DOE Office of Electricity Energy Storage Development at PNNL

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DOE Office of Electricity Energy Storage Program – Imre Gyuk Program Manager.

OE Energy Storage Systems Program Review
September 17th, 2014
Stationary Energy Storage Development Approach

Value Stream Analysis •
Use Case Analysis •
Tool development •
Codes and Standards •

Technology
(Redox Flow, Na, Li, etc)

Cost Effective
Reliable
Safe

• Component Cost Analysis
• Manufacturing Modeling
• Open Source Cost Model
Stationary Energy Storage Technology

**V/V Flow Battery Stack**
D. Reed: 8/17 – 9:55 am

**Advanced Flow Batteries**
W. Wang: 8/17 – 11:15 am
8/17 – 12:50 am

**Cost Effective**
**Reliable**
**Safe**

**Technology**
(Redox Flow, Na, Li, etc)

**IT Na-metal Halide**
JY Kim: 8/18 – 8:25 am

**Na-ion Batteries**
X. Li: 8/17 – 2:10 pm

**RFB Membrane Development**
X Wei: 8/17 Poster

**Catalyst Development VRFB**
B. Li: 8/17 Poster
FY14 Accomplishments

- 3 patents issued including V/V and V/Fe mixed acid system
  - “Redox flow batteries based on supporting solutions containing chloride” US 8,628,880, Issued: Jan 14, 2014
  - “Fe-V redox flow batteries” US 8,771,856, Issued: Jul 8, 2014
  - “Methods and apparatuses for making cathodes for high-temperature, rechargeable batteries” US 8,728,174, Issued: May 20, 2014

- 5 patent applications
  - “Polymer sealing technology for planar ZEBRA batteries (190°C)” 14/464,356, Filed: Aug 20, 2014.
  - “Non-aqueous metal-iodine redox flow battery” 14/294,391, Filed: Jun 6, 2014.
  - “Hybrid anode for lithium based non-aqueous redox flow battery” 14/166,389. Filed: Jan 28, 2014.

- 1 license agreement (Technology)
  - Aartha US: Fe-V redox mixed acid electrolyte.

- 5 license agreements (Tools)
  - Royalty free license “Battery Storage Evaluation Tool”
FY14 Accomplishments

8 peer reviewed publications


4 Reports

- DR Conover “Inventory of Safety-related Codes and Standards for Energy Storage Systems” PNNL-23618.
- DR Conover “Overview of Development and Deployment of Codes, Standards and Regulations Affecting Energy Storage System Safety in the United States” PNNL-23578
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