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SCHOOL OF CHEMICAL AND
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RENEWABLE AND SUSTAINABLE ENERGY
SYSTEMS LABORATORY



www.nezeh.eu

NEARLY ZERO ENERGY HOTELS

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Co-funded by the Intelligent Energy Europe
Programme of the European Union



Sustainable Pathways for the Tourism Industry in Malta - ESPON Peer Learning Workshop, 30 May 2022, Online

1

Environmental sustainability of the hospitality industry in the Green Deal era



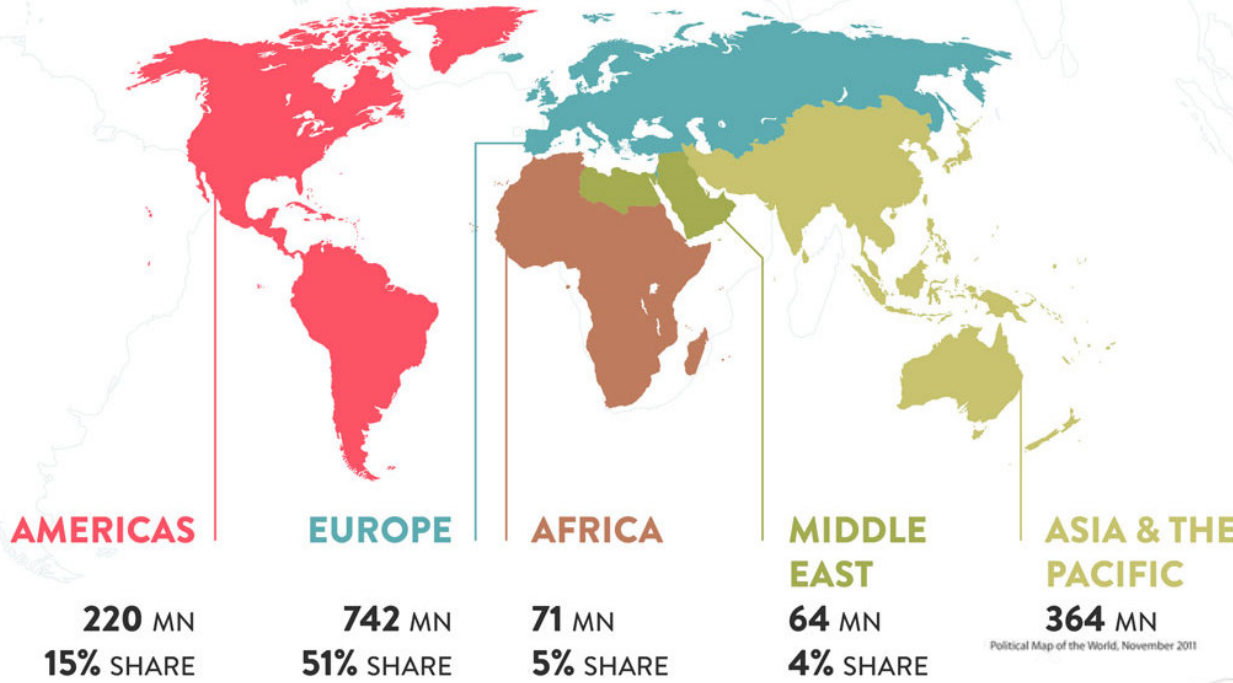
1.5 BILLION
INTERNATIONAL TOURIST ARRIVALS

+4% CHANGE

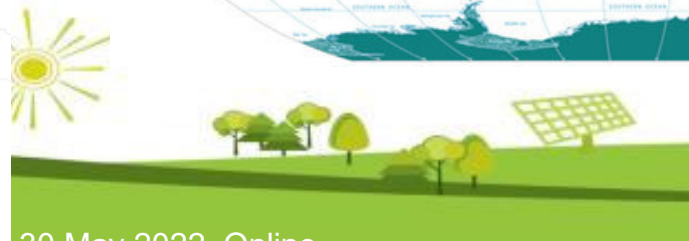
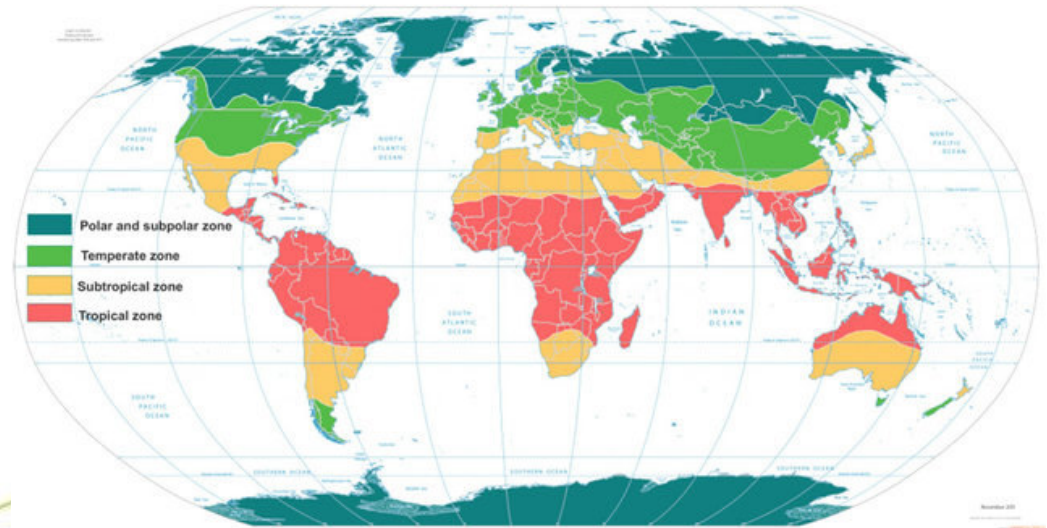
4 MILLION
ARRIVALS PER DAY



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WHY TOURISM MATTERS?



30 May 2022, Online

¹ Source: World Travel & Tourism Council (WTTTC)
Source: © UNWTO Barometer 2018 - World Tourism Organization (UNWTO), June 2018



Climate Change as an opportunity



© European Union, 2021

Cleaning our energy system



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Transition to climate neutrality, a unique opportunity to reduce inequality and energy poverty. Ambitious target:

55% reduction in GHGs emissions compared to 1990, by 2030

Requires higher shares of renewable energy and greater energy efficiency



~~36%~~

Energy efficiency - EED proposal

39%

~~40%~~

Renewable energy

45%

RePowerEU



Energy performance of buildings directive

Proposal for revision



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- Addresses carbon emissions over the **full lifecycle of a building**
- Requirements for:
 - **recharging infrastructure** in private buildings
 - **bicycle parking** places in new/renovated buildings and existing large non-residential ones
 - recharging points to **support smart charging**
- **100% of on-site energy consumption is covered by renewable energy as of 2030**, in all new buildings, where technically feasible
- New zero-emission buildings, and buildings undergoing major renovations, are equipped with devices for **monitoring and regulation of indoor air quality**.



2

Why Nearly Zero Energy Hotels

Flagship projects in Europe

Framework, tools and results

The neZEH frontrunners



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At the energy forefront of the European Accommodation Industry



16 hotels across **7 countries** followed large-scale renovation plans to become nearly Zero Energy Hotel frontrunners and serve as examples of best practice





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PROJECT COORDINATOR



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7 EU countries

16 neZEH hotels

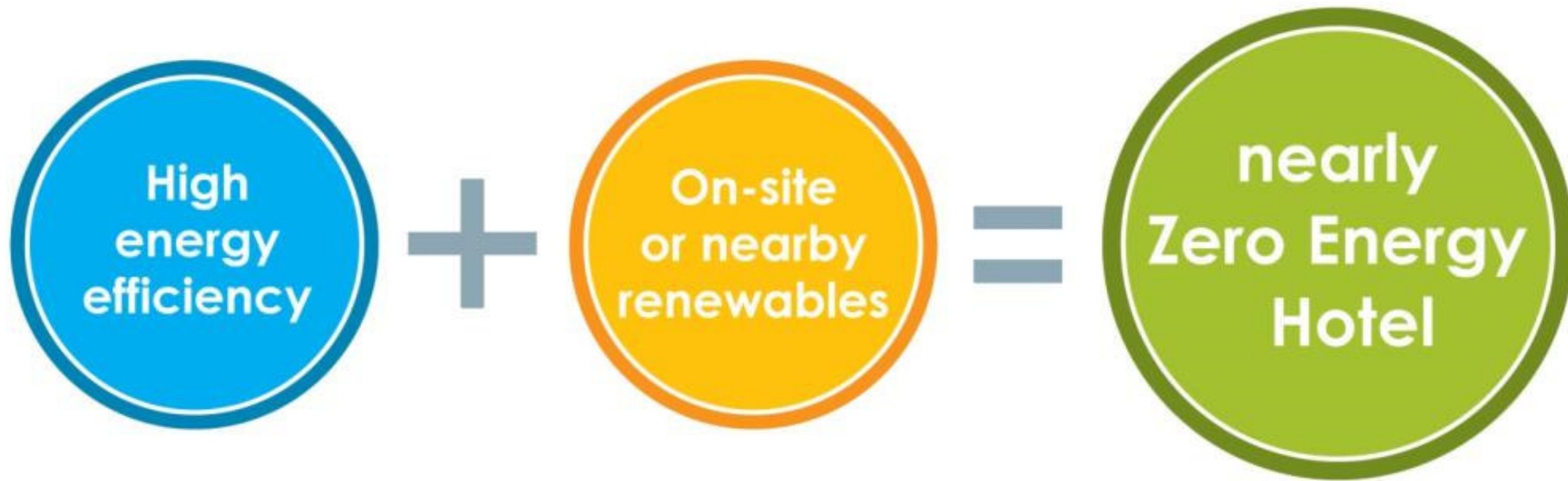
4 neZEH hotels awarded



What is a neZEH hotel



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A nearly Zero-Energy Hotel (neZEH) is a hotel that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent from renewable sources, including energy from renewable sources produced on-site or nearby.

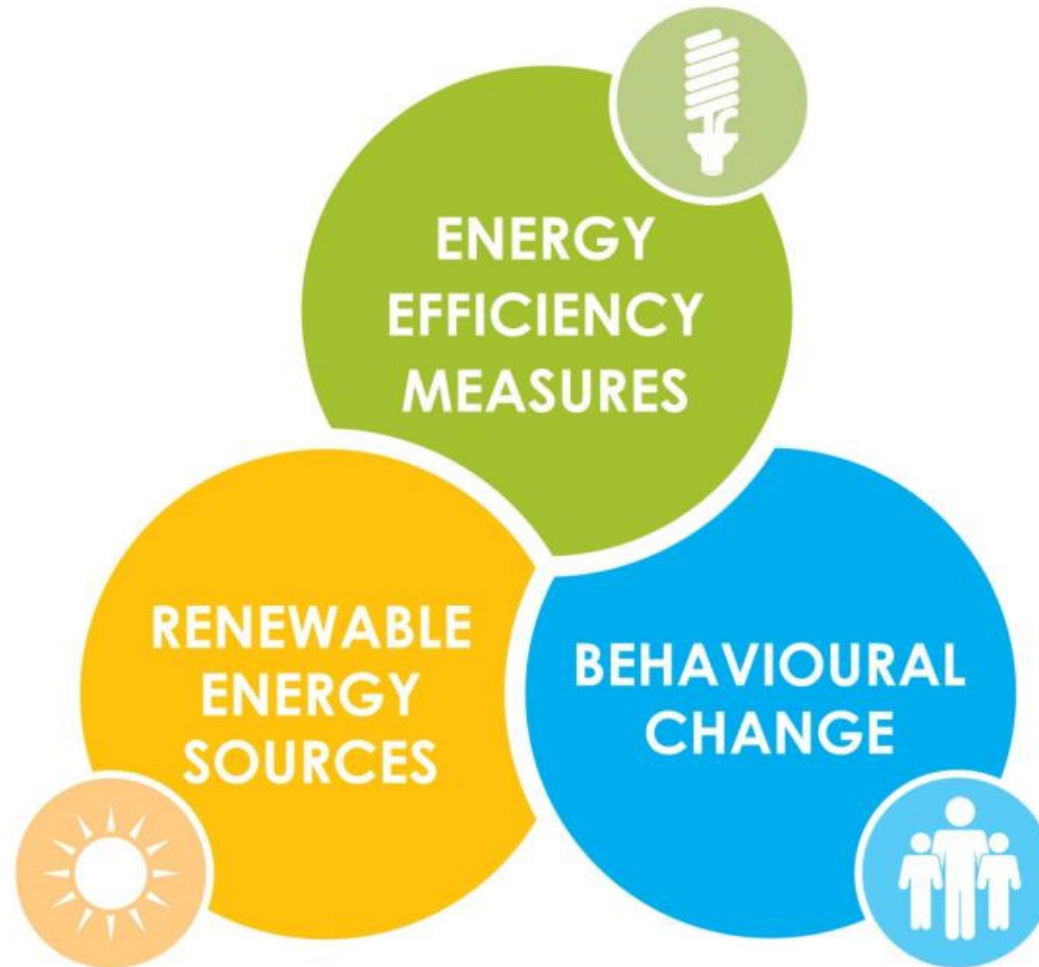
Following the EPBD recast



Being a nearly Zero Energy Hotel implies acting in 3 key areas:



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Hoteliers business challenges

- ▶ Reduction of operational and maintenance cost
- ▶ Energy security
- ▶ Market and guests expectations - Competitiveness
- ▶ Regulatory-legislative changes
- ▶ Funding opportunities for renovation
- ▶ Climate change - Environmental footprint – Social Responsibility

▶ Sustainability



Four steps towards a nearly Zero Energy Hotel!



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1

Assess your hotel's energy performance and identify actions needed to achieve nearly zero energy status.

Use the neZEH Energy Solutions Toolkit.

2

Develop your business plan and specify the most suitable energy efficiency solutions and renewable energy technologies for your hotel. Identify financial instruments available at national and EU level.

Learn from the neZEH methodology and find out existing financial tools for large scale hotels renovation. Benefit from the experience of neZEH pilot hotels.

3

Build up your renovation plan and a roadmap to achieve nearly zero energy status.

Follow the example of the neZEH frontrunners. Use the neZEH Training Material.

4

Inform your staff and guests, make them ambassadors of the nearly zero energy experience.

Use the neZEH marketing tools and join the neZEH network.



Hotel functions & energy consumption

Hosting functions
(typical use of the building)



Guests' rooms
Reception hall
Offices
Bar
Restaurant
Sitting rooms
Meeting rooms

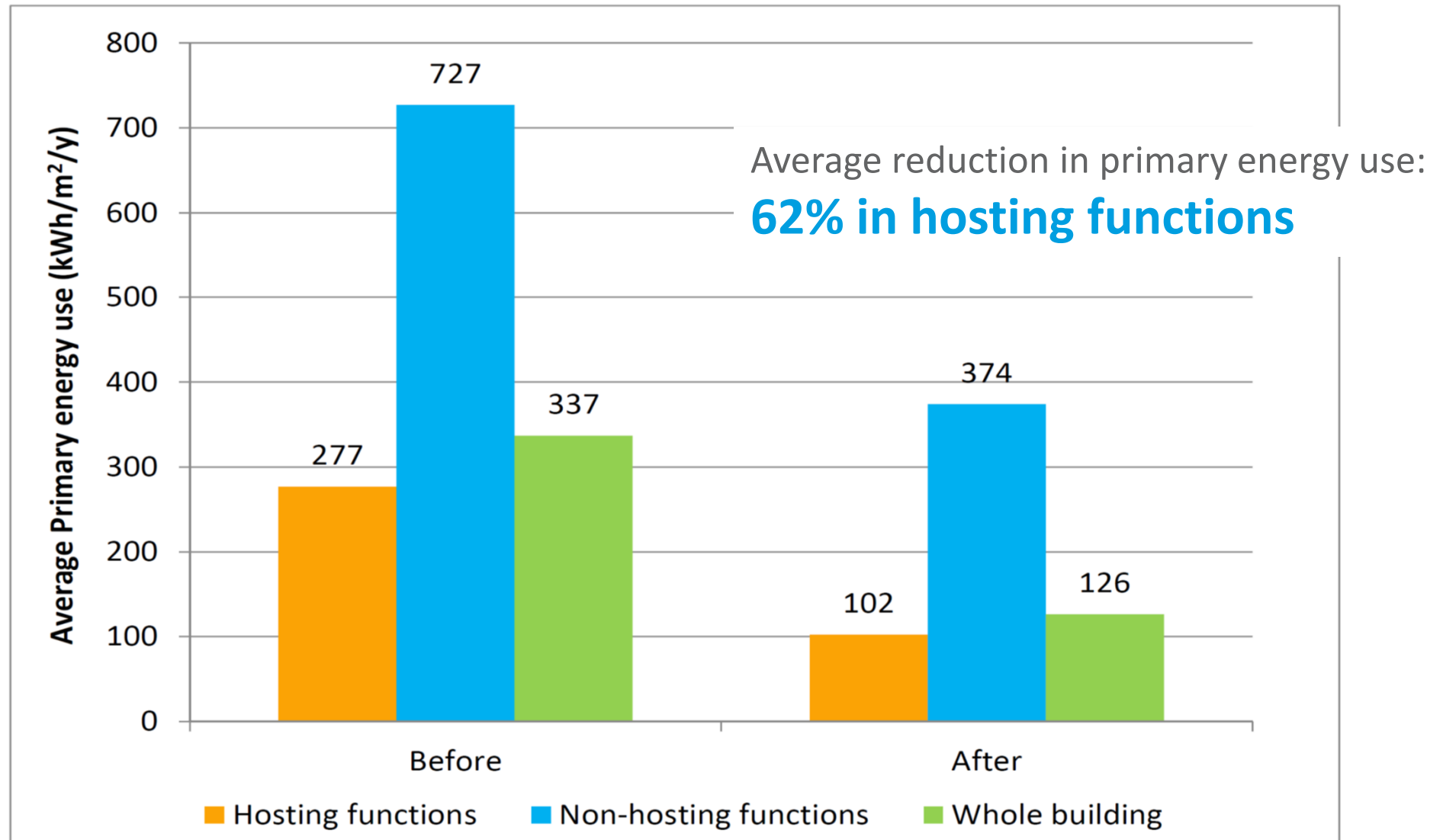
Non-hosting functions
(specific challenge for hotels)



Kitchen
Laundry
Technical rooms
Swimming pool
Spa
Sauna
Gym



Results from energy renovations towards neZEH



The neZEH Pilot Hotels typologies



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URBAN

B&B

COASTAL

Business

RURAL

Resort

MOUNTAIN

Spa/Wellness



Common measures per hotel category



Coastal

- Replacement of pumps with more efficient ones
- Installation of a VRV system
- LED lighting
- Installation of presence detectors
- BEMS installation
- Installation of a photovoltaic system
- Building envelop insulation
- Installation of sun shading devices



Mountain

- LED lighting
- Installation of presence detectors
- Installation of thermostatic valves
- Installation of a solar-thermal system
- BEMS installation
- Insulation of hot water pipes



Urban

- BEMS installation
- LED lighting
- Installation of a photovoltaic system
- Building envelop insulation
- Installation of a solar-thermal system
- Installation of geothermal system
- Replacement of low efficient pumps
- Installation of thermostatic valves
- Installation of heat recovery system in air handling units

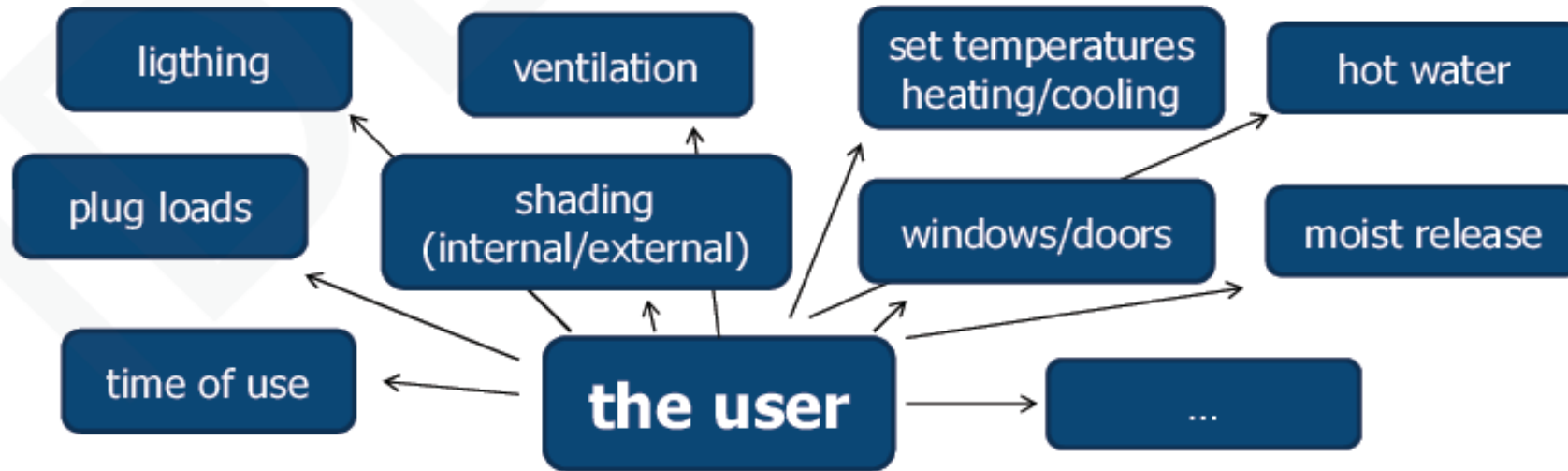


Rural

- Installation of a photovoltaic system
- Building envelop insulation
- Water-saving aerators
- LED lighting

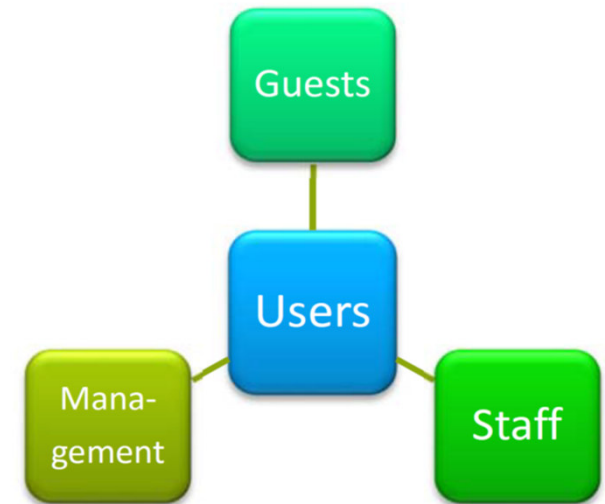


Change of users behaviour



Source: IDES-EDU

influences energy consumption, indoor air quality, illuminance, comfort,...



Change of users behaviour

Staff training – Information to guests



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1. Let your guests know that you care for the environment!



2. Inform your guests that energy conservation actions greatly contribute to limiting the environmental impact of your activity and of their stay.



3. Tell your guests about the simple actions they can take to support your efforts!





Financing hotels energy renovations through Energy Performance Contracts (EPC)



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Lighting

- Substitution of incandescent lamps with LED
- Occupancy and presence detectors in bathrooms and corridors
- Photocell to dim luminous flux based on natural light

Average savings
26-50%

Heating & Cooling

- Substitution of boiler burner, low efficiency heat pumps, windows, etc.
- Installation of high temperature cooling, variable frequency drives, curtains etc.
- Improvement of thermal insulation of roofs, facade, etc.

Average savings
17-46%

Refrigeration

- Substitution of appliances with more efficient ones
- Installation of temperature detectors
- Proper insulation of doors and others

Average savings
10-30%

Domestic Hot Water

- Substitution of conventional boilers
- Heat recovery systems in chillers
- Solar thermal panels

Average savings
15-52 %

Equipment & others

- Substitution of hydraulic motors in elevators
- Substitution of conventional appliances
- Installation of RES

Average savings
5-10 %

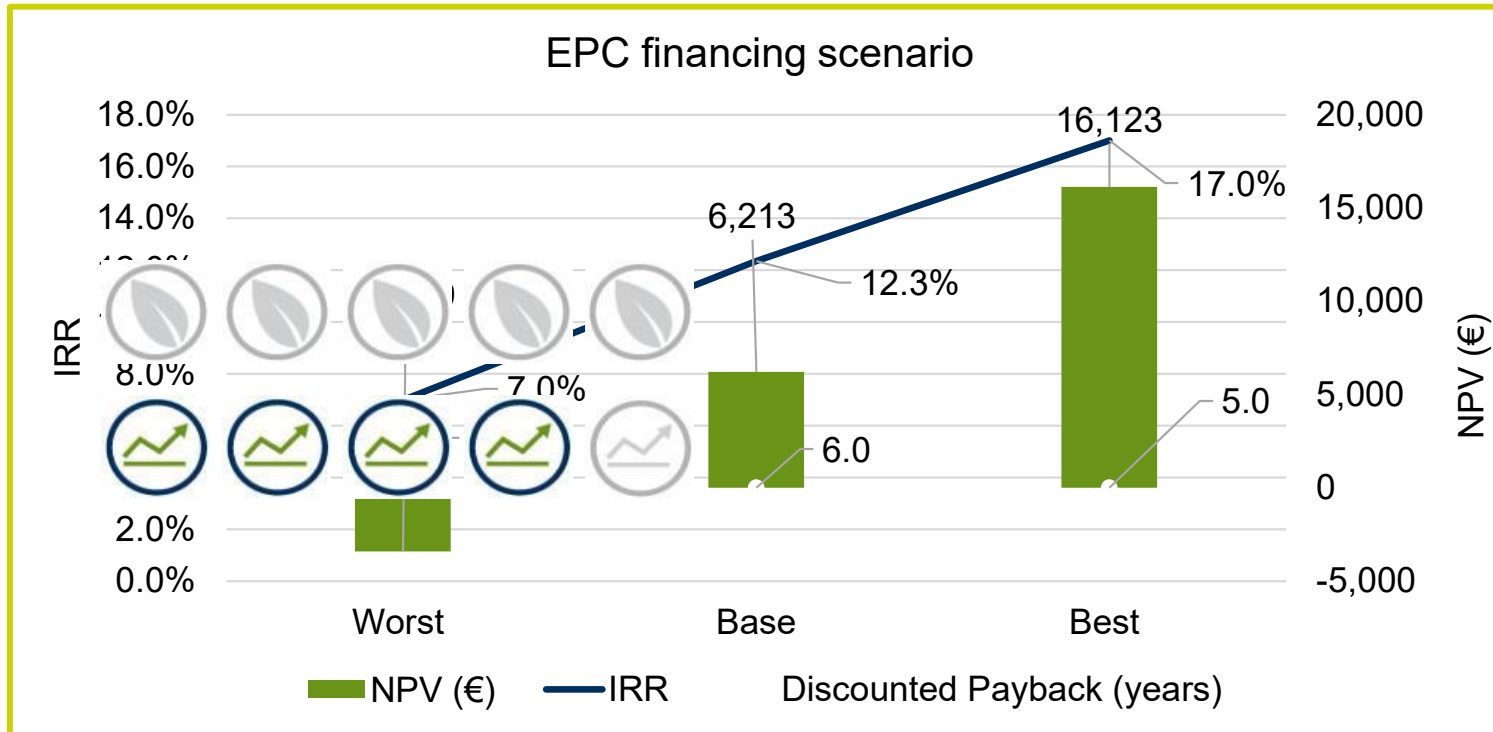


TRUST
EPC SOUTH



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Financing hotels energy renovations through Energy Performance Contracts (EPC)–Case study



Hotel in Rethymno



Energy Performance Contract Potential

Financial savings:	21,218	€
Energy savings:	194,651	kWh/year
Energy savings percentage:	37.66	%
Carbon savings:	170,419	kgCO ₂ /year
Investment:	103,605	€
Equity percentage:	40.00	%
IRR:	10.3	%
NPV:	2,363	€
avg. DSCR:	2.1	
min. DSCR:	1.7	
Discounted payback:	6.0	years

EPC Financing scenario

<u>FINANCIAL KPIs</u>	IRR	NPV (€)	Discounted Payback (years)	Min DSCR	Average DSCR	Negative FCF (years)
Worst scenario	7.0%	-3,409	7.0	1.6	1.8	0
Base scenario	12.3%	6,213	6.0	1.7	2.1	0
Best scenario	17.0%	16,123	5.0	1.9	2.4	0

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Lessons learnt & recommendations

Energy Transition of Hospitality Industry

What solutions... how...



Large scale retrofitting of hotels is **technically and economically feasible**.
Technology solutions are widely available.

- **Renewable energy** power generation (WE, PV, Geothermal, etc)
- **Energy Saving** (appliance efficiency, building envelope, smart monitoring)
- Existing Know-how (potential limitations in smaller communities)

A **short-medium-long** term plan is required (ranking of measures - assessment of technical scenarios - alternative financing)

- Energy audits, a determining factor
- Step by step approach of investment and construction works due to the interventions complexity and the operational aspects of hotels



Energy Transition of Hospitality Industry

Why beneficial for the hospitality industry



- Need to participate in Climate Change mitigation - Adaptation to national/European regulations/Directives
- Increase energy supply safety, minimize energy cost
- Response to guest's expectations



ENERGY

- Reduce your operational and maintenance costs.
- Increase independence from energy suppliers.
- Take advantage of funding opportunities.



BRANDING

- Extend your brand image with the green concept.
- Gain visibility in a new market segment: the "sustainability market".
- Increase your competitive advantage.



ADD VALUE

- Reduce your carbon footprint.
- Meet your corporate and social responsibility targets.
- Increase your guests' loyalty by improving living comfort and enriching experience.



Training material (a) hoteliers and (b) building professionals

Practical guides for hotel owners

Interviews and showcasing videos



ReSEL-TUC Projects linked to sustainable energy & tourism



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www.trustepc.eu



civitas.eu/projects/destinations



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ReSEL-TUC Projects linked to sustainable energy & tourism



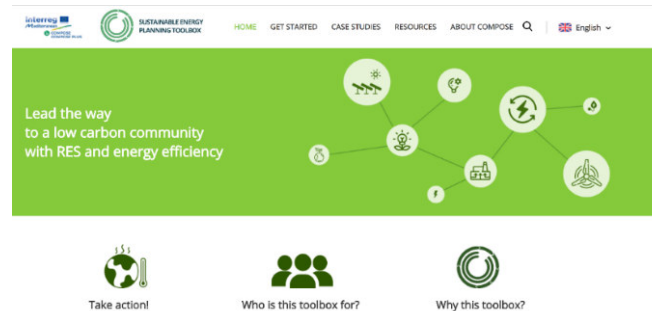
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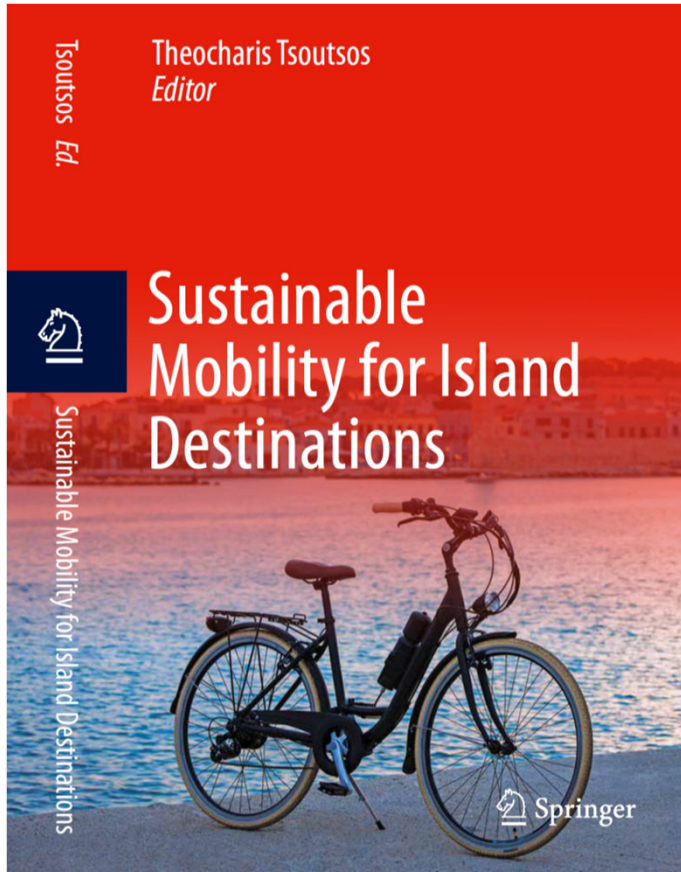
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Indicative Publications



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DESTINATIONS
 Back to Sustainable mobility in times of COVID-19
 Strategies for touristic destinations and smart cities

Edited by **Andrea Lorenzini** - MemEx srl



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Grazi!
Thank you for your attention!
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