

Clean Energy Research Enabled by NSF Engineering Directorate

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Clean Energy Topic Areas

Renewable Energy Production

Alternative Fuels

Biofuels (bio & chemical routes)
Solar Fuels (CO₂, water splitting)

Electricity

Solar Photovoltaics
Wind
Water (hydrokinetic/tidal/wave)
Solar Thermal
Geothermal

\$139M

Storage & Grid

Energy Storage

Batteries & capacitors
Fuel Cells
Thermal Storage

Other Topics

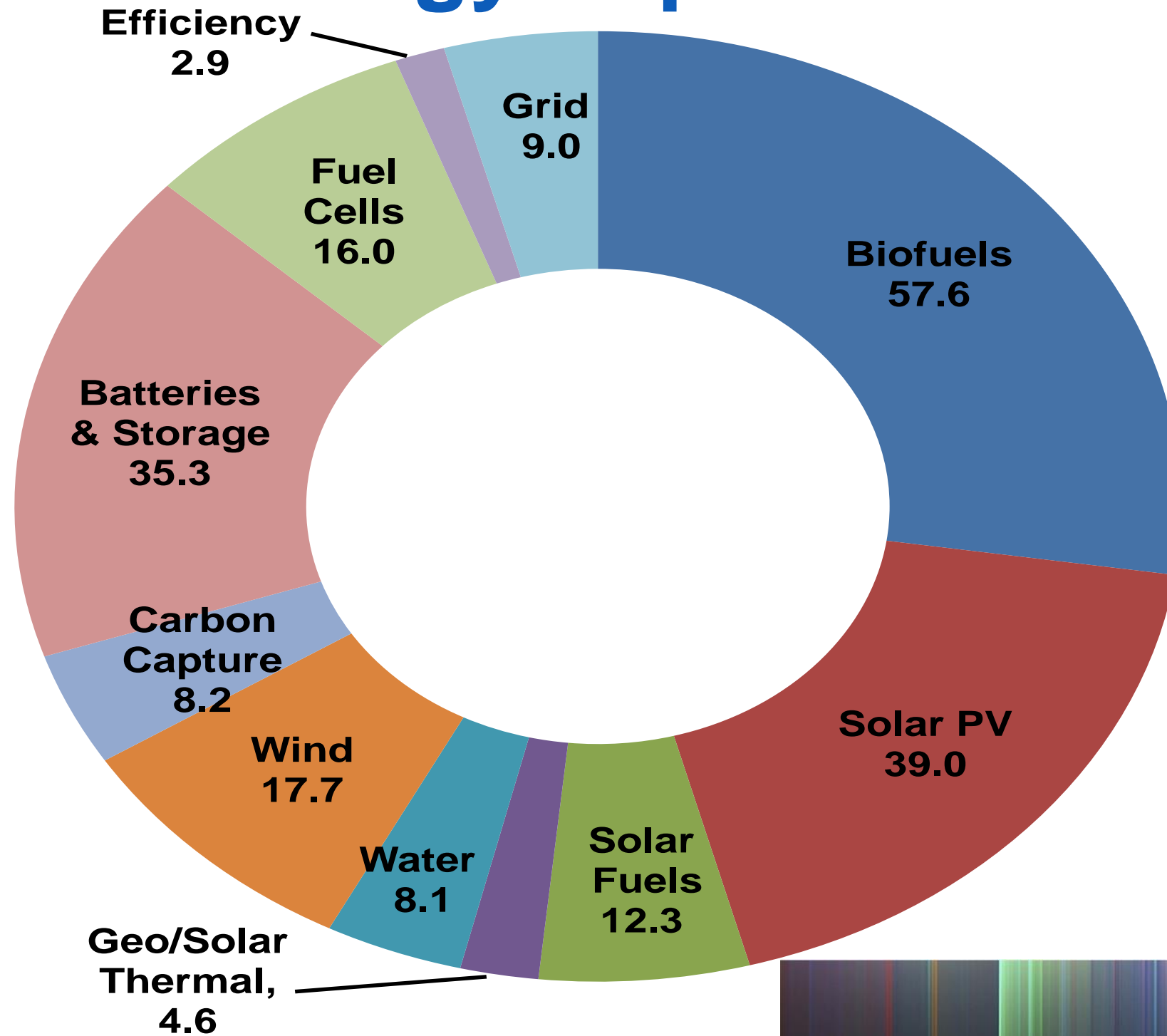
Grid (micro, smart)
Energy Efficiency
Carbon Capture

\$72M

FY 2012-14



Clean Energy Topics Distribution



FY 2012-2014
~ 700 Awards
\$211 M



Understanding fundamental principles of systems

Energy as Service

- **Incorporation of social, behavioral, and economic sciences into energy technologies and systems**
- **Distributed energy systems will drive the future evolution of energy systems**

ENERGY & ENVIRONMENT

Solar Power Battle Puts Hawaii at Forefront of Worldwide Changes

New York Times

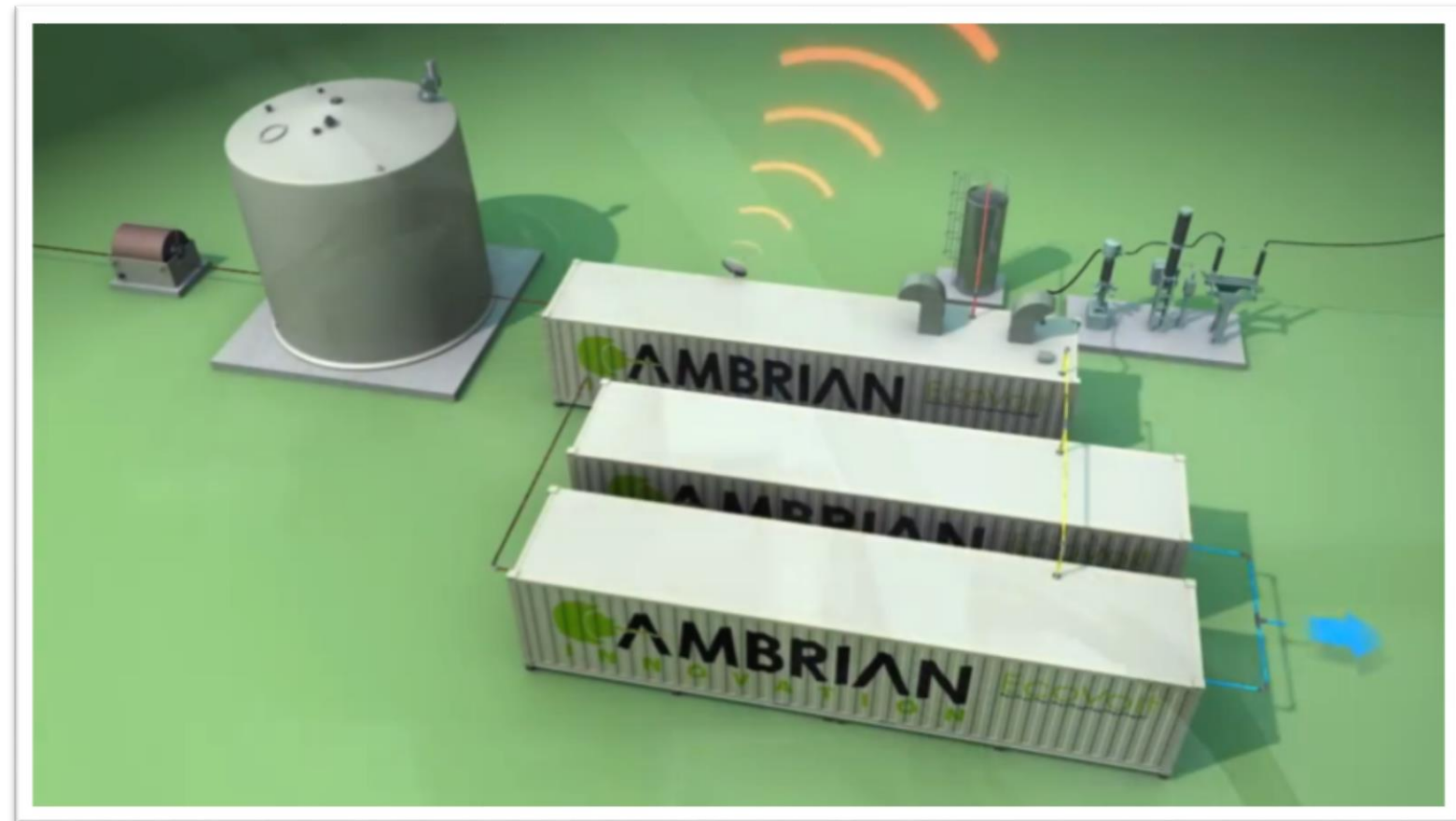
By DIANE CARDWELL APRIL 18, 2015



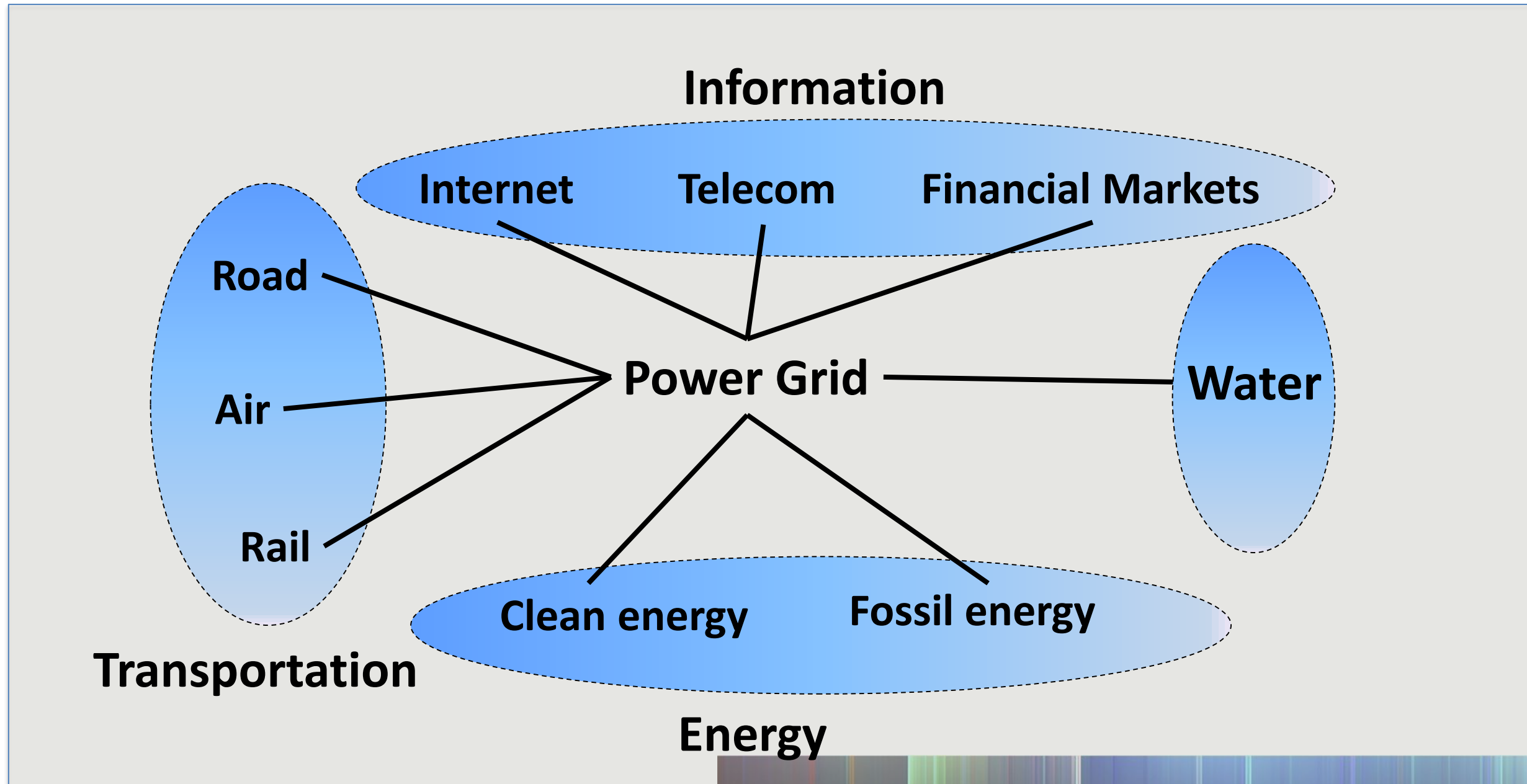
Interdependency and Interconnections among Systems are Big Themes in NSF FY 2016 Budget Initiatives

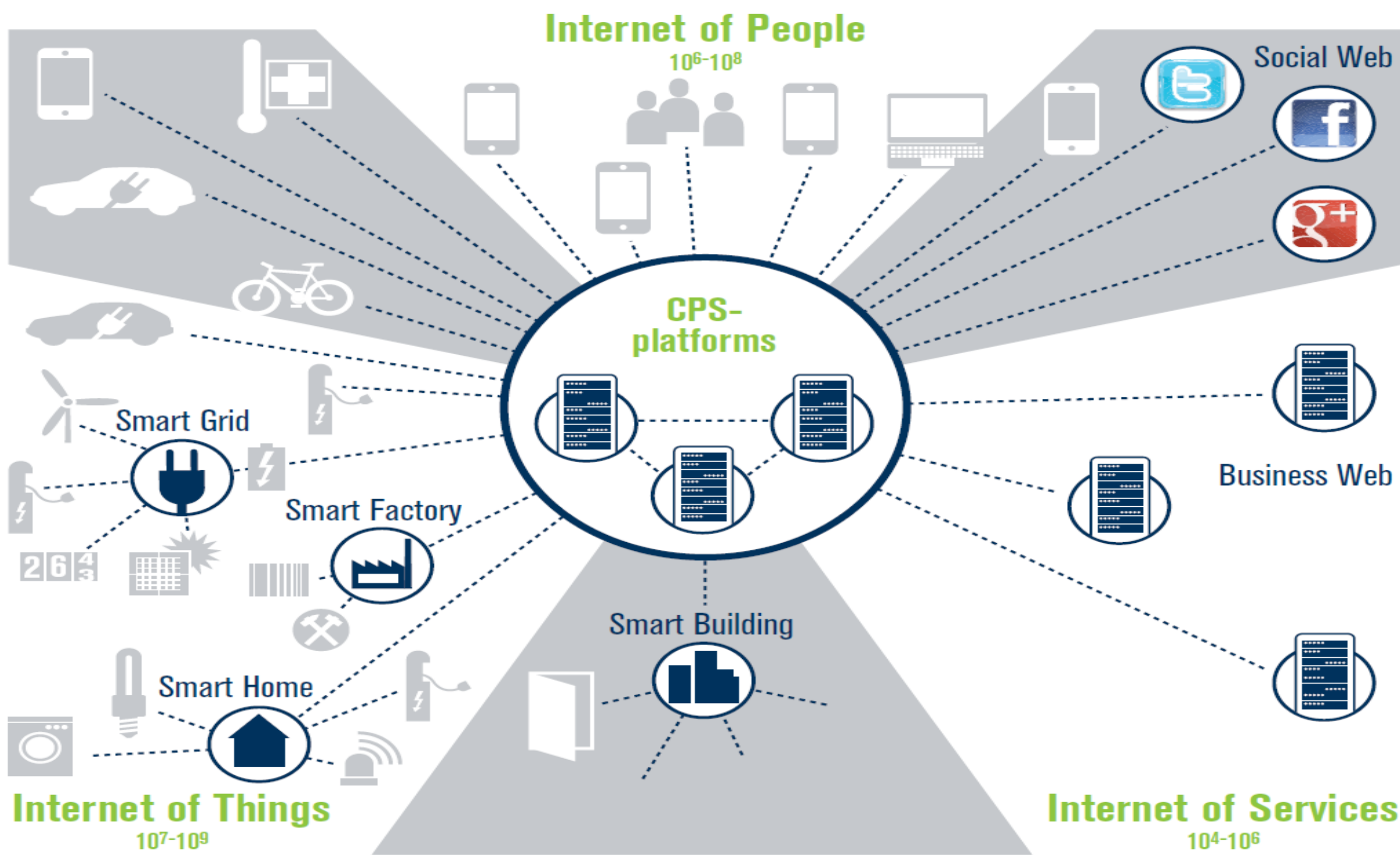
- **Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS)**

Images courtesy Cambrian Innovation



Critical Resilient Interdependent Infrastructure Systems and Processes (CRISP)





Source: Bosch Software Innovations 2012



- ✓ **Understanding fundamental principles of systems**
- ✓ **Energy production, distribution and *service***
- ✓ **Interdependency and interconnections among systems**
- ✓ **Cybersecurity**