

## Electromagnetic Field Modeling of Appropriate Technology Generators for Rural Electrification

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Dr. Henry Louie 2



### Overview

- Appropriate Technology Generators
- Development and Evolution of this design
- Modeling and Simulation in the Design Process
- Electromagnetic Field Modeling Software
- Verification
- Insight from Modeling

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### Appropriate Technology

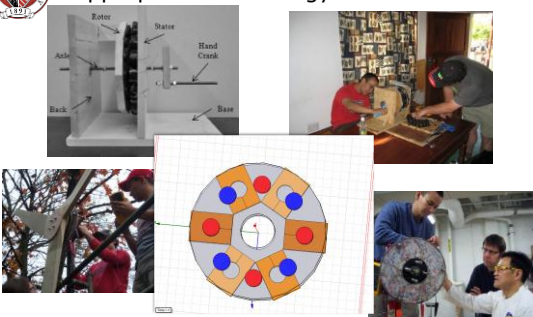
- Open source appropriate technology design:
  - Made in-country
  - Simple and accessible materials
  - Simple techniques
  - Social business enabling




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### Appropriate Technology Generators



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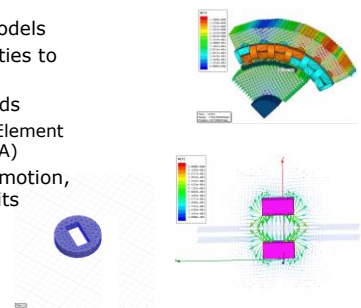
### Modeling and Simulation in the Design Process

- Low technology implementation—high technology design
- Role of modeling and simulation
  - Determine flux linkages and induced voltage
  - Circuit parameters
    - $$e = -\frac{d\phi}{dt}$$
    - Synchronous inductance
  - External circuit simulation

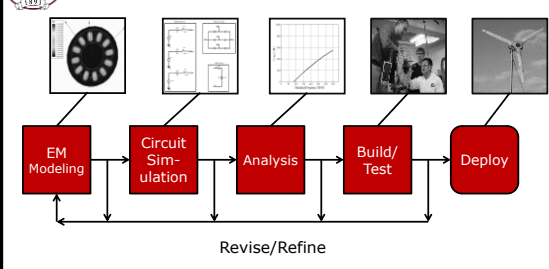
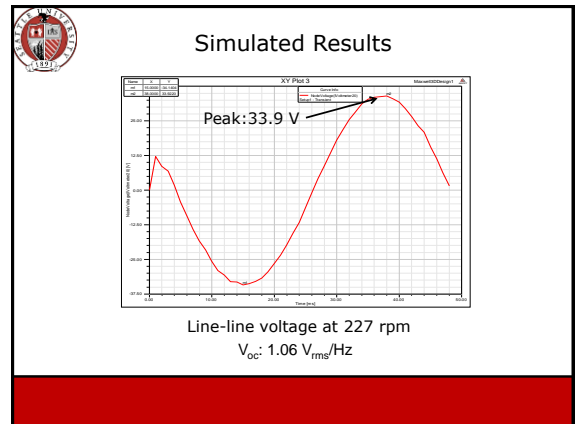
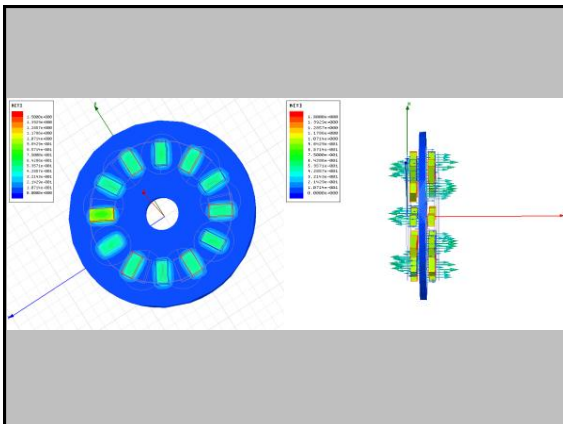
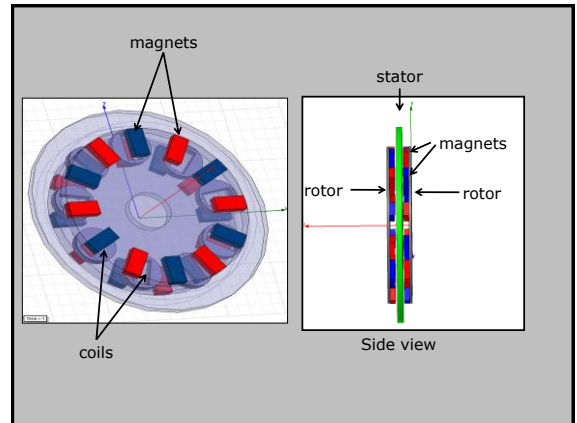
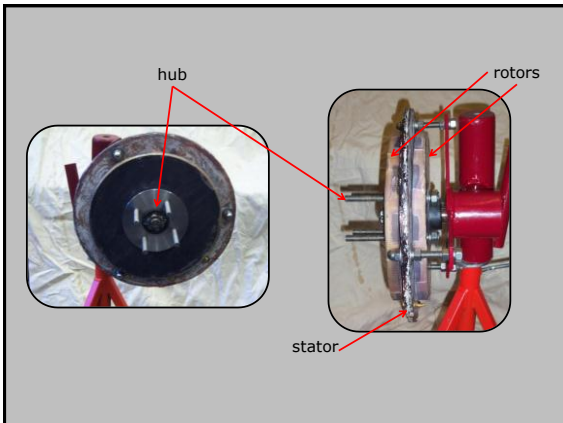
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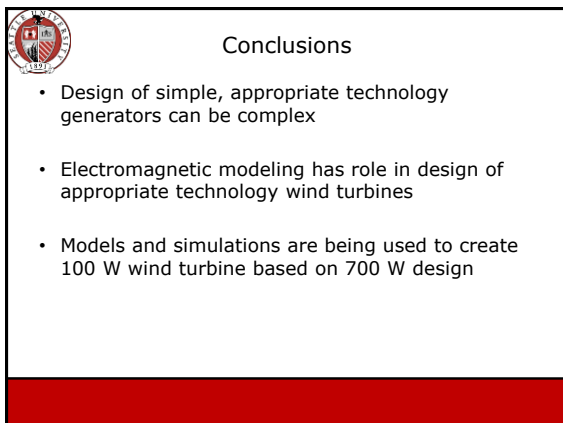
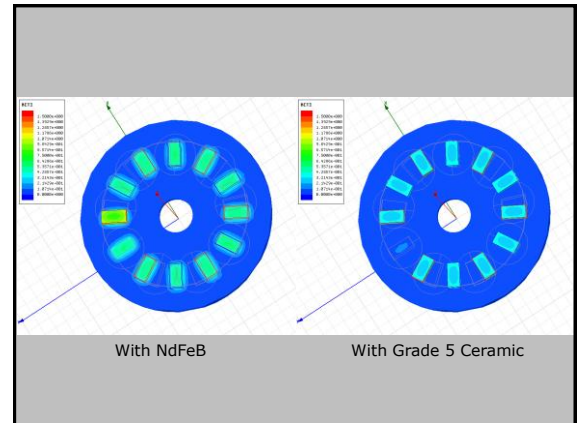
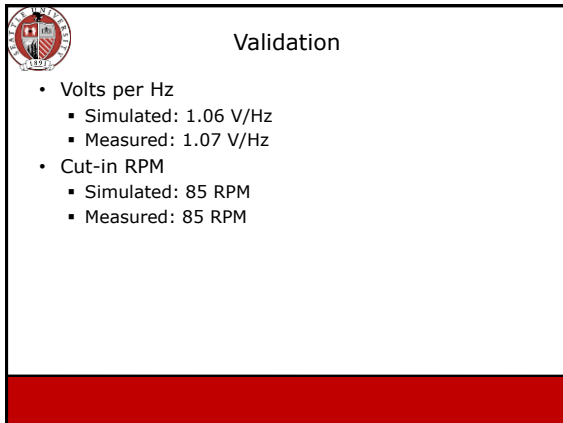
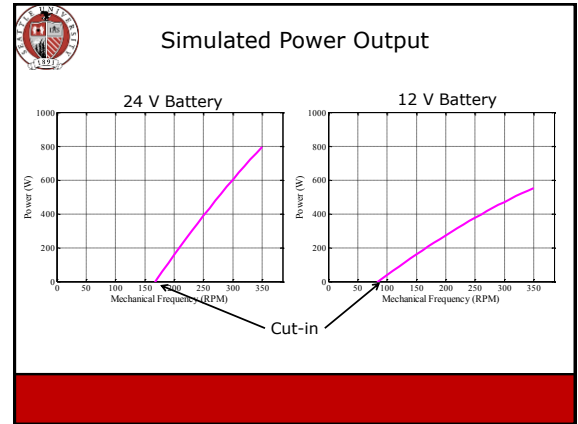
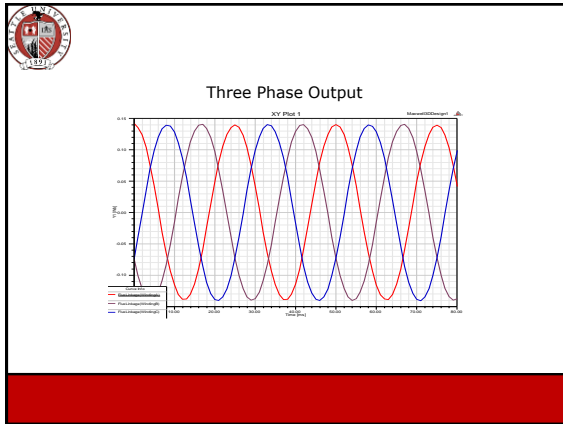
### Electromagnetic Field Modeling Software

- Create 3-D models
- Assign properties to materials
- Solves EM fields
  - Uses Finite Element Analysis (FEA)
- Can simulate motion, external circuits



### Design Process





Learn More

- [www.communitysolutionsinitiative.org](http://www.communitysolutionsinitiative.org)
- [www.drhenrylouie.org](http://www.drhenrylouie.org)
- @henrylouie
- [www.otherpower.com](http://www.otherpower.com)



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