9th WindSim User Meeting

25-26 June 2014, Tønsberg

WindSim New Tools

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SENIOR SOFTWARE DEVELOPER & SOFTWARE ARCHITECT

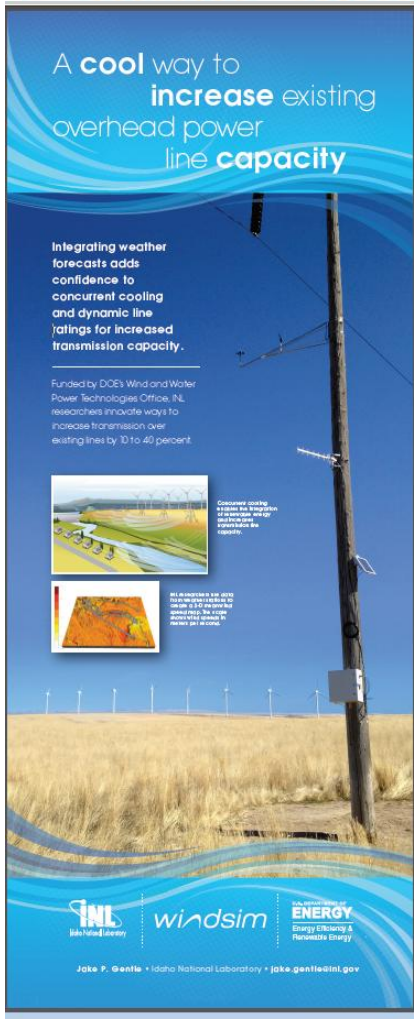
windsim

Agenda

- **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…**

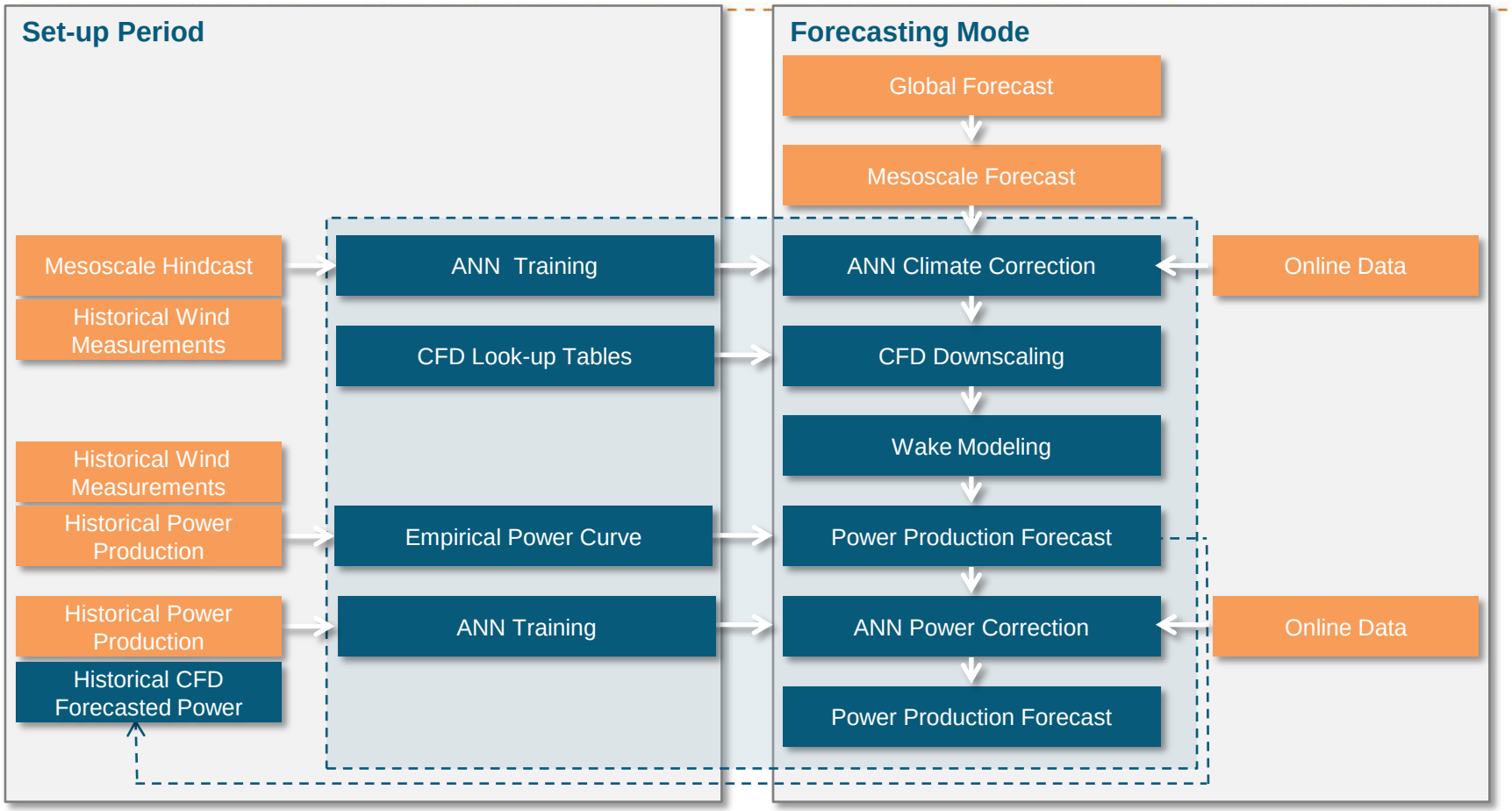
WindSim tools Big Picture

WindSim PowerLine



- **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)



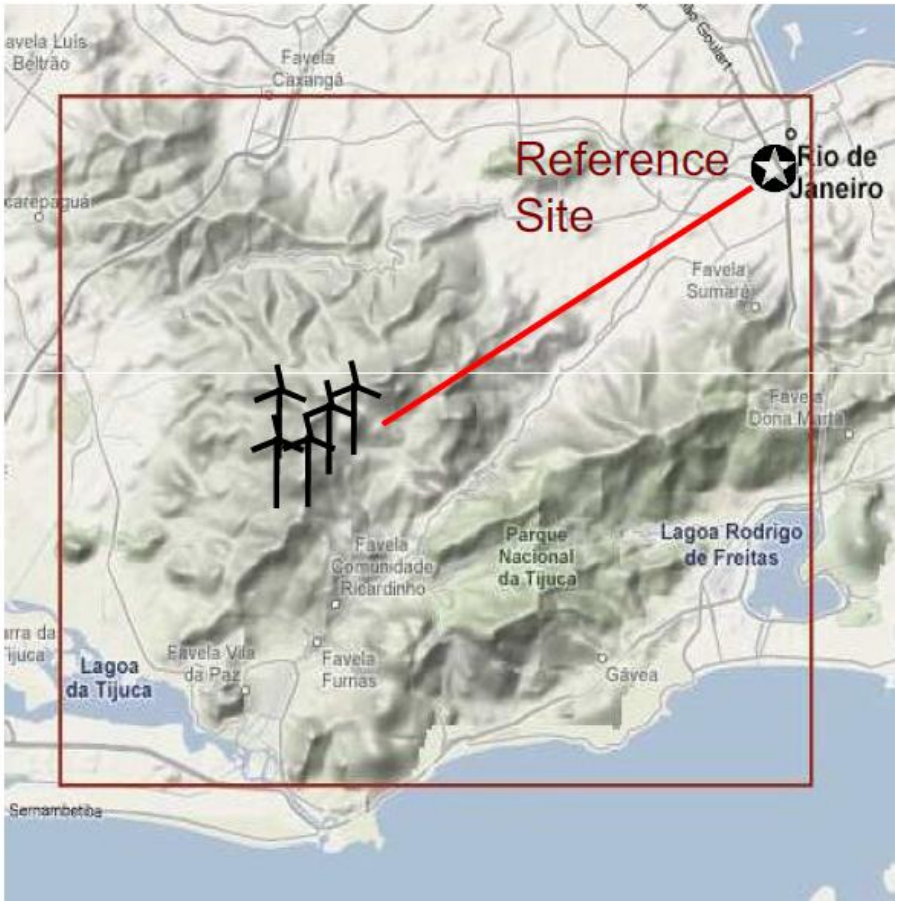
Short-term Forecasting using Mesoscale Simulations, Artificial Neural Networks (ANN) and Computational Fluid Dynamics (CFD): Input; WindSim software or data

WindSim Forecasting (API)

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

WindSim Webinar Power Forecasting

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..)

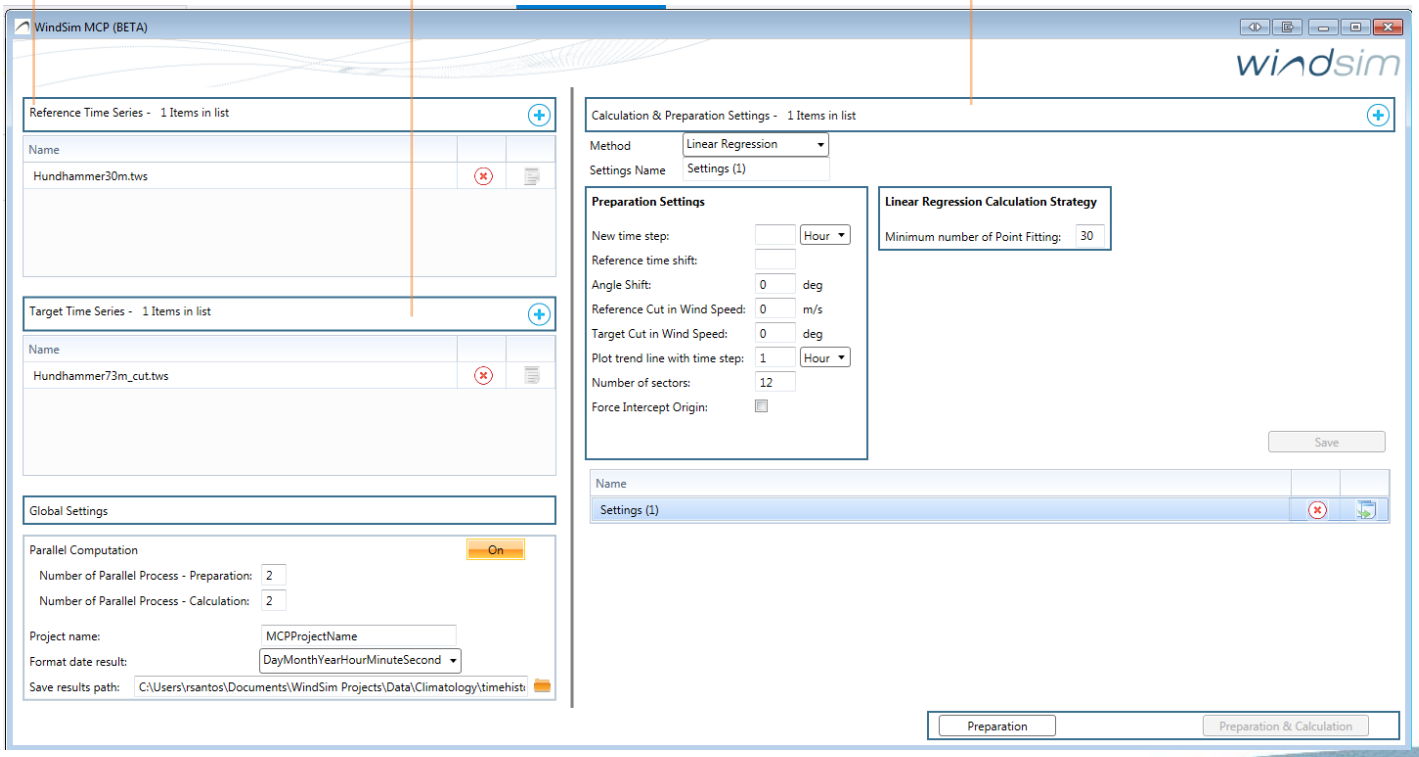
WindSim MCP

Add multiple Reference Time Series

Add multiple Target Time Series

Add multiple Settings

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



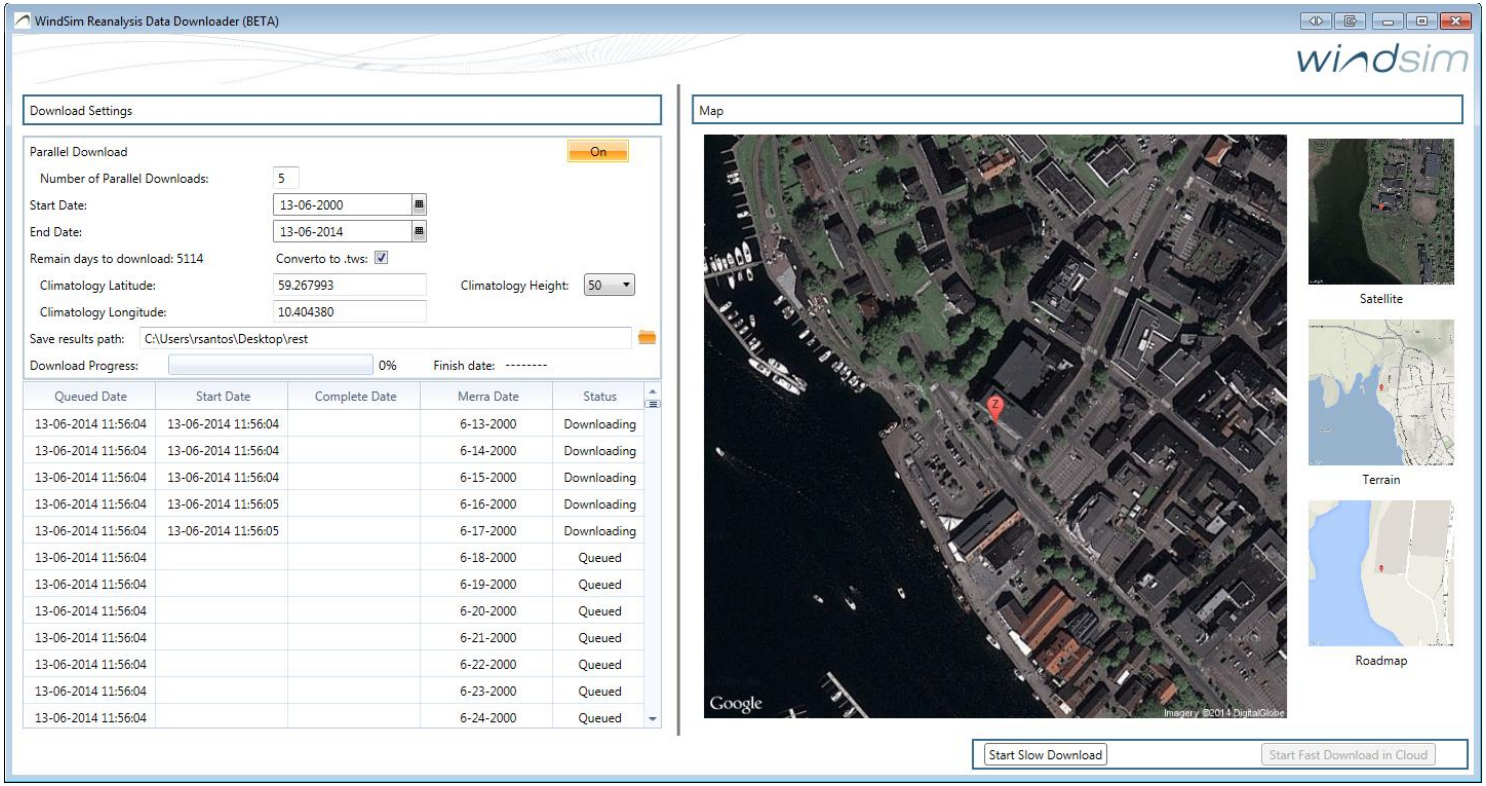
WindSim MCP

DEMO

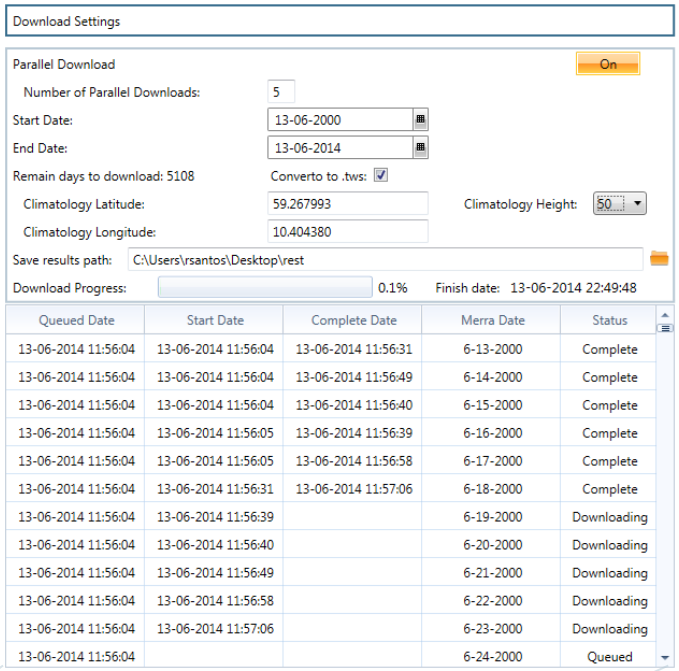
1) Add Reference
   - See time series report
2) Add Target
3) Define Global Settings
   - Parallel combinations
   - Result path
4) Add Settings
   - See different settings
   - See clone settings
5) Start Preparation
   - See the progress
   - See the results
   - Select preparation
6) Start Calculation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

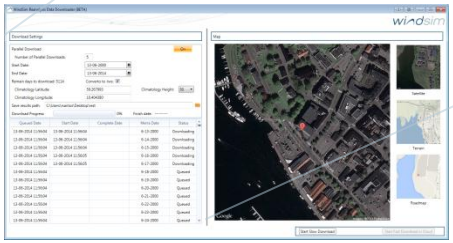
WindSim Reanalysis Data Downloader

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.



WindSim Reanalysis Data Downloader

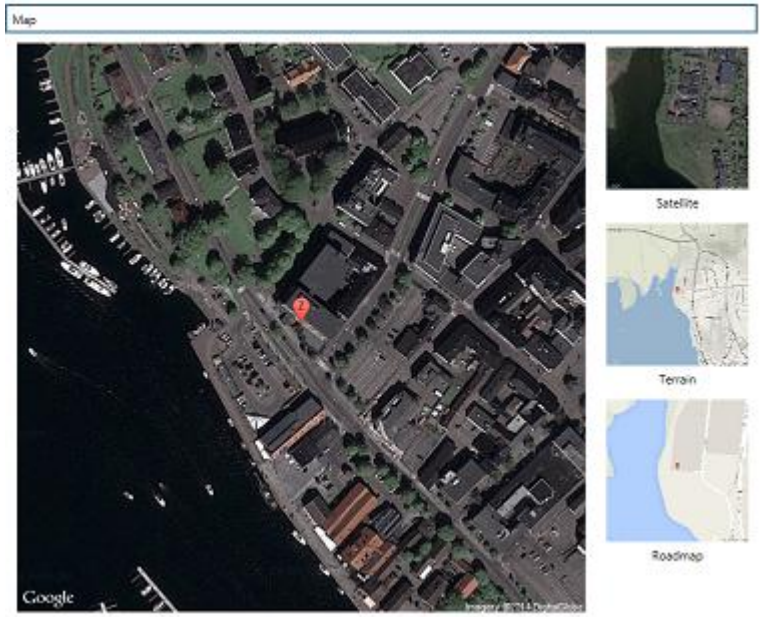


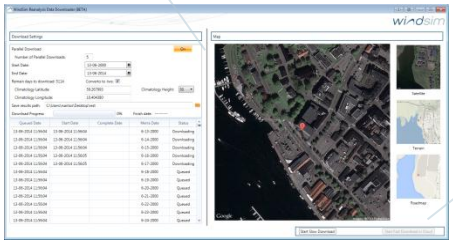


- **Download Settings - Today**
  - Parallel downloads, maximum 5 days in parallel
  - Wind information from 1979 until *today*
  - Conversion to .tws automatically
  - Possibility to define the Climatology position and Height – 10m, 50, and ~60m
  - Define the result path
  - See the download progress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

- **Download Settings - Future**
  - Download maximum 30 years .tws file in seconds

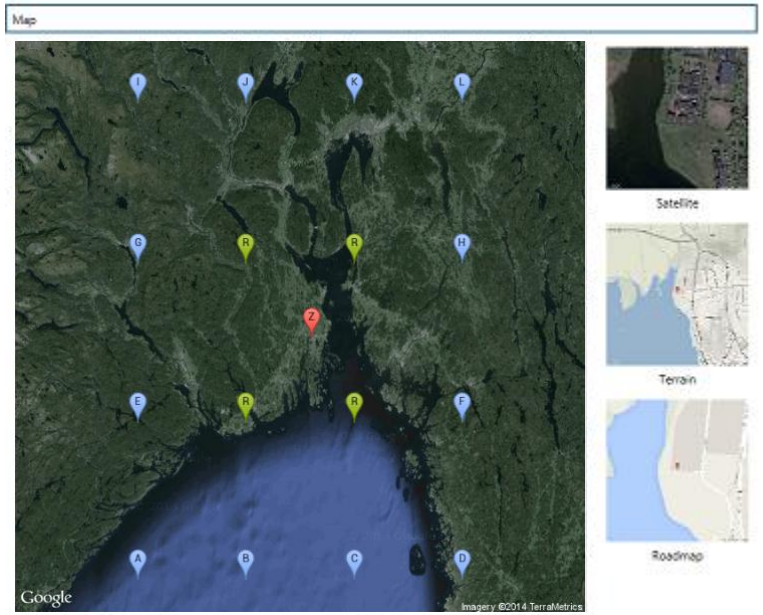
WindSim Reanalysis Data Downloader

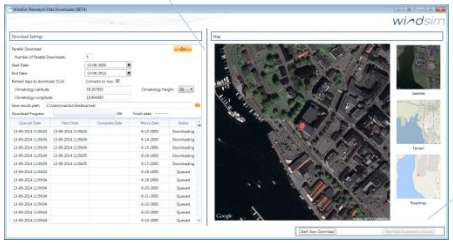




- **Map - Today**
  - Map updated in real time when climatology coordinates change
  - Possibility to see different map types – Satellite – Terrain - Roadmap

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 .tws 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…

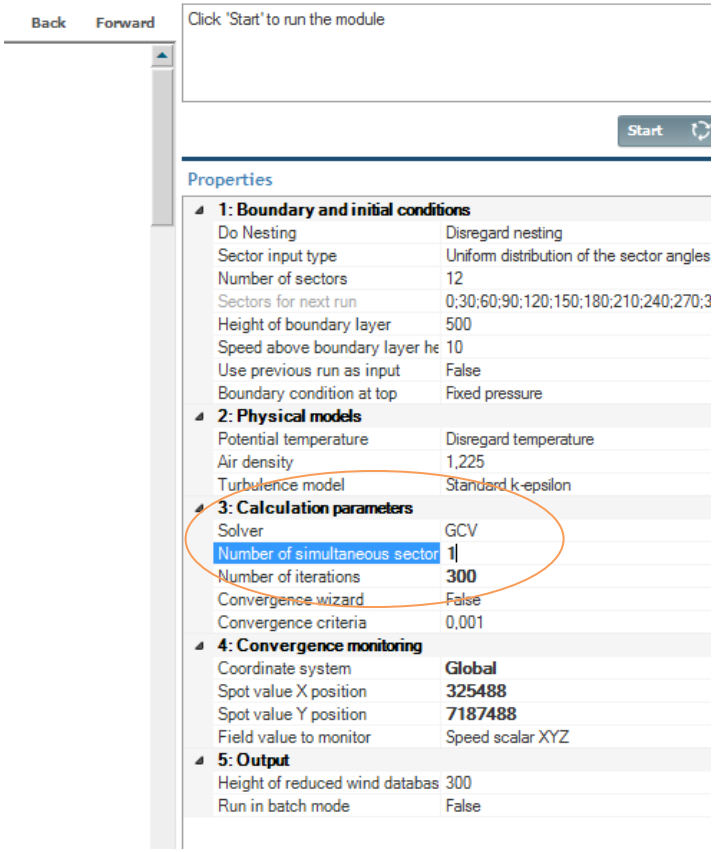
WindSim Reanalysis Data Downloader

DEMO

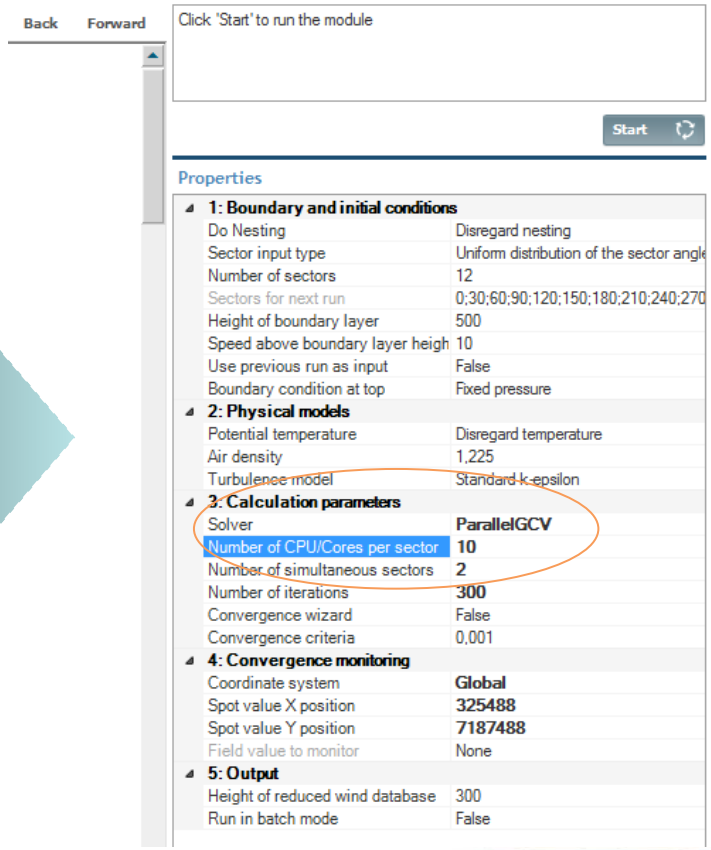
1) Define the Period
2) Define the Position
3) See different Maps Types
4) Start Download
5) See the result

WindSim Queueing

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

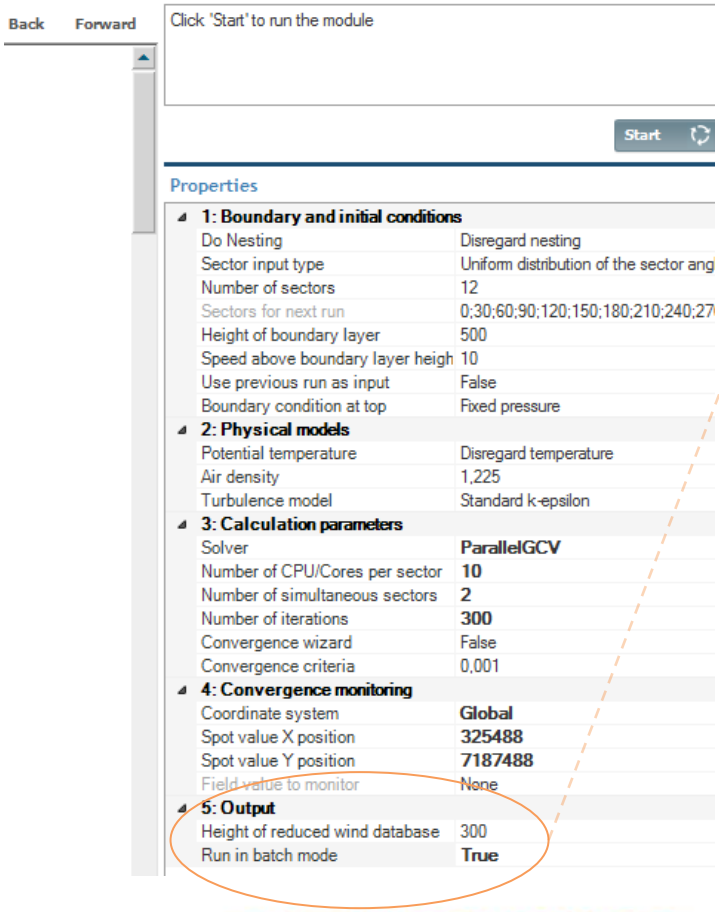


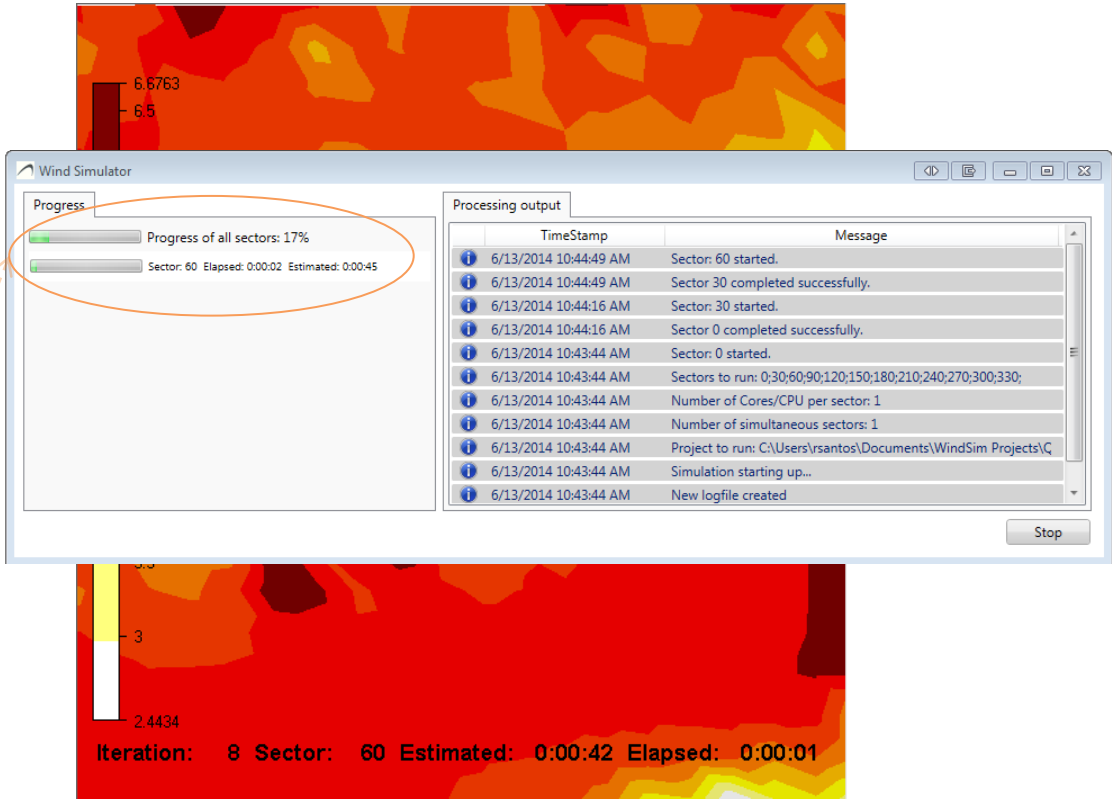
Running **N sectors** of **1 project** in parallel blocking the GUI



WindSim Queueing

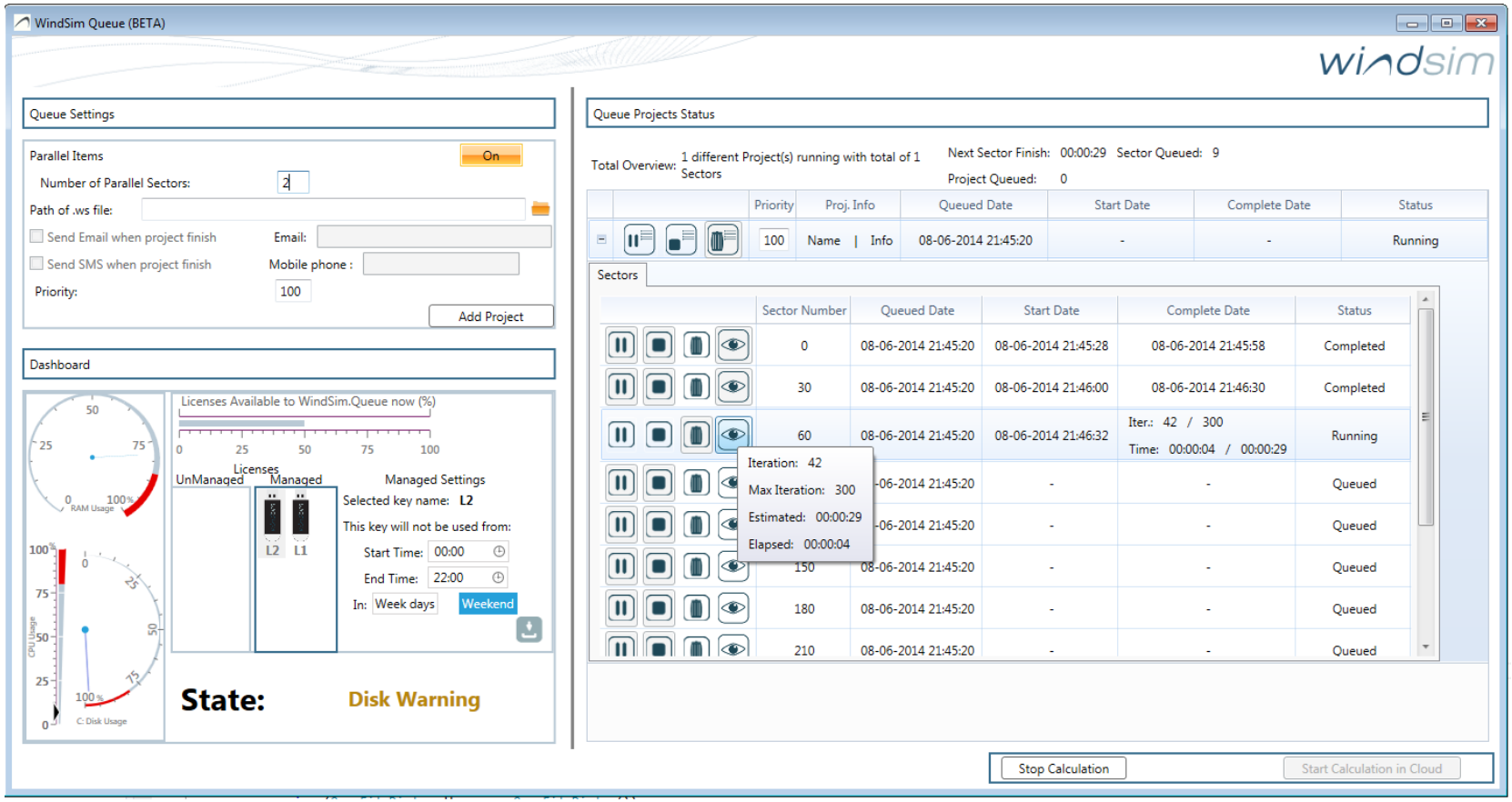
Running N sectors of 1 project
in parallel not blocking GUI





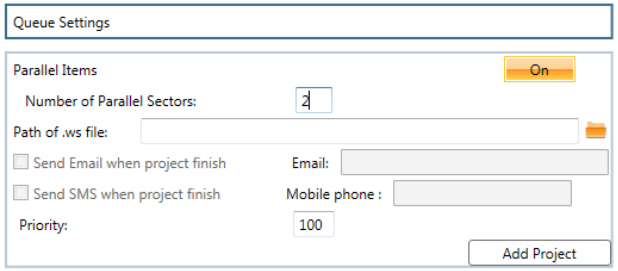
WindSim Queueing

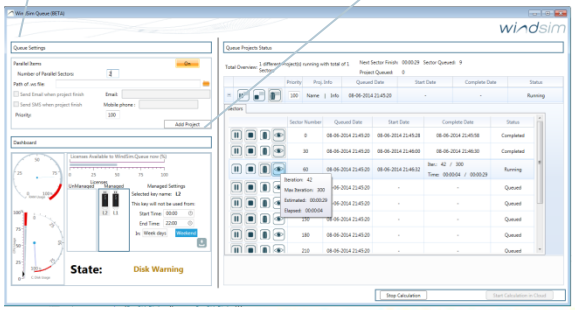
Running N sectors of N project
in parallel not blocking GUI



WindSim Queueing

Running N sectors of N project in parallel not blocking GUI



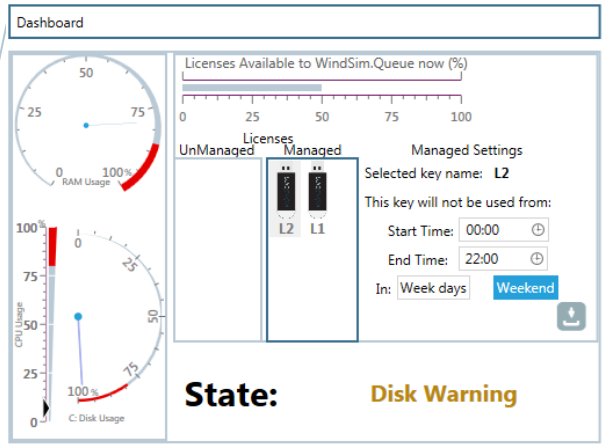


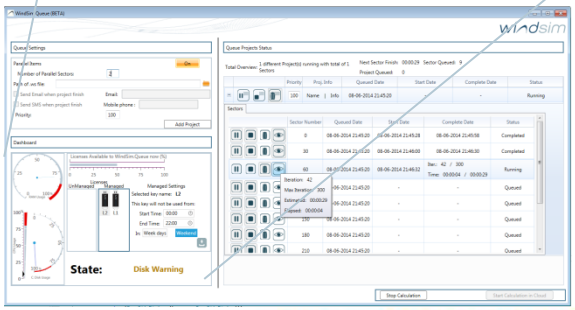
- **Queue Settings - Today**
  - Activate the parallel simulations
  - Define the number of sectors you want to run in parallel (each sector will use 1 Core)
  - Add project to Queue system providing the path to the .ws file
  - Define the Priority of the Project in the Queue (lower number bigger priority)

- **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

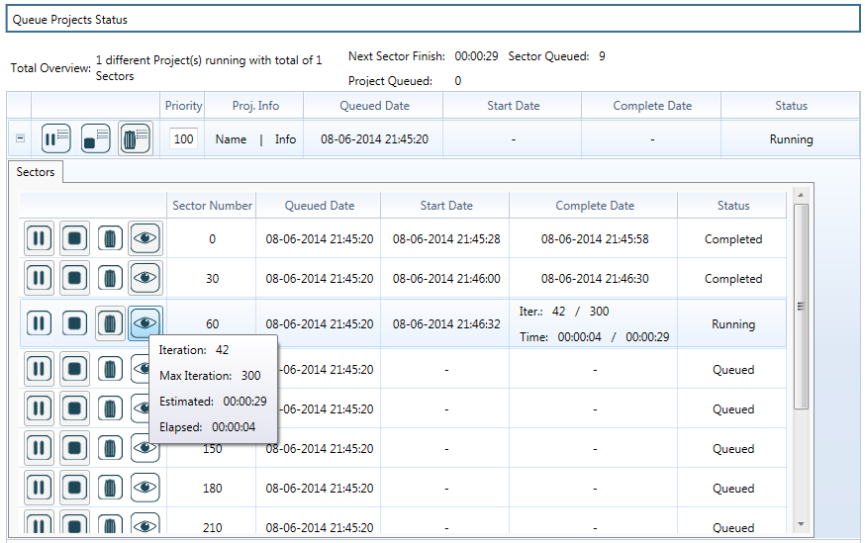


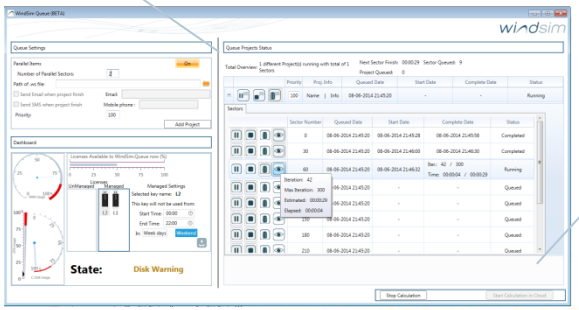


- **Queue Dashboard - Today**
  - See the status of the RAM
  - See the status of the CPU
  - See the status of C: drive
  - See System State – Warning-Critical Errors
  - See the number of Keys available for WindSim Queue
  - **Manage the license based on DateTime**
    - Use Drag&Drop to move Licenses 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

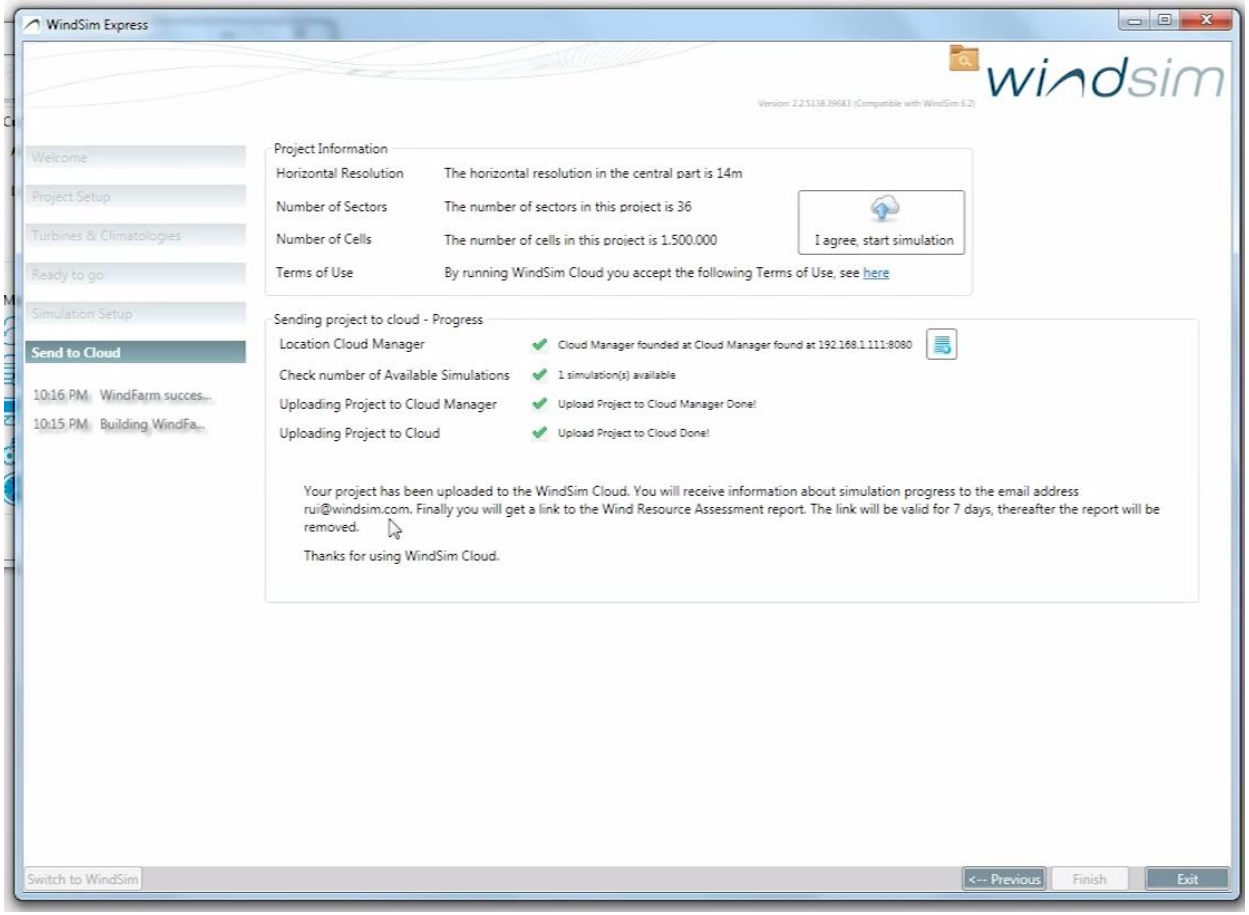




- **Queue Projects Status - Today**
  - See the total overview of Running Sectors and Queued
  - Change the priority of a project after it has been queued
  - See information about the project – Number of cells, Forest,….
  - See Project Queue Data, Start Date, Complete Date and Status
  - See all the 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

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 Micrososft 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 under WindSim Cloud menu

How to Create WindSim Cloud Account

How to Recharge WindSim Cloud Account

How to Upload a project to WindSim Cloud

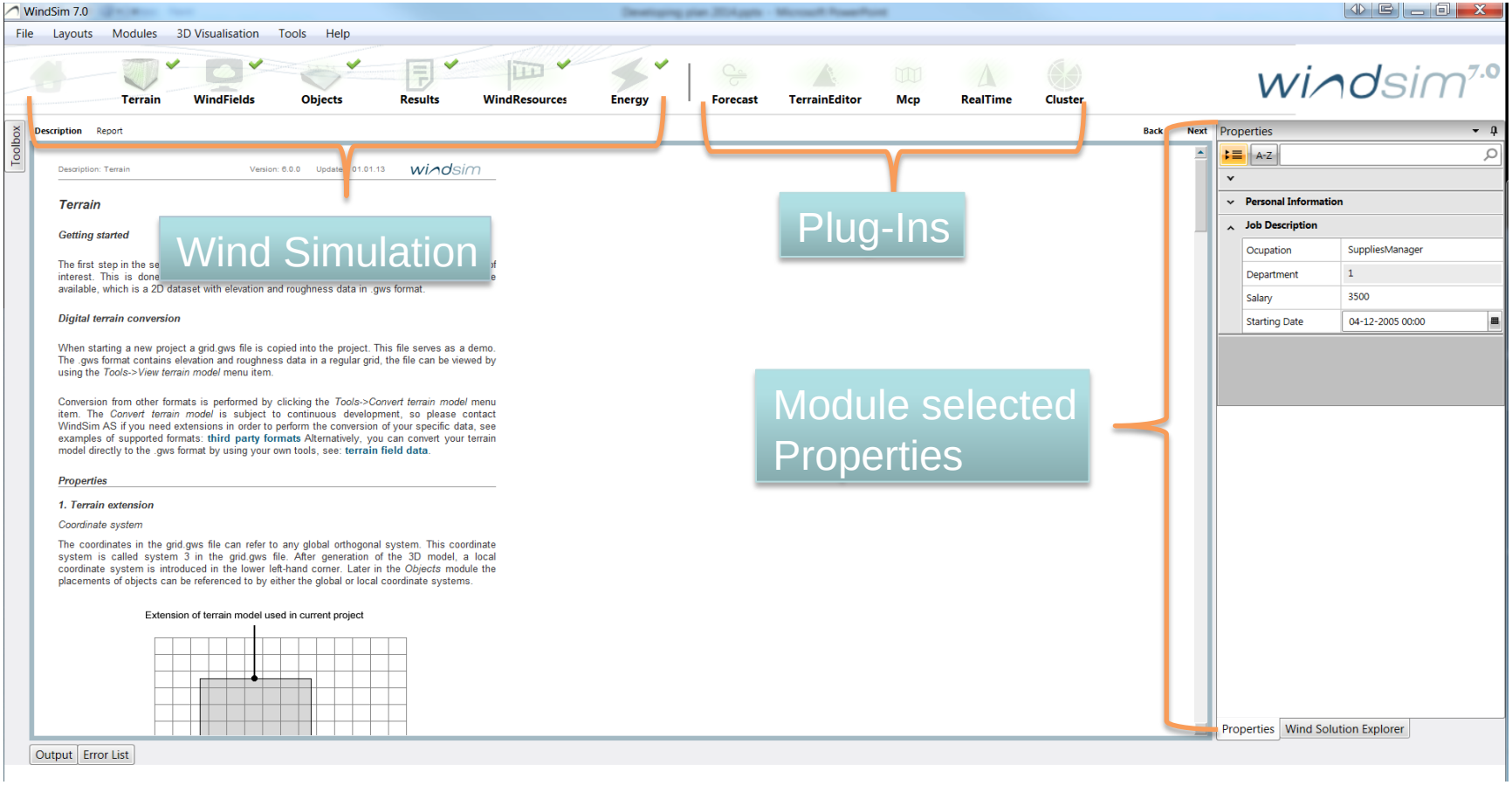
Future of WindSim 6.3, Forecasting, Queue…

Future - Plan

… the plan is only valid until it changes …

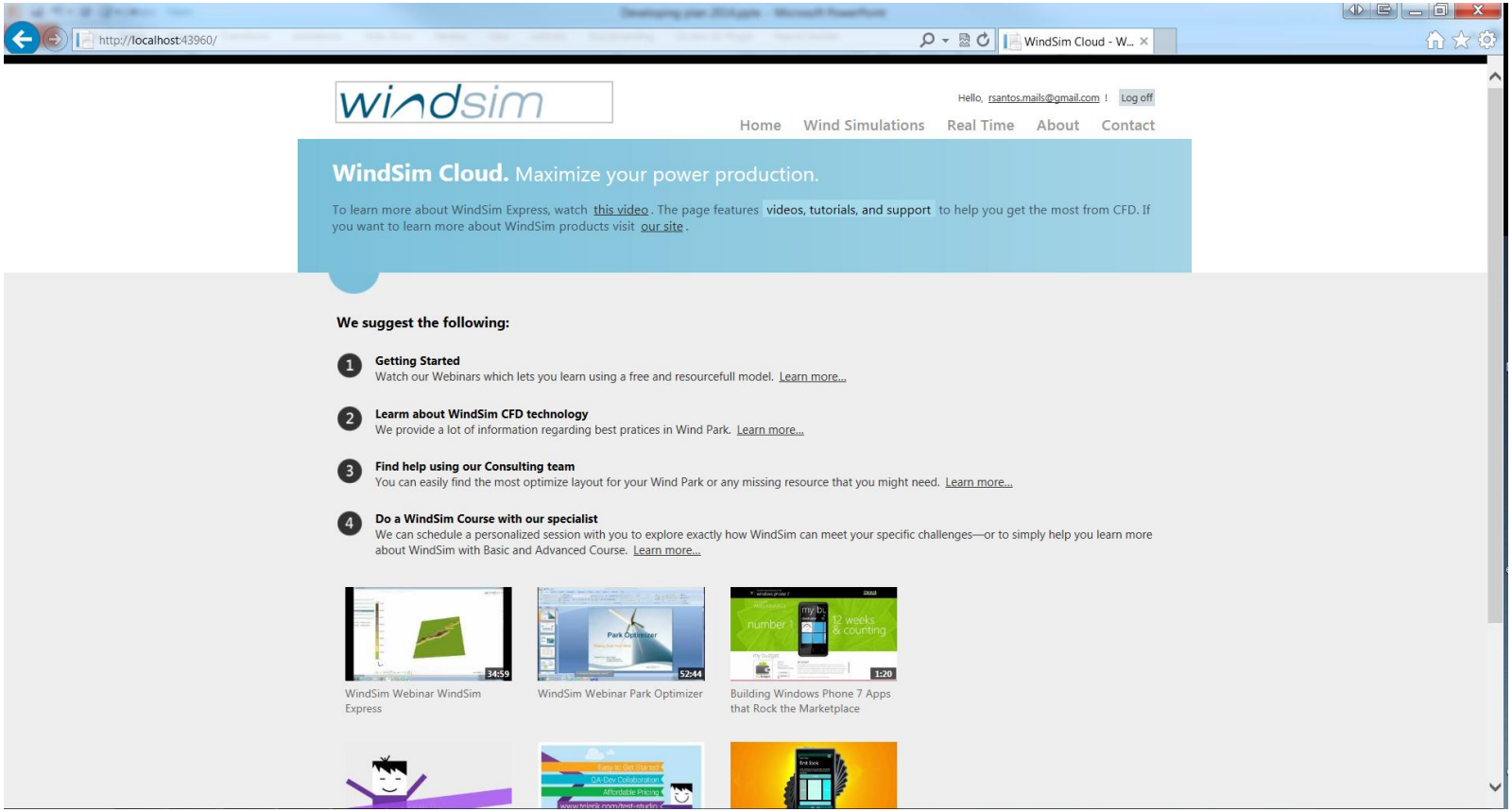
Future of WindSim 6.3, Forecasting, Queue…

All products in 1 place – WindSim ?.0



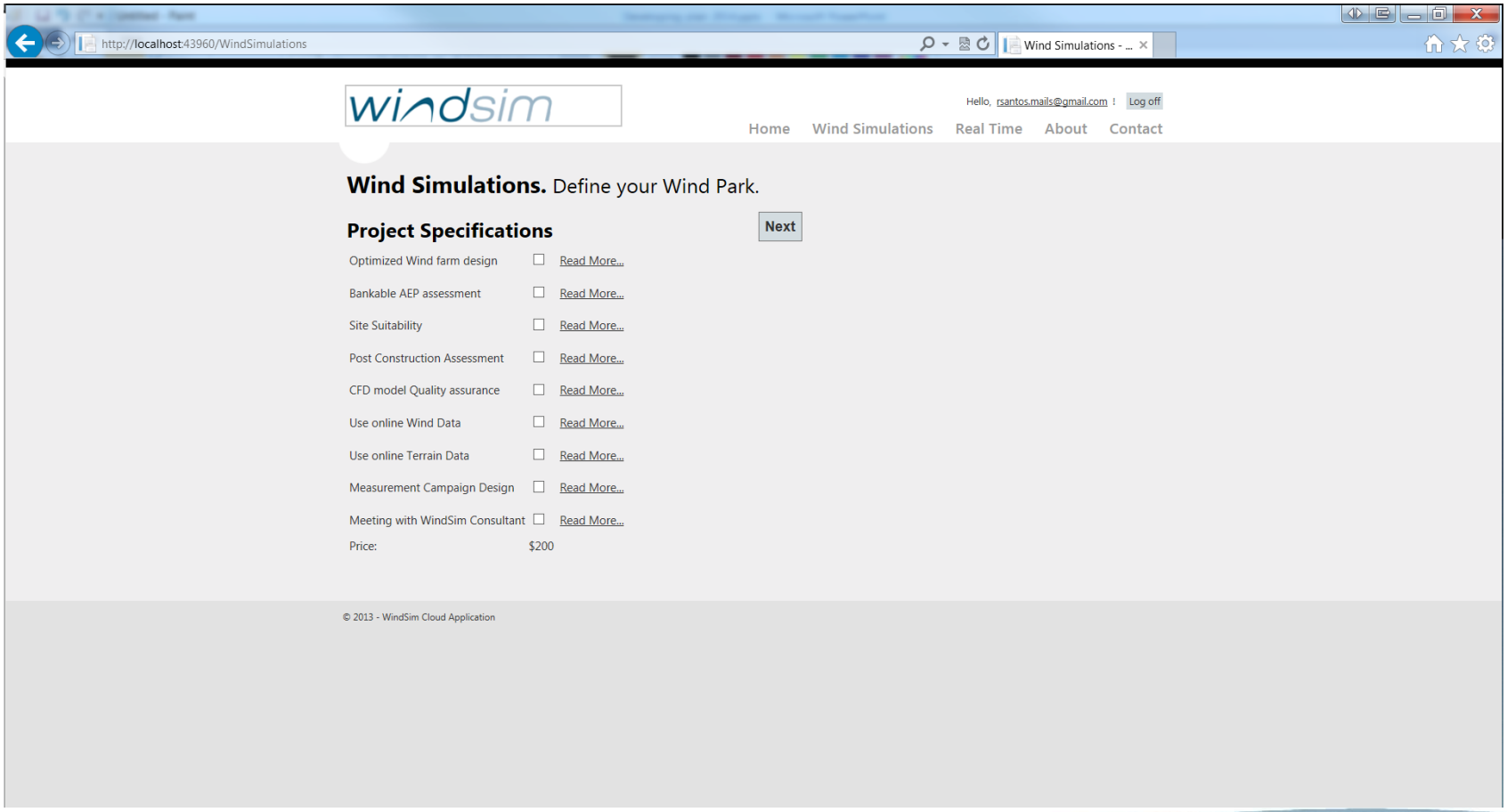
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Web based



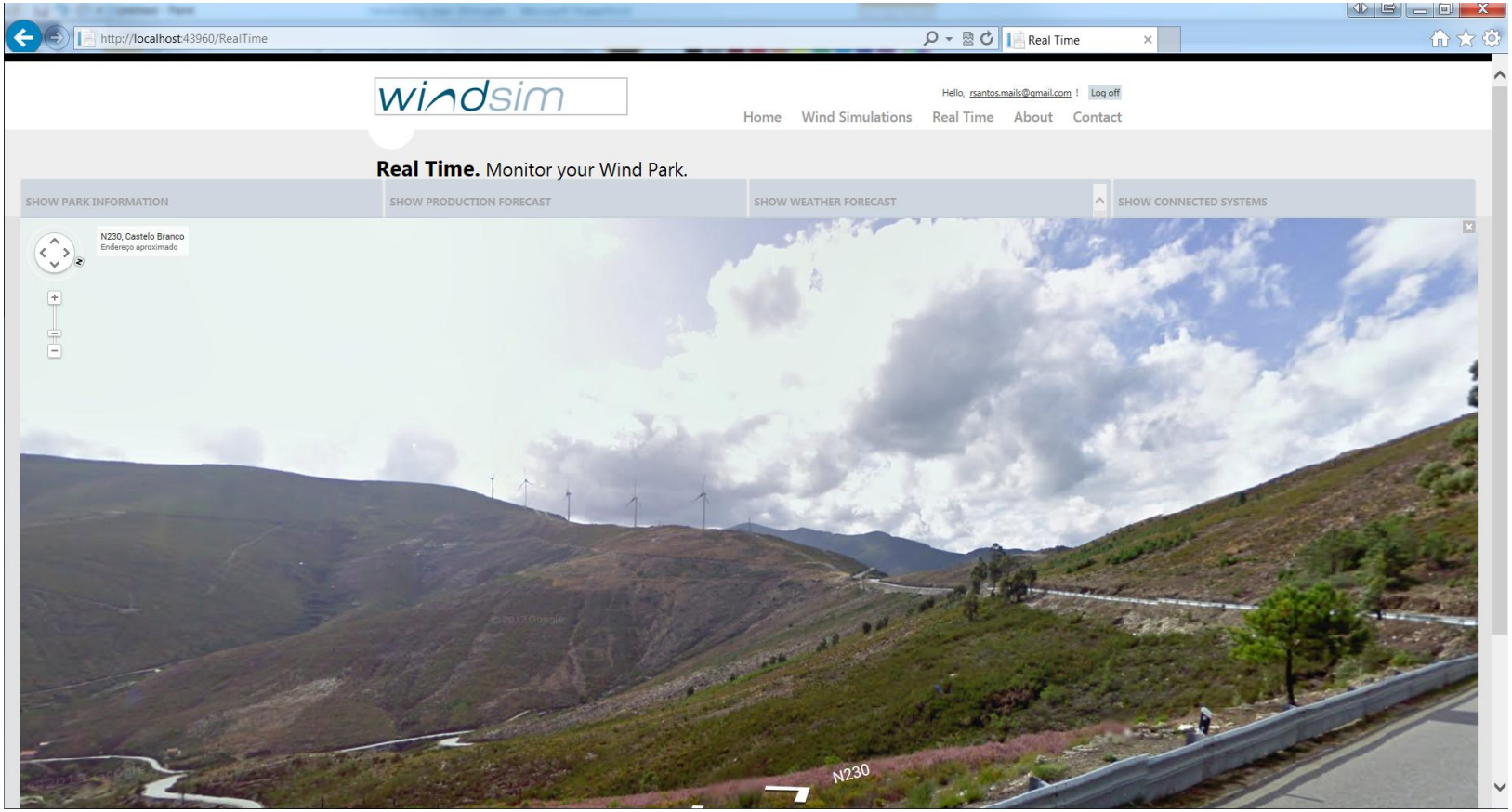
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Consultancy and Extra Services



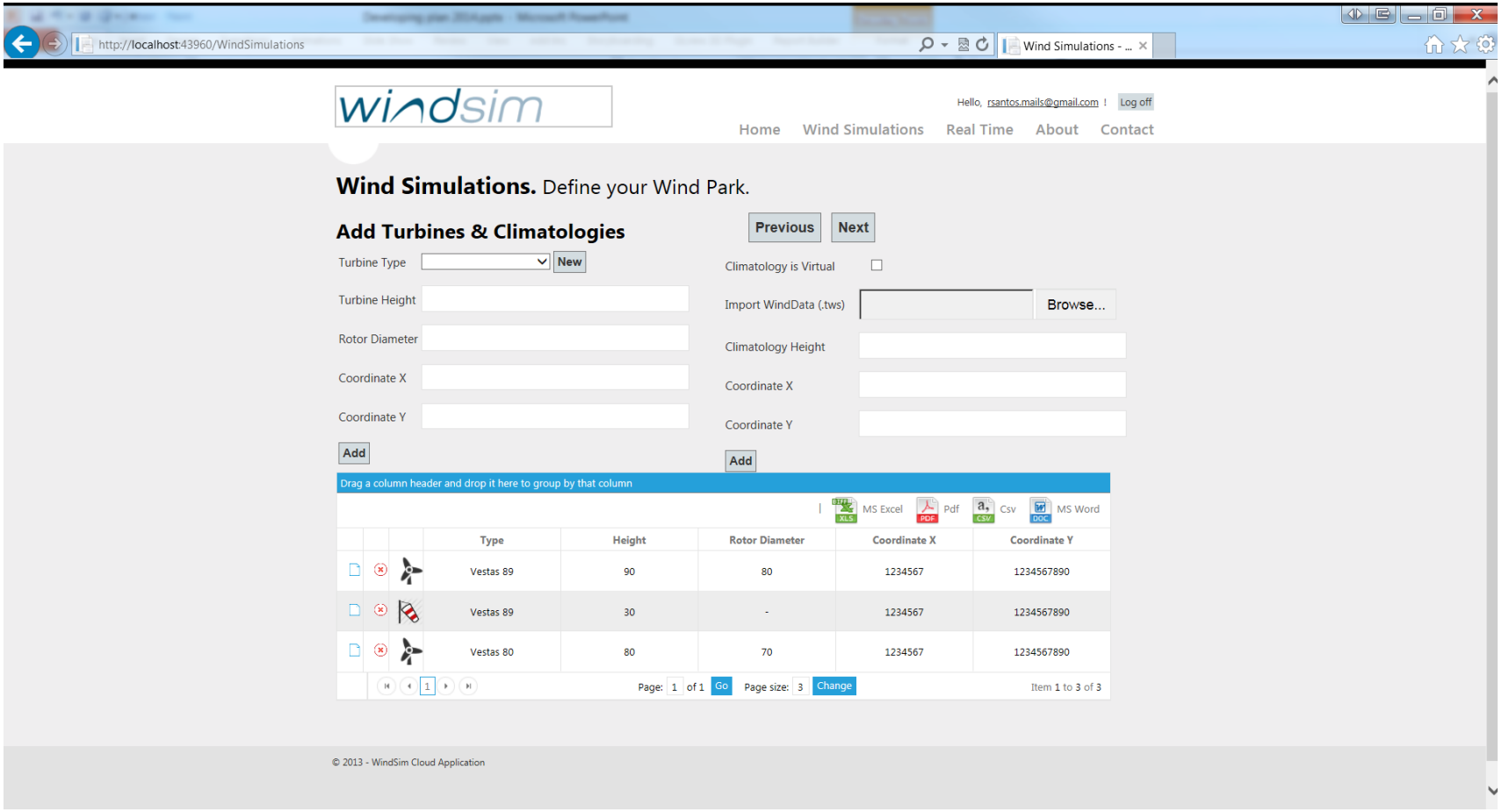
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Forecasting



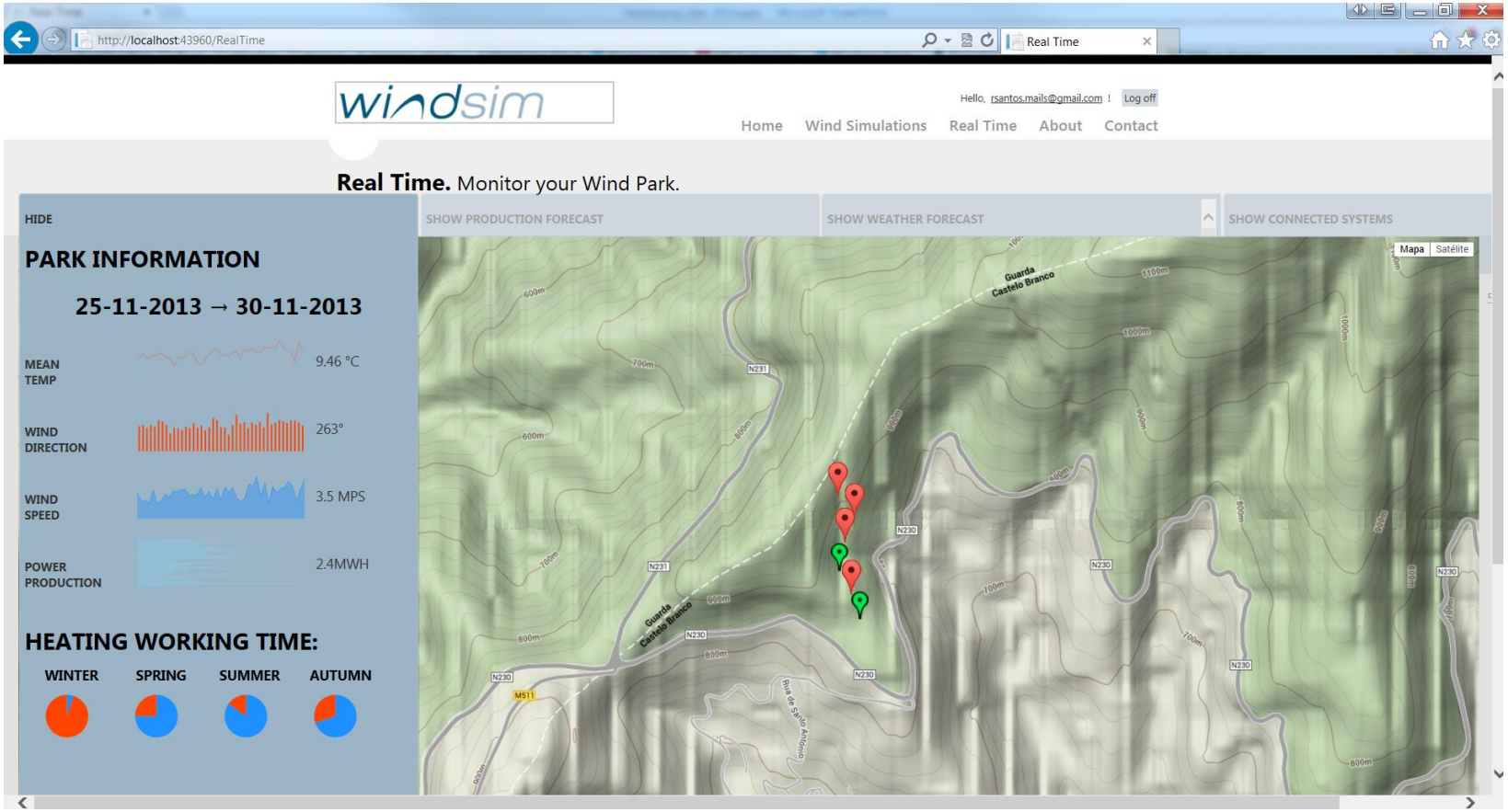
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Forecasting & Real Time



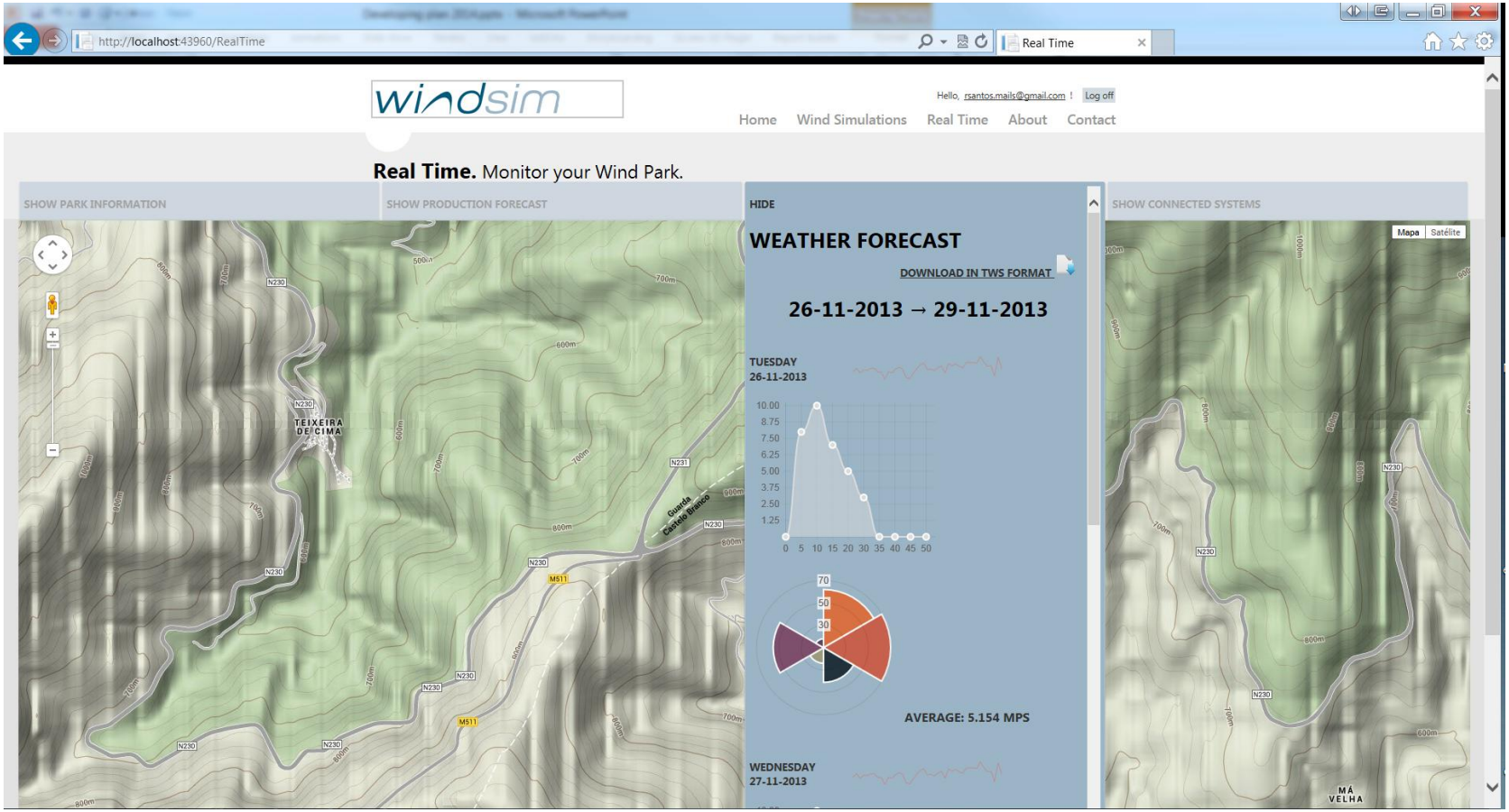
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Forecasting & Real Time



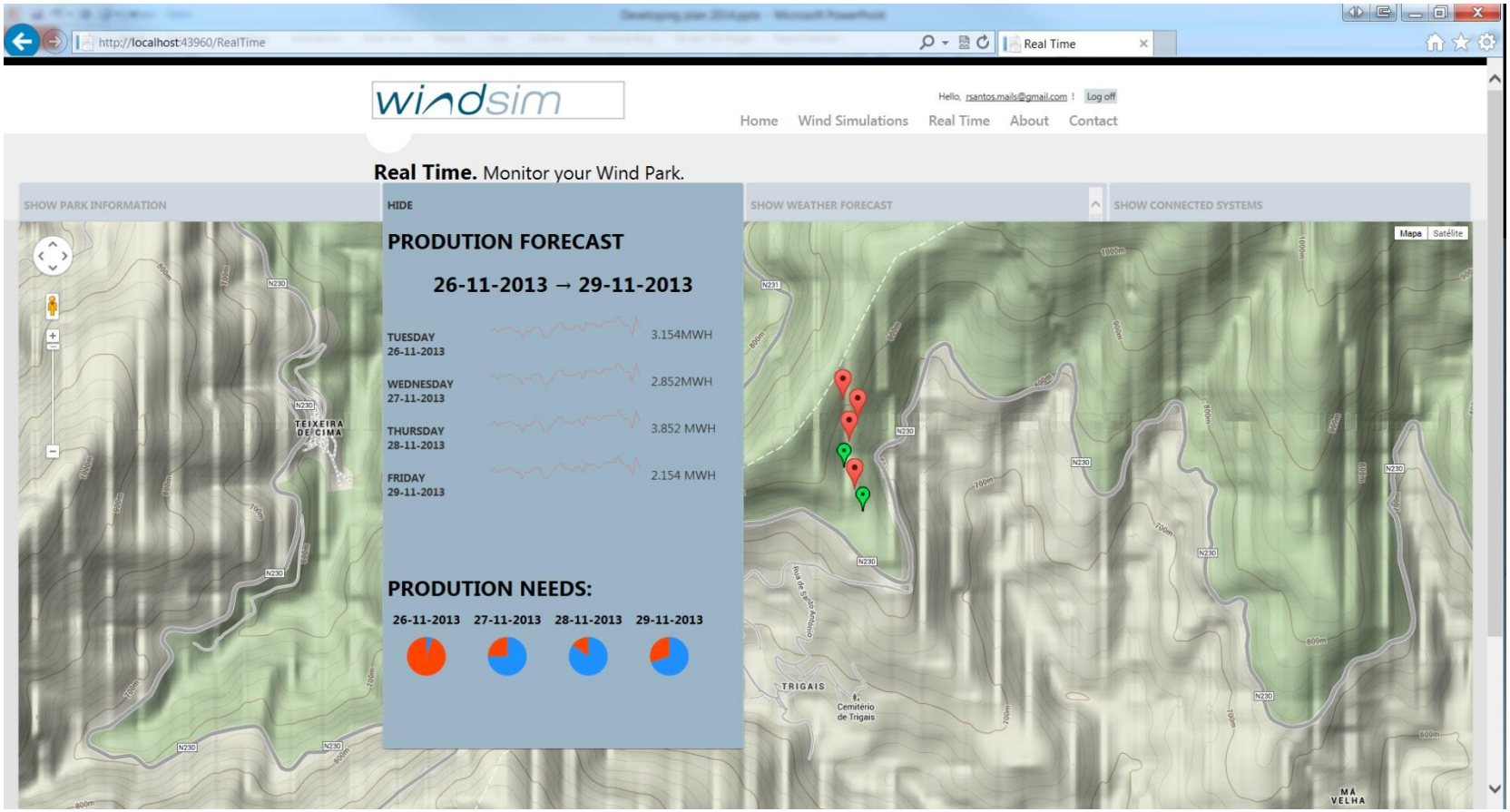
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Forecasting & Real Time



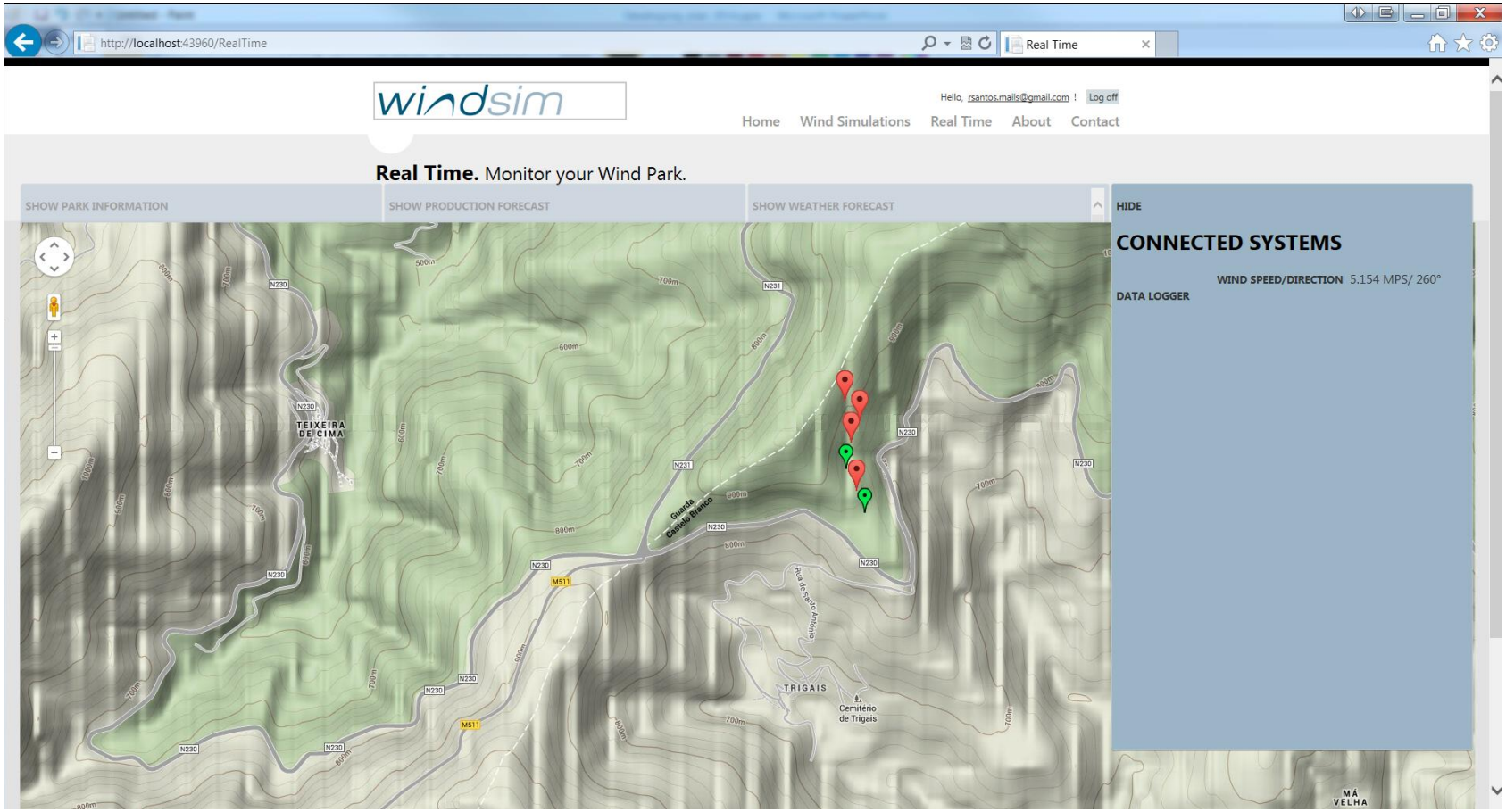
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Forecasting & Real Time



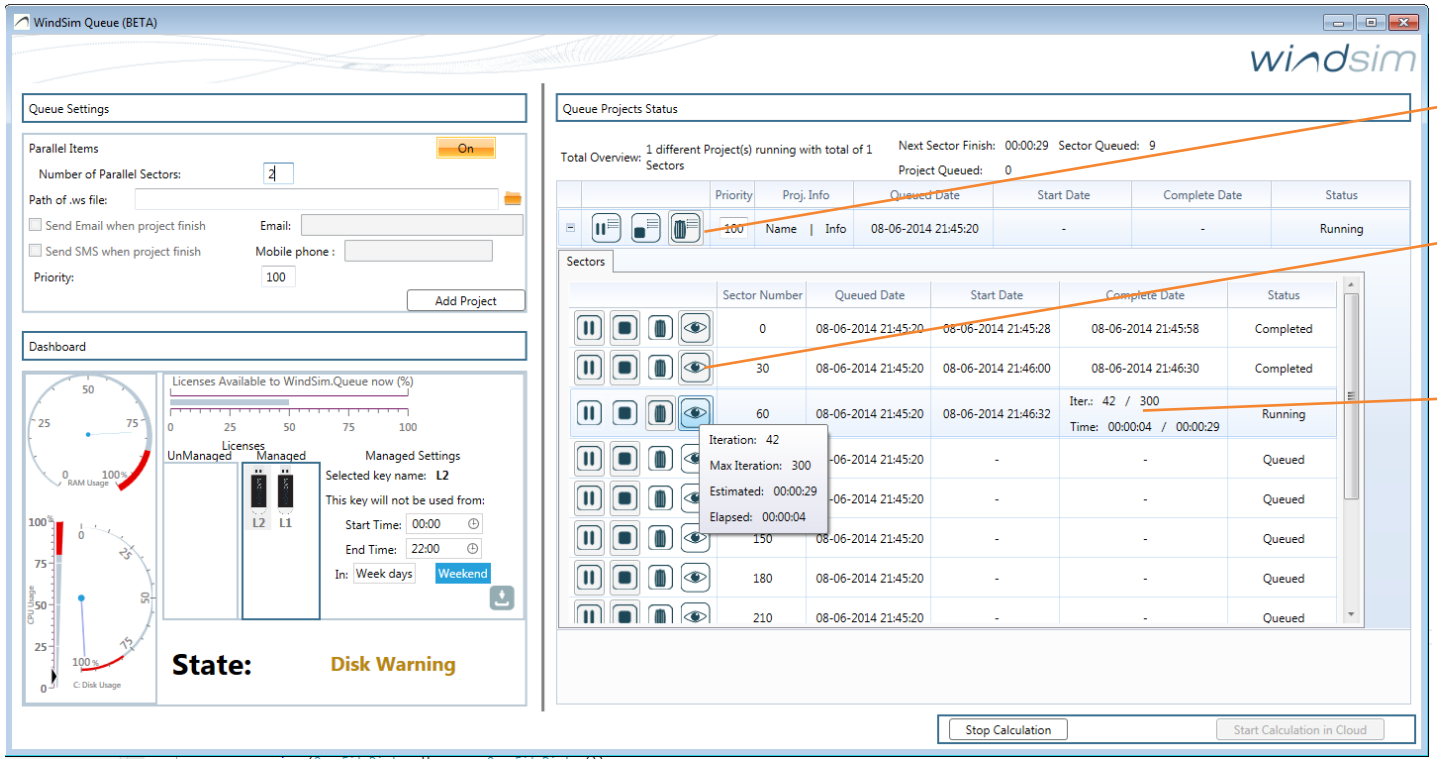
Future of WindSim 6.3, Forecasting, Queue…

WindSim Services – Forecasting & Real Time



Future of WindSim 6.3, Forecasting, Queue…

WindSim Queue – Integration with Cloud



Send all sectors to the Cloud

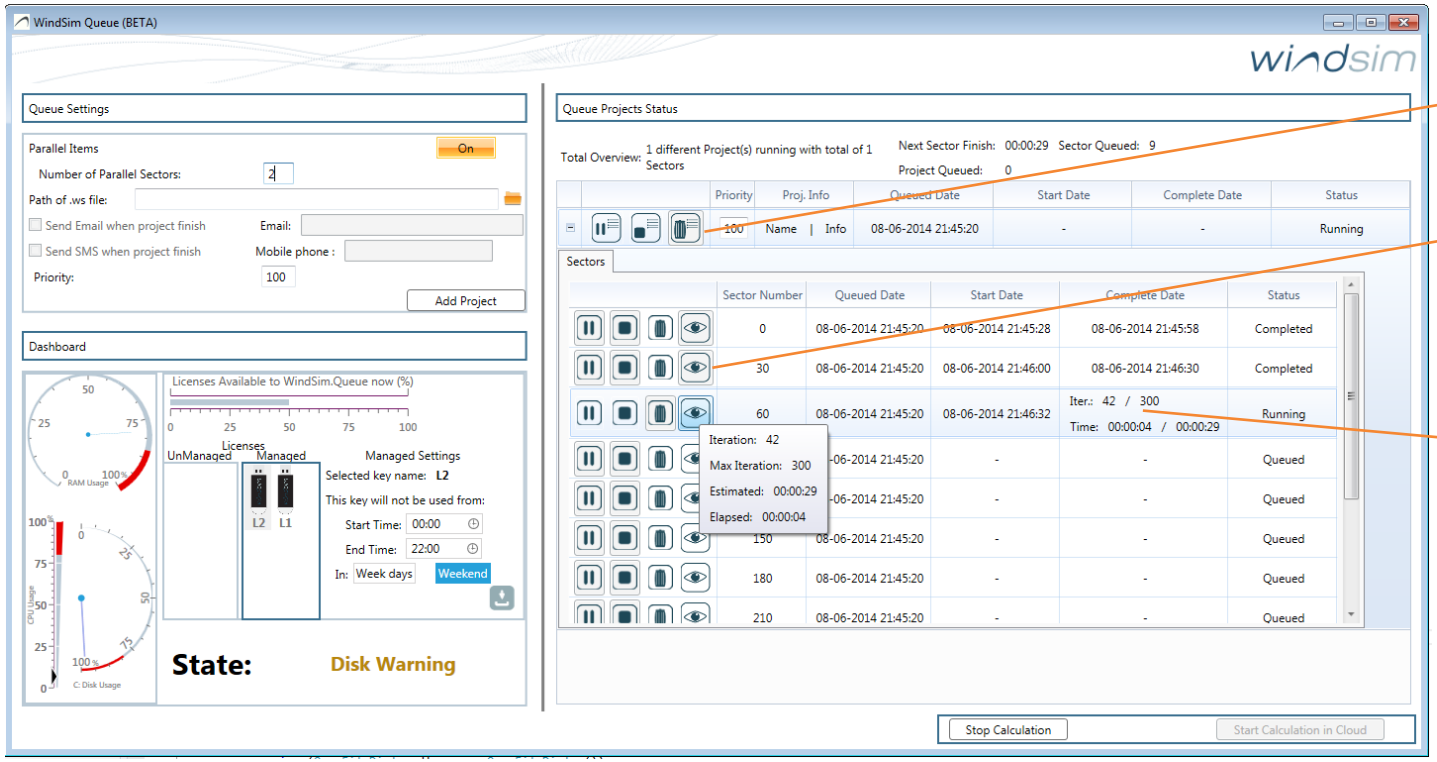
Send individual sectors to the Cloud

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



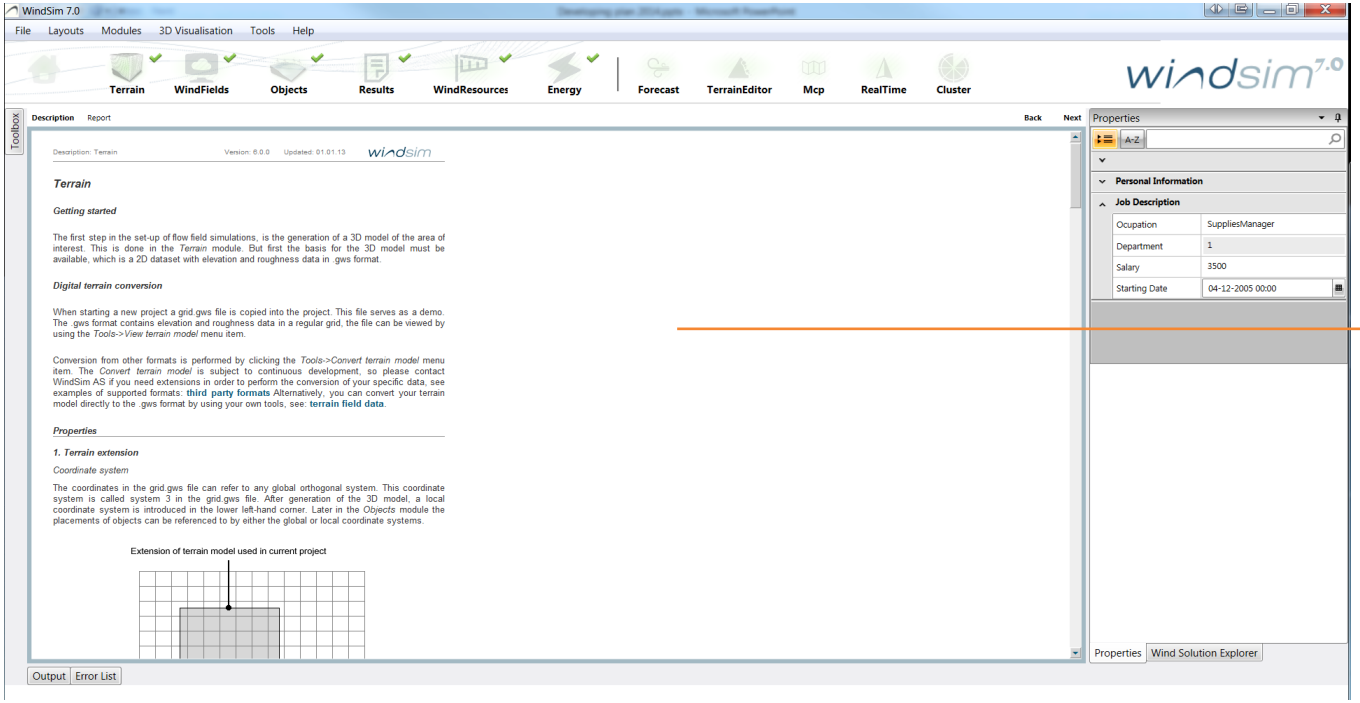
Distribute all sectors to available machines

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?

THANK YOU

Email:

rui.santos@windsim.com