National Electrical Code
Requirements
For
Grounding PV Systems
A SOLARABCS White Paper

John C. Wiles
Southwest Technology Development Institute
New Mexico State University
P.O. Box 30001/MSC 3 SOLAR
Las Cruces, New Mexico 88003

http://www.nmsu.edu/~tdi >> PV >> Codes and Standards
e-mail: jwiles@nmsu.edu
Phone: (575) 646-6105
Fax: (575) 646-3841
To Ground or Not to Ground
That was the Question

The NEC was first published in 1897

Thomas Edison was generating Direct Current electricity at that time

Grounding was debated from 1892 to 1913 And still is

The 1913 NEC had several grounding requirements—mostly AC

The 2011 NEC has 31 pages on grounding plus Art 690 requirements

Much of the Rest of the World (ROW) elected to not ground electrical systems
Grounding? Definitions Lead to Understanding

Circuit grounding >> The grounded conductor

Equipment grounding >> Equipment-grounding conductors (EGC)

ROW>> Protective Earth (PE)

Grounding electrode >> Connection to Earth

Grounding-electrode conductors (GEC) >> Grounding system to Electrode
Do We Have Problems?

Complex and in some cases unclear Code requirements

Unclear standards requirements

Inconsistent application of standards >> Differing hardware

Insufficient training of Installers

Insufficient experience/training of Inspectors

Murphy
The White Paper

Definitions
Equipment-grounding requirements
System grounding requirements
Grounding Issues
Suggestions for improved grounding longevity

GROUNDING, GROUNDING, GROUNDING, GROUNDING

An important key to Public Safety for the next 50+ years