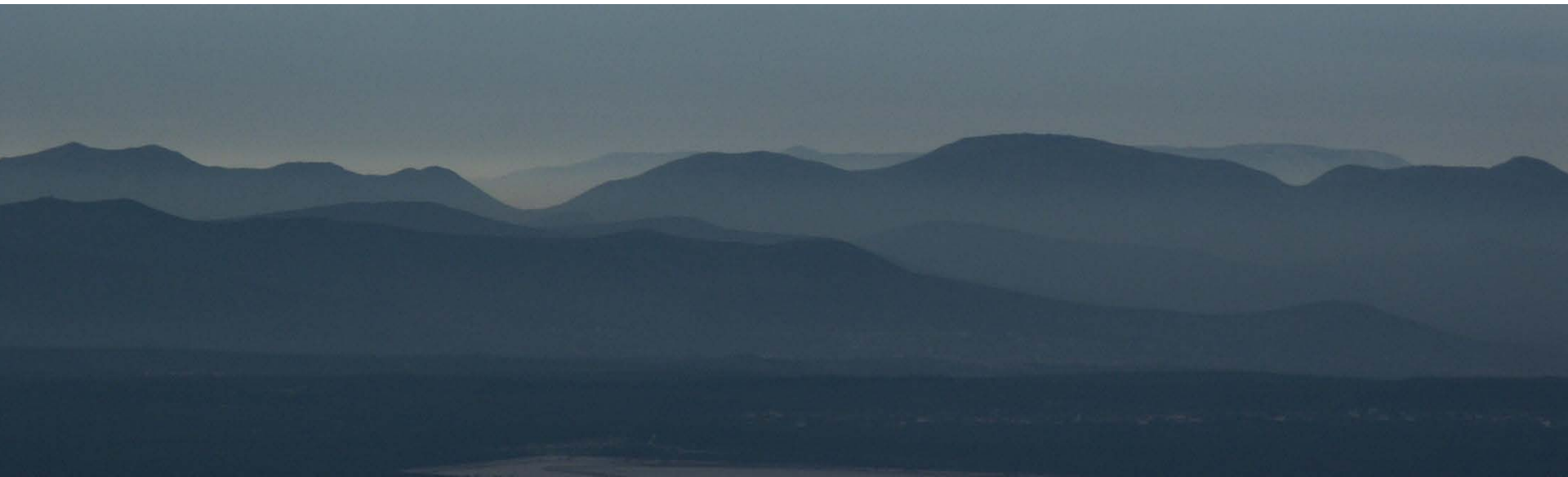


SEEWIND

Experiences of three Project Developers
in Croatia, Serbia and Bosnia-Herzegovina



Andreas Krenn, Energiewerkstatt



FP6 Project SEEWIND

Verein
energiewerkstatt^o

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PROJECT KEY DATA

R&D Project Objectives:

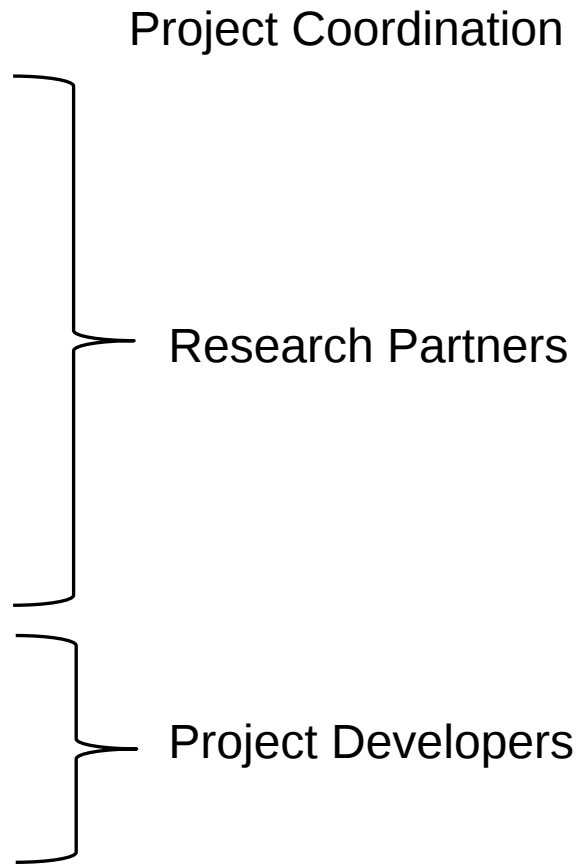
- To test innovative measurement and simulation techniques for complex terrain (SODAR/LIDAR)
- To gain more knowledge about wind potential in SE-Europe
- To standardize and harmonize building codes for wind turbines in SEE
- **To construct Multi-MW wind turbines at three different sites in Croatia, Bosnia-Herzegovina and Serbia**
- To gain knowledge in constructing and operating wind turbines at sites with complex terrain and specific local wind conditions
- To provide an impulse to wind energy exploitation in SEE

Financing:

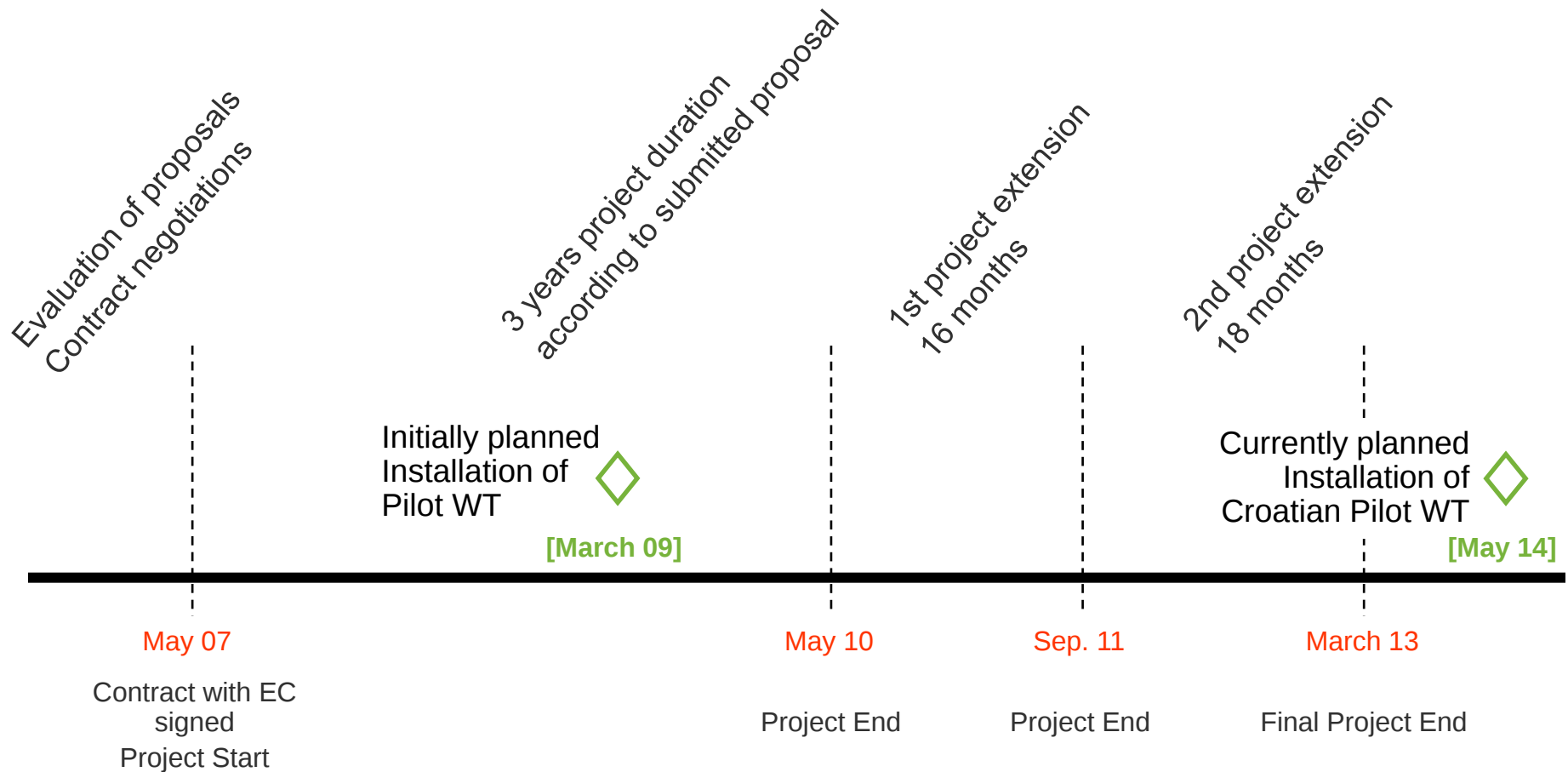
- Funds from European Commission € 3,7 Mio.

PROJECT CONSORTIUM

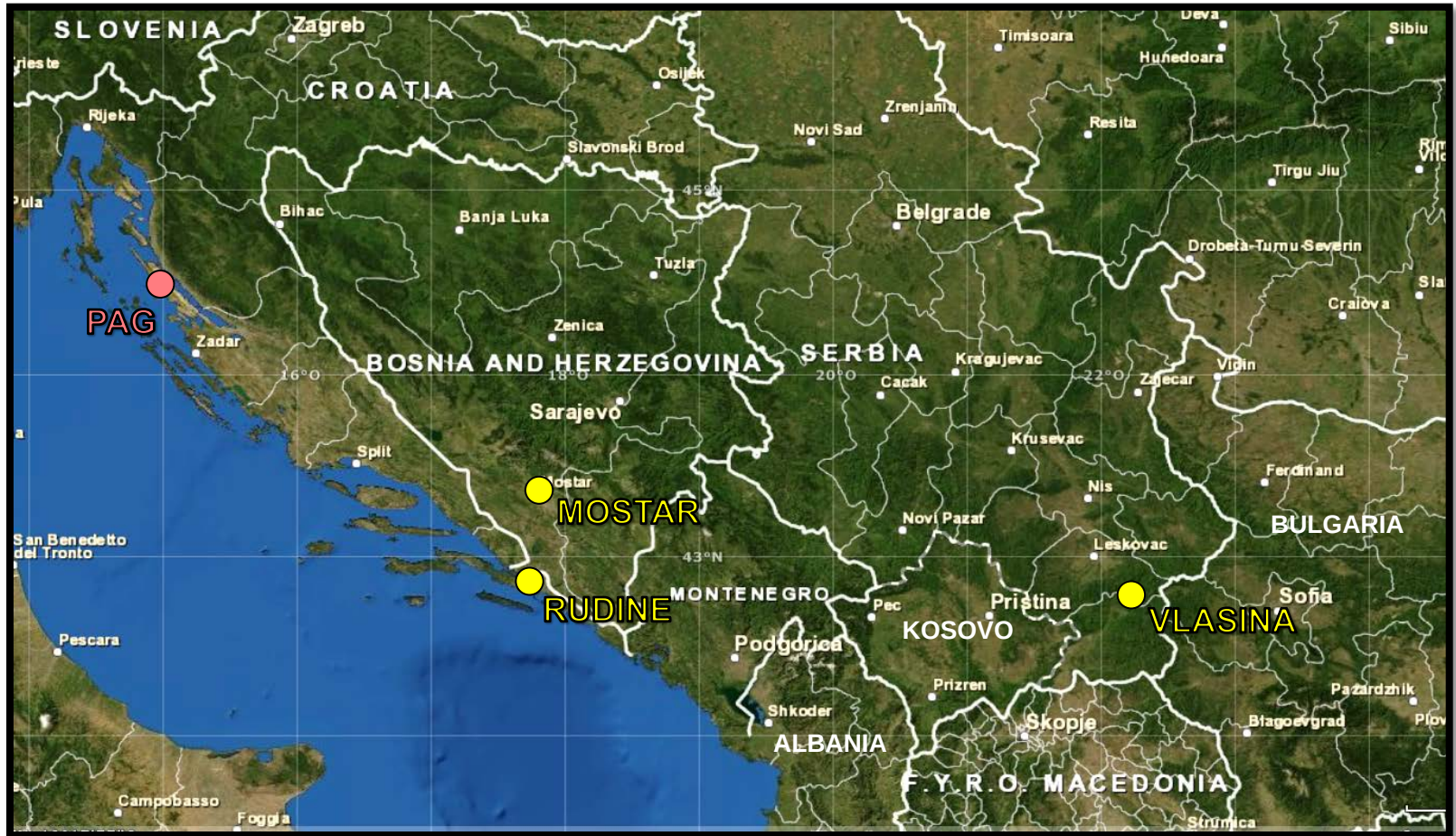
11 project members from 6 different countries:

- Energiewerkstatt, Austria
 - German Wind Energy Institute, Germany
 - Offshore and Certification Centre, Germany
 - Meteotest, Switzerland
 - Meteo BiH Sarajevo, Bosnia-Herzegovina
 - University of Mostar – Mechanical Faculty, BiH
 - University of Belgrade, Serbia
 - Vjetroenergetika d.o.o., BiH
 - Adria Wind Power d.o.o., Croatia [Rudine d.o.o.]
 - Masurica d.o.o., Serbia [Promaja d.o.o.]
 - Elektroprivreda BiH, Bosnia-Herzegovina
- 
- The diagram uses three large curly braces on the right side to group the 11 project members into three categories:
- Project Coordination:** This group includes the first three members: Energiewerkstatt, Austria; German Wind Energy Institute, Germany; and Offshore and Certification Centre, Germany.
 - Research Partners:** This group includes the next five members: Meteotest, Switzerland; Meteo BiH Sarajevo, Bosnia-Herzegovina; University of Mostar – Mechanical Faculty, BiH; University of Belgrade, Serbia; and Vjetroenergetika d.o.o., BiH.
 - Project Developers:** This group includes the last three members: Adria Wind Power d.o.o., Croatia [Rudine d.o.o.]; Masurica d.o.o., Serbia [Promaja d.o.o.]; and Elektroprivreda BiH, Bosnia-Herzegovina.

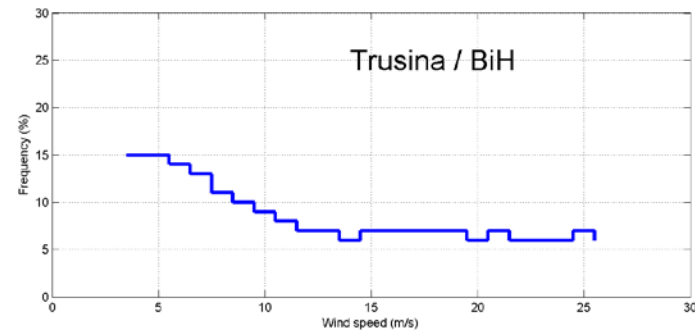
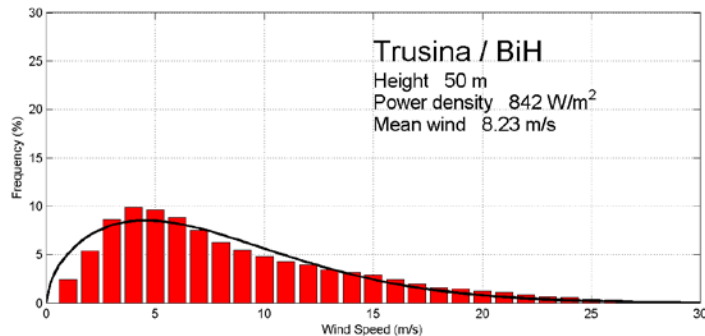
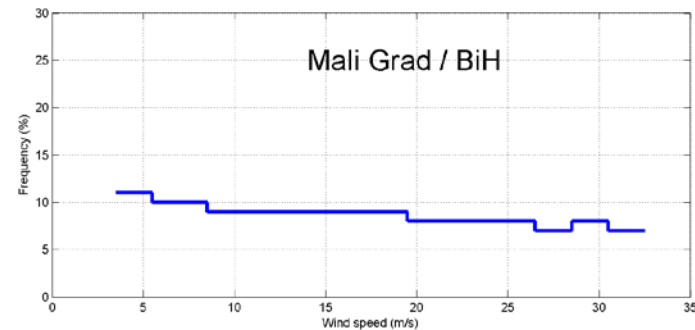
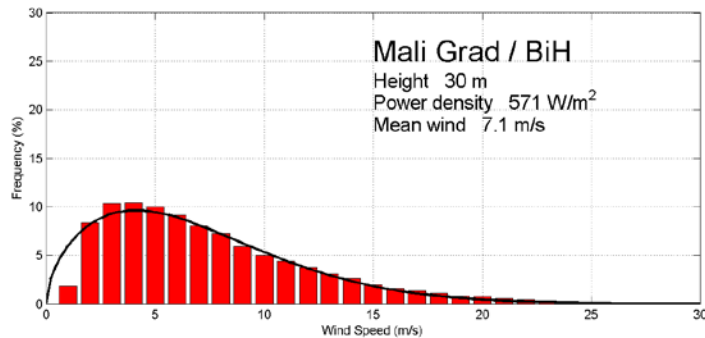
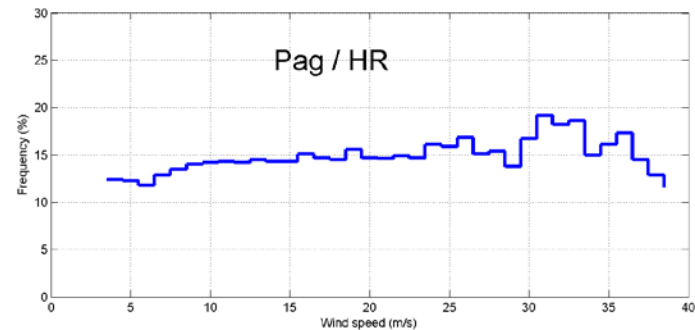
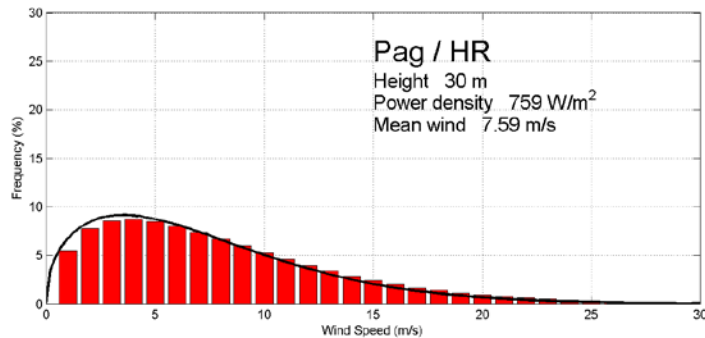
PROJECT TIMELINE



LOCATION OVERVIEW



FINGERPRINTS OF WIND SYSTEMS



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COUNTRY PROFILE CROATIA



- Currently installed capacity:
 - 141,25 MW (end of 2012)
- Wind farms with signed PPA:
 - 136 MW (some are already in construction)
- Croatia has committed itself to the EU Climate & Energy Package [20-20-20-Targets]:
 - 1.200 MW of wind farms until 2020
- Quota for grid connection:
 - 400 MW up to 2015 (stipulated by HEP OPS)
 - Quota is already full with 408 MW of projects
- New feed-in tariff system since May 2012:
 - PPA for 14 years and 9,35 c€/kWh; corrected for index inflation

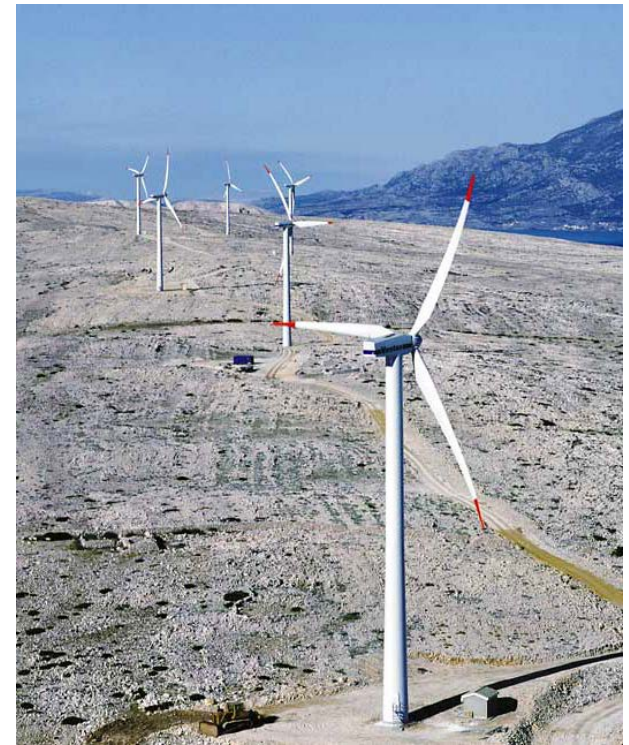


Photo: WF Pag

WF PROJECT RUDINE

- Terrain: Moderately complex
- Sea level: 330 – 380m
- 6,3 – 6,9 m/s (in 80m)
- Phase I – 12 WT
 - Valid Construction permit
 - Manufacturer not yet selected
 - 27,6 – 36 MW
 - 2.300 – 2.700 full load hours
 - 8.000 MWh/year (V112 - 3MW)
 - Implementation: Spring 2014
- Phase II – 16 WT



Photo: Rudine Location

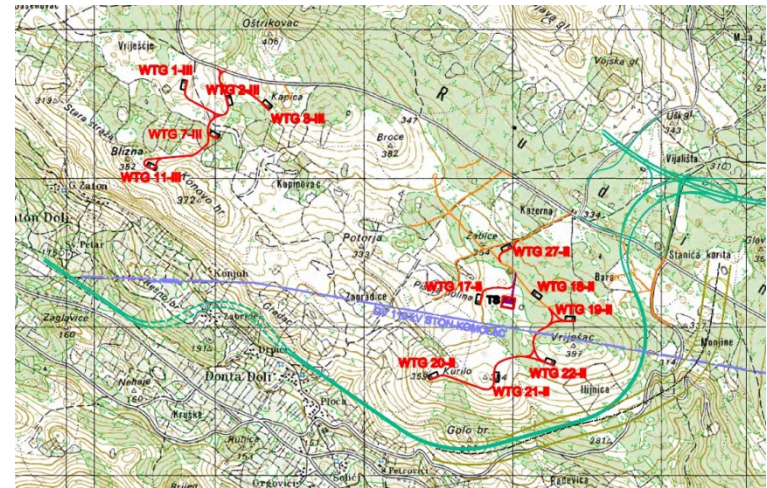


Fig.: Layout Rudine

HURDLES FOR WF PROJECT RUDINE

- Appropriation of state-owned land
 - Regulations stipulate regional offices are responsible → Documentation was sent
 - In the meantime it was decided that Ag. Public Asset Management should take care
 - Second set of documents was sent → another 4 months for final signatures
- HEP OPS (TSO) to figure as the owner for grid connection infrastructure
 - Demanded a change of valid location permit → 10 months delay for building permit
- Quota for grid connection (since Feb. 2012)
 - 'Preliminary Electro Energetic Consent' was issued in 2008
 - At that time, issued on a very restrictive basis taking into account the grid conditions; those that had a permit were assured they would be able to connect
 - Now this new rule states that only 400 MW can be connected, first come first served
 - WF Rudine is just outside the quota
- Bank Guarantee for PPA (since May 2012)
 - Bank guarantee in amount of 10% of total investment costs to secure a timely installation and that the facility will be built according to terms prescribed
 - The first version: Valid until the project bearer delivers the contract on grid usage
 - After renegotiations: Released after 30% of the investment has been realised

COUNTRY PROFILE SERBIA

- Currently installed capacity: 0 MW
- Anticipated installations for 2013: 0 MW (?)
- The old set of regulations (9,7 c€/kWh, 450MW) expired end of 2012
- The Ministry of Mining and Energy presented some key elements on the new regulatory proposal (no official documents)
 - 9,2 c€/kWh, for 12 years, corrected for index inflation
 - 250 MW before 2015; another 250 MW till 2020
 - Additional income from selling of CO₂ - Certificates



Photo: Installation of WM mast

Serbia is currently in a regulatory void until the proper regulations are enacted

- New set of regulations has been announced repeatedly, but not yet been decreed

WF PROJECT VLASINA

- Terrain: Rather Complex
 - Sea level: 1.600 – 1.750m
 - 6,4 – 7,2 m/s (in 80m)
 - Phase I – 17 WT
 - Phase II – 17 WT
-
- Main obstacles – Regulatory void
 - Missing Bylaws governing the implementation of the energy law
 - Decree on Feed-in Tariffs
 - Decree on PPA Terms
 - Decree on conditions for delivery and supply of electricity
 - Decree on PPP Status



Photo: Vlasina Location

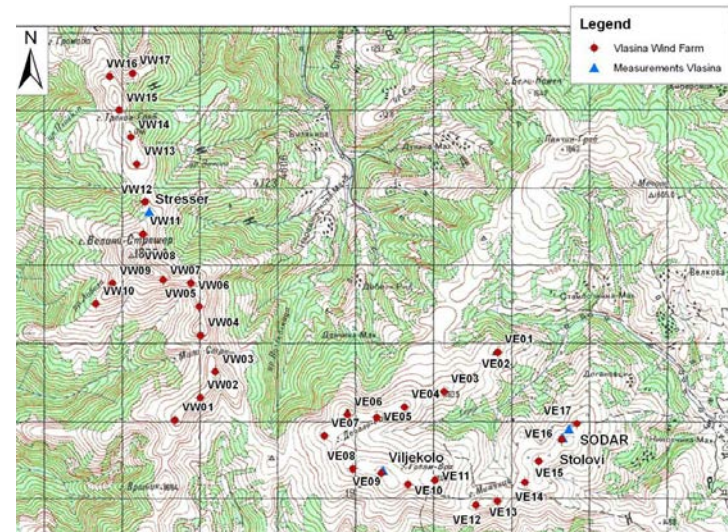


Fig.: Layout Vlasina

COUNTRY PROFILE BiH (F-BiH and RS)

- Currently installed capacity: 0 MW
- Anticipated installations for 2013: 0 MW
- Green Electricity Targets (No Energy Strategy on State level):
 - Action Plan for F-BiH is currently being prepared
 - Action Plan for RS foresees installation of 100 MW till 2020
- Limit for Grid connection (DERK): 350 MW
 - 230 MW for F-BiH
 - 120 MW for RS
- Feed-in tariff system
 - F-BiH: 7,84 c€/kWh for 12 years (+ income from CO₂ certificates)
 - RS: 5,68 / 8,45 c€/kWh for 15 years



Fig.: Map of BiH

WF PROJECT MOSTAR

- Project owner:
 - Elektroprivreda BiH
- Terrain: Complex
- Sea level: 750 – 900m
- 7,1 – 7,8 m/s (in 80m)
- Specific Energy Yield:
 - 900 – 1.200 kWh/m² and year
- Phase I – 1 WT
 - SEEWIND Pilot Wind turbine
- Phase II – 15 WT



Photo: Mostar

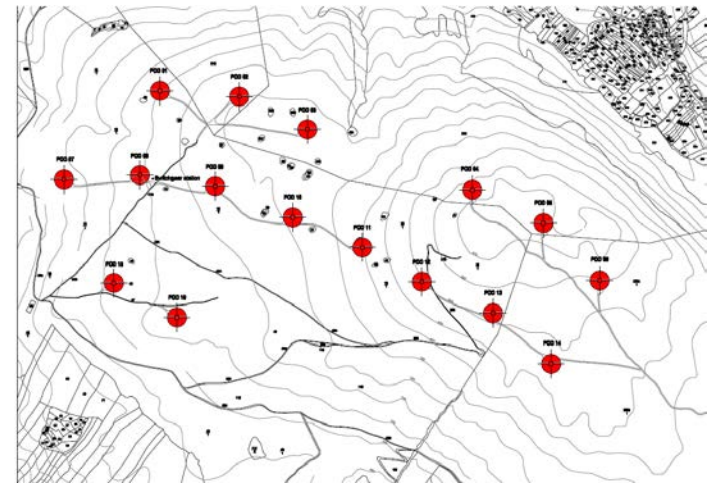


Fig.: Layout Mostar

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CONCLUSIONS

- Objectives of Project SEEWIND
 - + Research Objectives have been reached
 - + Intercultural exchange and knowhow transfer
 - Demonstration Objectives within the remaining timeframe
- Internal reasons
 - Optimism / lack of experience
- External reasons
 - Lack of (clear) regulations
 - Required documentation for some of the permits is unclear
 - Unregulated legal relations / Frequent shifting of responsibilities
 - Long period of issuance of some of the permits
 - Retroactive application of new regulations on projects
 - Laws and by-laws get changed during the development
 - In case of bigger changes, often there are some additional permits needed

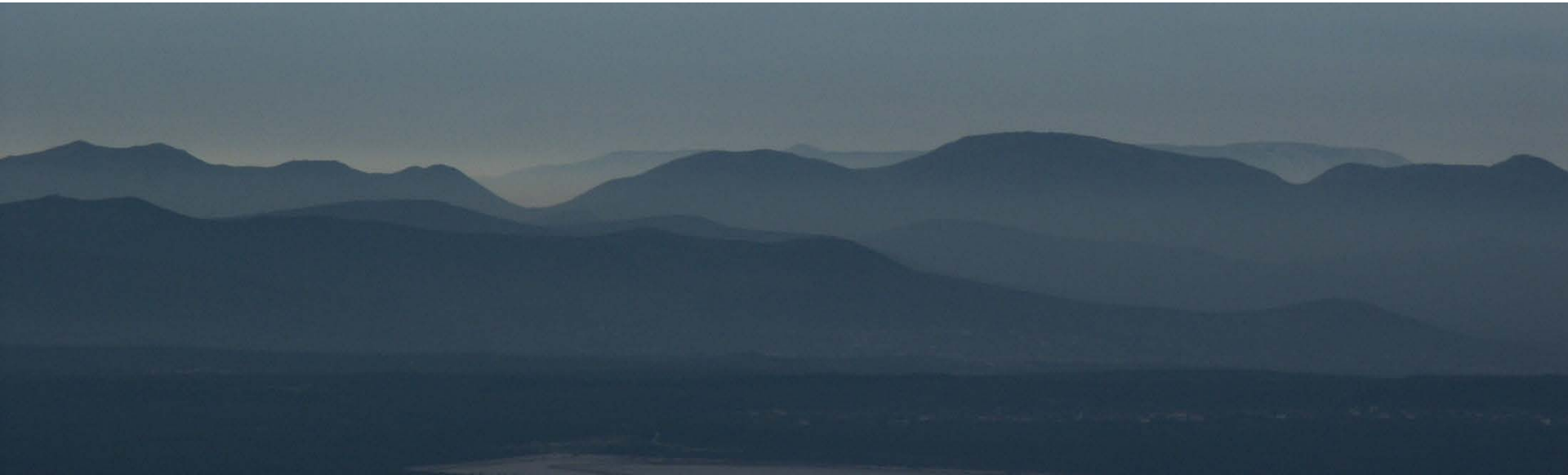
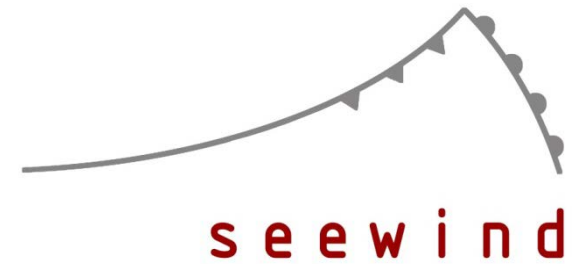
CONCLUSIONS

- Croatia
 - Reasonable wind resources
 - Existing Energy Strategy and certain Consolidation in RES legislation process
 - EU membership negotiations have been concluded → Accession is foreseen for 1st of July 2013
- Serbia
 - Reasonable wind resources
 - New set of regulations has been announced repeatedly, but not yet been decreed
 - EU candidate status since 1st of March 2012; negotiations have not yet started
- Bosnia-Herzegovina
 - Excellent wind resources
 - Difficult political and administrative situation
 - Has not yet applied for EU membership

SEEWIND

Wind Energy Research and Demonstration Project

Andreas Krenn, Energiewerkstatt, Austria



Thanks for your attention!

CONCLUSIONS

- Croatia
 - Reasonable wind resources
 - Existing Energy Strategy and certain Consolidation in RES legislation process
 - EU membership negotiations have been concluded → membership likely in the near future
 - Corruption Perception Index 2012: Score 46, Rank 62 (Transparency Int.)
- Serbia
 - Reasonable wind resources
 - New set of regulations has been announced repeatedly, but not yet been decreed
 - EU candidate status since 1st of March 2012; negotiations have not yet started
 - Corruption Perception Index 2012: Score 39, Rank 80 (Transparency Int.)
- Bosnia-Herzegovina
 - Excellent wind resources
 - Difficult political and administrative situation
 - Has not yet applied for EU membership
 - Corruption Perception Index 2012: Score 42, Rank 72 (Transparency Int.)