Demo of the OpenAFPM Services from ICCS-NTUA

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An Open Source Toolset for Wind Electric Systems

- This series of design tools have been developed by the Rural Electrification Research Group (RurERG)
  - RurERG conducts interdisciplinary research with the aim of providing open source technical solutions on small wind and pico-hydro systems for rural energy access
- RurERG is part of the Smart RUE (Smart grids Research Unit of the Electrical and Computer Engineering School) of the National Technical University of Athens (NTUA)
  - SmartRUE is lead by Prof Nikos Hatziargyriou and conducts research on Microgrids and also on rural Mini-grids
- Tools have been designed in order to assist designers and practitioners involved with small scale wind electric systems on the field, primarily from the global Wind Empowerment network, an association for the development of locally manufactured small wind turbines for sustainable rural electrification.
  - Wind Empowerment has more that 70 members, in more than 30 countries

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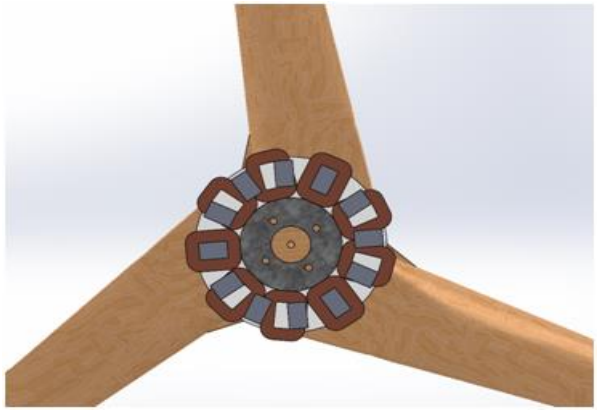
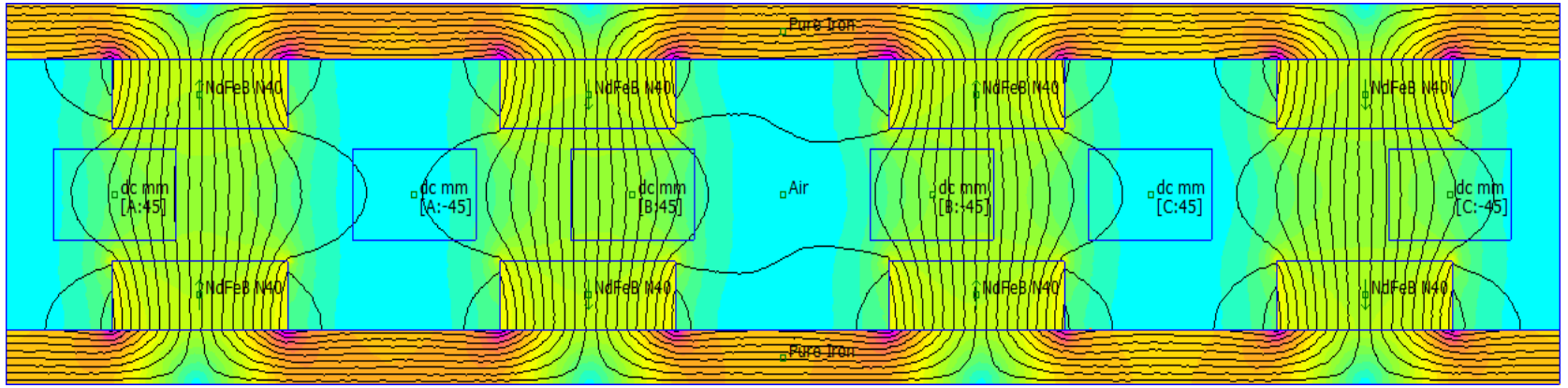
Open Axial Flux Permanent Magnet - OpenAFPM

- The OpenAFPM modeling tools can be used for designing Axial Flux Permanent Magnet (AFPM) generators for wind electric systems with the use of the open source finite element analysis software ‘Finite Element Method Magnetics’ (FEMM).





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The OpenAFPM toolset

- The OpenAFPM tools series consists of three design tools named MagnAFPM, UserAFPM and OptiAFPM:
  - The tool **MagnAFPM** can be used for designing a generator for a specific set of rotor blades and a specific set of permanent magnet dimensions
  - The tool **UserAFPM** can be used to validate the performance of a specific generator geometry by performing a finite element analysis using FEMM
  - The tool **OptiAFPM** uses the particle swarm optimisation (PSO) to optimize the dimensions of the permanent magnets used in the generator design for a specific set of rotor blades, while minimising the generator's efficiency, cost and/or mass

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OpenAFPM Resources: Design Tips & User Location

RURERG.NET
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Navigation

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User login

Username *

Password *

- Create new account
- Request new password

Log in

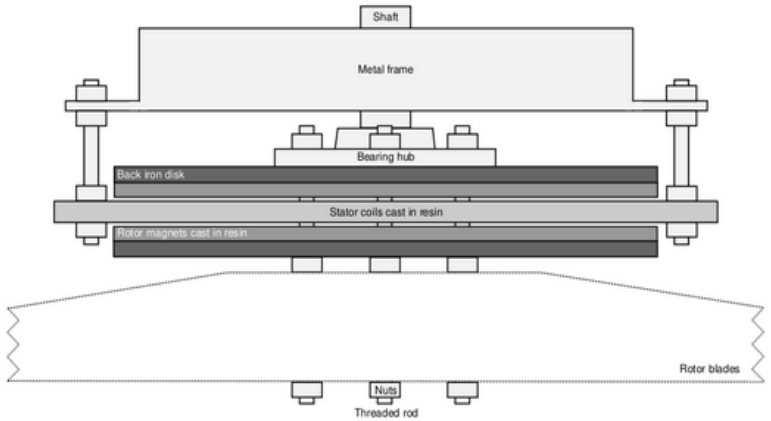
Sim Engine

Status: OnLine

Design Tips

Input Design Variables

The default values of the input design variables of all OpenAFPM tools correspond to a 2.4m rotor diameter 24V small wind turbine which is used frequently in rural electrification applications, while the values follow the design tips suggested in this section. Most locally manufactured small wind turbines follow the construction process presented in Hugh Piggott's 'Wind Turbine Recipe Book' and so the designs created by the OpenAFPM tools are intended to by manufactured in the same way. If you would like to perform a design with the design values used in the 'Wind Turbine Recipe Book' then refer to the 'Alternator Design' section at the end of the book, which has some good design tips which can be used in combination with the design tips of this section.



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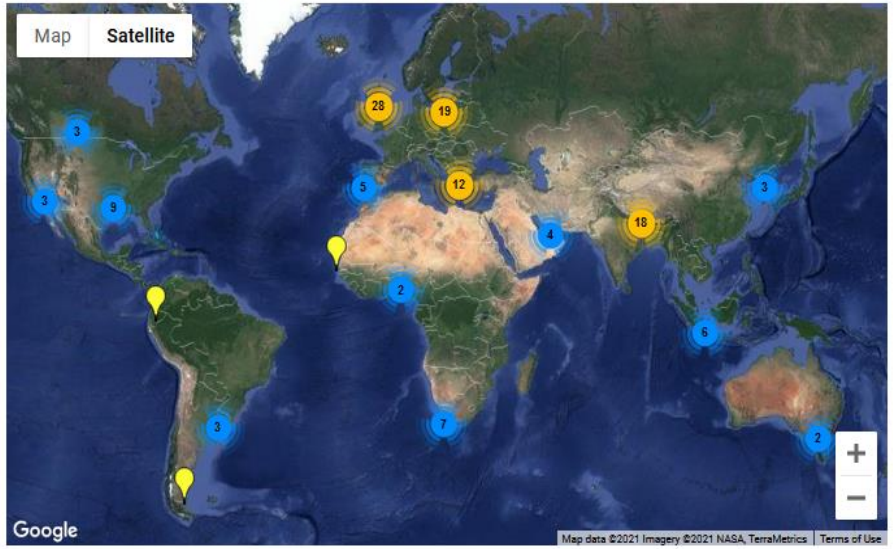
User Locations

This map illustrates the extent of users of this website. Each marker indicates a user that has entered their location.



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Let’s visit the OpenAFPM online tools!

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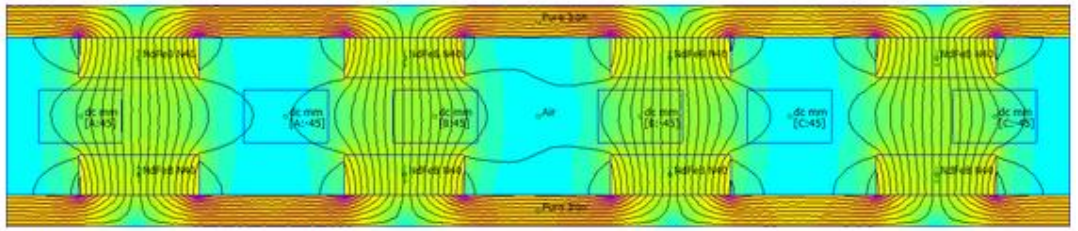
Online Design Tools for Locally Manufactured Small Wind Turbines

The OpenAFPM modeling tools can be used for designing Axial Flux Permanent Magnet (AFPM) generators for wind electric systems with the use of the open source finite element analysis software 'Finite Element Method Magnetics' (FEMM). This series of design tools have been developed by the Rural Electrification Research Group (RurERG), which is part of the SmartRUE (Smart grids Research Unit of the Electrical and Computer Engineering School) of the National Technical University of Athens (NTUA), in order to assist designers and practitioners involved with small scale wind electric systems.

The tool MagnAFPM can be used for designing a generator for a specific set of rotor blades and a specific set of permanent magnet dimensions. The tool UserAFPM can be used to validate the performance of a specific generator geometry by performing a finite element analysis using FEMM. The tool OptiAFPM uses the particle swarm optimization (PSO) to optimize the dimensions of the permanent magnets used in the generator design for a specific set of rotor blades, while minimizing the generator's cost and mass, and maximizing its efficiency.



The creation of the online user interface of the OpenAFPM modeling tools has been supported by WISIONS as part of the project 'Online Design Tools for Locally Manufactured Small Wind Turbines'

WISIONS of sustainability

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