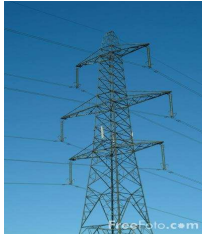
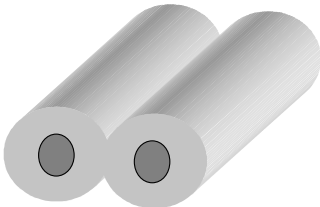


ELECTRIC POWER INDUSTRY APPLICATIONS OF MEMS



Richard M. White, EECS Dept.
ETD Meeting
18 September 2008



Residential/Commercial

Distribution Circuits

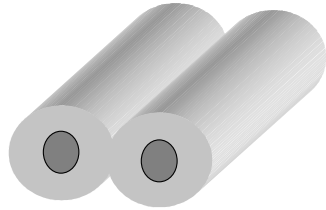
Transmission Circuits

120 – 660 Vrms

4 – 39 kVrms

115 kVrms and up





Residential/Commercial

120 – 660 Vrms



Distribution Circuits

4 – 39 kVrms



Transmission Circuits

115 kVrms and up



V

MEMS

Wireless passive proximity measurement of voltage, current, phase, power

Suite of MEMS-based sensors in different voltage ranges conceived



Energy scavenging from energized circuit via sensor + UCB 88% efficient synchronous rectifier (Seeman/Sanders)

Sensors can also derive energy from nearby conductors to supply wireless radio; UCB (Seeman/Sanders) synchronous rectifier prototype 88% efficient

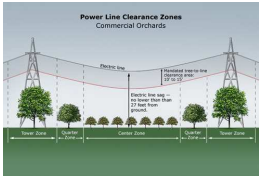


Assessment of U/G cable aging



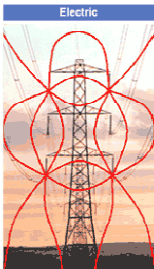
Conductor temperature measurement

Can include conductor temperature sensors on the electrical sensor platform



MEMS accelerometer sag sensor described in literature; we're looking at using electric field.

**Line sag measurement
Vegetation growth detection**

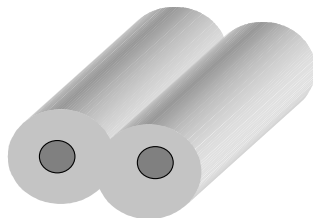


**Can you determine voltages remotely from E-fields?
Analysis + hardware**

Remote (non-MEMS) field-based voltage measurement

Residential/Commercial

120 – 660 Vrms



Distribution Circuits

4 – 39 kVrms



Transmission Circuits

115 kVrms and up



**Graduate Student Researcher Eli Leland will next present
new results on the passive proximity MEMS AC current
sensor**