



# 9<sup>th</sup> WindSim User Meeting

25-26 June 2014, Tønsberg

## WindSim New Tools

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SENIOR SOFTWARE DEVELOPER & SOFTWARE ARCHITECT

windsim

# Agenda

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- **WindSim tools Big Picture**
  - WindSim PowerLine
  - WindSim Forecasting API
  - WindSim MCP
  - WindSim Reanalysis Data Downloader
  - WindSim Queueing
  - WindSim Cloud
- **Future of WindSim 6.3, Forecasting, Queue...**

# WindSim tools Big Picture



# WindSim PowerLine

A cool way to increase existing overhead power line capacity

Integrating weather forecasts adds confidence to concurrent cooling and dynamic line ratings for increased transmission capacity.

Funded by DOE's Wind and Water Power Technologies Office, INL researchers innovate ways to increase transmission over existing lines by 10 to 40 percent.

CONCURRENT COOLING  
INTEGRATING WEATHER FORECASTS AND DYNAMIC LINE RATINGS FOR INCREASED TRANSMISSION CAPACITY

ALL INFORMATION IS PUBLIC UNLESS INDICATED OTHERWISE BY THE ENERGY EFFICIENCY & RENEWABLE ENERGY DIVISION

INL  
Idaho National Laboratory

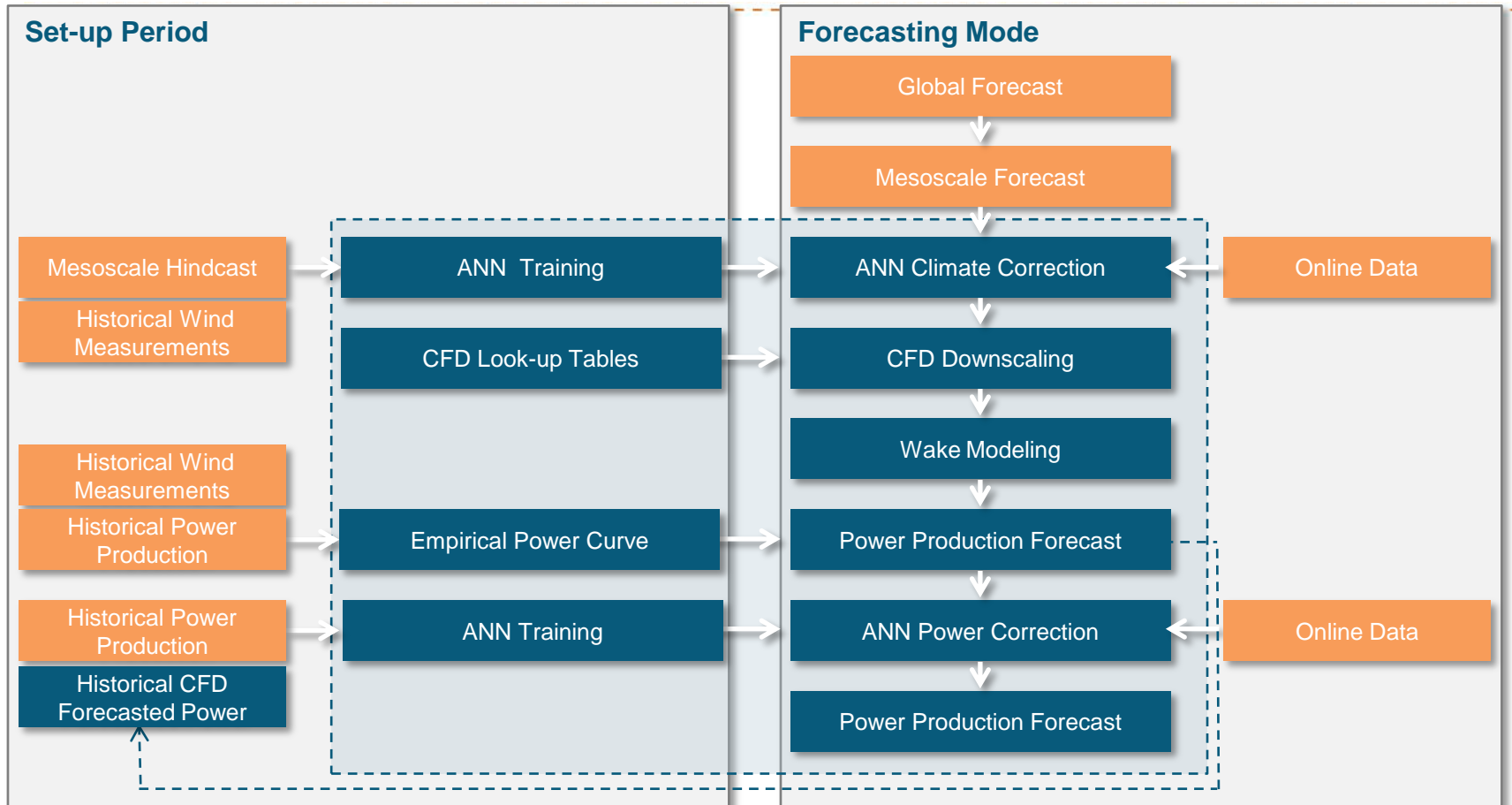
windsim

ENERGY  
Energy Efficiency & Renewable Energy

Jake P. Gentle • Idaho National Laboratory • [jake.gentle@inl.gov](mailto:jake.gentle@inl.gov)

- **Improved line capacity forecasting**
  - Increase in wind speed blowing at a right angle to a high voltage line can cool the line enough to safely **increase the amount of current it can carry by 10 to 40 percent**
  - Power engineers train system operators in the use of weather station data and software tools to generate transmission capacity operating limits

# WindSim Forecasting (API)



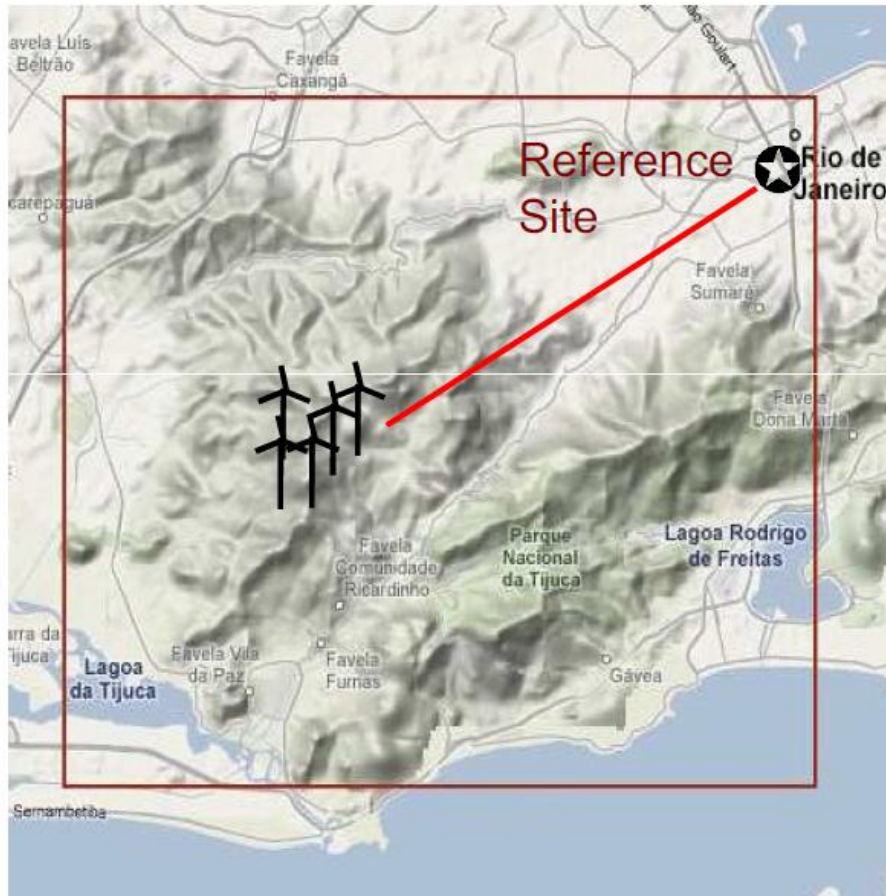
Short-term Forecasting using Mesoscale Simulations, Artificial Neural Networks (ANN) and Computational Fluid Dynamics (CFD): ■ Input; ■ WindSim software or data

# WindSim Forecasting (API)

More information <https://www.youtube.com/WindSimAS>



# WindSim MCP (Measure-Correlate-Predict)



MCP is a statistical technique used for predicting the long term wind resource at a proposed wind farm site by relating measurements from a short-term measurement campaign to the long term measurements at meteorological sites.

Find **statistical relationship between a reference observation** (usually long term time series) **and a on site observations** (at least one year)

Traditional reference:

- Meteorological observation stations
- Aviation

Synthetic reference:

- Forecast models (Merra etc..)

# WindSim MCP

Add multiple Reference Time Series

Add multiple Target Time Series

Add multiple Settings

WindSim MPC will handle all combinations between:  
Reference <-> Target <-> Settings

The screenshot displays the WindSim MCP (BETA) software interface. It features three main panels:

- Reference Time Series - 1 Items in list:** Contains a table with one entry: Name: Hundhammer30m.tws.
- Target Time Series - 1 Items in list:** Contains a table with one entry: Name: Hundhammer73m\_cut.tws.
- Calculation & Preparation Settings - 1 Items in list:** Includes a dropdown for Method (Linear Regression), a field for Settings Name (Settings (1)), and a sub-panel for Linear Regression Calculation Strategy with a Minimum number of Point Fitting set to 30. Other settings include New time step (Hour), Reference time shift, Angle Shift (0 deg), Reference Cut in Wind Speed (0 m/s), Target Cut in Wind Speed (0 deg), Plot trend line with time step (Hour), Number of sectors (12), and Force Intercept Origin (unchecked).

At the bottom, there are buttons for 'Preparation' and 'Preparation & Calculation'. A 'Global Settings' panel is also visible, showing options for Parallel Computation (On), Number of Parallel Process (2), Project name (MCPProjectName), Format date result (DayMonthYearHourMinuteSecond), and Save results path (C:\Users\rsantos\Documents\WindSim Projects\Data\Climatology\timehist).

## DEMO

- 1) Add Reference
  - See time series report
- 2) Add Target
- 3) Define Global Settings
  - Parallel combinations
  - Result path
- 4) Add Settings
  - See different settings
  - See clone settings
- 5) Start Preparation
  - See the progress
  - See the results
  - Select preparation
- 6) Start Calculation
  - See the progress
  - See the results
  - Save preparation

# WindSim Reanalysis Data Downloader

**Reanalysis** is a scientific method for developing a comprehensive record of how weather and climate are changing over time. In it, observations and a numerical model that simulates one or more aspects of the Earth system are combined objectively to generate a synthesized estimate of the state of the system. A reanalysis typically extends over several decades or longer, and covers the entire globe from the Earth's surface to well above the stratosphere.

The screenshot displays the WindSim Reanalysis Data Downloader (BETA) application. The interface is divided into several sections:

- Download Settings:** Includes a 'Parallel Download' section with a 'Number of Parallel Downloads' set to 5 and a toggle set to 'On'. It also features fields for 'Start Date' (13-06-2000), 'End Date' (13-06-2014), 'Remain days to download: 5114', 'Convert to .tws:' (checked), 'Climatology Latitude: 59.267993', 'Climatology Longitude: 10.404380', and 'Climatology Height: 50'. The 'Save results path' is set to 'C:\Users\rsantos\Desktop\rest'.
- Download Progress:** Shows a progress bar at 0% and a 'Finish date' field.
- Table:** A table with columns: Queued Date, Start Date, Complete Date, Merra Date, and Status. It lists 14 entries for dates from 13-06-2014 11:56:04, with Merra Dates from 6-13-2000 to 6-24-2000. Statuses include 'Downloading' and 'Queued'.
- Map:** A large map view showing a satellite image of a coastal urban area. To the right of the map are three smaller map overlays: 'Satellite', 'Terrain', and 'Roadmap'. At the bottom of the map area are two buttons: 'Start Slow Download' and 'Start Fast Download in Cloud'.

# WindSim Reanalysis Data Downloader

Download Settings

Parallel Download On

Number of Parallel Downloads: 5

Start Date: 13-06-2000

End Date: 13-06-2014

Remain days to download: 5108

Convert to .tws:

Climatology Latitude: 59.267993

Climatology Height: 50

Climatology Longitude: 10.404380

Save results path: C:\Users\rsantos\Desktop\vest

Download Progress: 0.1% Finish date: 13-06-2014 22:49:48

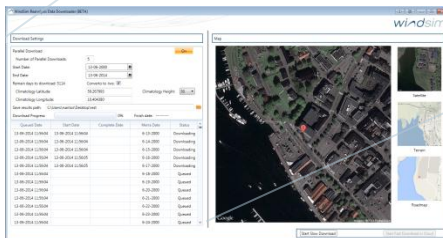
Queued Date	Start Date	Complete Date	Merra Date	Status
13-06-2014 11:56:04	13-06-2014 11:56:04	13-06-2014 11:56:31	6-13-2000	Complete
13-06-2014 11:56:04	13-06-2014 11:56:04	13-06-2014 11:56:49	6-14-2000	Complete
13-06-2014 11:56:04	13-06-2014 11:56:04	13-06-2014 11:56:40	6-15-2000	Complete
13-06-2014 11:56:04	13-06-2014 11:56:05	13-06-2014 11:56:39	6-16-2000	Complete
13-06-2014 11:56:04	13-06-2014 11:56:05	13-06-2014 11:56:58	6-17-2000	Complete
13-06-2014 11:56:04	13-06-2014 11:56:31	13-06-2014 11:57:06	6-18-2000	Complete
13-06-2014 11:56:04	13-06-2014 11:56:39		6-19-2000	Downloading
13-06-2014 11:56:04	13-06-2014 11:56:40		6-20-2000	Downloading
13-06-2014 11:56:04	13-06-2014 11:56:49		6-21-2000	Downloading
13-06-2014 11:56:04	13-06-2014 11:56:58		6-22-2000	Downloading
13-06-2014 11:56:04	13-06-2014 11:57:06		6-23-2000	Downloading
13-06-2014 11:56:04			6-24-2000	Queued

## • Download Settings - Today

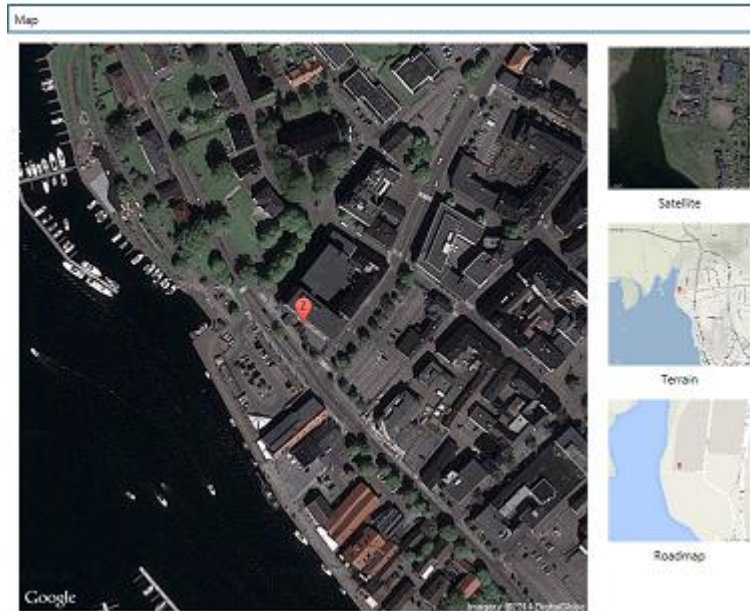
- Parallel downloads, maximum 5 days in parallel
- Wind information from 1979 until *today*
- Conversion to .tws automatically
- Possibility to define the Climatology position and Height – 10m, 50, and ~60m
- Define the result path
- See the download progress in percentage and complete download estimation date
- Full status of each day downloaded

## • Download Settings - Future

- Download maximum 30 years .tws file in seconds

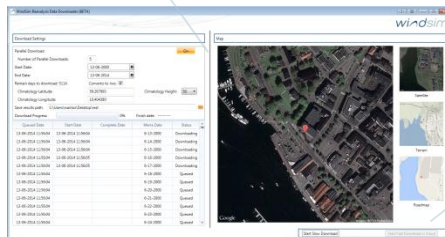


# WindSim Reanalysis Data Downloader

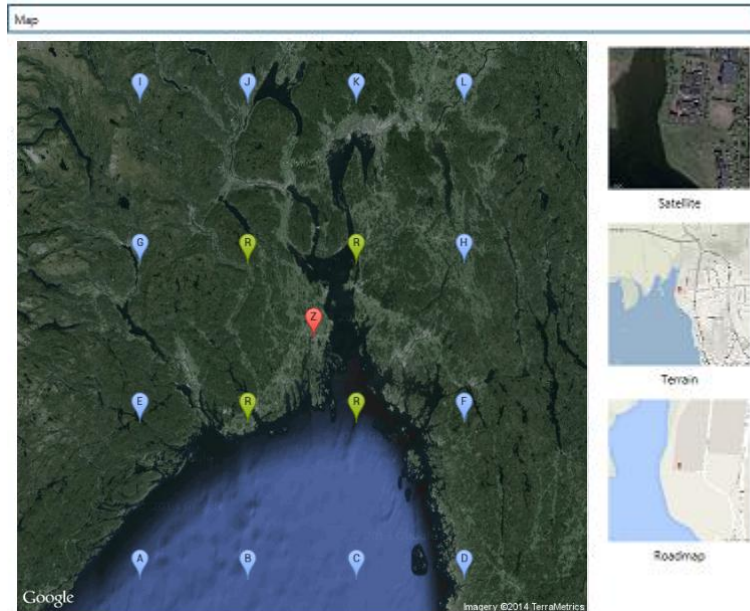


- **Map - Today**

- Map updated in real time when climatology coordinates change
- Possibility to see different map types – Satellite – Terrain - Roadmap



# WindSim Reanalysis Data Downloader

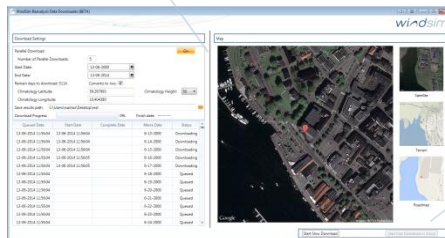


## • Map - Today

- See all Merra Data points near the selected position – Color Blue
- See the 4 closest Merra Data points near the selected position which we will download– Color Green
- Result of 4 .tw5 for each Green point with the distance to the original point

## • Map - Future

- Possibility to zoom in the map
- Pick the position from the map
- Apply some techniques to improve the result
- Have different variables in the result file – temperature, boundary layer height, friction velocity...



# WindSim Reanalysis Data Downloader

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## DEMO

- 1) Define the Period
- 2) Define the Position
- 3) See different Maps Types
- 4) Start Download
- 5) See the result

# WindSim Queueing

Running **1 sector** of **1 project** sequentially blocking the GUI

Back Forward Click 'Start' to run the module

Start

Properties

- 1: Boundary and initial conditions
  - Do Nesting Disregard nesting
  - Sector input type Uniform distribution of the sector angles
  - Number of sectors 12
  - Sectors for next run 0;30;60;90;120;150;180;210;240;270;3
  - Height of boundary layer 500
  - Speed above boundary layer height 10
  - Use previous run as input False
  - Boundary condition at top Fixed pressure
- 2: Physical models
  - Potential temperature Disregard temperature
  - Air density 1,225
  - Turbulence model Standard k-epsilon
- 3: Calculation parameters
  - Solver GCV
  - Number of simultaneous sectors 1
  - Number of iterations 300
  - Convergence wizard False
  - Convergence criteria 0,001
- 4: Convergence monitoring
  - Coordinate system Global
  - Spot value X position 325488
  - Spot value Y position 7187488
  - Field value to monitor Speed scalar XYZ
- 5: Output
  - Height of reduced wind database 300
  - Run in batch mode False



Running **N sectors** of **1 project** in parallel blocking the GUI

Back Forward Click 'Start' to run the module

Start

Properties

- 1: Boundary and initial conditions
  - Do Nesting Disregard nesting
  - Sector input type Uniform distribution of the sector angles
  - Number of sectors 12
  - Sectors for next run 0;30;60;90;120;150;180;210;240;270
  - Height of boundary layer 500
  - Speed above boundary layer height 10
  - Use previous run as input False
  - Boundary condition at top Fixed pressure
- 2: Physical models
  - Potential temperature Disregard temperature
  - Air density 1,225
  - Turbulence model Standard k-epsilon
- 3: Calculation parameters
  - Solver ParallelGCV
  - Number of CPU/Cores per sector 10
  - Number of simultaneous sectors 2
  - Number of iterations 300
  - Convergence wizard False
  - Convergence criteria 0,001
- 4: Convergence monitoring
  - Coordinate system Global
  - Spot value X position 325488
  - Spot value Y position 7187488
  - Field value to monitor None
- 5: Output
  - Height of reduced wind database 300
  - Run in batch mode False

# WindSim Queueing

Running **N** sectors of 1 project  
in parallel not blocking GUI

Back Forward Click 'Start' to run the module

Start

### Properties

- 1: Boundary and initial conditions**
  - Do Nesting: Disregard nesting
  - Sector input type: Uniform distribution of the sector ang
  - Number of sectors: 12
  - Sectors for next run: 0;30;60;90;120;150;180;210;240;27
  - Height of boundary layer: 500
  - Speed above boundary layer height: 10
  - Use previous run as input: False
  - Boundary condition at top: Fixed pressure
- 2: Physical models**
  - Potential temperature: Disregard temperature
  - Air density: 1,225
  - Turbulence model: Standard k-epsilon
- 3: Calculation parameters**
  - Solver: **ParallelGCV**
  - Number of CPU/Cores per sector: **10**
  - Number of simultaneous sectors: **2**
  - Number of iterations: **300**
  - Convergence wizard: False
  - Convergence criteria: 0,001
- 4: Convergence monitoring**
  - Coordinate system: **Global**
  - Spot value X position: **325488**
  - Spot value Y position: **7187488**
  - Field value to monitor: None
- 5: Output**
  - Height of reduced wind database: 300
  - Run in batch mode: **True**

Wind Simulator

Progress

- Progress of all sectors: 17%
- Sector: 60 Elapsed: 0:00:02 Estimated: 0:00:45

Processing output

TimeStamp	Message
6/13/2014 10:44:49 AM	Sector: 60 started.
6/13/2014 10:44:49 AM	Sector 30 completed successfully.
6/13/2014 10:44:16 AM	Sector: 30 started.
6/13/2014 10:44:16 AM	Sector 0 completed successfully.
6/13/2014 10:43:44 AM	Sector: 0 started.
6/13/2014 10:43:44 AM	Sectors to run: 0;30;60;90;120;150;180;210;240;270;300;330;
6/13/2014 10:43:44 AM	Number of Cores/CPU per sector: 1
6/13/2014 10:43:44 AM	Number of simultaneous sectors: 1
6/13/2014 10:43:44 AM	Project to run: C:\Users\rsantos\Documents\WindSim Projects\Q
6/13/2014 10:43:44 AM	Simulation starting up...
6/13/2014 10:43:44 AM	New logfile created

Stop



# WindSim Queueing

Running **N** sectors of **N** project  
in parallel **not blocking** GUI

**Queue Settings**

Parallel Items:  On

Number of Parallel Sectors:

Path of .ws file:

Send Email when project finish    Email:

Send SMS when project finish    Mobile phone:

Priority:  Add Project

**Dashboard**

Licenses Available to WindSim.Queue now (%)

UnManaged Licenses    Managed Licenses

Managed Settings

Selected key name: **L2**

This key will not be used from:

Start Time:

End Time:

In:

**State:** Disk Warning

**Queue Projects Status**

Total Overview: 1 different Project(s) running with total of 1 Sectors    Next Sector Finish: 00:00:29    Sector Queued: 9

Project Queued: 0

	Priority	Proj. Info	Queued Date	Start Date	Complete Date	Status
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	100	Name   Info	08-06-2014 21:45:20	-	-	Running

**Sectors**

	Sector Number	Queued Date	Start Date	Complete Date	Status
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	0	08-06-2014 21:45:20	08-06-2014 21:45:28	08-06-2014 21:45:58	Completed
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	30	08-06-2014 21:45:20	08-06-2014 21:46:00	08-06-2014 21:46:30	Completed
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	60	08-06-2014 21:45:20	08-06-2014 21:46:32	Iter: 42 / 300 Time: 00:00:04 / 00:00:29	Running
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	-	08-06-2014 21:45:20	-	-	Queued
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	-	08-06-2014 21:45:20	-	-	Queued
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	150	08-06-2014 21:45:20	-	-	Queued
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	180	08-06-2014 21:45:20	-	-	Queued
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	210	08-06-2014 21:45:20	-	-	Queued

# WindSim Queueing

Running **N** sectors of **N** project  
in parallel **not blocking** GUI

Queue Settings

Parallel Items On

Number of Parallel Sectors:

Path of .ws file:

Send Email when project finish Email:

Send SMS when project finish Mobile phone:

Priority:

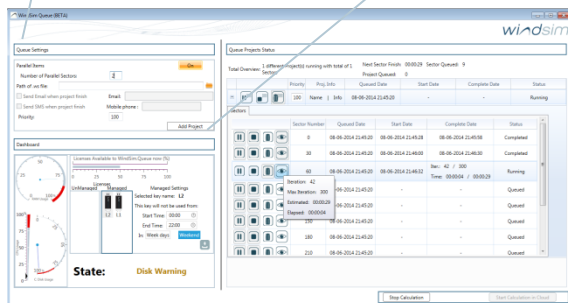
Add Project

## • Queue Settings - Today

- Activate the parallel simulations
- Define the number of sectors you want to run in parallel (each sector will use 1 Core)
- Add project to Queue system providing the path to the .ws file
- Define the Priority of the Project in the Queue (lower number bigger priority)

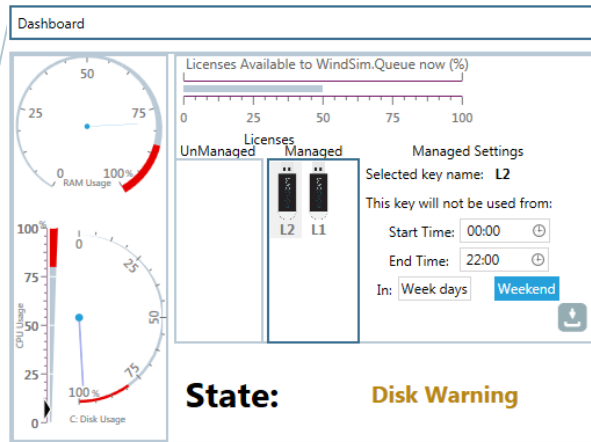
## • Queue Settings - Future

- Possibility to provide Email for notification when the project is completed
- Possibility to provide Mobile Number for SMS notification when the project is complete or there is a warning
- *Possibility to retrieve a URL so the user can see the Queue progress in a Web Page from home*



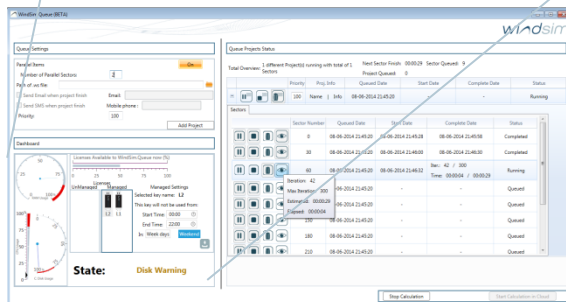
# WindSim Queueing

Running **N** sectors of **N** project  
in parallel **not blocking** GUI



## • Queue Dashboard - Today

- See the status of the RAM
- See the status of the CPU
- See the status of C: drive
- See System State – Warning-Critical Errors
- See the number of Keys available for WindSim Queue
- **Manage the license based on DateTime**
  - Use Drag&Drop to move Licenses from UnManaged <-> Managed
  - Define which license should be used by managed
  - Define the hour which the Managed License shouldn't be available for WindSim Queue
  - Define when the time should be apply – During WeekDays – Weekend
  - The changes will only be taken in consideration when are saved



# WindSim Queueing

Running **N** sectors of **N** project  
in parallel **not blocking** GUI

## • Queue Projects Status - Today

- See the total overview of Running Sectors and Queued
- Change the priority of a project after it has been queued
- See information about the project – Number of cells, Forest,....
- See Project Queue Data, Start Date, Complete Date and Status
- See all the sectors of a Specific Project
- See real time competition time for each sector after started
- See the current iteration of the sector
- Possibility to stop – Remove a sector from the Queuing, still see the result until the stop
- Possibility to pause – Resume a sector from the paused state
- A sector will start depending on different combinations
  1. Number of Licenses in the WindSim Key
  2. Number of Parallel Sectors introduced by the user
  3. Managed Licenses configured by the user
  4. RAM available in the PC

Queue Projects Status

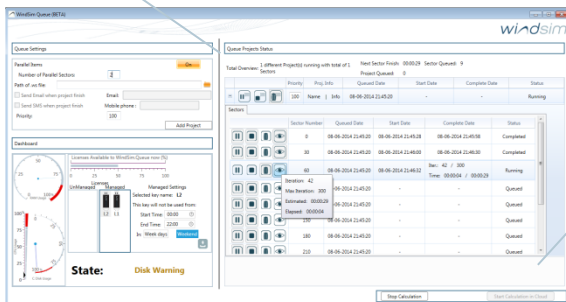
Total Overview: 1 different Project(s) running with total of 1 Sectors    Next Sector Finish: 00:00:29    Sector Queued: 9  
Project Queued: 0

Priority	Proj. Info	Queued Date	Start Date	Complete Date	Status
100	Name   Info	08-06-2014 21:45:20	-	-	Running

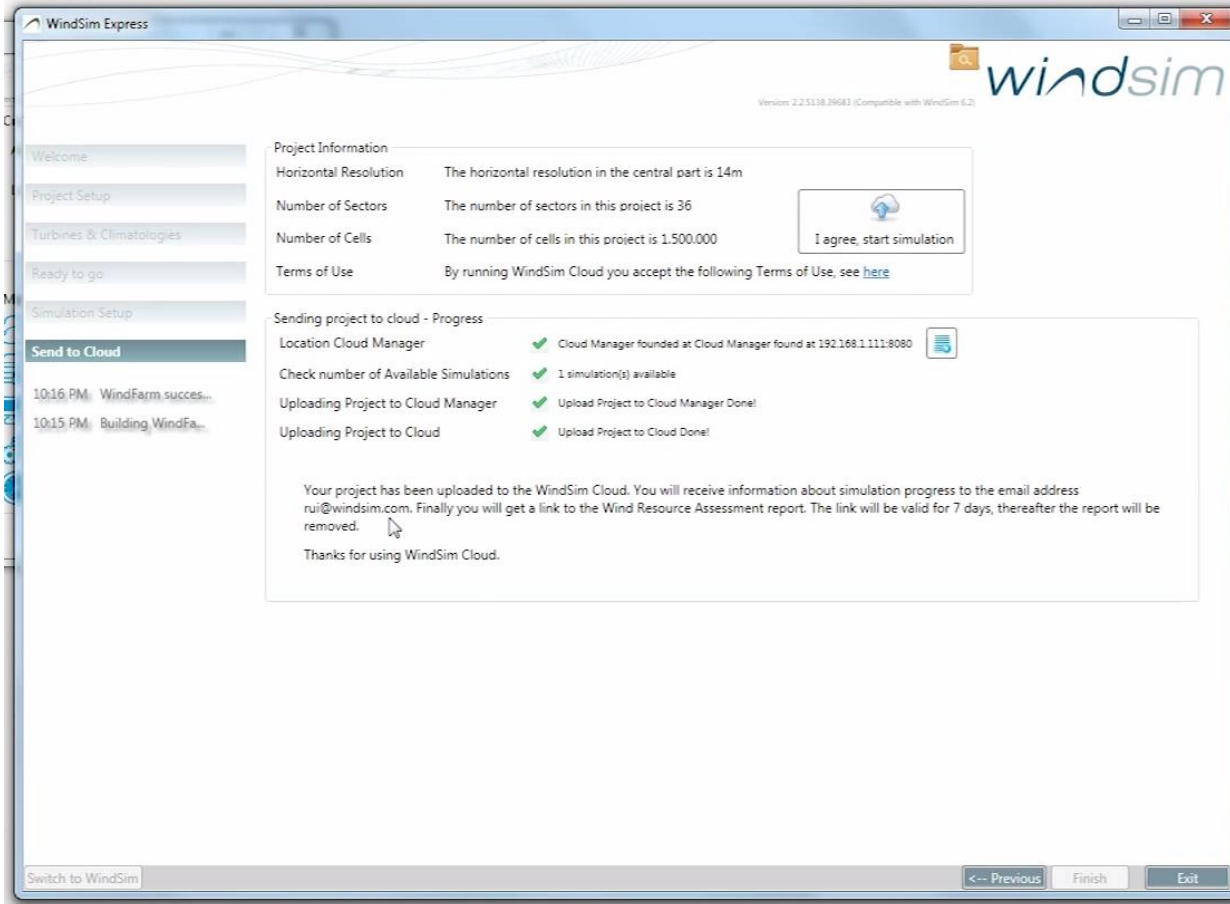
Sector Number	Queued Date	Start Date	Complete Date	Status
0	08-06-2014 21:45:20	08-06-2014 21:45:28	08-06-2014 21:45:58	Completed
30	08-06-2014 21:45:20	08-06-2014 21:46:00	08-06-2014 21:46:30	Completed
60	08-06-2014 21:45:20	08-06-2014 21:46:32	Iter: 42 / 300 Time: 00:00:04 / 00:00:29	Running
-	-	-	-	Queued
-	-	-	-	Queued
150	08-06-2014 21:45:20	-	-	Queued
180	08-06-2014 21:45:20	-	-	Queued
210	08-06-2014 21:45:20	-	-	Queued

Iteration: 42  
Max Iteration: 300  
Estimated: 00:00:29  
Elapsed: 00:00:04



# WindSim Cloud

Full integrated with WindSim Express



## WindSim Cloud Status – Today

- Possibility to run a complete project with 1.5 Million cells with 36 sectors in about 4 hours
- User gets a Microsoft Word Report with all relevant information, plots and tables
- If the user has a WindSim license he will also receive the complete WindSim Project with all modules green

## WindSim Cloud Status – Future

- What about run 7 Million cells ?

# WindSim Cloud

More information [www.windsim.com](http://www.windsim.com) under WindSim Cloud menu



How to Create WindSim Cloud Account



How to Recharge WindSim Cloud Account



How to Upload a project to WindSim Cloud

# Future of WindSim 6.3, Forecasting, Queue...

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## Future - Plan

*... the plan is only valid until it changes ...*

# Future of WindSim 6.3, Forecasting, Queue...

All products in 1 place – WindSim ?.0

The screenshot shows the WindSim 7.0 software interface. The top menu bar includes File, Layouts, Modules, 3D Visualisation, Tools, and Help. Below the menu is a toolbar with icons for Terrain, WindFields, Objects, Results, WindResources, Energy, Forecast, TerrainEditor, Mcp, RealTime, and Cluster. The main workspace displays the 'Terrain' module's documentation, including sections for 'Getting started', 'Digital terrain conversion', and 'Properties'. A blue box labeled 'Wind Simulation' is overlaid on the 'Getting started' section. A blue box labeled 'Plug-Ins' is overlaid on the toolbar icons. A blue box labeled 'Module selected Properties' is overlaid on the 'Properties' section of the documentation. On the right side, a 'Properties' panel is visible, showing a table with personal and job information. A blue box labeled 'Module selected Properties' is overlaid on this panel. The bottom of the interface has 'Output' and 'Error List' buttons.

Occupation	SuppliesManager
Department	1
Salary	3500
Starting Date	04-12-2005 00:00

# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Services – Web based

The screenshot shows a web browser window displaying the WindSim Cloud website. The browser's address bar shows 'http://localhost:43960/'. The website features the WindSim logo in the top left, a navigation menu with 'Home', 'Wind Simulations', 'Real Time', 'About', and 'Contact', and a user profile 'Hello, rsantos.mails@gmail.com' with a 'Log off' button. A prominent blue banner reads 'WindSim Cloud. Maximize your power production.' Below this, a text block encourages users to watch a video and visit the site for more information. A section titled 'We suggest the following:' lists four items: 1. Getting Started (34:59), 2. Learn about WindSim CFD technology (52:44), 3. Find help using our Consulting team (1:20), and 4. Do a WindSim Course with our specialist. Each item includes a brief description and a 'Learn more...' link. Below the list are six video thumbnails with titles and durations: 'WindSim Webinar WindSim Express' (34:59), 'WindSim Webinar Park Optimizer' (52:44), 'Building Windows Phone 7 Apps that Rock the Marketplace' (1:20), and three smaller thumbnails for 'Easy-to-Get Started', 'QA-Dev Collaboration', and 'Affordable Pricing'.

WindSim Cloud. Maximize your power production.

To learn more about WindSim Express, watch [this video](#). The page features [videos, tutorials, and support](#) to help you get the most from CFD. If you want to learn more about WindSim products visit [our site](#).

**We suggest the following:**

- 1 Getting Started**  
Watch our Webinars which lets you learn using a free and resourcefull model. [Learn more...](#)
- 2 Learn about WindSim CFD technology**  
We provide a lot of information regarding best practices in Wind Park. [Learn more...](#)
- 3 Find help using our Consulting team**  
You can easily find the most optimize layout for your Wind Park or any missing resource that you might need. [Learn more...](#)
- 4 Do a WindSim Course with our specialist**  
We can schedule a personalized session with you to explore exactly how WindSim can meet your specific challenges—or to simply help you learn more about WindSim with Basic and Advanced Course. [Learn more...](#)

WindSim Webinar WindSim Express 34:59

WindSim Webinar Park Optimizer 52:44

Building Windows Phone 7 Apps that Rock the Marketplace 1:20

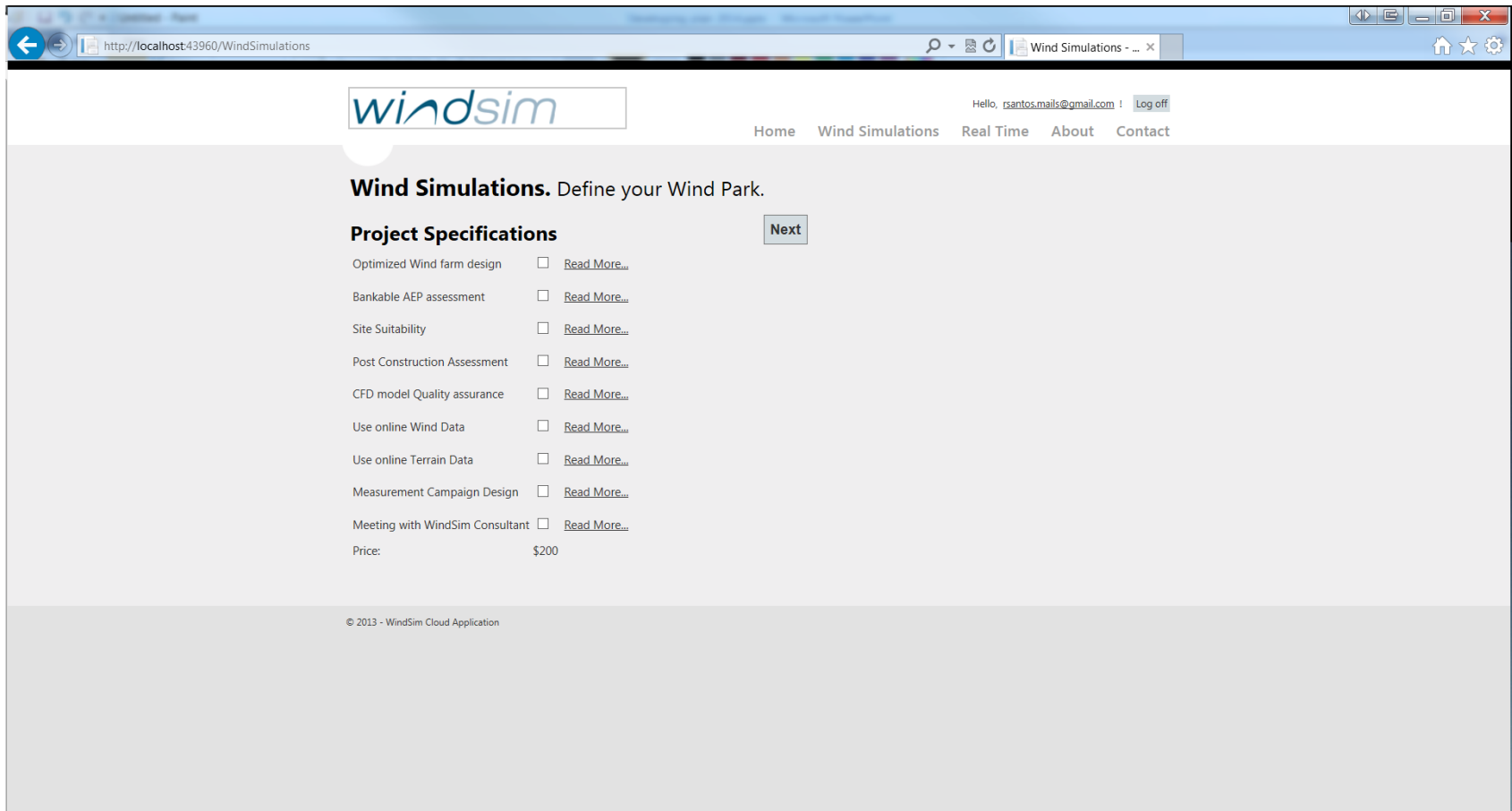
Easy-to-Get Started

QA-Dev Collaboration

Affordable Pricing

# Future of WindSim 6.3, Forecasting, Queue...

WindSim Services – Consultancy and Extra Services



The screenshot shows a web browser window displaying the WindSim website. The browser's address bar shows the URL `http://localhost:43960/WindSimulations`. The website header includes the WindSim logo, a user greeting "Hello, rsantos.mails@gmail.com", and a "Log off" link. A navigation menu contains "Home", "Wind Simulations", "Real Time", "About", and "Contact". The main content area features the heading "Wind Simulations. Define your Wind Park." followed by a "Project Specifications" section. This section lists various services with checkboxes and "Read More..." links. A "Next" button is positioned to the right of the list. At the bottom of the page, a copyright notice reads "© 2013 - WindSim Cloud Application".

http://localhost:43960/WindSimulations

windsim

Hello, rsantos.mails@gmail.com | Log off

Home Wind Simulations Real Time About Contact

**Wind Simulations.** Define your Wind Park.

**Project Specifications** [Next](#)

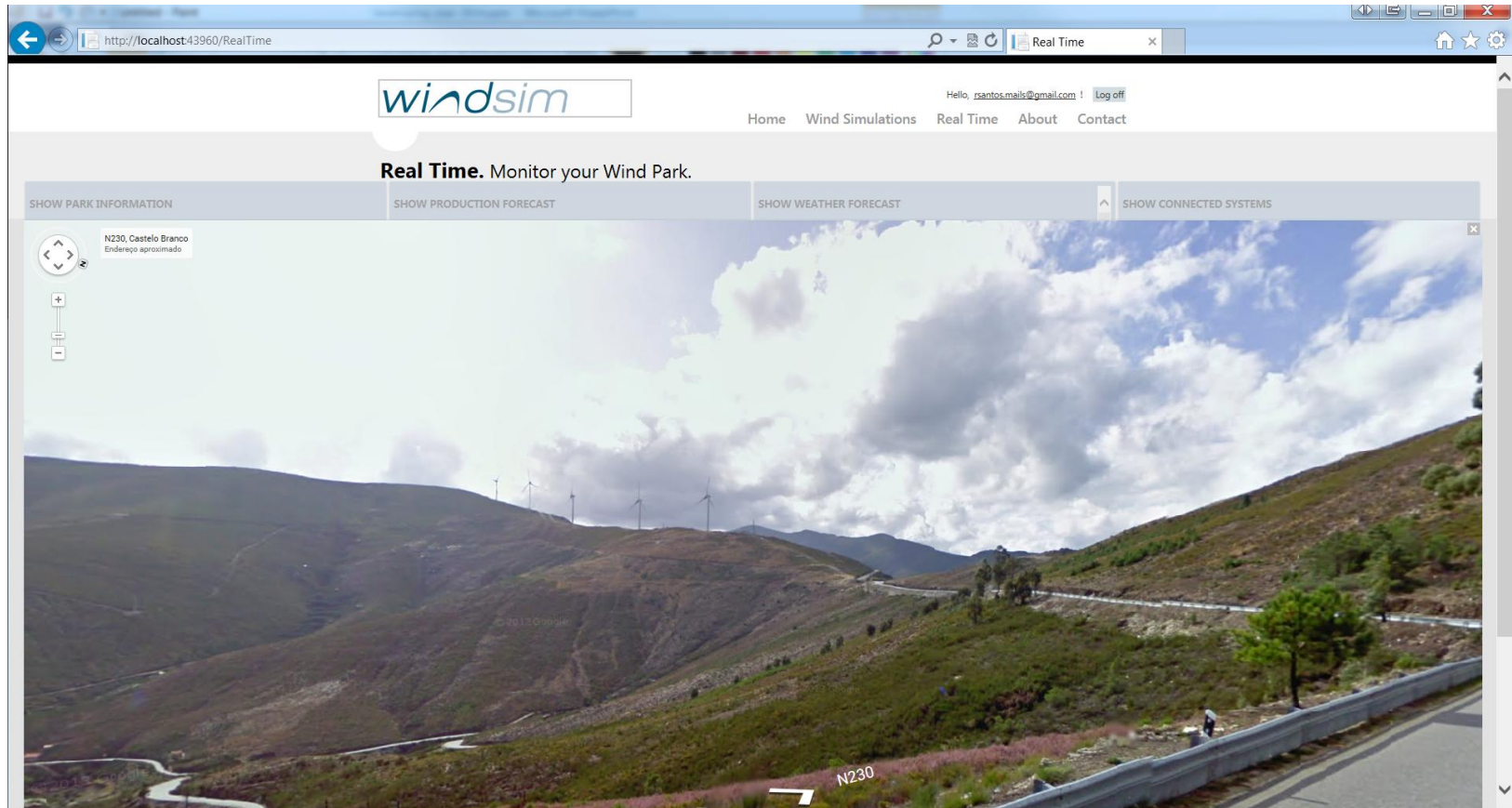
- Optimized Wind farm design [Read More...](#)
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- Use online Wind Data [Read More...](#)
- Use online Terrain Data [Read More...](#)
- Measurement Campaign Design [Read More...](#)
- Meeting with WindSim Consultant [Read More...](#)

Price: \$200

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# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Services – Forecasting



# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Services – Forecasting & Real Time

The screenshot shows the WindSim web application interface. At the top, there is a navigation bar with the WindSim logo, a user greeting "Hello, rsantos.mails@gmail.com !", and a "Log off" link. The main navigation menu includes "Home", "Wind Simulations", "Real Time", "About", and "Contact".

The main content area is titled "Wind Simulations. Define your Wind Park." Below this is a section for "Add Turbines & Climatologies". This section contains several input fields: "Turbine Type" (with a dropdown and a "New" button), "Turbine Height", "Rotor Diameter", "Coordinate X", and "Coordinate Y". There are also checkboxes for "Climatology is Virtual" and "Import WindData (.tws)" (with a "Browse..." button). "Add" buttons are located at the bottom of the form sections.

Below the form is a table with a blue header that says "Drag a column header and drop it here to group by that column". The table has columns for "Type", "Height", "Rotor Diameter", "Coordinate X", and "Coordinate Y". The table contains three rows of turbine data:

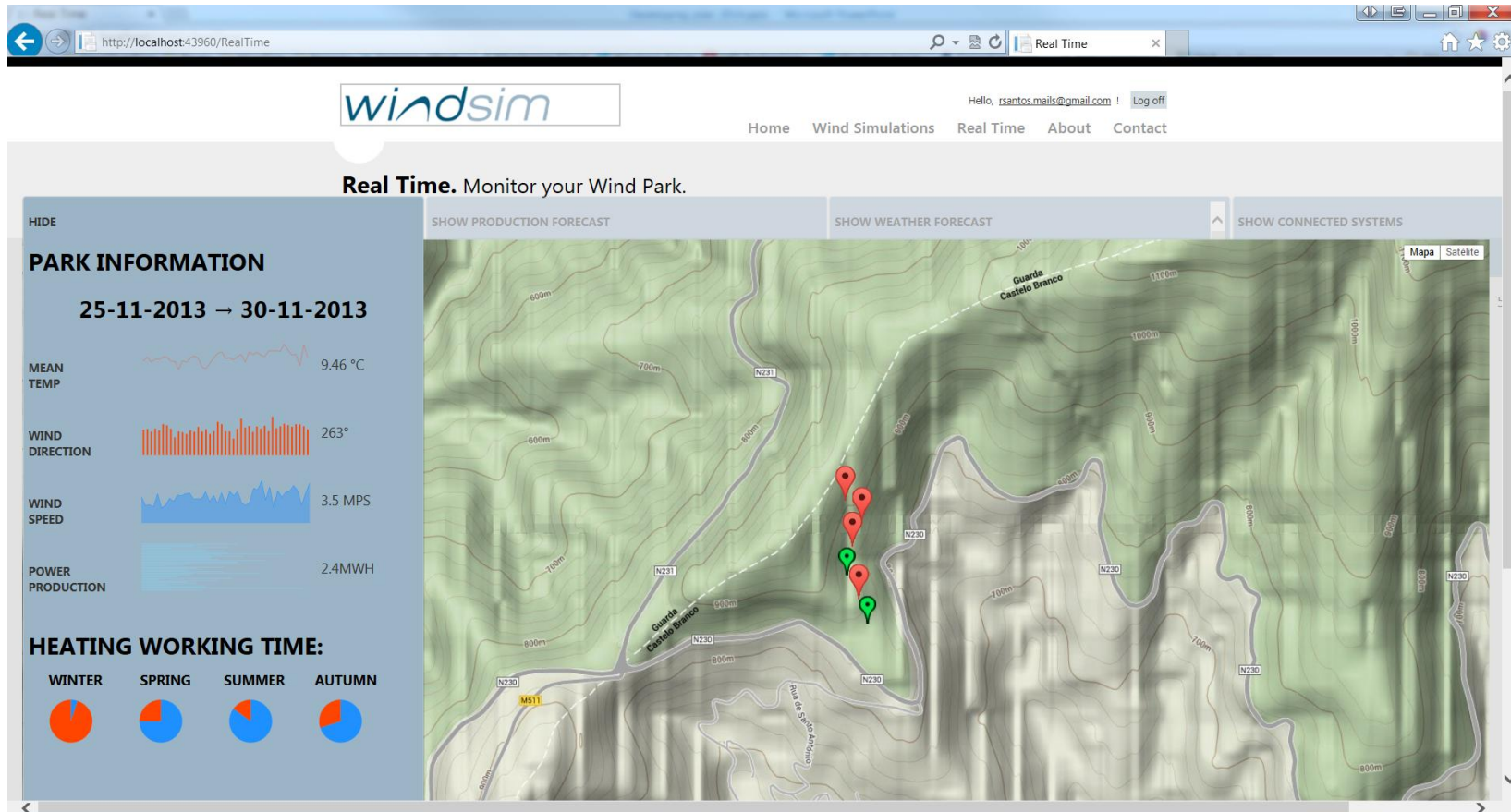
Type	Height	Rotor Diameter	Coordinate X	Coordinate Y
Vestas 89	90	80	1234567	1234567890
Vestas 89	30	-	1234567	1234567890
Vestas 80	80	70	1234567	1234567890

At the bottom of the table, there is a pagination control showing "Page: 1 of 1", "Go", "Page size: 3", "Change", and "Item 1 to 3 of 3".

At the bottom left of the page, there is a copyright notice: "© 2013 - WindSim Cloud Application".

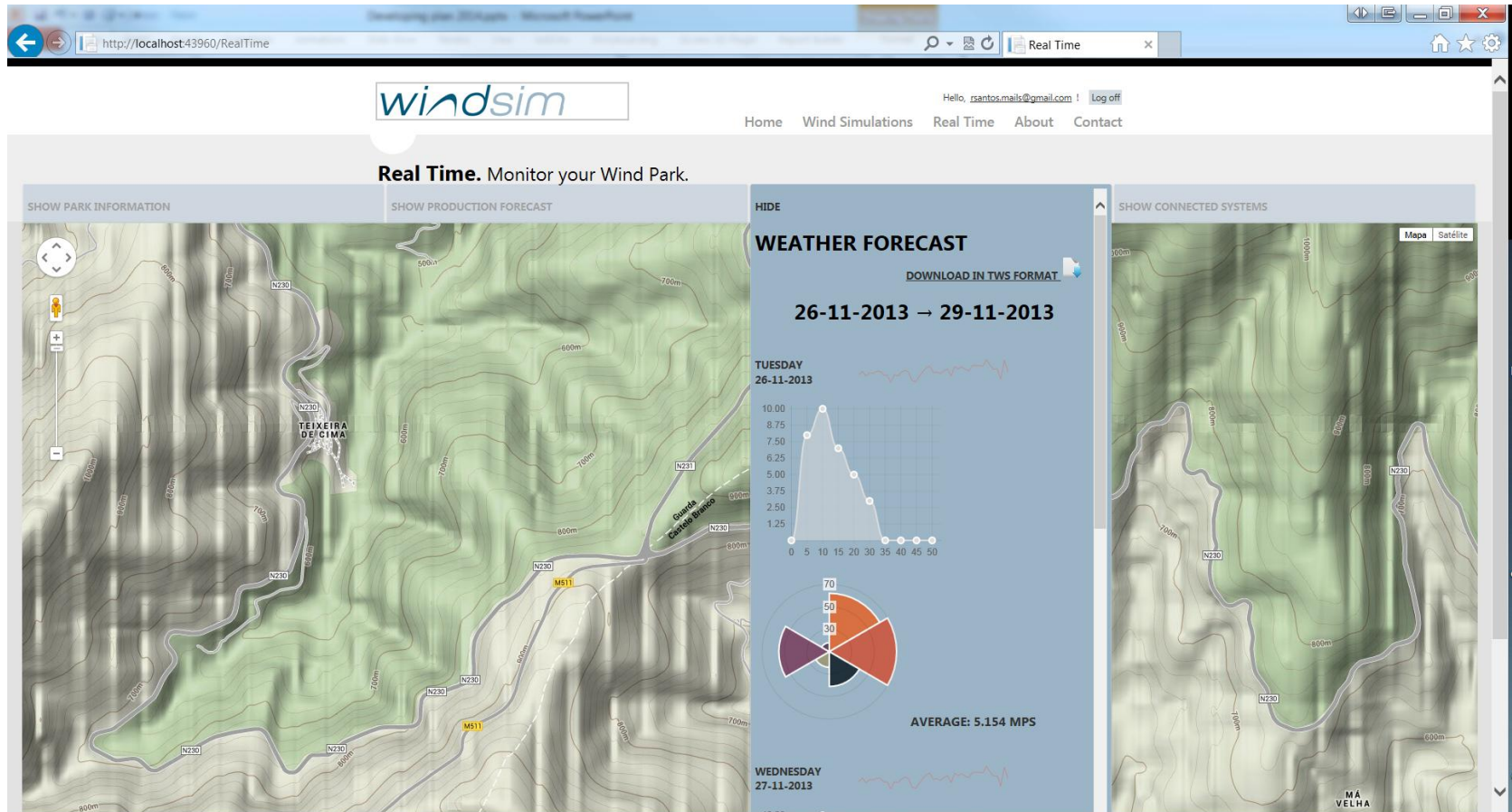
# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Services – Forecasting & Real Time



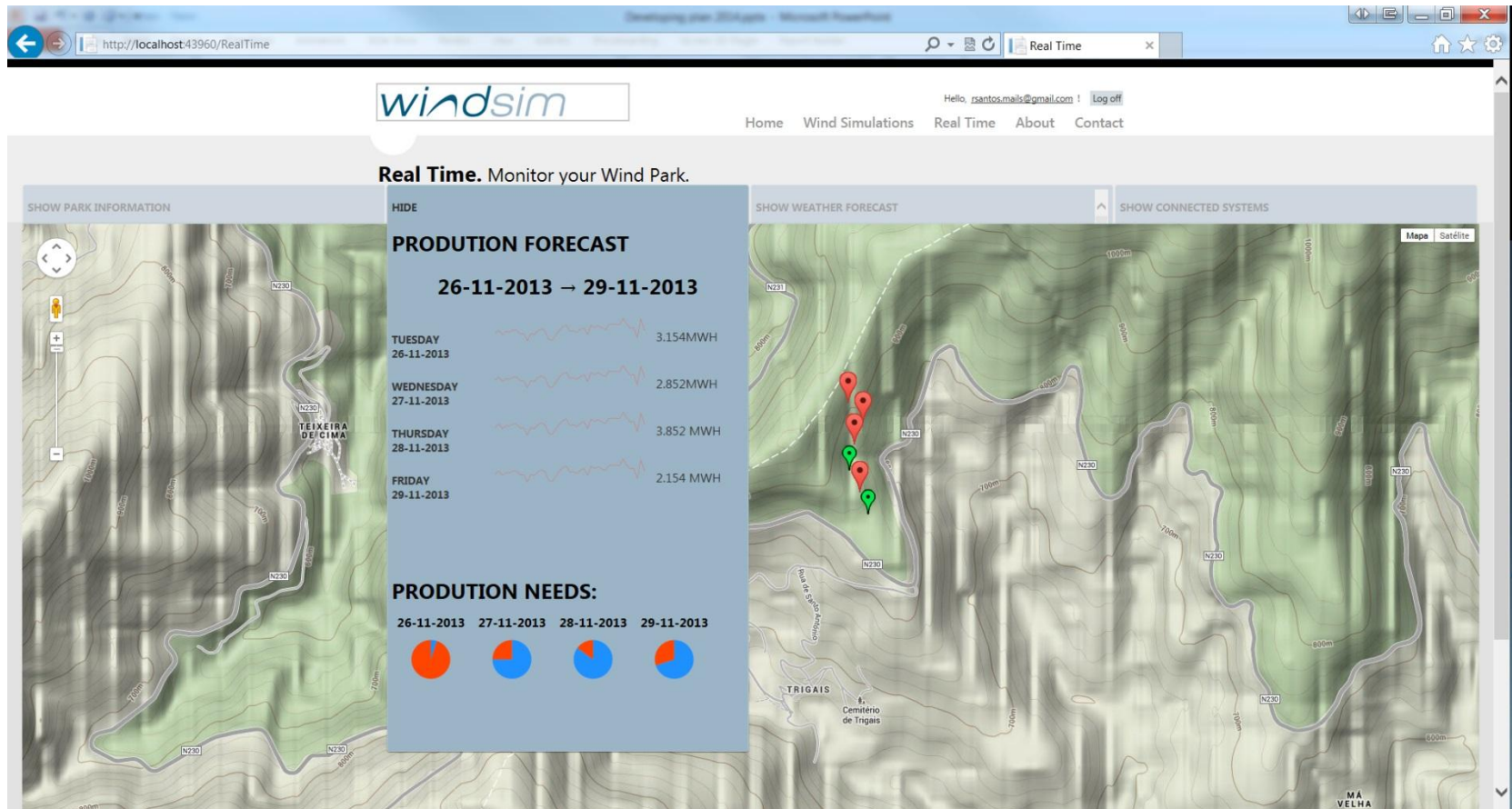
# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Services – Forecasting & Real Time



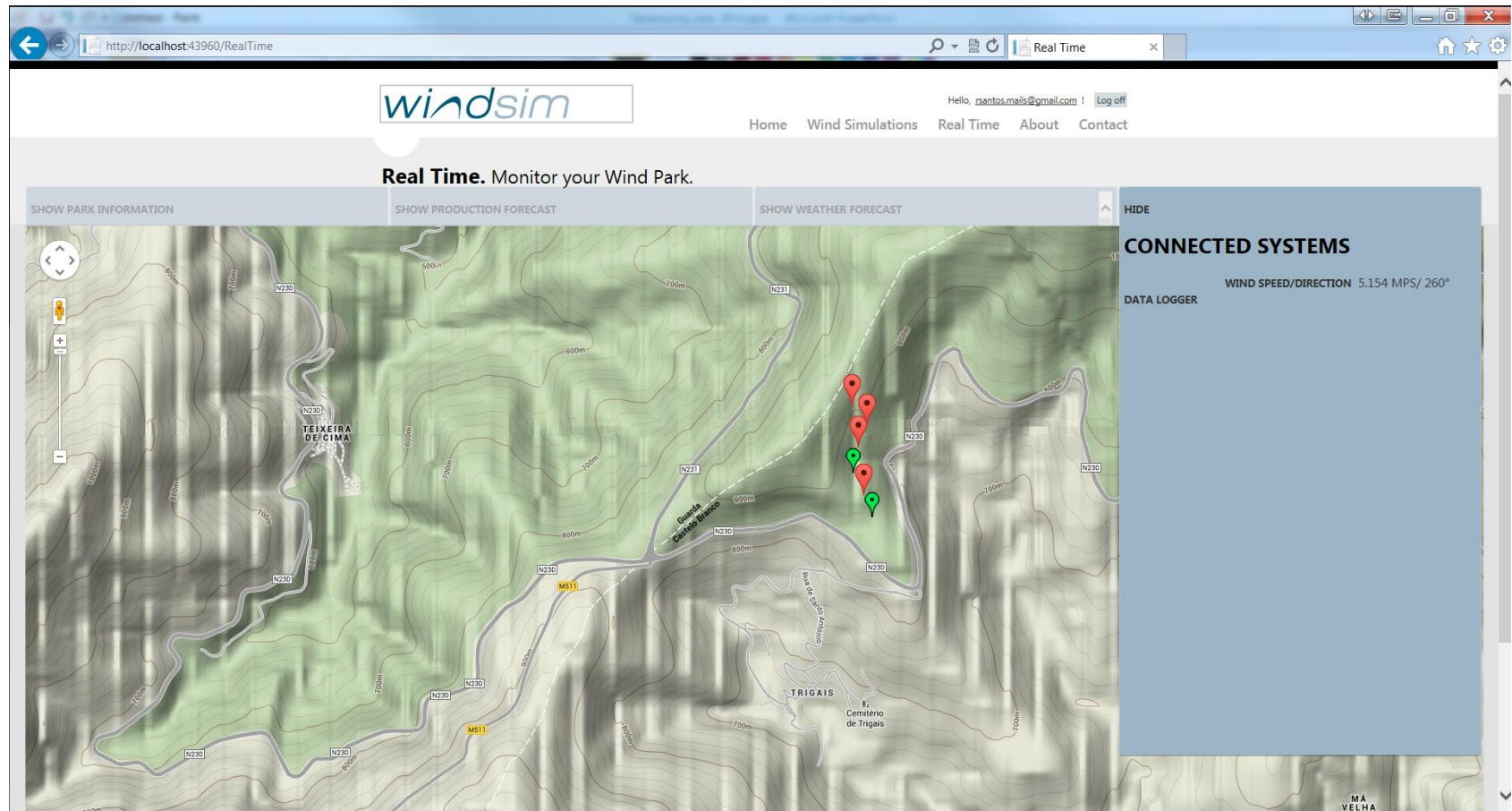
# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Services – Forecasting & Real Time



# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Services – Forecasting & Real Time



# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Queue – Integration with Cloud

WindSim Queue (BETA)

Queue Settings

Parallel Items

Number of Parallel Sectors: 4

Path of .ws file:

Send Email when project finish Email:

Send SMS when project finish Mobile phone:

Priority: 100

Add Project

Dashboard

Licenses Available to WindSim.Queue now (%)

RAM Usage

CPU Usage

UnManaged Licenses

Managed Licenses

Managed Settings

Selected key name: L2

This key will not be used from:

Start Time: 00:00

End Time: 22:00

In: Week days Weekend

State: Disk Warning

Queue Projects Status

Total Overview: 1 different Project(s) running with total of 1 Sectors

Next Sector Finish: 00:00:29 Sector Queued: 9

Project Queued: 0

Priority	Proj. Info	Queued Date	Start Date	Complete Date	Status
100	Name   Info	08-06-2014 21:45:20	-	-	Running

Sectors

Sector Number	Queued Date	Start Date	Complete Date	Status
0	08-06-2014 21:45:20	08-06-2014 21:45:28	08-06-2014 21:45:58	Completed
30	08-06-2014 21:45:20	08-06-2014 21:46:00	08-06-2014 21:46:30	Completed
60	08-06-2014 21:45:20	08-06-2014 21:46:32	-	Running
90	08-06-2014 21:45:20	-	-	Queued
120	08-06-2014 21:45:20	-	-	Queued
150	08-06-2014 21:45:20	-	-	Queued
180	08-06-2014 21:45:20	-	-	Queued
210	08-06-2014 21:45:20	-	-	Queued

Iteration: 42  
Max Iteration: 300  
Estimated: 00:00:29  
Elapsed: 00:00:04

Iter: 42 / 300  
Time: 00:00:04 / 00:00:29

Stop Calculation Start Calculation in Cloud

Send all sectors to the Cloud

Send individual sectors to the Cloud

View real progress sector running in the Cloud

Download all data from the Cloud automatically

# Future of WindSim 6.3, Forecasting, Queue...

## WindSim Queue – Integration with On Premises Computers

**Queue Settings**

Parallel Items:

Number of Parallel Sectors:

Path of .ws file:

Send Email when project finish Email:

Send SMS when project finish Mobile phone:

Priority:

**Dashboard**

Licenses Available to WindSim.Queue now (%)

RAM Usage: 0% to 100%

CPU Usage: 0% to 100%

C: Disk Usage: 0% to 100%

Licenses: UnManaged, Managed

Managed Settings

Selected key name: L2

This key will not be used from:

Start Time: 00:00

End Time: 22:00

In:

**State:** Disk Warning

**Queue Projects Status**

Total Overview: 1 different Project(s) running with total of 1 Sectors  
Next Sector Finish: 00:00:29 Sector Queued: 9  
Project Queued: 0

Priority	Proj. Info	Queued Date	Start Date	Complete Date	Status
100	Name   Info	08-06-2014 21:45:20	-	-	Running

**Sectors**

Sector Number	Queued Date	Start Date	Complete Date	Status
0	08-06-2014 21:45:20	08-06-2014 21:45:28	08-06-2014 21:45:58	Completed
30	08-06-2014 21:45:20	08-06-2014 21:46:00	08-06-2014 21:46:30	Completed
60	08-06-2014 21:45:20	08-06-2014 21:46:32	-	Running
90	08-06-2014 21:45:20	-	-	Queued
120	08-06-2014 21:45:20	-	-	Queued
150	08-06-2014 21:45:20	-	-	Queued
180	08-06-2014 21:45:20	-	-	Queued
210	08-06-2014 21:45:20	-	-	Queued

Iteration: 42  
Max Iteration: 300  
Estimated: 00:00:29  
Elapsed: 00:00:04

Iter: 42 / 300  
Time: 00:00:04 / 00:00:29

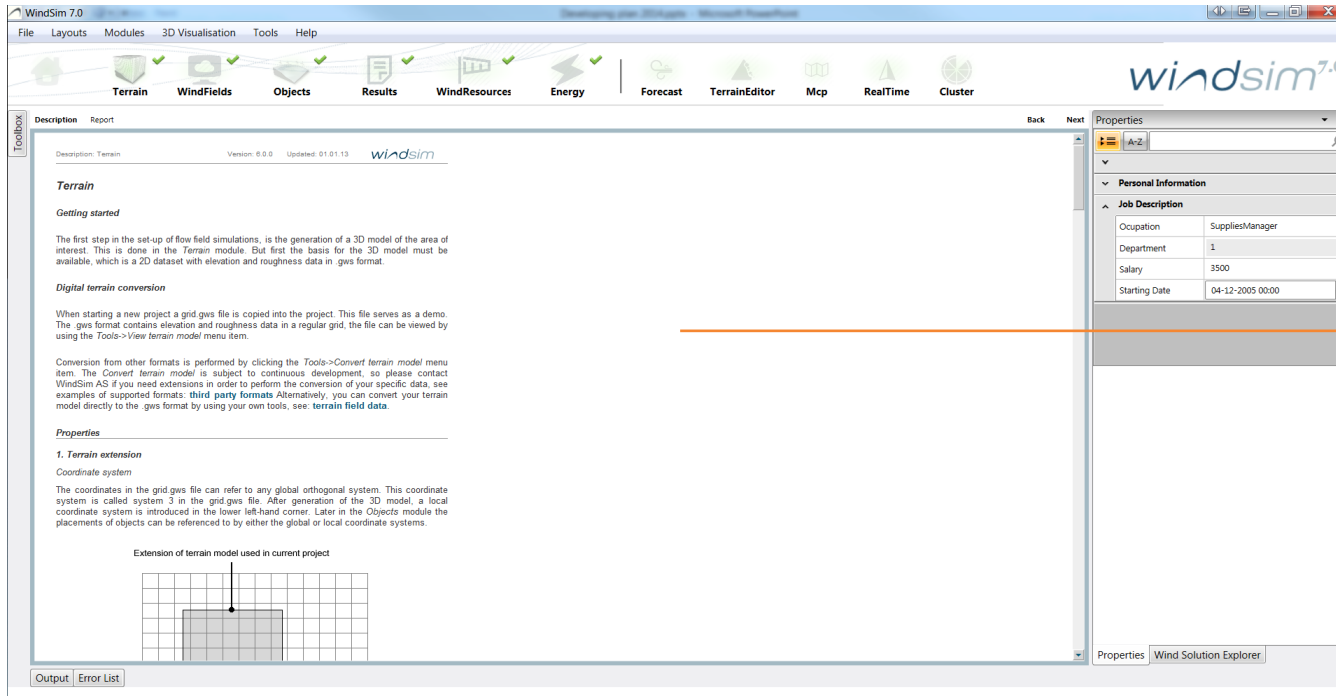
Distribute all sectors to available machines

Send individual sectors to the specific machine

View real progress sector running In the Cloud

# Future of WindSim 6.3, Forecasting, Queue...

## WindSim ? .0 – Integration with Cloud



Run all modules in the Cloud

Send projects with >40 million cells and 36 sectors

See the progress - getting all the data when it is done

# Questions?

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## THANK YOU

**Email:**

**[rui.santos@windsim.com](mailto:rui.santos@windsim.com)**