Work Breakdown

1. Meet with/find a client or field expert
   1. Description of the problem
   2. Develop objectives and constraints
   3. Develop a budget
2. Develop ideas
   1. Brainstorm system functionality
   2. Meet and discuss with field experts/clients
   3. Group discussion
   4. Trade studies
3. Revise/Refine ideas
   1. Determine the best design
      1. Power efficiency
      2. Level of functionality
      3. Cost of design
      4. Effectiveness of design
      5. Ease of integration
      6. Availability of parts/materials
   2. Prototype small subsystems
      1. Power monitors for breakers
      2. System power monitor
      3. Wireless communication devices
      4. Hardware/software upgrade mechanism
      5. Base-station OS
      6. Panel meter display module
      7. Firmware
      8. Configurable logic blocks
   3. Feed findings back into design process
   4. Test subsystems interoperability
   5. Develop computer models
4. Construct system prototype
   1. Test prototype
   2. Verify correct functionality of all system/subsystems after integration
   3. Test soldering points for possible failure
   4. Complete testing plan
   5. Ensure prototype meets customer/field expert set requirements
5. Communicate Results
   1. Communicate results of system testing
   2. Communicate design decisions
   3. Communicate design implementation of all systems and subsystems
   4. Communicate plan for testing all systems
   5. Present project in written and oral format

System Breakdown

Level 1: Home Power Monitoring System

Level 2: Subsystems…

* Base-station
  + CPU
  + Memory
    - RAM
    - On-Board Storage
  + Ethernet/network interface
  + Wireless interface
  + Display interface
  + Power supply
  + Operating System
  + Web server
  + Google Power API Interface
  + EEPROM/Flash Chip
  + Reset button
* Digital Breaker
  + Current monitoring interface
    - Serial/SPI communications
    - LED indicator
  + E-Panel Meter Interface
  + Trip mechanisms
  + Reset mechanisms
  + Design internal component placement
* E-Panel Meter
  + Power monitoring and display driver
  + CPU
  + Memory/Storage
  + EEPROM/Flash
  + Power Line Communications Module
  + Home-area-network interface
  + Digital breaker interface
  + Power supply
  + Display
  + PCB/System Layout
  + Enclosure Design