

1- Need title: Supply of energy to ships during the docking phase in the port

Goal

Smart Growth:

- Enhancing access to, and use and quality of, information and communication technologies
- Supporting the shift towards a low-carbon economy

Sustainable Growth:

- Preserving and protecting the environment and promoting resource efficiency (through RES implementation)
- Promoting sustainable transport and improving network infrastructures

Inclusive Growth:

- Investing in education, training and lifelong learning
- Improving the efficiency of public administration (with special reference to Energy Efficiency management)

Sector of application concerned (with special reference to energy oriented aspects)

- Mobility/transport
- Public infrastructure (Lighting)
- Building
- Energy production
- ICTs
- Industrial production process
- Marine Environment
- Blue Growth
- Other. Please, specify:

Need description:

During a 10-hour stay in the harbor, the diesel engines of a single ship can burn up to 20 tons of fuel and produce 60 tons of carbon dioxide. This is equivalent to the total emissions produced by 25 medium-sized European cars in a year. These emissions can be reduced by shore-to-ship power solutions. Driven by the recent legislative evolution in the environmental field, port authorities and shipowners in many parts of the world are trying to reduce emissions with a view to mitigating global climate impact. A valid alternative for the reduction of polluting agents is the electrification of the docks, in other words the construction of infrastructures designed to supply the electric power necessary for the operation of the auxiliaries of ships during their stay in port. However, these infrastructures require costly investments and an adequate energy distribution system, as well as the need to produce energy elsewhere.

As reported in the title of the NEED, it is therefore necessary to provide a valid technological solution for the electrification of the quays that allows overcoming technological and market barriers, evaluating the possible use of alternative energy sources for the production of electricity on site.

2- Need title: Efficient distribution of LNG

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Need description:

During a 10-hour stay in the harbor, the diesel engines of a single ship can burn up to 20 tons of fuel and produce 60 tons of carbon dioxide. This is equivalent to the total emissions produced by 25 medium-sized European cars in a year. Driven by the recent legislative evolution in the environmental field, port authorities and shipowners in many parts of the world are trying to reduce emissions with a view to mitigating global climate impact. A valid alternative for the reduction of pollutants in the port area is the use of Liquefied Natural Gas (LNG) as a naval fuel (for dual-fuel engine ships) for the so-called "last mile" and for the mooring and docking phase in port. The European directives (TEN-T corridors) are urging the introduction of LNG storage systems located in strategic ports in the Mediterranean area and not.

As reported in the title of this NEED, one of the problems encountered by the ports that are about to install these storage systems is the distribution of this fuel (currently carried out by tankers and trucks). Therefore it is required to provide a valid technical or logistic solution with good economic impact that allows to develop LNG distribution systems in the port areas, starting from the production/storage system up to the final user (cargo ships, but also ferries, cruise ships, buses and lorries), in order to spread LNG use towards sustainable mobility.

3- Need title: Energy data collection and analysis

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Need description:

By collecting, combining and aggregating (individual) data, a specific energy-environmental policy can be developed and implemented on a local scale (for example in a neighbourhood) or in the port area. Global and energy data can also facilitate the identification of any port development limitations and contribute to the definition of environmental priorities and actions, as well as facilitating the start-up of programs for the integrated development of urban and industrial areas by the public administration.

As defined in the NEED title, it is required to provide an ICT solution for the collection and analysis of energy-environmental data with a "user-friendly" interface, that can be used by district managers and by public administration in order to monitor constantly energy consumptions, evaluating the data collected, highlighting any weaknesses and identifying possible improvement actions. This system should also help identify needs and opportunities in areas of interest for the eventual creation of small energy islands: co-management of (possible) production, distribution, sharing of energy.

4- Need title: Microclimate improvement

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- Other. Please, specify: **Public/open space**

Need description:

Port areas are heavily cemented and this causes the so-called "heat island" effect in the summer. To avoid this, it is necessary to develop solutions for the improvement of the microclimatic comfort of public / open spaces through, for example, the use of green islands of easy installation and maintenance (no plants on the ground, for which it is necessary to foresee reconstitution of the soil nutrients, once floors and cementitious elements have been removed), or the application of heat-reflecting paints, or other interventions that may help the improvement of the microclimate in the port area (as reported in the title of this Need). The solution must include low investment costs, ease of installation, simple and inexpensive maintenance, and effectiveness of the result.

In this key, the project proposes and advocates the creation of a new concept, conceived in particular to satisfy social demand, characterized by a great architectural urban quality, understood in the most recent "eco-sustainable" key, ie adopting a design approach where the energy saving and respect for the environment are combined with low cost management and soil savings, and to reduce of management costs, precisely by virtue of the adoption of techniques of bioclimatic design, use of technologies and

materials already tested for efficiency and savings in energy consumption, use of renewable sources for energy production.

5- Need title: Facilitation to virtuous behavior

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Need description:

Behavioral changes at home or in the office can produce sensitive and measurable (through the use of smart meters) savings. Several pilot experiences suggest that with only behavioral changes, significant energy savings of 10-15% can be achieved in both offices and residential buildings. For this reason it is important for workers and citizens to be educated and incentivized for the rational use of energy and energy resources.

As indicated by the title of this NEED, it is required to support the development of a widespread culture of energy conservation through, for example:

- Training courses on the measures to be taken to improve, for example, the management of heating and lighting systems (better if clearly addressed to the sectors in which port operators operate, such as the tertiary sector, logistics, production processes, mobility) ;
- Innovative learning methods (such as gamification) to involve workers and citizens in the process of energy efficiency of a given urban context (with particular reference to port areas);
- Effective ideas for the promotion of awareness campaigns;
- Incentive systems to facilitate the adoption of virtuous behavior.

6- Need title: Spaces and/or logistics rationalization

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Need description:

Logistics is the "core business" of many companies in port areas. A lack of rationalization of spaces (for example of warehouses) and logistics can result in production and energy inefficiencies.

What is required is an ICT methodology / a tool which, on the basis of the existing situation, is able to improve the organization of spaces (both for life inside buildings and for the production process) and to rationalize logistics in order to improve the production process and increase energy efficiency.

7- Need title: Methods and solutions for an effective distribution of compressed air and refrigerant fluid to make production processes more efficient

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Need description:

Compressed air and refrigeration systems for production machinery represent the major energy consumption centers for many manufacturing companies, both in the port and non-port areas. It has been estimated that the optimization of compressed air systems would produce savings of up to 35% of electricity consumption. It often occurs that, due to leaks in the distribution system, compressed air and / or refrigerant fluid are not at the correct temperature and pressure for a correct functioning of the machinery, consequently worsening the production process.

As expressed in the NEED title, it is required to develop methods of investigation of losses (for example through the use of thermal imaging cameras or other systems) and appropriate technological solutions (also ICT) to improve both the distribution of compressed air and refrigerant and the energy efficiency of the production process, in compliance with the operating parameters envisaged by the processes.

8- Need title: Methods for the complete renovation of existing HVAC systems

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Need description:

According to European Commission data, the European building stock is generally inefficient, with 35% of buildings over 50 years old. These buildings, both public, residential and offices, are characterized by old and inefficient heating, ventilation and cooling systems. The extraordinary maintenance interventions necessary for the complete overhaul of these plants are burdensome in economic terms and necessarily entail a halt in production or the need to move people elsewhere.

As reported in the NEED title, it is required to present a step-by-step methodology / process leading to the replacement (partial or total) of a dated civil installation, with the aim of containing costs and optimizing technological innovations on the basis of the given context. In this context, the use of another heating source (such as pellets, wood chips, methane, LPG) should also be considered.

9- Need title: Three year payback period

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Need description:

According to European Commission data, the European building stock is generally inefficient, with 35% of buildings over 50 and a very low annual restructuring rate. One of the barriers that prevent the energetic redevelopment of buildings (envelope, HVAC plant and lighting system) and on the production process is the return time of investments of this kind which, for example, relates to short rent that characterize our times, turns out to be too long.

It is therefore necessary to present technologies for energy efficiency that offer a payback period of less than 3 years. The focus of this need is not so much on technology, which can be of any type, but on the times of return in the face of an increase in efficiency of the building / production process. Given the specific request, it is requested to detail the type of incentive (regional, national) that one intends to use.

10- Need title: Roofs to produce energy from the bound or dated buildings

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Need description:

The specific need described in the title stems from the need to increase the production of energy from Renewable Energy Sources in the port area: many abandoned warehouses could be widely exploited to produce, for example, electricity through the installation of photovoltaic systems in coverage. Many of the buildings in the port area date back to the early decades of 1900 (many of these buildings are bound). This implies at the same time the need to restructure the roofs of these buildings before being able to proceed with the installation of the plant: and this turns out to be an economic burden that no owner intends to support.

It is therefore necessary to develop a structure that produces energy (electric or thermal) and can be supported on the walls with minimal interventions on the roof, so as not to require heavy infrastructural interventions on the building and / or not to compromise the coverage of a possible historic building.

11- Need title: Efficient lighting/equipment management

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Need description:

The current state of lighting/equipment infrastructure in ports is not at a satisfactory level from the point of view of electricity consumption and in terms of lighting quality. A large number of lighting fixtures still in operation today are in fact inefficient and obsolete (HP Hg lamps, HP sodium lamps, metal halide lamps), making maintenance very expensive. The lighting systems in the ports therefore represent a huge potential in terms of savings and functionality.

Lighting/equipment management could achieve several good results, such as: reducing energy consumption, CO2 emissions, light pollution as well as maintenance costs and acquiring a "green" image. To this extent, it is therefore necessary to develop an integrated efficient solution to manage lighting system also replacing old lamps with cost-optimal solutions.

12- Need title: Lowering peak power and Excessive reactive electricity

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Need description:

From the analysis of electricity consumption and peak loads in ports, it is noted that the use of transporter cranes greatly influences the consumption of reactive electrical energy.

In this context, the installation of electricity supply and demand management equipment and of peaks and reactive electricity compensation would significantly reduce electricity costs. In this context the NEED in question is located: it is necessary to develop solutions for a correct management of supply-demand of electricity with the aim of lowering the power peaks and the reactive load. In this context, solutions for the replacement of electric motors on cranes can also be adopted, as these engines are usually obsolete (they are over 50 years old).

13- Need title: Implementing RES production

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Need description:

Electricity consumption is quite high both for the buildings and the infrastructures of the port. Therefore, together with the adoption of energy saving measures, it is necessary to increase the share of renewable energy applications, with the aim of producing clean energy and minimizing the withdrawal of electricity from the grid. The focus should be on building-related technologies such as photovoltaic (PV), small wind turbines, geothermal energy, etc.

In this context, the switch to some other heating source (such as pellets, wood chips, methane, LPG) should also be considered. The solution must take into account the necessary infrastructural works and capital investments, taking advantage, wherever possible, of regional and national (state) incentive programs to reduce installation costs.

14- Need title: Zero energy mobility for tourists

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Need description:

Some ports face the challenge of transferring passengers from cruise ships to the city center, in addition to the problem of docking the ships themselves. As reported in the NEED title, it is required to develop energy efficient systems for the tourists transport from the cruise terminal to the city center, such as electric bikes connected to renewable energy production systems, electric or hybrid buses (eg. hydrogen-fuel cell) with systems zero impact charge (with RES production systems).