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FDAS-20-01 Zero crossing switching and flywheels

Devices that implement zero crossing switching could be used to modulate motors with flywheels to store and release energy to support grid balance.

Each phase of the grid's power transmission system has zero energy output 120 times a second, this is known as "zero crossing". Switching that happens at these zero energy points of the sine wave could be used to control motor loads.

Flywheels could store and release energy to drive appliances needs. Slippage of a motor coasting on flywheel power could be synced to the sine wave and switched at zero crossing to modulate load on the grid. Motors could be run on a hit and miss schedule that would give headroom for energy storage and release.

Flywheel storage could be as small as a few watt-seconds per appliance for common appliances such as refrigerators. Appliances such as refrigerators could have flywheels and zero crossing switching that could also improve power factor and quietness of operation.

Reduced motor starting inrush current could be achieved by using zero crossing switching to soft start a motor. Smart power devices could be programmed to offer locked rotor current protection. This would help when a large number of appliances try to start at the same time due to a pricing signal.

These methods of heterodyning the grid would not require pricing signals. Smart power devices could monitor local power conditions and make needed adjustments.