3rd MED PORTS – CASABLANCA
25 MARCH 2015

ENERGY EFFICIENCY : IMPACTS ON MONEY SAVINGS

VALENCIAPORT FOUNDATION: A MAIN INNOVATION AND TRAINING CENTER OF THE PORT INDUSTRY

ENERGY EFFICIENCY IN GREENER PORTS

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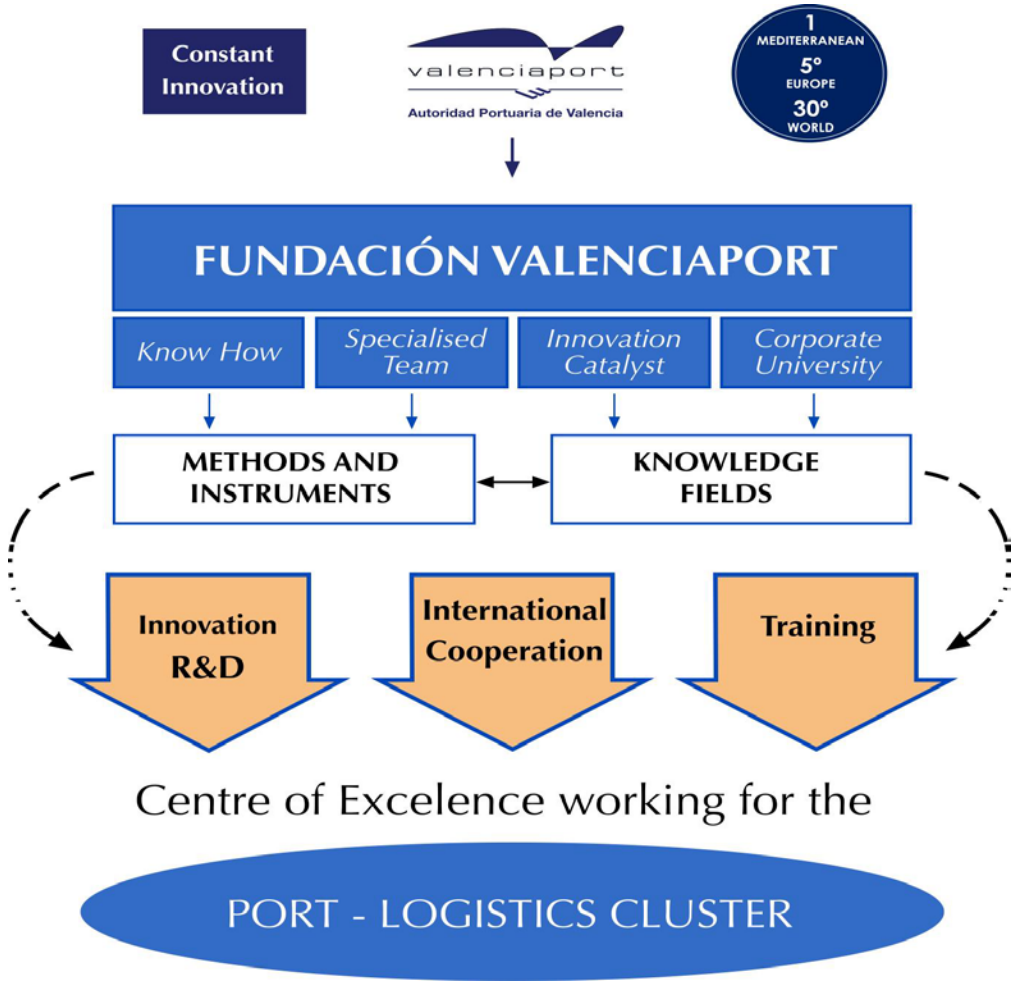


VALENCIAPORT FOUNDATION: A MAIN INNOVATION AND TRAINING CENTER OF THE PORT INDUSTRY

MAIN FIELDS OF KNOWLEDGE:

- PORT PLANNING AND MANAGEMENT
- LOGISTIC CHAIN AND INTERMODALITY
- PORT SERVICES AND INFRASTRUCTURES
- ENERGY EFFICIENCY
- SECURITY AND CYBER-SECURITY
- ICT IN PORTS
- FINANCIAL FEASABILITY
- PORT HIGHER EDUCATION TRAINING
- PORT VOCATIONAL TRAINING
- Etc.

OUR CLIENTS:

- EUROPEAN UNION
- WORL BANK
- INTERNATIONAL DONORS
- MINISTRIES
- PORT AUTHORITIES
- PORT TERMINALS
- Etc.

MAIN TOOLS AND METHODS:

- AUTOMATIZATION MODELS
- TRAFFIC FORECASTS
- EVALUATION OF ALTERNATIVES
- FINANCIAL FEASIBILITY STUDIES
- MARKET RESEARCH
- MICROSIMULATIONS
- PROCESS REINGENEERING
- DATA ENVOLVMENT ANALYSIS
- CO2 EMISSIONS ESTIMATIONS
- GEOGRAPHIC INFORMATION SYSTEMS
- TRANSPORT MODELISATION
- HINTERLAND SIMULATION
- ENERGY EFFICIENCY AUDITS
- SAMPLING METHODS
- and many more.

VALENCIAPORT FOUNDATION: A MAIN INNOVATION AND TRAINING CENTER OF THE PORT INDUSTRY

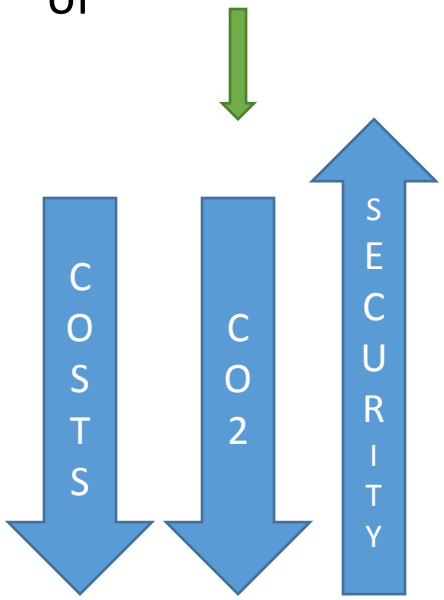
SOME OF OUR MOST RECENT PROJECTS:

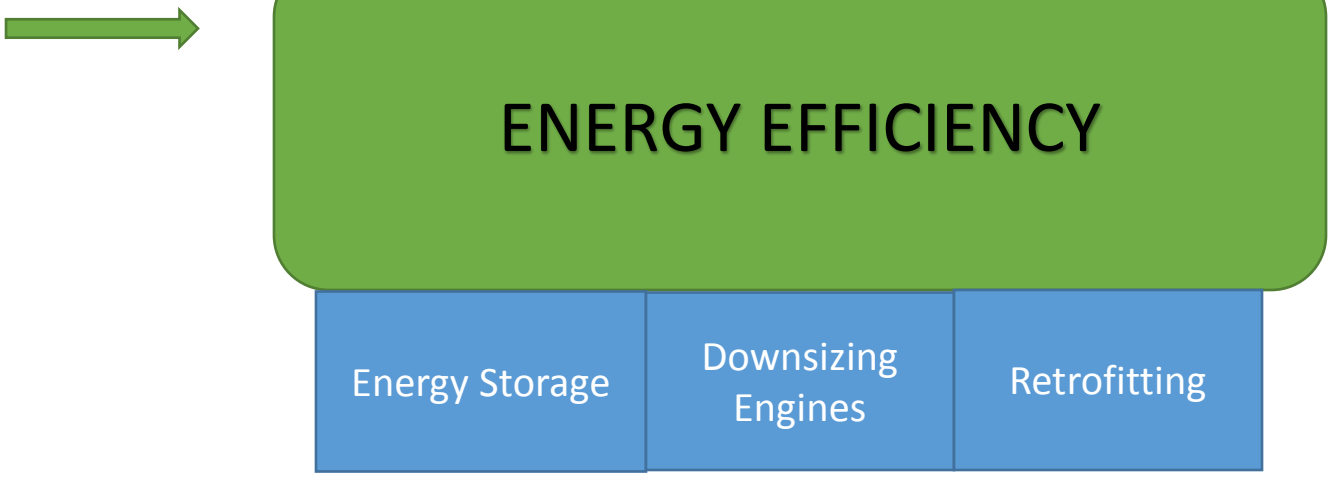
- ✓ **ANALYSIS OF THE CAPACITY OF THE SOUTH BERTH IN CALLAO TERMINAL (PERU)**
- ✓ **DRAFTING OF THE DEVELOPOMENT STRATEGY OF THE NATIONAL PORT SYSTEM**
- ✓ **MEDITERRANEAN NETWORK FOR CUSTOMS PROCEDURES AND SIMPLIFICATION OF CLEARANCE IN PORTS**
- ✓ **FUTUREMED - FREIGHT AND PASSENGER SUPPORTING INFOMOBILITY SYSTEMS FOR A SUSTAINABLE IMPROVEMENT OF THE COMPETITIVENESS OF PORT-HINTERLAND SYSTEMS OF THE MED AREA**
- ✓ **COSTA - CO2 & SHIP TRANSPORT EMISSIONS ABATEMENT BY LNG**
- ✓ **GREENCRANES – GREEN TECHNOLOGIES AND ECO-EFFICIENT ALTERNATIVES FOR CRANES AND OPERATIONS AT PORT CONTAINER TERMINALS**
- ✓ **SEATERMINALS – SMART, ENERGY EFFICIENT AND ADAPTIVE PORT TERMINALS**
- ✓ **CONTAIN - CONTAINER SECURITY ADVANCED INFORMATION NETWORKING**
- ✓ **BUSINESS TO MOTORWAYS OF THE SEA**
- ✓ **SUSPORTS – DELIVERY SUSTAINABLE ENERGY SOLUTIONS TO PORTS**

ENERGY EFFICIENCY IN PORTS

Valenciaport Foundation is developping innovation actions related to Energy Efficiency

With the final aim of

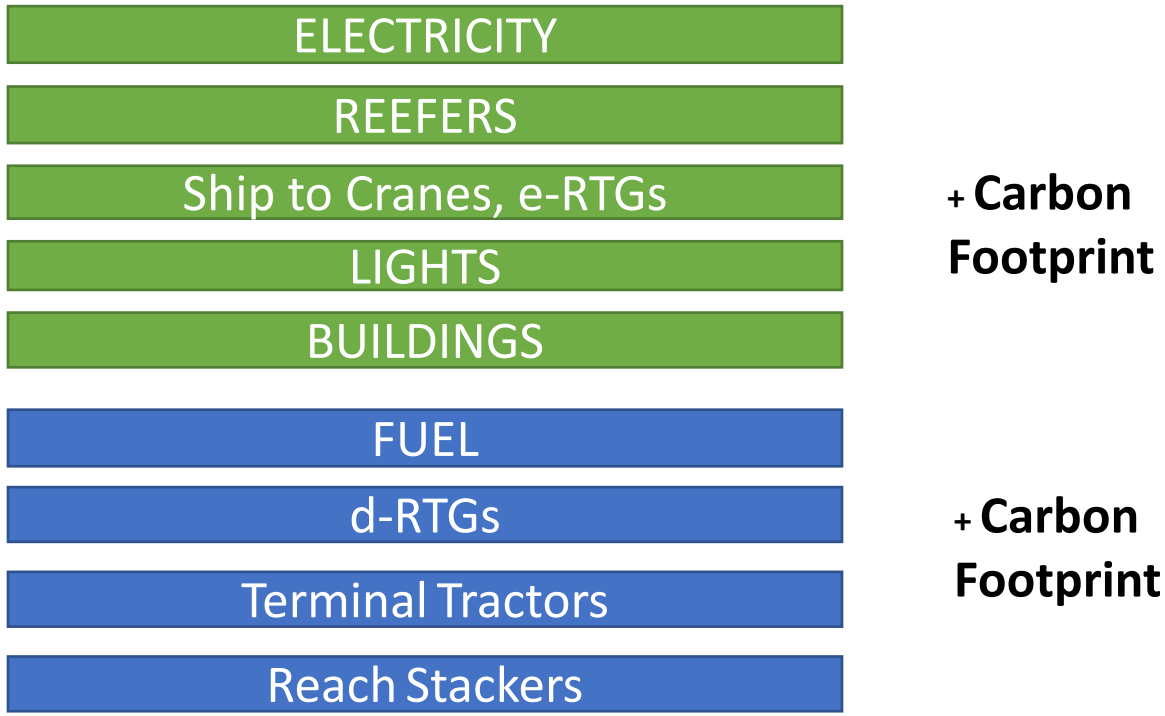




ENERGY EFFICIENCY PORTS: WHERE PORTS SPEND IN VAIN AND HAVE POTENTIAL SAVINGS?

Energy Consumption Analysis

We mapp the port container terminals Energy Profiles



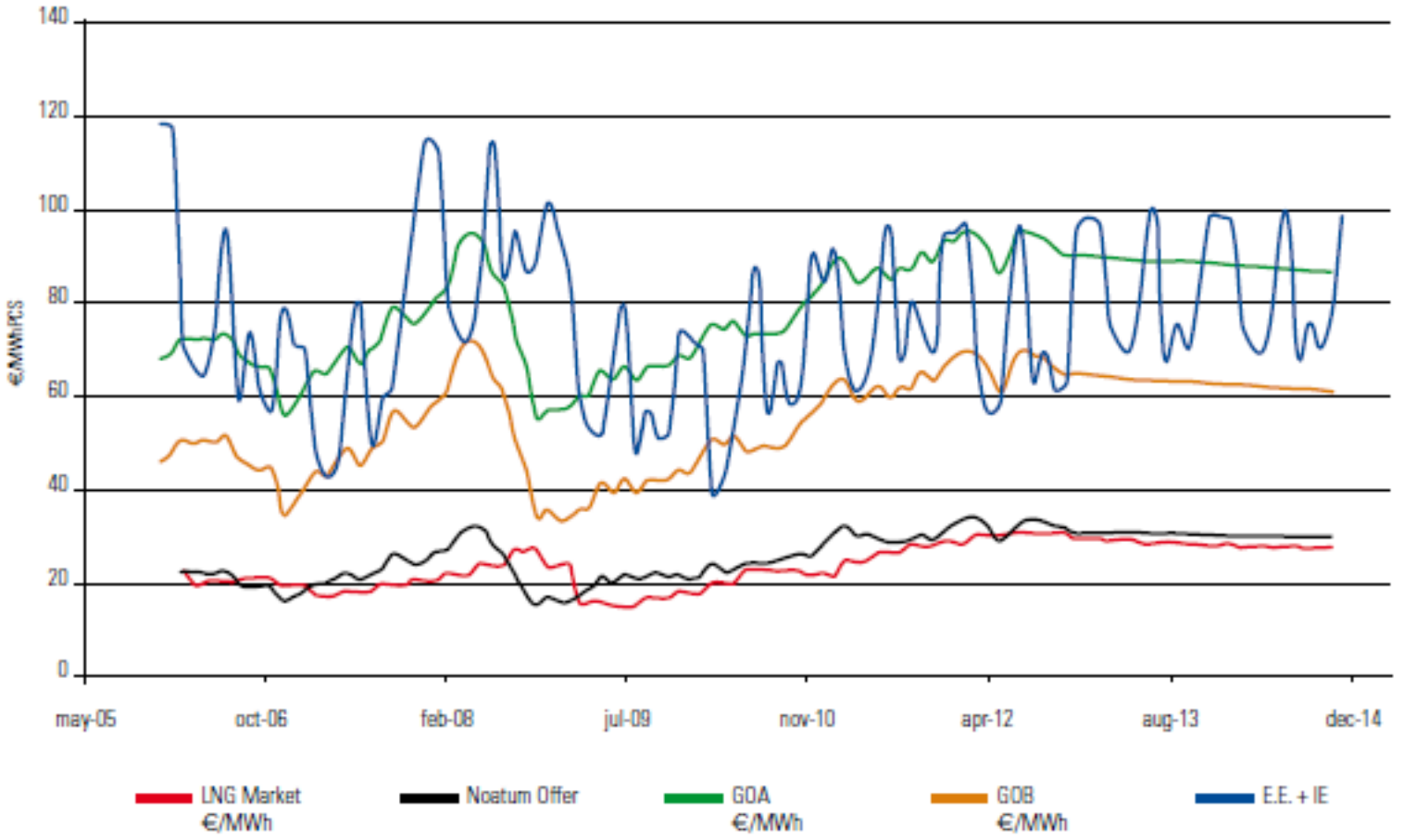
ENERGY EFFICIENCY IN PORTS: HOW AND WHEN LNG CAN REDUCE TERMINAL COSTS

TERMINAL TRUCKS AND REACH STACKERS

RTG CRANES

OTHERS

ENERGY EFFICIENCY IN PORTS: HOW AND WHEN LNG CAN REDUCE TERMINAL COSTS



Energy Prices in Spain

ENERGY EFFICIENCY IN PORTS: NEW LNG TRUCKS

We assess the potential use of LNG in Port Machinery:

Terminal Trucks
Reach Stackers
RTGs

Similar perfomance

Financially viable with a

Payback Time stable at 9 years from 19 Units

and an IPR around 20%

Less CO2 Emissions

→ Renew the fleet of Trucks can help maximise the profitability of in container terminals

→ The optimum number of Trucks to be replaced will depend on fuel prices in each country

ENERGY EFFICIENCY IN PORTS: NEW LNG TRUCKS

New TT	δ INVESTMENT (€)	NPV (€)	IRR (%)	Payback (years)
	600,000.00 €	-600,000.00 €	-100%	41
2	640,000.00 €	-530,124.29 €	-100%	41
4	680,000.00 €	-464,101.81 €	-7.5%	41
5	700,000.00 €	-432,450.25 €	-5%	41
6	720,000.00 €	-397,668.17 €	-2.6%	41
7	740,000.00 €	-363,611.23 €	-0.6%	41
8	760,000.00 €	-330,162.94 €	0.9%	41
9	780,000.00 €	-297,349.83 €	2.3%	41
10	800,000.00 €	-263,240.77 €	3.6%	41
11	820,000.00 €	-229,841.13 €	4.6%	41
12	840,000.00 €	-197,020.84 €	5.6%	41
13	860,000.00 €	-164,878.62 €	6.5%	41
14	880,000.00 €	-131,666.34 €	7.3%	11
15	900,000.00 €	-99,077.54 €	8%	10
17	940,000.00 €	-33,930.04 €	9.3%	10
19	980,000.00 €	34,339.83 €	10.6%	9
21	1,020,000.00 €	102,791.86 €	11.7%	9
23	1,060,000.00 €	168,322.81 €	12.6%	9
25	1,100,000.00 €	231,108.79 €	13.5%	9
27	1,140,000.00 €	292,623.60 €	14.2%	8
29	1,180,000.00 €	352,717.65 €	14.9%	8
31	1,220,000.00 €	411,009.32 €	15.5%	8
33	1,260,000.00 €	467,456.93 €	16.0%	8
35	1,300,000.00 €	520,189.50 €	16.5%	8
45	1,500,000.00 €	778,635.62 €	18.4%	8
55	1,700,000.00 €	1,005,305.54 €	19.5%	8
65	1,900,000.00 €	1,173,437.85 €	20.1%	8
75	2,100,000.00 €	1,279,079.06 €	20.3%	8

TT ENERGY REPLACEMENT

FINANCIAL OUTPUTS

ENERGY EFFICIENCY IN PORTS : ELECTRIFICATION OF RTGs

We assess whether electrification of d-RTGs is convient or not

Tecnical Feasibility

Financial Feasibility

Environemental aspects

Viability depends on:

- Oil prices
- Electricty prices
- Cost of Electric Systems
- Fuel consumption of current RTGs
- Cost of investments in the terminal
- Number of container moves by meter

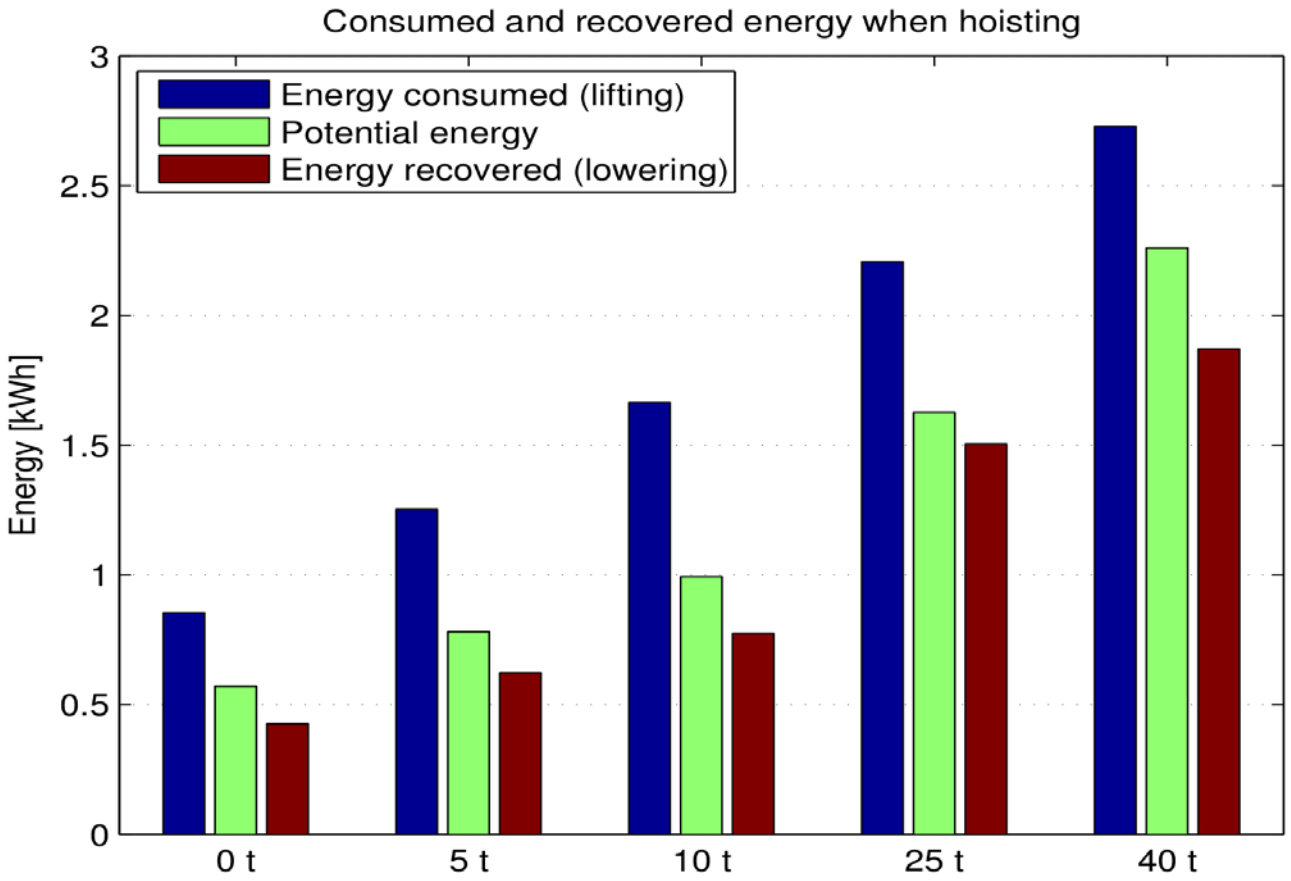
→ Electrification will be more profitable in terminals with higher number of container moves by meter

ENERGY EFFICIENCY IN PORTS : ENERGY STORAGE

We assess how much energy can be saved in terminal operations and reused

Between 50% to 65% of Energy can potentially be recovered in Gantry Cranes

Example of Energy Storage Potential in Gantry Cranes

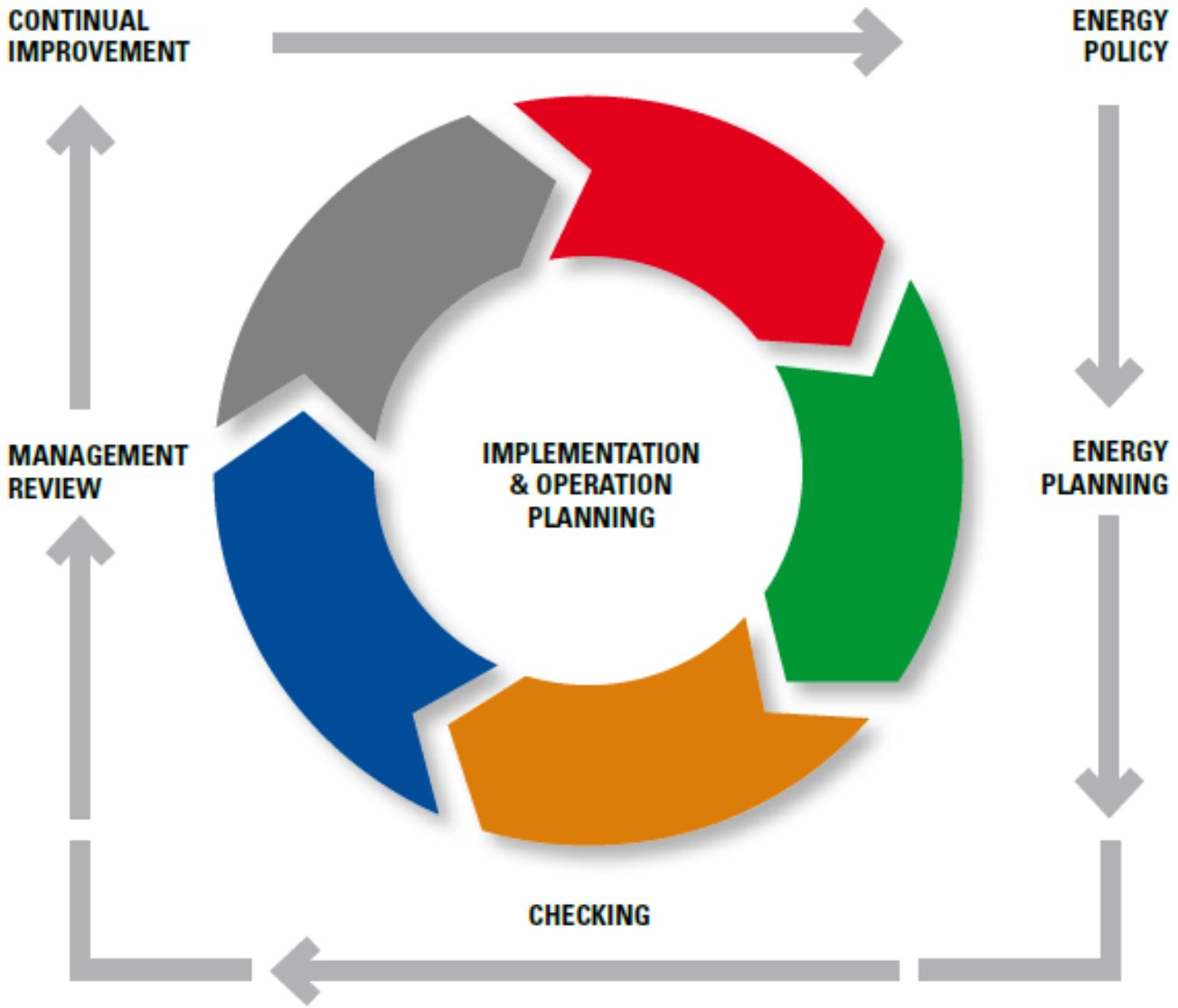


ENERGY EFFICIENCY IN PORTS : ENERGY MANAGEMENT SYSTEMS

Integrate Energy management into the port business structrue saving Energy and Costs

Continuous improvement of Energy performance

Long-term savings of over 20%



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