



**International Partnership
on Mitigation and MRV**

Experiences and methodological approaches for MRV of emission reduction and co-benefits in renewable energy measures

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2. Baseline EF determination for RE projects,
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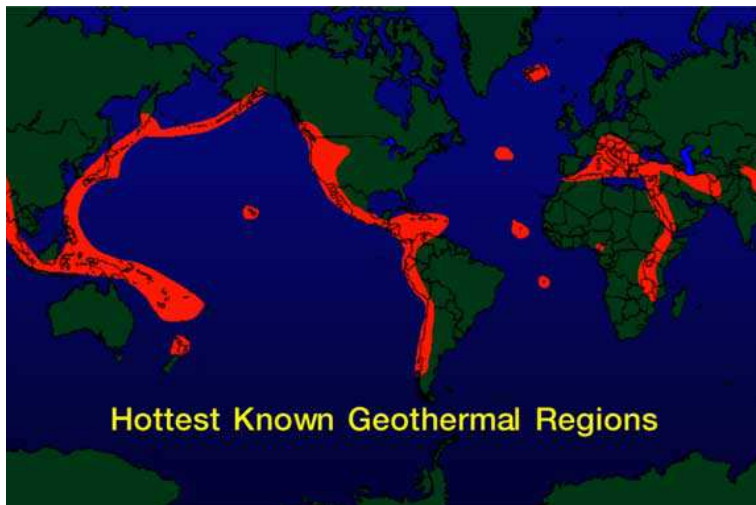
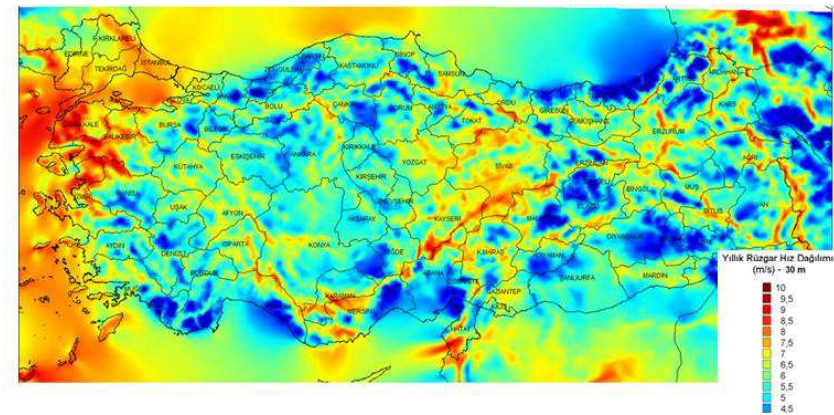
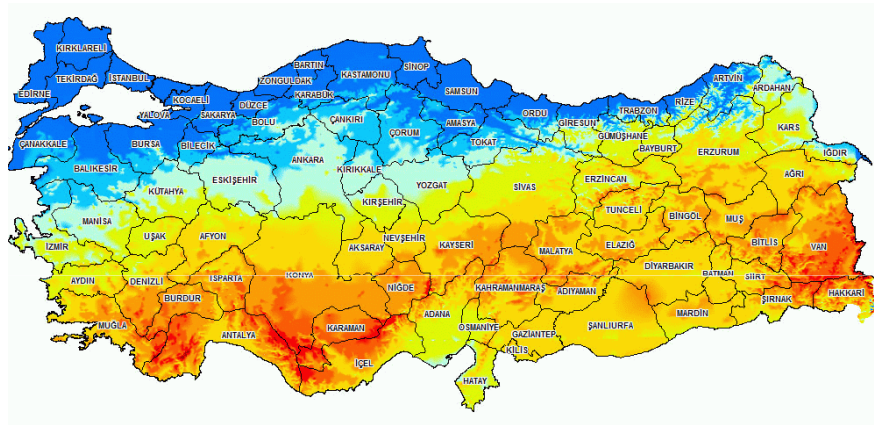
Turkish Electricity Market

- = Liberalization started in 2003; more than 1,300 generation and 146 wholesale licences are issued up to now
- = One of the fastest growing market with around 7% annual increase of demand (with ~75 Million population)
- = 54,750 MW installed power capacity and 260,000 GWh annual generation
- = Fossil fuel dominated generation with around 50% natural gas, 25% coal and 25% hydro included renewables
- = 2,000 MW wind, 114 MW geothermal capacity in operation by July 2012. ~2,600 MW wind and 130 MW geoth. are under construction
- = Total non-hydro renewables has only 2.5% shares of the generation



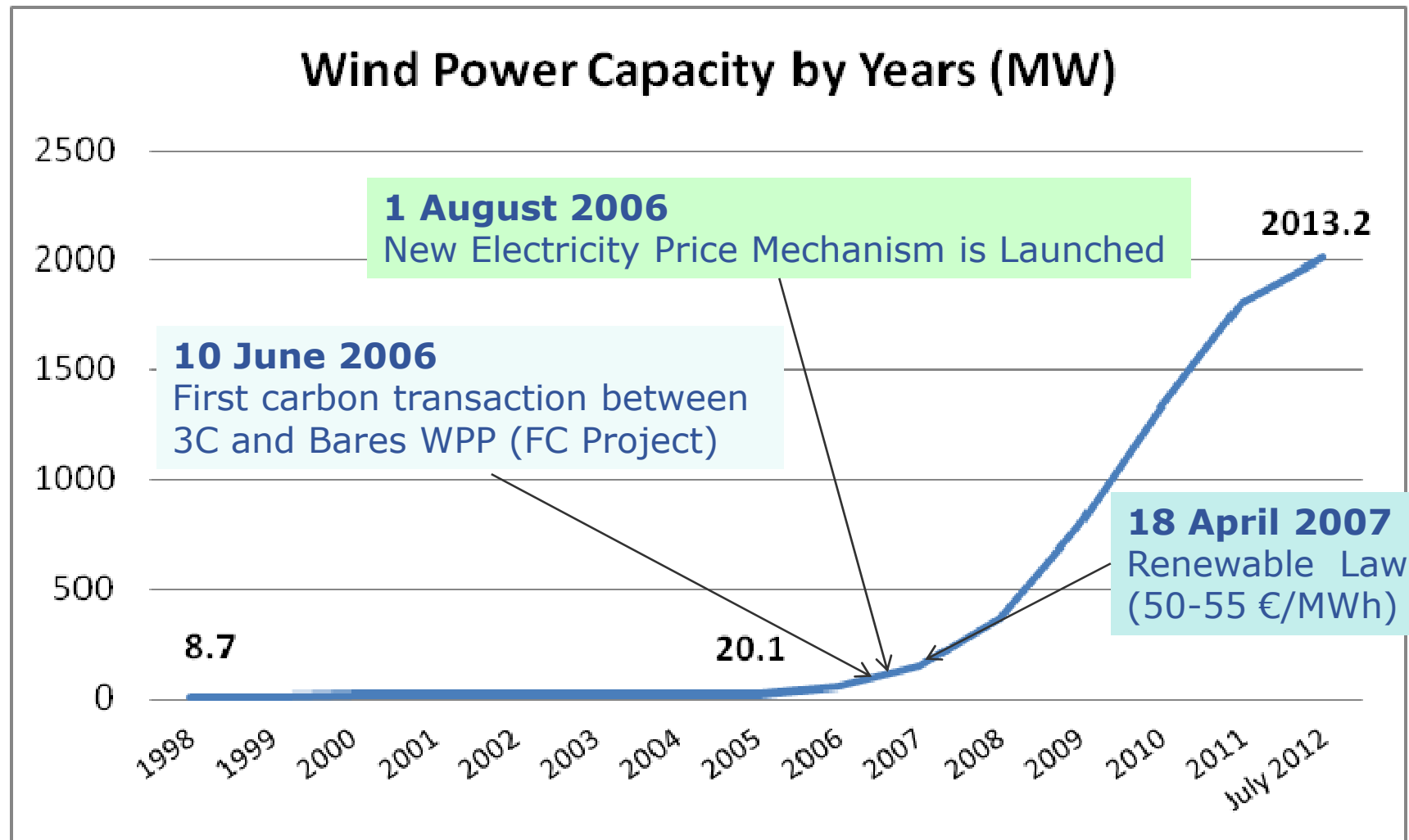
Turkish Electricity Market

— Huge potential for solar, wind, geothermal and biomass energy





Turkish Electricity Market





Turkish Electricity Market

== Current Feed-in-tariffs for renewables:

Sources:	US\$c/kWh
Hydro	7.3
Wind	7.3
Geothermal	10.5
Solar	13.3
Biomass (including landfill)	13.3

== Plus up to 3.7 USc/kWh for wind and 6.7 USDc/kWh for PV for local content use

== Projects below 500 kW for self-consumption are free from licence obligations and can sell remaining amount to the DisCos with above tariffs



Voluntary Carbon Market in Turkey

- Turkey is not eligible to market mechanisms of Kyoto Protocol
- However benefits from CDM based voluntary carbon market since 2006
- Gold Standard and VCS are the most preferred certification organizations for project owners
- More than 250 projects are applied and 90 of them are registered by July 2012. ER potential of these projects are ~15 MtCO₂e/year
- Prices are around 1-2.5 EUR/ton for VCS and 4-6 EUR/ton for Gold Standard





Baseline EF determination for RE projects

- = For grid connected RE projects, applicable CDM methodologies are AMS-I.D (small) and ACM0002 (large) for baseline and monitoring
- = Both methodologies refer to “Tool to calculate the emission factor for an electricity system” (Tool) for EF calculation
- = Tool applies step-wise approach for EF calculation and has several methods which are applicable to the countries having different grid characteristics and data availability
- = EF is weighted average of two parameters: Operating Margin and Build Margin (for wind and solar $EF = 0.75*OM + 0.25*BM$; For others $EF = 0.50*OM + 0.50*BM$)
- = BM is for reflection of technological development to EF, as it can be fixed for at least 7 years



Baseline EF determination for RE projects

- = Calculation of EFs necessitates too many data and information, and all of them shall be from credible and publicly available sources
- = Considering also necessity of validation, EF calculation becomes long and costly process
- = However, even this process cannot ensure having a standard emission factor in the same sector for all similar projects
- = For the most recently registered three wind projects in Turkey EFs are: Ziyaret 0.6020, Seyitali 0.611, Bandirma 0.604 tCO₂/MWh.
- = This is mostly due to application of different data sources or assumptions for calculation (like electrical efficiency of fossil-fuel fired PPs, identification of must-run/low cost sources etc.)



Baseline EF determination for RE projects

- = Why we are discovering America each time?
- = If the baseline is same for all grid connected projects, why every project needs to follow this long and costly process?
- = Here comes the Standardized Baselines (SBs): calculated and submitted by DNA; checked, reviewed and recommended by Secretariat and adopted by CDM EB
- = SBs shall be updated regularly to reflect development in the sector,
- = SBs shall be used by all projects in the same sector and type, without going in detail calculation and separate validation
- = Together with Positive Lists, Standardized Baselines will definitely speed up the establishment of NAMAs and MRV in energy sector



MRV of Emission Reductions for RE Projects

- = For most of the RE projects MRV is relatively simple and easy.
- = This is because net electricity generation amount is the only parameter to be monitored and it is also the main product of such projects to generate income
- = Thus, contrary to most of the EE projects, RE projects need to establish a high quality monitoring system for electricity generation by default
- = Only, for geothermal projects Non-Condensed GHGs (carbon dioxide and methane) in reservoir shall also be monitored as project emissions
- = Monitoring methods for NCGs are very complex and need to be performed every three months. Default emission factors can be generated for the projects built in the same region where reservoirs have similar characteristics



MRV of Co-benefits for RE Projects

- Most of the renewable projects creates benefits to the environment and society which are additional to the reduction of GHGs.
- Increasing the air quality, creating local employment, know-how transfer are some of the co-benefits of RE projects
- CDM EB considers to adopt a voluntary tool for highlighting sustainable development co-benefits of CDM project activities and PoAs
- However, negative impacts of CDM projects shall also be elaborated as all projects have risk of damage if they will not be developed and implemented with environmental and social integrity
- Sustainability Rules and Tools of Gold Standard can be a good example!



MRV of Co-benefits for RE Projects

- _ Gold Standard (GS) is established in 2003 by WWF and supported by more than 80 international NGOs
- _ Currently focuses to EE and RE projects/PoAs
- _ CDM/JI and VER projects can apply for Gold Standard registration
- _ Has experiences from more than 700 projects in over 50 countries on sustainability assessment and co-benefits
- _ One wind, two small-hydro projects from Chile are “Listed” in GS Registry
- _ 172 projects from Turkey are listed in GS Registry and 45 of them are registered



MRV of Co-benefits for RE Projects

— In addition to the fully implementation of CDM rules, GS requires below processes and assessments for Sustainability Assessment:

- ❖ Two-step interactive 'Local Stakeholder Consultation' in both the design phase & feedback rounds
- ❖ Sustainable Development Matrix including social, economic and environmental benefits for local communities
- ❖ "Do no harm" assessment – based on UNDP safeguarding principles
- ❖ Measurement, Reporting and Verification of sustainable development indicators and other environmental co-benefits
- ❖ Active engagement of independent technical experts & NGOs



MRV of Co-benefits for RE Projects

Local Stakeholder Consultation:

- Physical meeting close to the project area with local people, NGOs, official representatives, universities, etc.
- All concerns of participants shall be addressed, reasonable ones shall be reflected to the project design
- Participants score the impact of the project to the Sustainability Development Indicators with positive, negative and neutral
- Meeting shall be well prepared and reported





MRV of Co-benefits for RE Projects

Example for Stakeholder Comments and Consequent Changes in PD

Project	Comment received	Change in project design
Wind farm	Placement of one of the turbines will affect a livestock watering hole. Stakeholders have asked for compensation for a better watering hole for their animals.	The project design has changed to include a new watering hole at a location more suitable for the herders.
Biomass project using agro-industrial crop residue (e.g. rice husk)	Farmers have asked if they can receive money for delivering crop residue (e.g. wheat straw) directly to the biomass plant. They want to score this positively under the indicator 'Quantitative employment and income generation.'	The project design has changed to include the monitoring of payments to farmers for delivery of crop residue, with a measuring parameter of subsequent household increases in income.
Biogas capture and utilisation (electricity generation connected to the grid)	Stakeholders have asked for free electricity for the village	No change. The project participant explains that the electricity is being fed directly to the grid, and is therefore not under his jurisdiction.



MRV of Co-benefits for RE Projects

Do-No-Harm Assessment

- The aim of this self-assessment is to gain insight into the risk that the project might result in negative environmental, social and/or economic impacts that are serious enough for The Gold Standard to eliminate the project from the approval process.
- Based on Safeguarding Principles of UNDP with 4 main topics:
 - Human Rights
 - Labour Standard
 - Environmental Protection
 - Anti-Corruption
- Projects risk on principles are assessed with High/Medium/Low. All Medium and High risks shall be mitigated and monitored



MRV of Co-benefits for RE Projects

Examples for Do-No-Harm Assessment

Project	Safeguarding principle	Description of relevance to my project	Assessment of my project risk	Mitigation measure
Landfill gas capture	Labour standards	Unsafe handling of the captured gas	High	Organise training and only authorise trained personnel on site.
Off grid solar	Environmental protection	Batteries used to store electricity end up in environment	High	Organise a recycling system for batteries at the end of their life.
Hydro-electric project	Human rights	A village's sacred burial site is threatened by the placement of a powerhouse	High	Shift the location of powerhouse so as not to disturb cultural dignity.



MRV of Co-benefits for RE Projects

= Sustainable Development Matrix (SDM)

- Impact of the project to 12 indicators for three categories (Environment, Social and Techno-Economic Development) shall be assessed in detail with corresponding parameters
- Each indicator shall be scored with 'negative', 'positive' or 'neutral' in comparison of project situation with the baseline situation and justified.
- Negative indicators shall be 'neutralised' with mitigation measures
- All non-neutral indicators must be monitored and mitigation measures shall be monitored
- To be eligible under The Gold Standard project must contribute positively to at least two of the three categories and neutral to the third category.



MRV of Co-benefits for RE Projects

Indicators of SDM:

Environment

- Air quality
- Water quality and quantity
- Soil condition
- Other pollutants
- Biodiversity

Social Development

- Quality of employment
- Livelihood of the poor
- Access to affordable & clean energy services
- Human and institutional capacity

Economic & Technological Development

- Quantitative employment and income generation
- Access to investment
- Technology transfer and technological self-reliance



MRV of Co-benefits for RE Projects

SDM Assessment - An Example

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Final score
Gold Standard indicators of sustainable development.	If relevant copy mitigation measure from "do no harm" – table, or include mitigation measure used to neutralise a score of '–'	Check www.undp.or/mdg and www.mdgmonitor.org Describe how your indicator is related to local MDG goals	Defined by project developer	Negative impact: score '–' in case negative impact is not fully mitigated score 0 in case impact is planned to be fully mitigated No change in impact: score 0 Positive impact: score '+'
Quality of employment	Only staff of operation & maintenance contractor who has climbing certificates will have right to access to towers (accessing the turbines). The relevant staff will be trained to be able to work with high voltages	MDG-1: Eradicate extreme poverty & hunger 1.B. Achieve full and productive employment and decent work for all, including women and young people	Parameter: Health & Safety trainings Explanation: Project developer ensures high standard health and safety conditions for the employees. Baseline for parameter: Not Applicable Future target for parameter: Staff will have health&safety trainings.	+



MRV of Co-benefits for RE Projects

= Sustainability Monitoring Plan

= All non-neutral indicators and all mitigation and compensation measures identified by Stakeholder Consultations, DNH and SD Assessments shall be monitored

No		5
Indicator		Quality of employment
Mitigation measure		Only staff of equipment provider or project developer who has climbing certificates will have right to access to towers. The relevant staff will be trained to be able to work with high voltages.
Chosen parameter		Health&Safety trainings
Current situation of parameter		Not applicable.
Estimation of baseline situation of parameter		Not applicable.
Future target for parameter		Staff will have Health&Safety trainings
Way of monitoring	How	Training attendance list or certificates. After first verification, only any changes for this parameter will be monitored.
	When	Annually (Once at the end of the each monitoring period)
	By who	Assigned technician by Plant Manager or assigned carbon consultant.



MRV of Co-benefits for RE Projects

== Essentials of GS Sustainability Development Assessment:

- Active and continuous participation of stakeholders, experts and NGOs since project design phase
- Detail assessment of project on Environment, Social Development and Techo-Economic Development
- Mitigating all possible negative impacts with performing related measures
- Proper monitoring and reporting of all mitigation measures and non-neutral impacts



Summary

- = Good combination of different incentive mechanisms can create momentum for deployment of renewable sources
- = Standardized Baselines and Positive Lists will speed up establishment of NAMAs for renewable energy projects
- = Co-benefits of projects shall be elaborated together with potential damage of such projects
- = Gold Standard rules for Sustainability Development Assessment may be considered rigorous and stringent but having experiences for 700+ CDM projects from 50+ countries, can be good example for co-benefit discussions

Thank you!

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