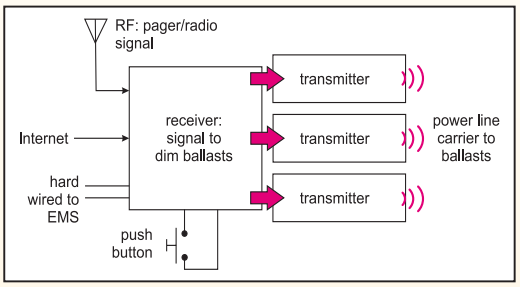
Load-Shedding Ballast: Reducing Peak Electric Demand Cost Effectively

Lighting provides a cost-effective and energy-efficient opportunity to reduce the electric demand on the nation's power grid during critical periods. LRC researchers have developed a ballast that quickly and reliably sheds the electric load within a building's fluorescent lighting system. By dimming lighting via an electronic signal, the ballast reduces the current supplied to the lamps. The ballast's use has the potential to reduce U.S. peak electric demand by 20,000 megawatts.

The load-shedding ballast system aggregates the entire fluorescent lighting load, providing an automated, single control point.

Load shedding through lighting provides good customer return on investment in commercial new construction and remodeling markets.



Load-shedding communication system

The load-shedding transmitter:

- Signals ballasts via a power line carrier.
- One transmitter can signal over 100 load-shed ballasts.
- Receives signal directly from a utility/ISO or the building's energy management system.

The load-shedding ballast:

- Uses the inexpensive and efficient instant-start ballast platform and adds receiver and dimming circuits.
- Reduces lighting power demand by 33% (light levels reduced by approximately 35%).
- Has a negligible effect on lamp life based on approximately 200 hours of operation per year.

Ballast Performance		
	Load-shedding off	Load-shedding on
Power (watts)	89.5	60.1
Relative light output (%)	100	66
Ballast efficiency factor (BEF)	0.98	0.97

Data for prototype system configured as an add-on device to a commercial, instant-start electronic ballast operating three standard 32-watt, T8 fluorescent lamps.

Sponsors

Connecticut Light and Power

California Energy Commission

New York State Energy Research and Development Authority

U. S. Department of Energy

Rensselaer

Lighting Research Center

Lighting Research Center, Rensselaer Polytechnic Institute • 21 Union Street • Troy, NY 12180 • (518) 687-7100 • www.lrc.rpi.edu