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Using Alternative Non-Pour Renewable Energy Technologies in the Food Industry

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Labor and energy have been the two leading expenditure concerns among food industry businesses. With recent record-setting prices per barrel of crude oil, those food businesses that rely on petroleum-based—or pour-technology—fuel and energy sources are scrutinizing the use of alternative renewable energy sources, especially the non-pour technologies that could readily substitute for purchasing electricity from the power grid. In particular, on-site photovoltaic (solar), wind, and hydroelectric systems have been identified by the National Renewable Energy Laboratory as viable, commercially available renewable energy or green technologies. Each of these three systems generates electricity that is storable in industrial storage batteries, and the excess electricity can be net-metered to the utility company.

Several food processing and distribution firms have adopted steered solar cell or photovoltaic systems to generate energy for lighting and moderate electrical needs in offices and assembly lines. An energy audit, adopting light emitting diode technology, and reducing phantom electrical loads help determine peak load needs.

Wind-turbine technologies are feasible electricity sources if a minimum five mph wind prevails. These turbines are sized from those on commercial utility wind farms to smaller units for firm-level applications. The small turbines deliver low-voltage

power that is directly usable as two- or three-phase current. Wind power is not new, and has great potential and requires a very small footprint.

Mini-hydroelectric facilities can be established if there is a constant flowing water source—a spring, stream, or artesian well—that can be partially diverted through a pipe and turbine. Unlike the other two energy sources, a hydroelectric facility is location-specific, as the water source must be available on-site.

For small wind, photovoltaic, and mini-hydroelectric renewable energy sources, the input is free (unlike the bio-fuel technologies). Cooperating firms provided their respective installation costs and records of current and historical energy expenses so that a savings investment analysis could be conducted. The investment analysis for payback period, accounting rate of return, net present value and internal rate of return was computed for the three alternative renewable energy sources, with these findings representing the averages or ranges shown in Table 1.

The owners of the cooperating food-industry businesses indicated they were pleased with the investment analysis results and the intangible values (goodwill, going green, sufficiency) accrued to their firms from having switched to an alternative renewable energy source.

Table 1.

Renewable energy source	Financial determinant			
	PBP (years)	SRR (%)	NPV (\$ @ 10%)	IRR (%)
Small wind	4–5	20–25	59,000	16–23
Photovoltaic	3–5	22–28	42,500	11–14
Hydroelectric	5–8	15–20	23,500	9–13