



## Resource Efficient and Cleaner Production (RECP) Service Package for Small-Scale Food Enterprises

Resource Efficient and Cleaner Production (RECP) Guidelines for small-scale (5-19 employees) Dairy and “Bakery and Arabic Sweet” enterprises were developed by Water, Environment and Climate Change Centre (WEC)/ Cleaner Production Unit (CPU) and National Energy Research Centre (NERC) at the Royal Scientific Society (RSS) - Jordan in cooperation with STENUM for the service providers.

This initiative was supported by “Employment-Oriented MSME Promotion” project implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) under the “RECP Service Package - Design and Development of Tools for MSEs in the Food Processing Sector” activity to support Jordanian small-scale enterprises to become more competitive by increasing efficiency and productivity, while also reducing environmental impact through implementing RECP.

The developed approach uses elements of the basic RECP modules initiated in early nineties by United Nations Industrial Development Organization (UNIDO) and United Nations Environment Program (UNEP), UNIDO developed Transfer of Environmentally Sound Technology (TEST) approach and RSS/CPU, University of Applied Sciences of North-Western Switzerland (FHNW) and Swiss Secretary for Economic Affairs (SECO) developed RECP Quick-Scan Plus Assessment. And simplifies the RECP implementation steps for the application in small-scale enterprises.



**“Before implementing the project, saving opportunities were not seen by us, with the help of the RECP assessment, we have achieved savings in energy and raw materials, and now we are studying to develop our project further to reach better solutions”**

Mahmoud Al-Tamimi  
Owner, Al-Tawheed Dairy

# RECP Assessment Implementation Phases and Steps

## **Phase I:** **Planning (Plan)**

1. Obtain management commitment
  - Kick-off meeting
  - Policy statement (optional)
2. Establish the RECP team
3. Walk-through assessment
  - Collection of quantitative data (Baseline and Benchmarking)
  - Identification of RECP quick-win options
  - Identifying the focus areas (if needed)
4. Revealing sources and causes of inefficiency
5. Identification and screening of RECP options
6. Action plan

## **Phase II:** **Implementation of the RECP Options (Do)**

1. Direct implementation of good housekeeping (GHK) and no/low cost RECP options
2. Training of the staff
3. Link to existing national financial programs
4. Follow up the implementation of improvement measures and the recommendations for information, cost accounting and management systems, hygiene, health and safety conditions, and development of new products/by-products.

## **Phase IV:** **Continuous Improvement (Act)**

It is the company's actions to continually improve its performance in resource efficiency and integration of RECP in its management and decisions.

## **Phase III:** **Monitoring of Performance (Check)**

1. Monitoring to check, maintain and increase performance in resource utilization
2. Verification of the implemented options

## Improvement Options

The new RECP approach was demonstrated in four Dairy and four Bakery and Arabic Sweet small-scale enterprises in different areas of Jordan. The demonstration shows high potential of implementing RECP technical assistance and investment at this scale of businesses. Some of the options were implemented during the project's time achieving close savings to the calculated values in the feasibility analysis.

Following some of the improvement options:

### Bakery and Arabic Sweet

Improvement Option	Economic Saving			Annual Resource Saving and Environmental Impact
	Investment (JOD)	Saving (JOD/Year)	Payback Period (Year)	
Tightening well the sheet metal screws of the kunafa fluffing machine, placing rubber pads on the legs of the machine to absorb vibration and installing collection trays under the machine's collection vessel	Negligible	374	Immediate	720 kg Kunafa
Fixing and sealing well the refrigerator door	100	300	0.3	4,300 kWh Electricity 1,970 kg Carbon Dioxide (CO <sub>2</sub> )
Connecting the conveyor belts with each other by placing cylindrical tubes to transport the product through them and reduce waste	100	310	0.3	720 kg Dough
Producing by-product of roasted crumbs from the generated waste from the cutting process of the spread dough	1,300	12,384	0.1	28,800 kg Dough
Improving the efficiency of the Arabic bread furnace through: <ul style="list-style-type: none"> <li>– Replacing the existing diesel burner with another two-speed (high and low) burner that works on diesel and LPG.</li> <li>– Installing moving gates (dampers) on the chimney.</li> <li>– Installing an electric fan on the chimney connected to the start of the burner.</li> <li>– Improving the thermal insulation of the furnace.</li> <li>– Adding a ground gas burner that passes under the conveyor belt for baking inside the oven.</li> <li>– Adding a second dough cutter that works in parallel with the existing one, while adjusting the width of the first fermentation line.</li> </ul>	5,000	12,200	0.4	26,000 Litre Diesel More consumption of 573 Liquefied Petroleum Gas (LPG) Cylinders 48,900 kg CO <sub>2</sub>



**“Through the project, the amounts of energy consumption (electricity and gas), waste and return from the product were counted, evaluated and reduced. We recommend that the Royal Scientific Society continues to implement this service and stays in touch to support us in producing environment-friendly products”**

Hamzeh Bin Ali  
Executive Director, Sanabel Al-Shiekh Bakery

## Dairy

Improvement Option	Economic Saving			Annual Resource Saving and Environmental Impact
	Investment (JOD)	Saving (JOD/Year)	Payback Period (Year)	
Changing the physical characteristics of input materials to improve the screening of cooked yogurt	0.0	1,880	0.0	1,980 kg of Cooked Yogurt
Using water efficiency tools	310	9,000	0.03	900 LPG Cylinders 900 m <sup>3</sup> Water 33,454 kg CO <sub>2</sub>
Installing solar water heater	1,800	3,910	0.5	456 LPG Cylinders 16,950 kg CO <sub>2</sub>
Installing food grade hose to pump the milk which equipped with an automatic filling and emptying tool inside the milk buckets	200	12,020	0.02	13,356 kg Milk
Replacing the diesel burner in the cow milk pasteurization system with a new gas burner with the ability to adjust and control its speed	800	2,330	0.3	6,000 litre Diesel More consumption of 194 LPG Cylinders 9,000 kg CO <sub>2</sub>

## Achieved Results

### Bakery & Arabic Sweet

Company Name	Economic Saving			Resource Savings					Environmental Impact	
	Investment (JOD)	Saving (JOD/Year)	Payback Period (Year)	Electricity (kWh/Year)	Diesel (Litre/Year)	LPG Cylinders (Number/Year)	Raw Material (Kg/Year)	Water (m <sup>3</sup> /Year)	CO <sub>2</sub> Reduction (Kg/Year)	Solid Waste Reduction (kg/Year)
Al-Mamlakah Bakery	6,600	13,447	0.5	12,200	26,000	- 573	2,600	1.4	54,495	—
Ezz Al-Kanafani	3,660	4,970	0.7	15,300	—	220	2,386	504	15,193	2,386
Sanabel Al-Shiekh	4,200	19,500	0.2	—	—	485	34,560	—	18,028	34,560
Al-Helo Bakery	5,820	13,875	0.4	16,290	30,100	- 730	—	—	61,604	—

## Achieved Results

### Dairy

Company Name	Economic Saving			Resource Savings					Environmental Impact	
	Investment (JOD)	Saving (JOD/Year)	Payback Period (Year)	Electricity (kWh/Year)	Diesel (Litre/Year)	LPG Cylinders (Number/Year)	Raw Material (Kg/Year)	Water (m <sup>3</sup> /Year)	CO <sub>2</sub> Reduction (Kg/Year)	Solid Waste Reduction (kg/Year)
Marj Al-Hamam	5,900	7,490	0.8	8,300	9,145	74	1,040	114	31,248	—
Al-Amaneh	5,230	19,130	0.3	2,050	11,500	397	14,560	—	46,747	—
Al-Jamal	4,960	31,081	0.2	8,550	—	1,865	15,836	900	73,245	—
Al-Tawheed	3,700	15,697	0.2	10,850	6,000	- 32	14,342	10.8	19,985	150

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## Cumulative Results

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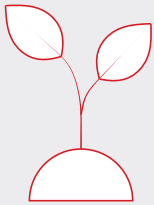
### Economic Gains



**28.0%**  
Annual Energy  
Savings



**15.7%**  
Annual Water  
Savings



**3.0%**  
Annual Material  
Savings



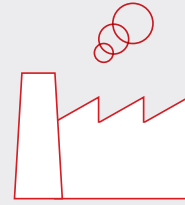
**125,190 JOD/Year;**  
Payback Period = 0.3 Year

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### Environmental Gains



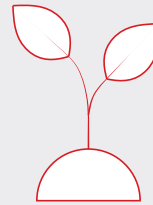
**1,180.3**  
**MWh/Year**  
Energy Savings



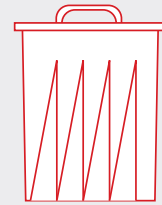
**320.5 ton/Year**  
CO<sub>2</sub> Reduction



**1,530 m<sup>3</sup>/Year**  
Water Savings



**85.3 ton/Year**  
Raw Material Savings

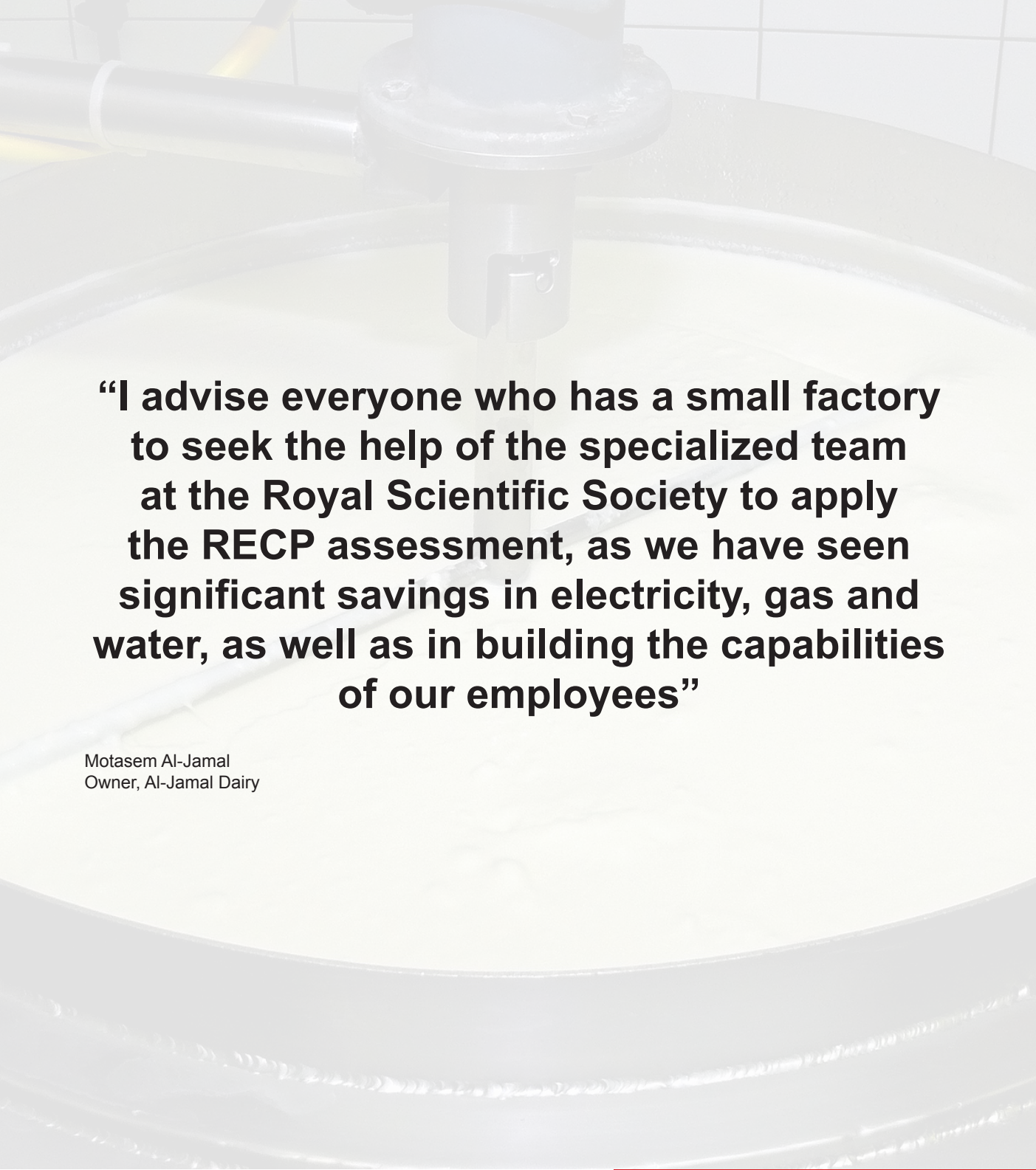


**37.1 ton/Year**  
Waste Reduction

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## Other Achievements

- RECP internal teams were established at the demonstration enterprises who were trained on implementing the steps of RECP approach and accordingly their mindset and performance skills have been improved toward the environment and resource efficiency.
- Monitoring plans including key performance indicators were prepared to support the demonstration enterprises to evaluate their performance regularly and to take corrective actions on time.
- The information system has been improved at all demonstration enterprises.
- Diesel sub-meters, electronic balances for LPG cylinders and testing equipment for milk temperature and pH were installed with a kind support from Royal Academy of Engineering and RSS “Integrating and Digitizing RECP in Food Industries: Towards Circular Economy in Jordan” project, which also supported the implementation of some of improvement options that need investment.
- Recommendations were provided to improve the work practices, materials storage and handling, and food quality and safety.



**“I advise everyone who has a small factory to seek the help of the specialized team at the Royal Scientific Society to apply the RECP assessment, as we have seen significant savings in electricity, gas and water, as well as in building the capabilities of our employees”**

Motasem Al-Jamal  
Owner, Al-Jamal Dairy