

## Magnetic energy and electric generators

It does indeed require energy to create a magnetic field using current. But once that field is created it requires no energy to maintain it. And when the current goes back down to zero, the same amount of energy drawn from the electrical system to create the field is returned to the electrical system.

This is because a magnetic field does no work. The work required to create a magnetic field is done against the induced electric field that accompanies the change in magnetic field. Similarly, the work done when a magnetic field collapses is done by the induced electric field.

Now, of course, ohmic heating in the current-carrying wires occurs in induction generators but not in magneto alternators. However, a simple glance at the miles of high-tension power distribution wires in this country, compared to the size of a wind turbine generator (about 14 feet tall), will convince you that the energy loss due to ohmic heating within a generator is dwarfed by the energy loss due to ohmic heating in transmission wires.