNICAL
- TECHNOLOGY
- PRODUCTION PROCESSES
- RESEARCH & DEVELOPMENT
- FINANCIAL
- STRUCTURAL CONNECTIONS AMONG INDUSTRIES
- EDUCATIONAL & PROFESSIONAL
- COMMUNICATION
- HABITS & TRADITIONS
1. EFFICIENCY – Energy, Materials, Fuel, Time,
2. ECOLOGICAL PRINCIPLES – Overproduction, Technology
3. ENERGY MANAGEMENT
4. R&D – constant R&D
5. MEASUREMENT & DANA MANAGEMENT
6. LEGISLATION – Transnational regulations,
7. STANDARDIZATION – respect of international standards
8. EXCHANGE OF EXPERIANCE AND GOOD PRACTICES
9. COMMON SOLVING OF OBSTACLES
10. ETHNICITY – Population, Environmental, Flora & Fauna,
RESEARCH AND DEVELOPMENT PROJECTS

- NEXT GENERATION OF ELECTRIC MACHINES
- INNOVATIVE PROCESS AND MATERIALS TECHNOLOGIES
- NEXT GENERATION OF MANUFACTURING PROCESSES
- NEXT GENERATION OF MATERIALS
- COMBINED HEAT & POWER
- SMALL BUSINESS INNOVATION RESEARCH
NEW POLICY APPROACHES FOR ENERGY EFFICIENCY IN INDUSTRY

- MANDATORY INDUSTRIAL ENERGY AUDITS
- ENERGY EFFICIENCY MANAGEMENT IN THE INDUSTRIAL ENTERPRISES AND ANNUAL REPORTING OF ITS IMPLEMENTATION
- DEVELOPMENT OF PUBLIC-PRIVATE PARTNERSHIP FOR IMPLEMENTATION OF ENERGY EFFICIENCY MEASURES
- INDUSTRIAL ENERGY EFFICIENCY NETWORK
- PROMOTION OF ENERGY MANAGEMENT SYSTEMS
- INTELLIGENT METERING IN THE INDUSTRIAL ENTERPRISES
- CREATION OF BUSINESS PARKS
COMPETITIVE LOW-CARBON ECONOMY

1. FOCUS ON ADVANCED VALUE-ADDED MANUFACTURING, ESTABLISHING A PUBLIC-PRIVATE PARTNERSHIP ON PROJECTS
2. TECHNOLOGY OF INTELLIGENT MATERIALS, HIGH PERFORMANCE PRODUCTION. …..
3. FACILITATING ACCESS TO NEW TECHNOLOGICAL INFRASTRUCTURE
4. ENSURE THE ACCESS TO SUSTAINABLE RAW MATERIALS AT WORLD MARKET PRICE FOR THE PRODUCTION OF BIO-BASED PRODUCTS
5. INTERCONNECTIONS AND SMART GRIDS CAPABLE OF HANDLING MULTIPLE VARIABLE INPUTS, BALANCING POWER AND CONSISTENT SUPPLY
6. CLEAN AND ENERGY EFFICIENT TRANSPORT AND COMMON STANDARDS FOR ELECTRIC CARS
7. BUILDING RENOVATION
Implementation of the following actions in the EU Member States and Norway:

1. Grants for energy efficiency measures in agriculture and animals, as in Bulgaria;
2. Energy audits in enterprises, as in Croatia, Denmark, Czech Republic, France, Germany, Latvia and Slovenia;
3. Development of Cogeneration and efficient Heat Networks as in France;
4. Implementation of Energy Management Systems, as in Germany and Latvia;
5. Energy efficiency investments in the SMEs, as in Poland;
6. Schemes for efficient utilization of electricity and heat, as in Germany and Slovenia;
7. Emissions reducing under EU-ETS, as in Romania and UK;
8. Financial and technical aids to SMEs and large companies in the industrial sector as in Spain.
THANK YOU
Zlatko Pavicic, zlapav@yahoo.com
+ 385 99 212 3443