

SOFTWARE SOLUTIONS

FLOWSTAR-Energy

MODELLING AIRFLOW IN COMPLEX TERRAIN



A validated model with global recognition

FLOWSTAR-Energy has been validated through use in several air quality monitoring studies, and has been studied in numerous scientific publications.

Easy to use

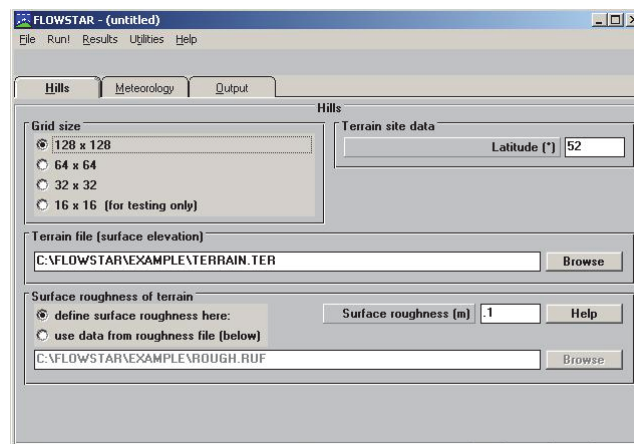
FLOWSTAR-Energy features a user-friendly interface; it only takes a few clicks to parameter the model.



The FLOWSTAR-Energy model produces 3-D wind field and turbulence predictions using global met. data, and factoring in the effects of hilly terrain and land occupation.

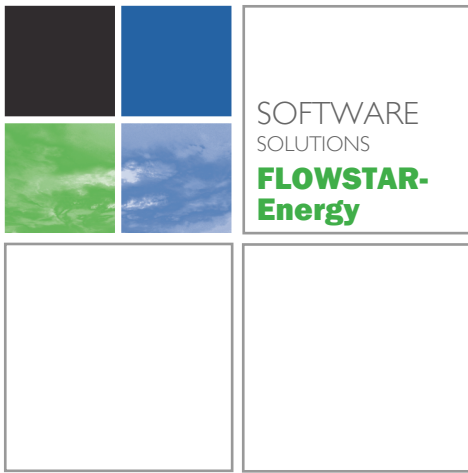
A decision support tool

- Forest fires: detailed prediction of wind fields in order to study fire propagation in rugged terrain. On-the-spot predictions enabling direct in-the-field use in operating mode.
- Wind farm potential: detailed assessment of areas with the most potential for wind farm planning based on an analysis of wide-scale meteorological conditions. Production of a wind farm atlas.
- Wind farm: calculation of wind turbines wakes, their interactions and their effects on wind field and on energy resource.
- Engineering/construction: fine-scale prediction of turbulence and wind conditions in the vicinity of wind-sensitive structures.
- Pollutant dispersion studies: all ADMS atmospheric dispersion models include FLOWSTAR-Energy for the calculation of plume trajectories and pollutant spread in complex terrain.



A system able to factor in complex phenomena

- Models the effects of topography and variable surface roughness on airflow.
- Factors in the effects of atmospheric stability into the calculation.
- "Reverse flow" phenomena.
- 3-D, high-resolution (approx. 100 m) field calculations on several vertical levels and up to an elevation of 2,000 metres.



Technical support

Our engineers provide online technical support, tutorials, and customized advice on how to conduct even the most complex of your studies.

Recommended configuration

The FLOWSTAR-Energy model runs under Windows 7, Windows 8 et Windows 10.

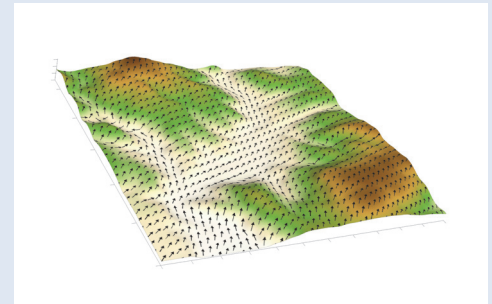
RAM: 128 Go.

Available disk space: 1 Go.

Technical features of the FLOWSTAR-Energy model

Methodology

- Linear diagnostic computer code based on the theoretical work of Jackson & Hunt (1975).
- Use of analytical solutions for continuity and motion quantity equations (Navier Stokes).
- Airflow is divided into 3 layers that each factor in the relative effects of stratification and shear stresses.

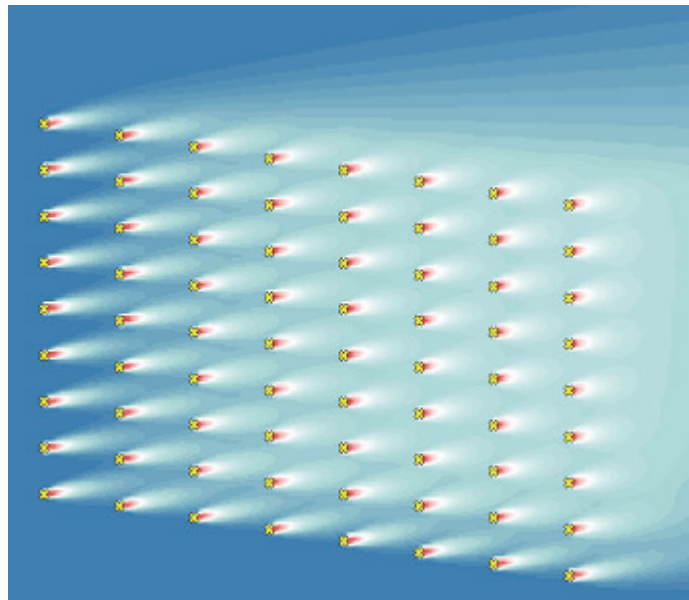
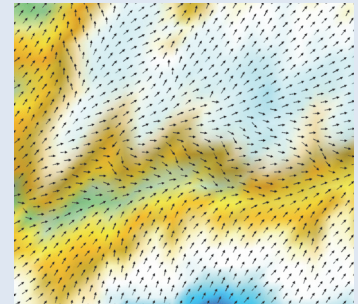


Input data

- Digital terrain data (DTM) in XYZ format (IGN data conversion utility included).
- 2-D surface roughness terrain data (optional).
- Met. data widely used for atmospheric dispersion software: wind speed and direction, temperature, turbulence or radiation (Météo France data converter included).

Model output data

- Turbulence and wind fields reconstructed on a calculation grid, at the altitude specified by the user.
- Results supplied for a weather condition or averaged for a weather record (one year, for example).
- Results presented as wind vector plots or iso-velocity (u, v and w components).
- The turbulence and wind fields predicted by FLOWSTAR-Energy can be directly plotted via SURFER.



FLOWSTAR-Energy is used to calculate wind turbines wakes and their effects on wind field.

FLOWSTAR is developed by CERC, Cambridge Environmental Research Consultants Ltd.