

Industrial Energy Savings Potential

The manufacturing processes used and the energy requirements for each industrial segment are as different as the products you produce. California's largest industrial segments include petroleum, chemical, food and beverage, computer and electronics (includes semiconductors, communications, peripherals), fabricated metal, machinery and transportation (includes motor vehicle and aerospace). Since technologies and processes vary from industry to industry and plant to plant, the potential for energy efficiency improvement is unique to your individual plants.

Low-cost recommendations for improving energy efficiency can be as straightforward as operational modifications, maintenance process changes or procurement specifications. The U.S. Department of Energy's Industrial Assessment Centers, which have performed over 10,000 audits for industrial facilities around the country, have found that the potential savings from common efficiency measures average about \$55,000 per manufacturer. Examples include:

- Install high-efficiency lighting equipment.
- Procure high-efficiency motor and drive equipment.
- Eliminate leaks in gas, steam and compressed air lines/valves.
- Insulate equipment and pipes.
- Reduce equipment use to match loads.
- Install controls and energy management systems.
- Institute preventative maintenance programs.

Be sure to research newer technology as well. One example is membrane technology. Membranes represent an exciting alternative to traditional separation technologies, which are among the most energy-intensive industrial processes. Membranes can be used to treat wastes, recover products as mundane as salt or as precious as silver, purify chemicals, produce corn syrup, or concentrate orange juice — all at higher quality while using less energy and producing less pollution than conventional processes.

The following sample energy-saving measures which have been implemented in a variety of plant venues and industry segments show the significant efficiencies that may be valuable in building your manufacturing plant.

Sample Measure Description	Annual Energy Cost Savings (\$/year)	Implement Cost (\$)	Payback (Years)
Motors			
Install variable speed drive on a 700-hp pump	\$120,000	\$10,000	0.8
Optimize pumps and fans with variable speed drives, direct digital control systems, energy efficient motors, downsizing, etc.	\$850,000	\$1,600,000	1.9
Compressed Air Systems			
Install engine driven compressor	\$75,000	\$150,000	2.0
Utilize buffer tank to regulate compressor duty cycle	\$5,000	\$15,000	3.0
Recover heat from compressor for preheating	\$3,000	\$5,000	1.7
Repair compressed air leaks	\$22,414	\$800	0.0
Steam Systems			
Retune boiler and install combustion analyzer	\$7,010	\$4,080	0.6
Repair steam traps	\$13,868	\$2,580	0.2
Shut steam valves feeding unused presses	\$54,060	\$15,000	0.3
Use economizer to preheat boiler feedwater	\$84,500	\$1,500	0.1
Install automatic boiler air/fuel ratio controls	\$33,580	\$25,000	0.7
Process Cooling			
Install closed loop cooling water system (cooling tower)	\$15,000	\$25,000	1.7
Install variable speed pump drive to optimize flows	\$12,000	\$20,000	1.7
Optimize chiller plant capacity (based on a typical 4000 ton chilled water distribution system)	\$401,095	\$0	0.0
Process Heating			
Install melting furnace heat recovery system	\$378,000	\$450,000	1.2
Install a direct fired heating system	\$1,253,000	\$1,839,000	1.5
Cogeneration			
Install combined thermal energy and power production system	\$150,000	\$600,000	4.0