Weather Intelligence for Wind Energy
WILL4WIND

Weather Intelligence for Wind Energy - WILL4WIND - Inovativna meteorološka podrška upravljanju energijom vjetra

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Ovaj projekt financira EU

Science and innovation investmen fund, contract no. IPA2007/HR/16IPO/001-040507

Meteorološki izazovi 3 Ekstremne vremenske prilike i utjecaj na društvo
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What are the key interactions of meteorology and wind energy?

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1. Wind resources (meas, model, IAV, projections)

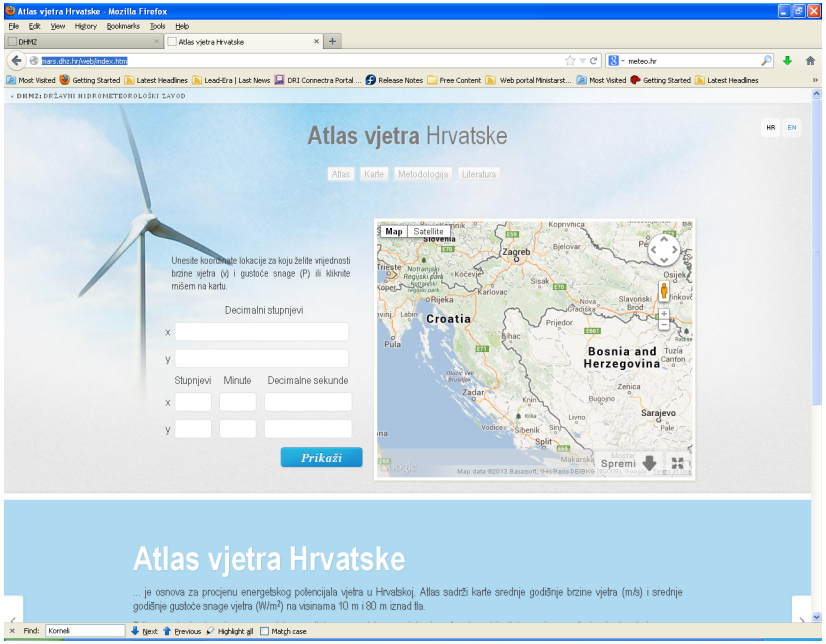
- Estimations inaccurate, typically overestimated

2. Prediction technologies on a range of scales

- Wind variability complicates grid integration
- Occasional large errors scale the system

3. Design, loads and wind turbine control

- Wind turbines are failing faster than predicted
- They are not designed for extreme weather conditions



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What means to manage energy?

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Wind energy management is

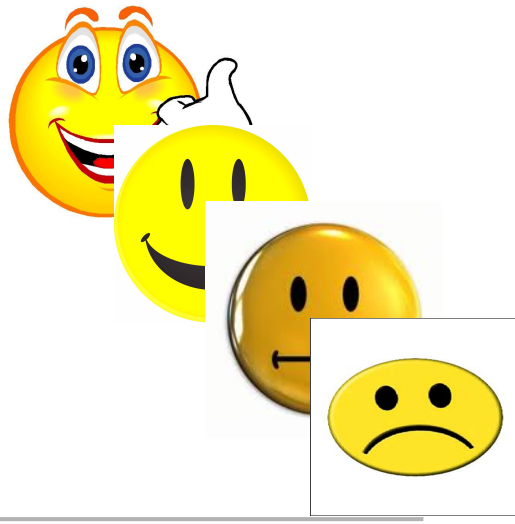
- Knowing what to do with produced energy
- How frequent is balance of production and consumption?

This is far from a simple problem:

- Includes knowing and predicting production, consumption
- Issues of transmission, energy markets, reserves, even politics
- Variability and predictability are key words

Predictions:

- Required for efficient (wind) energy management
- Required forecast horizons from seconds to decades in complex terrain
- Required realistic treatment of wind prediction uncertainty in complex terrain
- Q: Which forecast range is currently the greatest challenge to wind energy development *in Croatia*?



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WILL4WIND „factsheet”:

- Starting date: 10.4.2013.
- Duration: 24 months
- Cost: 535.863,41 EUR
  - 438.336,27 EUR from EU
  - 97.527,14 nacional co-financing
- Grant scheme: IPAIIIc, Science and innovation investment fund (www.siif-croatia.com)

- 22 persons in the project team, from 5 institutions
- 4 young researchers employed (2 DHMZ, 2 FER)
- From this grant scheme, 4 young researchers in 2013 employed for 2 years at DHMZ (DHMZ- Iris Odak, Josipa Kuzmić, Mario Hrastinski, Igor Horvat)

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Project consortium: "handling all aspects"

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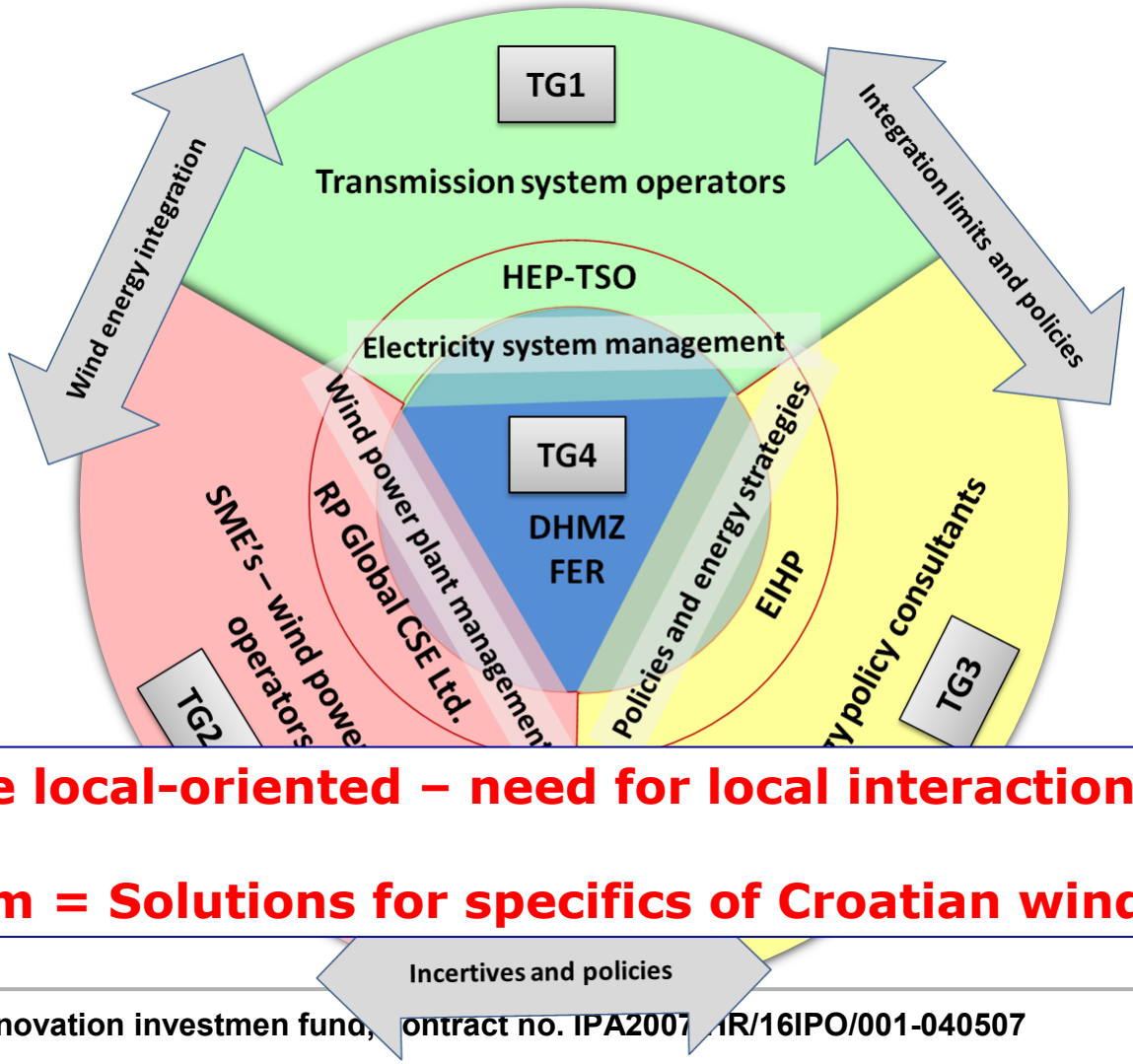
1. DHMZ
2. FER
3. HOPS
4. EIHP
5. RP GLOBAL Projekt

(6. Končar Institut)



Energy systems are local-oriented – need for local interactions

Croatian consortium = Solutions for specifics of Croatian wind climate

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ALADIN model chain

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- A set of dynamical refinements

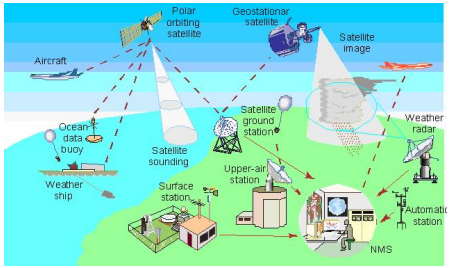
GLOBAL MODEL ARPEGE/IFS
Grid spacing ~12 km

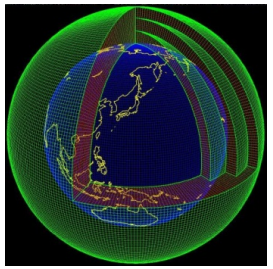
↓

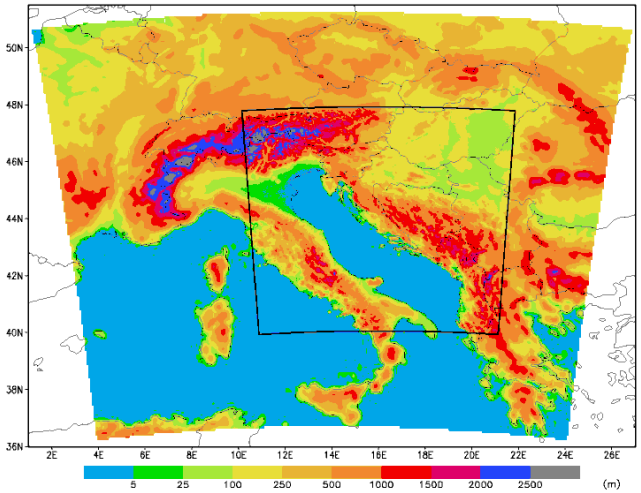
REGIONAL REFINEMENT1
Grid spacing ~ 8 km
Mesoscale data assimilation

↓

SUBREGIONAL REFINEMENT2
Grid spacing ~ 2 km







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Specific goal 1

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Goal 1:
Enhance weather prediction system (DHMZ,FER)

Enhance ALADIN weather prediction model

Develop ultra-short range wind forecast (0-3 h)

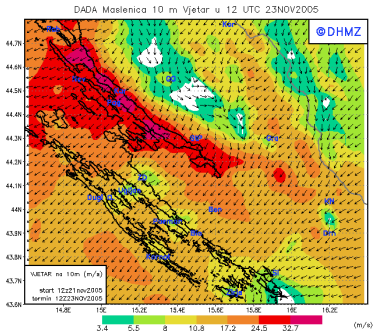
STATE-OF-THE-ART REGIONAL MODEL

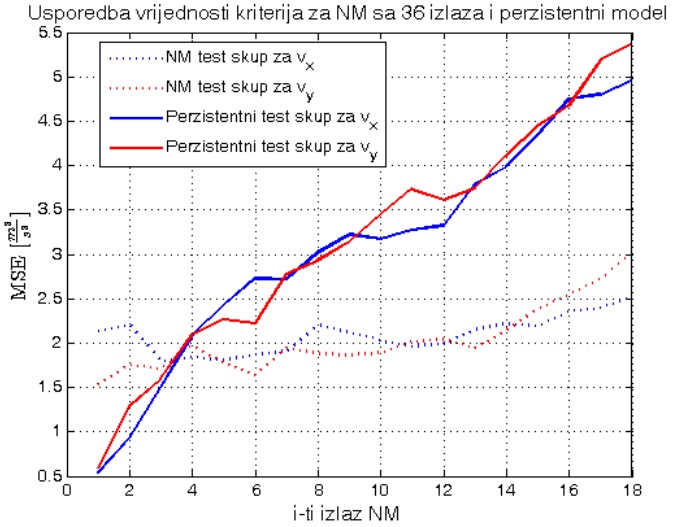
- Advance mesoscale data assimilation (currently ~100.000 observations)

+

LOCAL REFINEMENT

- Grid spacing ~ 1 km





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Specific goal 2

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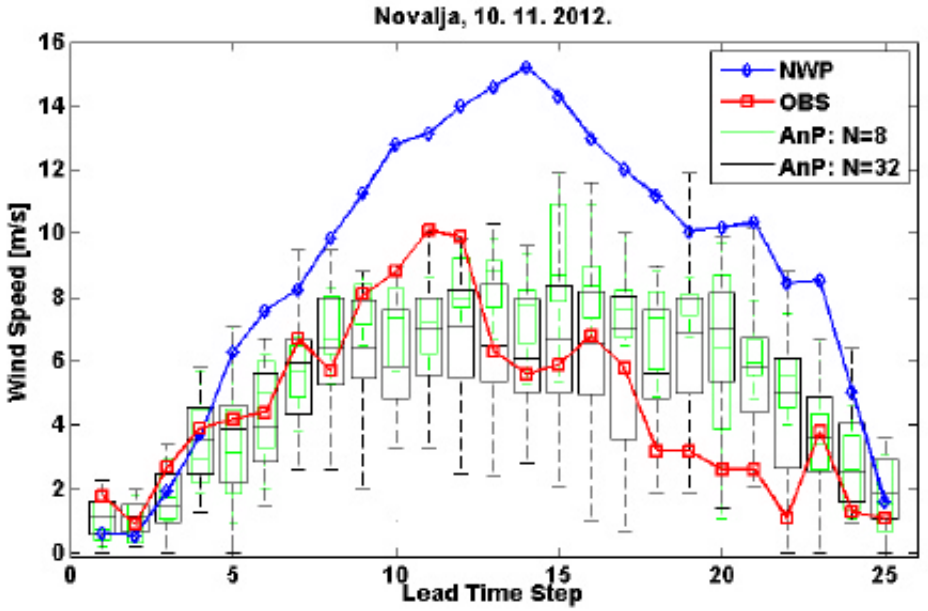
Goal 2:
Estimate errors and uncertainty intervals of wind precitions

Develop probabilistic wind prediction model

Enhance monitoring system



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Specific goals 3 & 4

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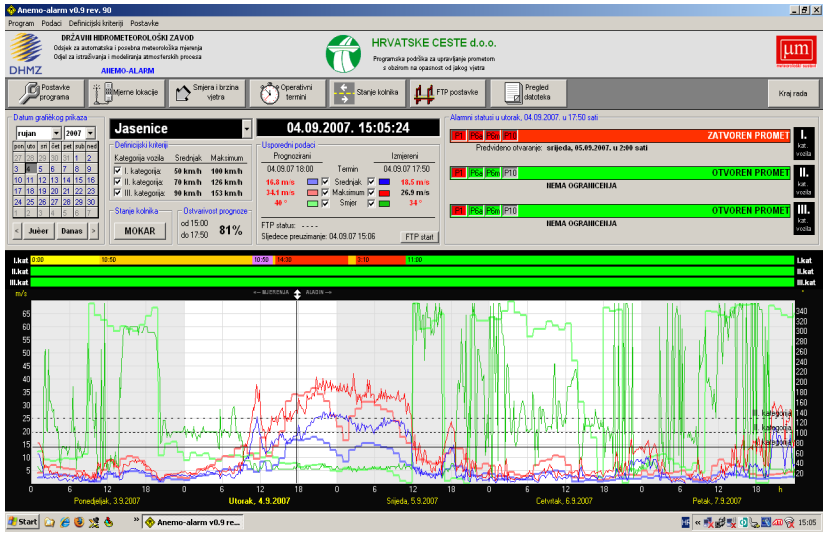
Goal 3:
Integrate developed technologies into forecasting and energy management processes



Goal 4:
Raise awareness of applied meteorological research

Workshops, panels, newsletters, conference etc.

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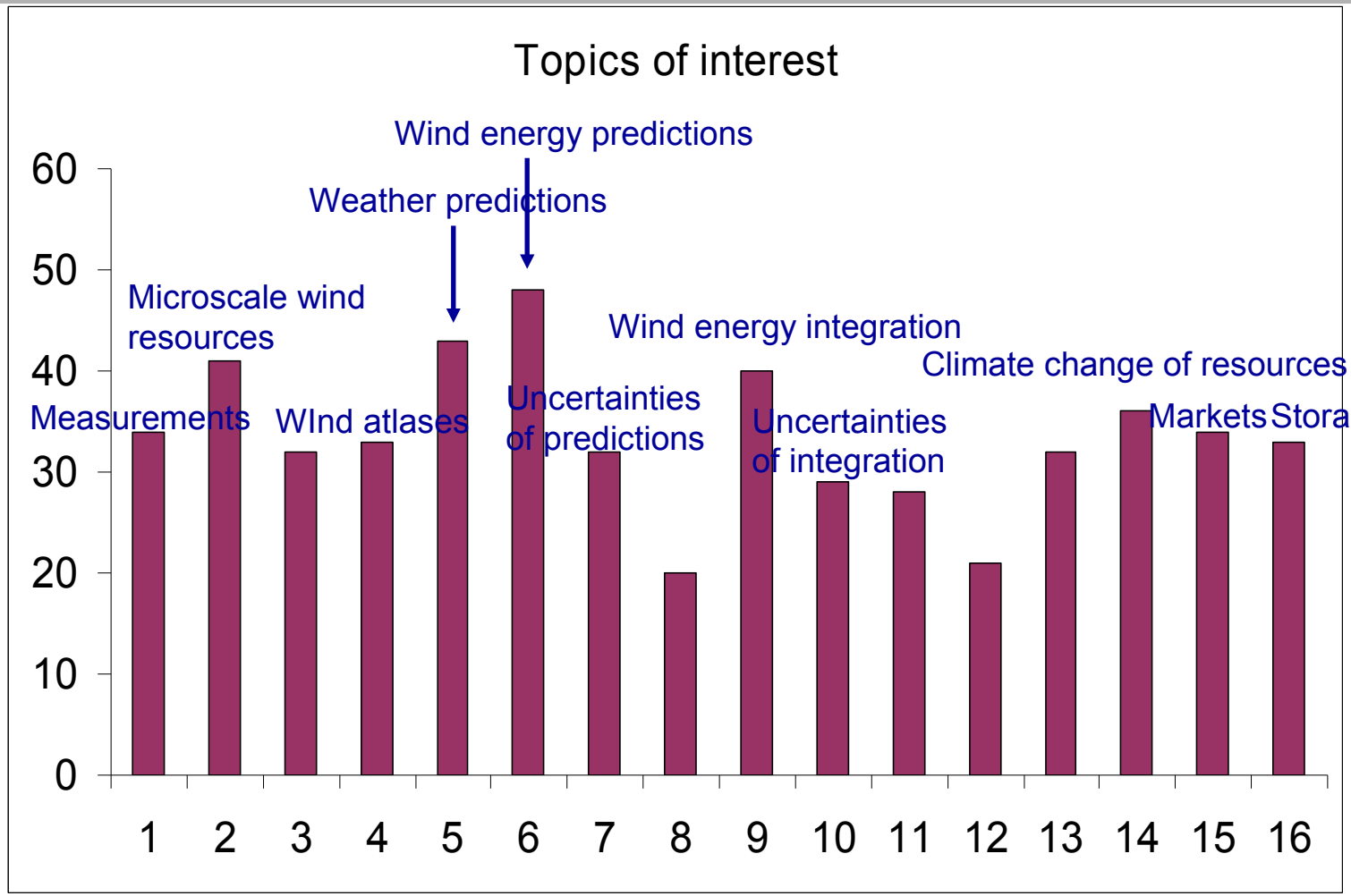
1. WILL4WIND workshop (67 participants, 25 institutions)



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Conclusions

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- Meteorological aspects of wind energy are important, but are only one piece of a puzzle

- There is a substantial gap between meteorology and wind energy sectors, but there is an increasing interest for interaction

- Meteorologists need to showcase their methods and technologies are useful, and better understand the real needs of the wind energy sector

- WILL4WIND is a unique opportunity to strengthen collaboration between meteorology, ICT and energy sectors

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Thanks for your attention!
Hvala na pažnji!

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