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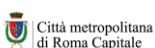
SSPICE IT!

Sustainability Skills Program for International Catering
operators and Entrepreneurs through Integrated Training

SSPICE IT! – Sustainability Skills Program for International Catering operators and Entrepreneurs through Integrated Training

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CIPFP CAMINO DE SANTIAGO
ESCUOLA DE HOSTELERÍA & TURISMO DE LA RIBERA



Escola Profissional AMAR TERRA VERDE



Submodule n°10: Sustainable Technologies in the Kitchen

THEMATIC AREA	How to implement circular practices in one's business
SUB AREA OF REFERENCE	<i>Sustainable food</i>
HOURS	3
LEARNING OBJECTIVES	
<p>By learning this module, the student should be able to:</p> <p>1. Adopt sustainable practices in one's job.</p>	
LEARNING ACTIVITIES	
Theoretical	Practical
Exposure of the contents through resources like PowerPoint and apps created specifically for this course.	Exercises, discussions, and practice tasks for the students to measure the knowledge acquired during the module.

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SUBMODULE 10: Sustainable Technologies in the Kitchen

In today's rapidly changing world, the food industry faces increasing pressure to adopt more sustainable practices. Among the various sectors of the food industry, professional kitchens play a crucial role in driving positive change towards environmental stewardship and resource efficiency. Sustainable technologies offer innovative solutions that can transform traditional commercial kitchens into eco-friendly and efficient spaces, aligning with the principles of environmental responsibility and social consciousness.

From reducing energy consumption and minimizing food waste to improving water efficiency and embracing renewable resources, sustainable technologies hold the potential to revolutionize the way professional kitchens operate. These cutting-edge solutions not only help businesses meet environmental goals but also yield economic benefits through cost savings and enhanced operational efficiency.

By adopting these advanced technologies, foodservice establishments can not only improve their environmental performance but also take on a leadership role in shaping a more sustainable future for the entire food industry.

1. Introduction to sustainable kitchen appliances

Sustainable kitchen appliances are appliances designed and manufactured with a focus on environmental responsibility and energy efficiency. These appliances are part of the broader effort to promote sustainability and reduce the environmental impact of household activities, including cooking and food preparation. Here are some key features and benefits of sustainable kitchen appliances:

Energy Efficiency: Sustainable kitchen appliances are engineered to consume less energy during operation. They often come with energy-saving features such as programmable timers, sensors, and inverter technology. Energy-efficient appliances help reduce electricity consumption, leading to lower utility bills and a smaller carbon footprint.

Water Conservation: Sustainable kitchen appliances, such as dishwashers and faucets, incorporate water-saving technologies to minimize water usage. Low-flow

faucets, water-efficient dishwashers, and smart water management systems contribute to water conservation and support sustainable water practices.

Recycled Materials: Many sustainable kitchen appliances are made using recycled materials, reducing the demand for new resources and diverting waste from landfills. Manufacturers may use recycled plastic, metal, or other materials in the production of these appliances.

Eco-Friendly Materials: Sustainable appliances may use eco-friendly materials that have a lower environmental impact during their lifecycle. For instance, some appliances feature bamboo, a rapidly renewable and biodegradable material, in their construction.

Longevity and Durability: Sustainable kitchen appliances are often designed to be durable and long-lasting, reducing the need for frequent replacements. Longer product lifespans contribute to waste reduction and resource conservation.

Non-Toxic and Chemical-Free: Sustainable appliances prioritize non-toxic materials and coatings to ensure that no harmful chemicals leach into the environment or food. This makes them safer for both users and the environment.

Smart Technology: Many sustainable kitchen appliances are equipped with smart technology, allowing users to monitor and control their energy and water consumption more effectively. Smart appliances may also optimize performance based on usage patterns.

Energy Star Certification: Appliances with the Energy Star label meet strict energy efficiency guidelines set by the U.S. Environmental Protection Agency (EPA) or similar regulatory bodies in other regions. Energy Star-certified appliances consume less energy and help users reduce greenhouse gas emissions.

Waste Reduction Features: Some sustainable appliances, such as composters and food waste disposers, aim to reduce food waste and promote responsible waste management in the kitchen.

As consumer demand for eco-friendly products continues to rise, manufacturers are increasingly incorporating sustainable practices into their appliance designs to meet the growing need for environmentally conscious solutions.

2. Harnessing renewable energy for cooking

Harnessing renewable energy for cooking offers an environmentally friendly alternative to traditional fossil fuel-based cooking methods. Renewable energy sources are sustainable, readily available, and do not produce greenhouse gas emissions, making them a viable and eco-conscious option for cooking. Here are some ways to harness renewable energy for cooking:

Solar Cooking: Solar cookers and solar ovens use sunlight to heat and cook food. They typically consist of reflective surfaces that focus sunlight onto a cooking chamber. Solar cooking is especially effective in sunny regions and can be used for various cooking tasks, such as baking, boiling, and roasting.

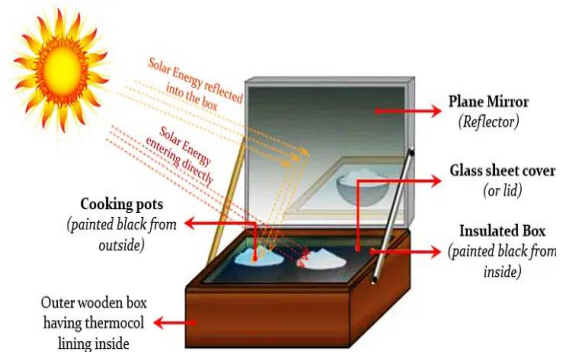


Figure 1: Image from <https://collegedunia.com>

Biomass Stoves: Biomass stoves use renewable plant-based fuels such as wood, crop residues, and agricultural waste to produce heat for cooking. Improved cookstove designs are efficient and reduce indoor air pollution compared to traditional open fires.

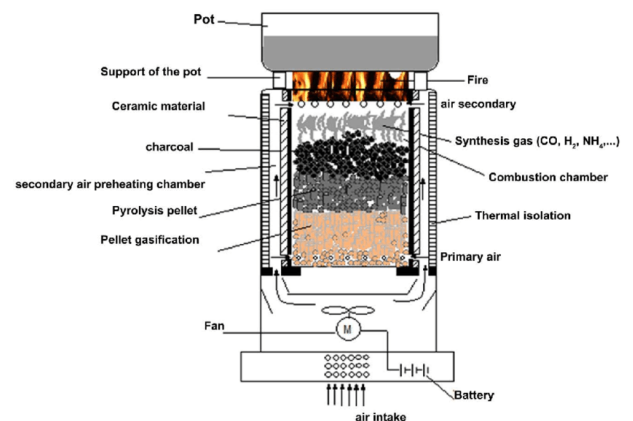


Figure 2: Image from Creative Commons Attribution 4.0 International

Biogas: Biogas is produced from the anaerobic digestion of organic materials, such as food waste, agricultural residues, or animal manure. Biogas can be used directly in biogas stoves or converted to electricity and used to power electric cookers.

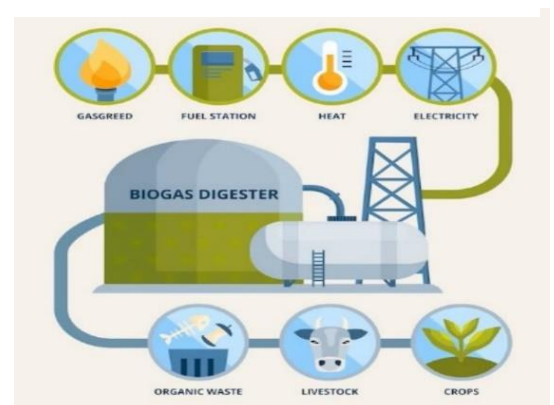


Figure 3: Image from <https://www.forbesargentina.com>

Hydroelectricity: If your home or community has access to hydropower, you can use electricity generated from flowing water to power electric cookers, induction cooktops, and other electric cooking appliances.

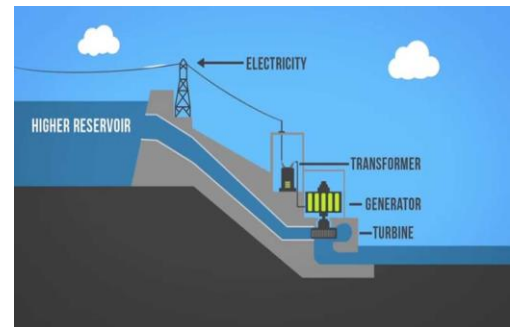


Figure 4: Image from https://energypedia.info/wiki/Hydro_Power_Basics

Wind Power: In areas with consistent wind resources, wind turbines can produce electricity for cooking purposes. Wind energy can be stored in batteries or fed into the grid and used when needed.

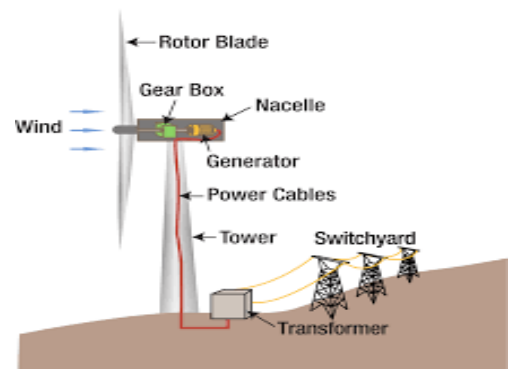


Figure 5: Image from <http://www.history.alberta.ca/energyheritage/energy/wind-power/modern-wind-power/modern-turbines-how->

Geothermal Energy: In regions with access to geothermal energy, ground-source heat pumps can be used for cooking. Geothermal energy is extracted from the Earth's heat, providing a consistent and reliable source of energy.

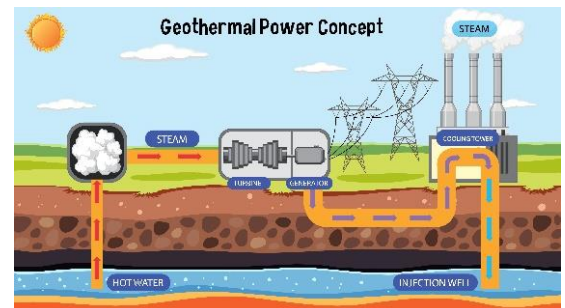


Figure 6: Image from freepik.com

Community-Based Renewable Energy: In some areas, communities may invest in shared renewable energy systems, such as community solar farms or wind turbines. Community members can access renewable energy for cooking through these collective initiatives.



Figure 7: Image from freepik.com

Grid-Tied Renewable Energy: If your local energy grid is supplied with renewable energy from sources like wind or solar farms, you can use regular electric or induction cooktops powered by the renewable energy mix.

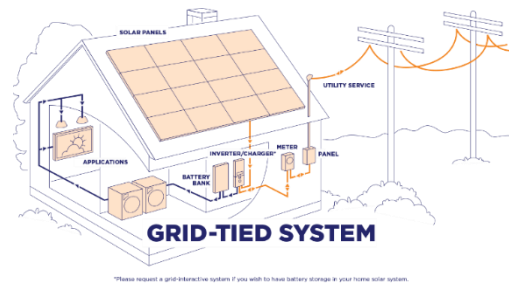


Figure 8: Image from freepik.com

It is important to note that the availability and feasibility of specific renewable energy options may vary depending on your location and local resources. Assessing the renewable energy sources available in your area and choosing suitable cooking technologies that align with those resources will be crucial in successfully harnessing renewable energy for cooking.

Transitioning to renewable energy for cooking not only reduces greenhouse gas emissions but also contributes to sustainable development, energy independence, and resilience to energy price fluctuations. As renewable energy technologies continue to advance, they offer a promising and sustainable pathway for the future of cooking.

3. Promoting energy-efficient kitchen design

Promoting energy-efficient kitchen design involves integrating sustainable principles into the layout, equipment selection, and practices of the kitchen. By optimizing energy usage, reducing waste, and adopting eco-friendly technologies, energy-efficient kitchen designs can significantly lower the environmental impact while saving costs. Here is an example of how to promote energy-efficient kitchen design:

Example: Eco-Friendly Restaurant Kitchen

Appliance Selection: Choose energy-efficient appliances with the Energy Star label or other energy certifications. Opt for induction cooktops, which are more efficient than traditional gas or electric cooktops. Select refrigerators and freezers with high Energy Efficiency Ratings (EER) and invest in energy-efficient convection ovens.

Ventilation System: Install a well-designed, energy-efficient ventilation system. Use exhaust hoods with variable speed controls to adjust airflow based on cooking activity, reducing energy waste during low-demand periods.

LED Lighting: Replace traditional lighting fixtures with energy-efficient LED lighting. LED lights consume significantly less energy, have a longer lifespan, and produce less heat, reducing cooling load requirements.

Natural Light and Skylights: Maximize natural light through windows and skylights, reducing the need for artificial lighting during daylight hours.

Energy Management Systems: Implement smart energy management systems that control appliances, lighting, and HVAC based on occupancy and demand. These systems can automatically adjust settings for energy efficiency.

Insulation: Ensure proper insulation in walls, ceilings, and floors to prevent heat loss and gain, reducing the load on heating and cooling systems.

Water Conservation: Incorporate water-efficient fixtures, such as low-flow faucets and pre-rinse sprayers, to reduce water consumption. Use energy-efficient dishwashers with shorter wash cycles.

Waste Management: Implement a comprehensive waste management plan to recycle, compost, and minimize food waste. Recycling and composting can reduce the waste sent to landfills, mitigating methane emissions.

Energy Audits and Monitoring: Conduct regular energy audits to identify opportunities for improvement. Install energy monitoring systems to track and optimize energy usage.

Employee Training: Train kitchen staff on energy-efficient practices, such as turning off appliances when not in use, using timers effectively, and practicing responsible water usage.

Highlighting a commitment to sustainability can resonate with customers, attract environmentally conscious diners, and contribute to a positive brand image. An energy-efficient kitchen serves as a model for sustainable practices, inspiring others in the foodservice industry to follow suit and promote a greener and more sustainable future.

Exercise: <i>Harnessing renewable energy for cooking</i>	
Pre-requisites	Knowledge of the sustainable technologies in the kitchen and how can we adapt and use different kind of appliances to cook taking advantage of the solar heat.
Time	1,5 hours
Tools	PC or Smartphone, internet connection, paper box, mirrors, foil paper, glue, etc...
Objectives	<ol style="list-style-type: none"> 1. Integrating environmentally conscious actions and behaviours into one's daily work routines and responsibilities to create well balanced meals according to nutritional needs. 2. Make choices that reduce the ecological footprint associated with job tasks, such as conserving resources, minimizing waste, and supporting environmentally friendly initiatives.
Instructions	
<p>In groups, carefully read the module and watch the link provided: https://www.youtube.com/watch?v=DaiGiRqCTQw</p> <p>After consulting links, create a handmade solar oven that you can use for dehydrating food or made recipes by slow cooking techniques.</p> <p>Extra task: Present a recipe made with your solar oven in 3 hours or less.</p>	

Appendix

1. Glossary of Key Terms

This glossary provides definitions for key terms used throughout the learning material. It serves as a handy reference for students to better understand the terminology related to sustainable food practices, energy efficiency, local food systems, and more.

Sustainable Agriculture: A method of farming that focuses on environmental stewardship, economic profitability, and social responsibility. It aims to minimize the negative impact of agriculture on the environment while ensuring the long-term viability of farming.

Energy Efficiency: The practice of using less energy to perform a specific task or achieve a particular outcome, often by using energy-efficient appliances, techniques, or practices.

Carbon Footprint: The total amount of greenhouse gases, primarily carbon dioxide (CO₂), produced directly or indirectly by an individual, organization, event, or product throughout its lifecycle. It is often measured in units of carbon dioxide equivalent (CO₂e).

Local Food: Food that is grown, produced, or sourced within a specific geographical region, typically with an emphasis on supporting local farmers and reducing food miles (the distance food travels from farm to plate).

Circular Economy: An economic system that aims to minimize waste and make the most of resources by designing products and materials for durability, reuse, remanufacturing, and recycling.

Food Waste: The edible food that is discarded at various stages of the food supply chain, from production and processing to distribution and consumption.

Composting: The natural process of breaking down organic matter, such as food scraps and yard waste, into nutrient-rich soil conditioner known as compost, which can be used to enrich soil for gardening and farming.

Sustainable Farming Practices: Methods of farming that prioritize environmental conservation and long-term ecological balance. Examples include crop rotation, cover cropping, and reduced pesticide use.

Renewable Energy: Energy derived from sources that are naturally replenished, such as sunlight, wind, and hydropower, and do not deplete finite resources like fossil fuels.

Food Security: The condition in which all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

Monoculture: The practice of cultivating a single crop species over a large area of land, often with the aim of maximizing production but at the risk of depleting soil and increasing vulnerability to pests and diseases.

Sustainable Kitchen Appliances: Energy-efficient and eco-friendly kitchen appliances designed to reduce energy consumption, water use, and environmental impact.

Regenerative Agriculture: A type of farming that aims to improve soil health, sequester carbon, and enhance biodiversity through practices like minimal soil disturbance, cover cropping, and rotational grazing.

Food Miles: The distance food travels from the place of production to the consumer's plate. Reducing food miles is a key aspect of promoting local and sustainable food systems.

Circular Food System: An approach to food production, distribution, and consumption that minimizes waste, optimizes resource use, and emphasizes the importance of recycling and reusing food and food-related materials.

Food Resilience: The capacity of a food system to withstand and recover from shocks and stresses, such as climate change, economic fluctuations, and supply chain disruptions.

Sustainable Packaging: Packaging materials and designs that minimize environmental impact, reduce waste, and promote recyclability or compostability.

Fair Trade: A trading system that ensures fair wages and working conditions for producers in developing countries, often involving agricultural products like coffee and chocolate.

Biodiversity: The variety and variability of life on Earth, including the different species of plants, animals, and microorganisms, their genes, and the ecosystems they form.

Organic Farming: A farming method that avoids the use of synthetic pesticides, herbicides, and genetically modified organisms (GMOs) and emphasizes soil health, biodiversity, and sustainable practices.

2. Bibliography

Content:

ENERGY STAR - Energy-Efficient Appliances: <https://www.energystar.gov/products/appliances>

Food and Agriculture Organization of the United Nations (FAO) - Energy-Smart Food for People and Climate: <http://www.fao.org/energy-smart-food/>

Sustainable Agriculture Research & Education (SARE) - Energy Efficiency on the Farm and in the Home: <https://www.sare.org/resources/energy-efficiency-on-the-farm-and-in-the-home/>

International Energy Agency (IEA) - Energy Efficiency Indicators: <https://www.iea.org/topics/energy-efficiency/energy-efficiency-indicators>

European Commission - Environment: https://commission.europa.eu/about-european-commission/departments-and-executive-agencies/environment_en

European Environment Agency (EEA): <https://www.eea.europa.eu/en>

Food and Agriculture Organization of the United Nations (FAO): <https://www.fao.org/home/en>

European Food Safety Authority (EFSA): <https://www.efsa.europa.eu/en>

European Environment Information and Observation Network (Eionet): <https://www.eionet.europa.eu/>

European Sustainable Development Network (ESDN): <https://www.esdn.eu/>

Sustainable Europe Research Institute (SERI): <https://www.seri.at/>

United States Environmental Protection Agency (EPA) - Energy Efficiency: <https://www.epa.gov/energy/energy-efficiency>

U.S. Department of Energy - Energy-Saving Tips for the Kitchen: <https://www.energy.gov/energysaver/save-electricity-and-fuel/appliances-and-electronics/energy-saving-tips-kitchen>

Local Harvest: <https://www.localharvest.org/newsletter/>

LCA Learning: <https://www.lifecycleinitiative.org/>

3. Further readings

- **Pollan, M. (2011). *The omnivore's dilemma*. Bloomsbury Publishing PLC.**- Explores the modern food industry and the impact of our food choices.
- **Participant Media & River Road Entertainment present; a film by Robert Kenner; producers, Robert Kenner, Elise Pearlstein; writers, Robert Kenner, Elise Pearlstein, Kim Roberts; directed by Robert Kenner. (2009). *Food, Inc.* [Los Angeles, CA]: Magnolia Home Entertainment.** - A visual exploration of the food production industry and its environmental and social consequences.
- **Pollan, M. (2009). *In defence of food*. Penguin.** - Offers practical advice on making healthier and more sustainable food choices.
- **Dan Barber (2016). *The Third Plate: Field Notes on the Future of Food*. Paperback. Penguin Press.** Chef Dan Barber explores the evolution of American food from the 'first plate,' or industrially produced, meat-heavy dishes, to the 'second plate' of grass-fed meat and organic greens and says that both of these approaches are ultimately neither sustainable nor healthy.

Websites:

- [The Sustainable Food Trust](#): Offers articles, reports, and resources on sustainable food systems.
- [Energy Star](#): Provides information on energy-efficient appliances and practices.
- [Local Harvest](#): Connects consumers with local farmers and food producers.

Organizations:

- [Slow Food](#): Advocates for sustainable and local food traditions.
- [The Ellen MacArthur Foundation](#): Promotes the circular economy and its applications in various industries, including food.
- [Food Tank](#): A think tank focused on sustainable agriculture and food systems.

Videos:

- [TED Talks on Food](#): Features a collection of TED Talks on various food-related topics, including sustainability.
- [Food, Inc. \(Documentary\)](#): A powerful documentary that explores the modern food industry and its impact.
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4. Acknowledgment

I would like to express my sincere gratitude to the individuals and institutions whose support and contributions have been invaluable in the creation of this module. First, I want to send a special thank you to my teamwork colleges from EPATV, Clara Sousa and Rui Silva, who participated with me in this project. I extend my appreciation to Jeremiah Lahesa for his total availability and guidance throughout the process of creating the manual. Heartfelt thanks to the whole team and partners of the SSPICE-IT! Project, thanks to your feedback and comments, I could make the reformulations and adaptations needed to finish this manual.

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Sincerely,

Rodolfo Meléndrez Rodriguez

Chef / Cooking Techniques Course Coordinator

EPATV