



EE4HORECA

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D2.3 Selection of best energy efficiency practices





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INTRODUCTION

The present deliverable contains a selection of Best Practices, gathered for the stakeholders of the HORECA value chain. These practices were collected subsequent to the actor (D2.1) and 'energetic' (D2.2) mapping analysis, which served as initial phase of the EE4HORECA project. The present, aims at promoting the engagement of the all stakeholders of the HORECA value chain, reflecting a guiding principle that sustains the cross-organization approach of this project.

A European-level research was conducted to identify good practices for improving energy efficiency for individual companies and at the HORECA value chain level. The following list, reported in tabular form, gathers a range of technologies, services, and habits, drawn from practitioner's interviews, desk research and project partners experiences. The format of the table includes:

- The category of the best practice,
- A brief description of each technology,
- An evaluation of implementation time and complexity,
- Identified targets for implementing the recommended best practices.

The implementation recommendations included in the list are tailored to address the specific needs and challenges of the sector. The aim was to identify and select the most effective energy efficiency practices throughout the entire value chain, resulting in the development of a transferable list of actionable strategies designed to improve sector efficiency, complemented by the establishment of partnerships and collaborative approaches between HORECA owners, managers and suppliers. The collaborative approach created with the working groups (D3.7) will be enhanced during living labs and training sessions foreseen in WP5.



TARGET OF BEST PRACTICES IMPLEMENTATION ACROSS THE HORECA SECTOR

The selection of best practices within the HORECA value chain is tailored to address the diverse roles and responsibilities of the stakeholders involved. Recognizing that different actors within the value chain play distinct roles in impacting the energy consumption within the value chain, the list of practices is categorized based on the specific actors who can adopt them effectively. These categories include decision makers (owners and managers), staff members, customers, and suppliers as measures includes technical and technological suggestions and as well virtuous behaviors to be promoted and adopted.

HORECA decision makers comprising owners and managers, hold significant influence over the overall operational strategies and investment decisions within the HORECA establishments. Therefore, the practices identified for this category aim to provide insights to prioritize energy efficiency initiatives, allocate resources effectively, and integrate sustainability principles into the core business agenda. The overall goal is to foster a culture of sustainability leadership within the organization, driving long-term commitment and investment in energy efficiency measures.

Staff members, including employees across various roles and functions within the establishments, are essential stakeholders in the implementation of energy efficiency practices on a day-to-day basis. Practices tailored for staff focus on awareness-raising, training, and capacity-building initiatives to ensure that employees understand the importance of energy conservation and are equipped with the skills to adopt energy-efficient behaviors in their operational tasks. Moreover, engaging staff members as advocates for energy efficiency not only enhances their job satisfaction but also fosters a culture of sustainability throughout the organization and toward the customers.

Guests play a crucial role in influencing energy consumption patterns within HORECA establishments through their choices and behaviors. Practices targeted at customers aim to raise awareness about energy efficiency initiatives, promote sustainable consumption practices, and incentivize energy-conscious behavior. These may include educational campaigns, rewards programs for eco-friendly choices, and transparent communication about the environmental impact of products and services. Additionally, by engaging customers as partners in the journey towards energy efficiency, organizations can not only reduce their environmental footprint but also enhance their brand reputation and customer loyalty.

Suppliers, serving as external partners providing goods and services to HORECA establishments, hold a significant position in boosting energy efficiency initiatives. The collaboration across industries is indispensable for achieving tangible results in sustainability efforts. Practices tailored for suppliers are geared towards promoting sustainable procurement practices, advocating for the adoption of energy-efficient



technologies and materials, and favoring collaborative partnerships focused on innovation and sustainability. This B2B collaboration not only drives mutual benefits for suppliers and establishments but also cultivates a culture of shared responsibility and collective action towards a greener future.

The categorization of energy efficiency practices based on different roles in value chain reflects a multi actor approach to address the diverse needs and responsibilities within the HORECA sector, tailoring recommendations to specific actors, and empower stakeholders at all levels to contribute effectively to energy conservation efforts.



BEST PRACTICES' CATEGORIES

The compilation of best practices within the HORECA sector extends beyond categorization based solely on the actors involved; it also explores thematic areas critical for enhancing energy efficiency. This subdivision into thematic categories enables a more targeted approach to address specific challenges and opportunities within the industry. In addition to focusing on thematic areas, it's crucial to consider return on investment concerns when implementing energy efficiency measures. While some practices may require significant upfront investment, others offer immediate savings with minimal or no cost. These "no-cost" best practices include simple behavioral changes, such as turning off lights when not in use or optimizing equipment settings. Incorporating a mix of investment-intensive and no-cost practices, businesses can maximize their energy efficiency gains while managing financial constraints. The comprehensive list of best practices aims to suggest a balanced approach to ensure the advancement of sustainability goals within the HORECA sector.

The first thematic category, **"Buildings"** focuses on strategies and techniques related to the physical structures of HORECA establishments. This includes initiatives such as improving insulation, optimizing building layout for natural lighting, and implementing renewable energy sources for power generation.

The categories of **"Electric Systems"** and **"Thermal Systems"** include technologies and products aimed at enhancing efficiency and modernizing the existing infrastructure within HORECA establishments. These advancements represent a proactive approach towards aligning with contemporary technological trends and sustainability goals. Within the "Electric Systems" category, innovations such as energy-efficient lighting systems, smart metering, and renewable energy integration signify a shift towards reducing electricity consumption and minimizing environmental impact. Similarly, advancements in "Thermal Systems," including upgraded HVAC equipment, zoning and occupancy sensors, and enhanced thermal insulation, reflect a commitment to optimizing heating, ventilation, and air conditioning processes for greater energy efficiency and comfort. "Electric Systems" as highlighted in D2.2 cover over the 50% of direct energy consumption in the hotels, over 35% in the restaurants and over the 40% in catering services and can be a huge opportunity for energy and costs savings.

The "Internal Equipment and Services" category revolves around optimizing main service operations, with a primary emphasis on food and beverage storage and preparation and service within the HORECA sector. It encompasses strategies and technologies aimed at enhancing efficiency and effectiveness in delivering these essential services in a perspective of energy efficiency as well increasing the efficiency of cold chain.



The **"Virtuous Behaviors"** category emphasizes practices that incur with minimal or no additional costs and do not require significant investments in specific products or technologies. These practices include appointing a dedicated energy efficiency team, adopting regular inspection and preventive maintenance, establishing energy efficiency targets, and implementing energy-efficient communication strategies. These actions can be readily adopted by stakeholders within the HORECA value chain to enhance sustainability with minimal budget and achieve short-term returns. They are designed to engage both internal staff and customers in the journey towards greater energy efficiency and environmental responsibility.

The **"Suppliers"** category relates to energy consumption resulting from upstream activities related to the acquisition of goods and services, not directly controlled by HORECA facility management. This includes both tangible products and intangible services. As highlighted in the D2.2 energy, food and beverage, transport and laundry services are the main energy demanding suppliers in the value chain, a first step toward energy efficiency across the value chain can be obtained with green procurement and the selection of suppliers, while other solutions requires a higher effort and a synergic collaboration across the value chain.



CONCLUSIONS

This report accentuates the importance of identifying and implementing best energy practices that are not only effective but also transferable across the entire value chain. This outcome has been achieved through active engagement of project partners and stakeholders, including HORECA owners, managers, energy practitioners and desk research. Its validation process will continue with the living lab activities and the involvement of over 100 key actors of the sector, providing valuable insights into their perspectives on the identified measures that will serve as input for the policy recommendations with a bottom-up approach. For what emerged from the first bilateral interviews, it remains imperative to assess the return on investment, available funding opportunities alongside the implementation time for each best practice as this is a key point for HORECA managers. The list of best practices together with the map of the actors and the direct and indirect energy process analysis will serve as a basis during the Living Lab sessions (WP5) and training initiatives, facilitating constructive discussions with companies regarding potential efficiency improvements within the sector.



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BEST PRACTICES TABLE

CATEGORIES	ENERGY EFFICIENCY MEASURES	HOW IT WORKS	IMPLEMENTATION TIME AND COMPLEXITY (short term - mid term - long term) (easy - medium - complex)	ENERGY EFFICIENCY MEASURES TARGET	Implementation time definition
	Walls and rooftop insulation	Adding insulation to a building's exterior walls reduces heat loss or gain through the building envelope, enhancing energy efficiency. Internal or cavity insulation options are also possible. While exterior insulation is preferable, interior solutions are viable for architecturally constrained buildings. Wall insulation, coupled with additional roof insulation, significantly optimizes energy performance of the building and minimizes thermal bridges.	complex - long term		short term: implemented in in under four weeks
BUILDING	Energy Efficient windows (glazing and frame)	Upgrading windows to double or triple glazed units with high insulation properties significantly enhances energy efficiency. These energy-efficient windows, available in various materials like wood, PVC, or aluminum, feature multiple low emissivity glass panes separated by spacers and filled with insulating gas. When selecting windows, it is important to consider the insulating glass unit (IGU) value for insulation and the solar factor for solar energy transmission.	medium -long term	HORECA DECISION MAKERS - MANAGERS	mid term: implemented within a few months
	Sun shading devices	Managing sunlight exposure is crucial to reduce cooling demands in buildings. External or internal sun shading window devices offer shading to limit unwanted sunlight infiltration. Another opportunity consists in planting deciduous trees can provide natural shading in summer while allowing sunlight in during winter.	easy -mid term		long term: implemented in more than 6 months
	BMS (Building Management Systems) GRMS (Guest Room Management Systems)	Building Management Systems (BMS) efficiently monitor and control electrical and mechanical equipment in large facilities, optimizing energy consumption. Integrated with automatic heating and air-conditioning controls, BMS utilizes demand-oriented strategies such as motion detectors and presence sensors to enhance efficiency. These systems manage ventilation, lighting, and sensors, facilitating energy savings and maintenance planning.	complex - long term		
	Photovoltaic plant with storage	Photovoltaic (PV) systems utilize sunlight to generate electricity through transparent semiconductor-based cells. PV panels and glasses, adaptable for facades, curtain walls, and terrace floors, enables buildings to lower power grid dependency and lower carbon footprints. Storage solutions play a crucial role in enhancing renewable hosting capacity by addressing intermittency and uncertainty linked to photovoltaic source. They store surplus energy for release during internal demanding periods, promoting self-consumption and reducing reliance on traditional power sources.	medium - long term		
	Electric car charging stations	Installing electric vehicle charging stations in the parking lot attracts environmentally conscious guests who own electric vehicles, enhancing the establishment's reputation for sustainability.	medium -mid term		



	LED Lighting	Switching to LED lighting both indoors and outdoors yields substantial energy savings. LED bulbs last significantly longer—up to 40,000 hours—compared to traditional ones. They consume between 25% and 80% less energy compared to older technologies and have a lifespan from 3 to 25 times longer. LED's efficiency stems from emitting minimal heat, unlike traditional bulbs, which emit up to 80% of energy as heat.	easy -mid term	
	Daylight and presence sensors	Utilizing presence or daylight sensors optimizes energy usage by automatically turning off lights in unoccupied rooms or spaces with enough natural light. This system adjusts artificial lighting based on ambient light levels, optimizing energy use effectively. Implementing motion detectors in corridors, timers, and light dimmers further enhances energy efficiency, minimizing waste and reducing overall operating costs.	medium -mid term	
SYSTEMS	 Electricity meters to monitor energy use of equipments 	Installing electricity meters allows for precise monitoring of energy usage over time, enabling accurate tracking of equipment energy consumption. This proactive approach facilitates better management of energy resources, leading to more informed decisions regarding energy efficiency measures. By closely monitoring energy use, organizations can identify areas for improvement, implementing targeted strategies.	easy -short term	
	Inverters (variable speed drives) on pumps	The inverters (variable speed drives) enable the conversion of incoming electrical power to optimize the engine performance, by adjusting the power supply to a variable frequency and voltage supplied to the motor. Minimizing wear and tear associated with abrupt starts and stops, these technologies reduce maintenance expenses and the frequency of motor replacements, providing long-term advantage in terms of performance, efficiency and operating costs.	complex - mid term	HORECA DECISION MAKERS - MANAGERS
	Departmental metering of thermal energy consumptions	Departmental metering of thermal energy consumption involves sub- metering to accurately monitor energy usage by specific zones or building systems. This detailed tracking enables identification of high-consumption areas or sources, and develop optimisation measures.	easy - short term	
THERMAL SYSTEMS	Heat recovery ventilation	Heat recovery ventilation (HRV) is a cutting edge technology for efficient air exchange, extracting stale air and introducing fresh air. HRV systems recover heat from exhaust air, pre-heating incoming fresh air during colder months. In summer, they utilize cooler exhaust air to pre-cool fresh air, reducing air conditioning energy usage. These systems can be retrofitted to existing setups or integrated into new installations, offering sustainable and energy-efficient ventilation solutions.	complex - long term	
	Solar Domestic Hot Water	Solar Domestic Hot Water (DHW) systems integrate solar panels with boilers to meet the hot water needs of hospitality establishments. These systems harness solar energy to heat water, using collectors to transfer energy to a heat transfer fluid, which in turn heats water stored in a tank. The hot water generated can be utilized both for sanitary purposes and as technical water to provide heat for processes in heating systems. This dual functionality enhances the overall operational energy efficiency of HORECA organizations.	medium - mid term	



	Geothermal heating/cooling	Geothermal heating and cooling systems leverage the earth's thermal energy absorbed from the sun. In winter, when ground temperature is higher than outside air, heat is extracted via underground pipes powered by a heat pump, warming buildings. Conversely, in summer, cooler ground temperatures facilitate the transfer of cool fluids through the pipe system, acting as a heat sink. These systems, utilizing vertical or horizontal pipe configurations, offer efficient year-round temperature control while reducing environmental impact.	complex - long term	
	Condensing boilers	Condensing boilers are highly efficient units capable of recovering waste heat generated during fuel combustion, known as latent heat of evaporation. This is utilized to heat water, enhancing boiler energy efficiency compared to conventional models. When retrofitting existing boilers, installing condensing units should always be considered due to their superior efficiency.	medium - mid term	
THERMAL SYSTEMS	Heat pumps and chillers	Heat pumps transfer heat from a colder area to a warmer one. Comprising a condenser, expansion valve, evaporator, and compressor, heat pump systems offer space heating, cooling (if reversible), and can also supply domestic hot water. Chillers are an essential technology extensively utilized in multiple sectors to remove heat from a liquid via a vapor-compression or absorption refrigeration cycle. The heating or cooling efficiency of a heat pump is quantified through two parameters, respectively COP (coefficient of performance) and EER (energy efficiency ratio) typically ranging from 3 to 6, depending on the type of heat pump and operating temperature.	complex - mid term	
	 Efficient distribution systems (pipe insulation) 	Thermal insulation of pipes is essential and should be incorporated during the installation or renovation of heating and cooling systems. Insulating pipes prevents heat loss or gain, ensuring that heat transfer fluid remains at the desired temperature throughout the distribution network.	easy - short term	HORECA DECISION MAKERS - MANAGERS
	Cogenerators	Utilizing cogenerators, also known as combined heat and power (CHP) systems, offers simultaneous on-site production of electricity and heat. Unlike traditional methods, CHP technology efficiently recovers otherwise wasted thermal energy for space heating or domestic hot water. Utilizing a generator driven by a fuel or gas engine, it maximizes energy efficiency. Cogenerators are complex systems that require a technical feasibility study, in order to the define cogenerator dimensions in function of internal thermal and electrical loads.	complex - long term	
		The process of upgrading to high-afficiency kitchen equipment entails		
INTERNAL EQUIPMENT AND SERVICES	High efficency kitchen equipment	replacing old appliances utilized in kitchen services such as refrigeration units, dishwashers, ovens, stovetops, etc. It's essential that the replacements maintain or improve environmental performance standards. When acquiring new equipment, priority should be given to selecting the highest energy-efficient models, unless there are specific reasons for opting for less efficient alternatives.	easy -short term	
	Induction cooking	Induction cooking offers rapid, precise heat control while saving energy. By inducing an electrical current in the pan through a magnetic field, it heats efficiently. The concentrated electrical current then heats the pan resistively, minimizing energy waste.	easy -mid term	



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INTERNAL EQUIPMENT AND SERVICES	Steam-heat-recovery kitchen equipment	Ventilation in professional kitchens is a major energy consumer due to high volumetric air extraction, requiring additional heating or cooling. Efficient use of steam-heat-recovery kitchen equipment involves optimizing air extraction and ventilation. Variable speed control allows adjustment for adequate airflow, especially during lower activity periods. Steam-heat- recovery solutions, like condensation hoods, capture heat from condensing air in ovens and dishwashers, reducing energy consumption and enhancing staff amd customer comfort.	complex - mid term	HORECA DECISION MAKERS - MANAGERS
	Vegetarian/Vegan menu	Introducing a Vegetarian/Vegan menu enhances energy efficiency by reducing the need for refrigeration, as vegetables have lower cooling requirements. To align with sustainability goals, at least half of the daily main dishes should comprise vegetarian or vegan options. Given the substantial carbon footprints of meat and dairy products relative to plant- based alternatives, this initiative significantly mitigates environmental impact by minimizing carbon emissions throughout the food production process.	easy -short term	
	Locally sourced food	Sourcing food locally, within a 50km radius of the property, reduces transport distances, supporting sustainability. This practice not only minimizes carbon emissions linked to transportation but also supports regional agricultural economies. By prioritizing local sourcing, establishments ensure fresher, higher-quality ingredients while demonstrating a commitment to environmental stewardship and community resilience in the food supply chain. On the other side,local sourced food should fully load the lorries for an efficient transportation.	easy -short term	
	Reduced laundry temperature and efficient laundry equipment	Maximize energy savings in laundry operations by employing lower temperatures and efficient equipment. Prioritize washing linens at reduced temperatures and air drying whenever possible. Ensure washing machines and dryers run with full loads to minimize cycle frequency.	easy-short term	
	Pool covers	Installing a pool cover minimizes evaporation in summer and heat loss in winter, saving energy. Reducing evaporation and condensation, pool covers decrease the energy needed to heat the swimming pool, promoting energy efficiency year-round.	easy -short term	
VIRTUOS BEHAVIOURS	A team or a person dedicated to energy-related issues	Appointing a dedicated team or individual to address energy-related issues offers numerous benefits for businesses. This responsible person would coordinate energy management policies and oversee a specialized team tasked with monitoring energy consumption, implementing efficiency procedures, and collecting data to evaluate progress.	easy -short term	
	Energy and environmental consultants	Energy and environmental managers fosters knowledge exchange on best practice measures. Collaboration with pre-qualified specialists in energy issues enhances expertise. Engaging with external professionals, businesses gain insights into effective energy management strategies, facilitating the implementation of sustainable practices and optimizing resource usage. This collaboration promotes continuous improvement and contributes to achieving energy efficiency goals across industries and obtain support for energy efficiency incentives.	easy -short term	HORECA DECISION MAKERS - MANAGERS + STAFF



	Regular inspection and preventive maintenance	Regular inspection and preventive maintenance are crucial for ensuring the efficient operation of technical equipment within a business or building. All technical equipment must undergo regular inspection, servicing, and maintenance to prevent downtime and ensure optimal performance. Trained employees should participate in appointments with external maintenance companies to acquire necessary skills for future self- maintenance. While some tasks are covered by maintenance agreements, routine inspections can be integrated into employee's daily responsibilities, promoting proactive maintenance practices.	medium - mid term	
	 Energy efficency annual targets 	Establishing energy efficiency targets is essential for driving progress and achieving measurable results. Clear and measurable goals should be set, such as reducing energy consumption by at least 5% compared to the previous year. Additionally, target dates should be established to track and ensure the timely achievement of these goals.	easy -short term	
	Digital communication	Implementing digital communication strategies involves, for instance, placing QR codes with energy-saving information at convenient locations. This information should be user-friendly and not overly technical. Additionally, guests should be provided with details regarding the hospitality business's energy policy and ways they can contribute to making the service more sustainable.	easy -short term	HORECA DECISION MAKERS - MANAGERS + STAFF
VIRTUOS BEHAVIOURS	Optimization of room thermal comfort	Optimizing room thermal comfort for energy efficiency involves setting thermostats at appropriate temperatures for the season. During summer, avoid setting them too low (e.g., 22-24°C) when the air conditioning system is in use. Additionally, cleaning and housekeeping staff can contribute to energy savings by routinely checking key energy-related aspects of guest rooms when they are vacant.	easy -short term	
	Eco-friendly cleaning products	Implement eco-friendly cleaning practices by procuring cleaning products in bulk, undiluted or dry form for on-site dilution. Opt for reusable cleaning accessories like microfiber cloths instead of disposables. Implement internal policies can also significantly reduce consumption of cleaning consumables.	easy -short term	
	Opt-out option for room cleaning	Offer guests the option to opt out of room cleaning services, reducing bed linen laundry and conserving water and energy resources. Communicate this initiative to guests, emphasizing its positive environmental impact and encouraging their participation in sustainable practices.	easy-short term	
	Towel re-use programme	Implement a towel reuse program available to guests. Communicate this initiative to guests, emphasizing its positive environmental impact and encouraging their participation in sustainable practices.	easy -short term	GUESTS + STAFF
	Food waste policy	Implement a comprehensive food waste policy involving both management and guests. Communicate the enterprise's energy efficiency efforts and encourage guest participation in sustainability initiatives. Adjust meal portions to accommodate customers and offer multiple portion sizes. Continuously or periodically measure food waste amounts. Establish accurate stock inventory and ordering systems to prevent over-ordering and stock spoilage.	easy -short term	



VIRTUOS BEHAVIOURS	Reduction of minibar in rooms	By refraining from using the minibar, guests can reduce energy consumption associated with refrigeration and minimize waste. Additionally, guests can explore alternative options for refreshments, such as purchase food and beverage in the hall or at the vendor machines.	easy -short term	GUESTS + STAFF
	Public transport or bicycle over car	Opt for public transportation or bicycles, including electric bicycles, over cars for commuting. By prioritizing public transport and bicycles, individuals contribute to mitigating traffic congestion, improving air quality, and reducing their environmental footprint.	easy -short term	
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SUPPLIERS	Energy green procurement	Implement green procurement practices by purchasing green electricity derived from renewable resources like wind, solar, geothermal, and hydropower. These sustainable energy sources have minimal environmental impact, aligning with eco-friendly principles. Communicate the use of green electricity to stakeholders, highlighting the organization's commitment to sustainability and environmental responsibility.	easy -short term	SUPPLIERS - B2B COLLABORATION
	Green procurement	Selection of suppliers that satisfy determined sustainability standards. For instance, This involves sourcing products and services from suppliers committed to reducing their environmental impact through measures such as efficient waste management and the use of renewable materials.	easy -short term	
	□ Use of local enterprises for maintenance, service, marketing & non-Food & Beverage supply needs	Utilize local enterprises for maintenance, service, marketing, and non-food and beverage supply needs. By partnering with local businesses, the enterprise supports the local economy, reduces transportation emissions, and fosters community resilience. Communicate this commitment to guests and stakeholders, highlighting the benefits of supporting local enterprises.	medium-short term	
	Reduced packaging	Suppliers are required to provide food products packaged in a form which reduces waste to a minimum while still ensuring the safety and preservation of food.	medium-short term	
	Reduce the frequency, duration or emissions- intensity of journeys	Implement measures to reduce the frequency, duration, or emissions intensity of journeys for transportation services. Develop a transport plan focused on minimizing greenhouse gas and air pollutant emissions, optimizing routes, considering load transportation, and addressing last-mile challenges. Similarly, decrease emissions from food transportation by optimizing logistics, route planning, and consolidating deliveries.	medium-short term	
	Zero emissions delivery vehicles	Zero emissions delivery vehicles permit to minimize the environmental impact of transportation services. Implementing such vehicles reduces greenhouse gas emissions and air pollutants associated with deliveries.	medium-short term	
	No single-use items	Eliminate single-use items for consumables, providing individual portions only upon specific request. Replace single-use plastic amenities with bulk dispensers to minimize plastic waste. Avoid offering single-use plastic water bottles. Implement a recycling plan to manage waste effectively.	easy -short term	