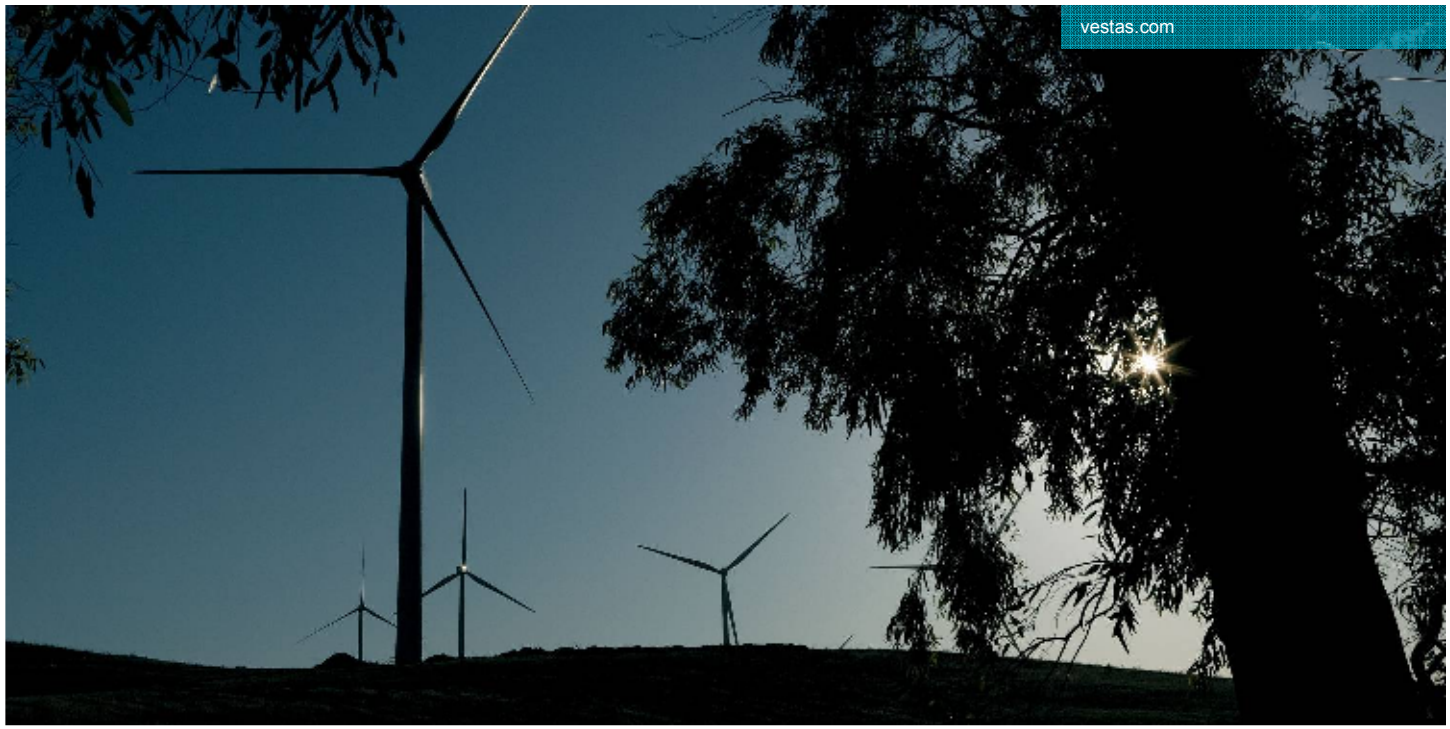
No. 1 in Modern Energy

# Wind Power in Romania: Potential, Benefits, Barriers

Jannik Termansen, Vestas Wind Systems A/S, 2 June 2009



# Agenda

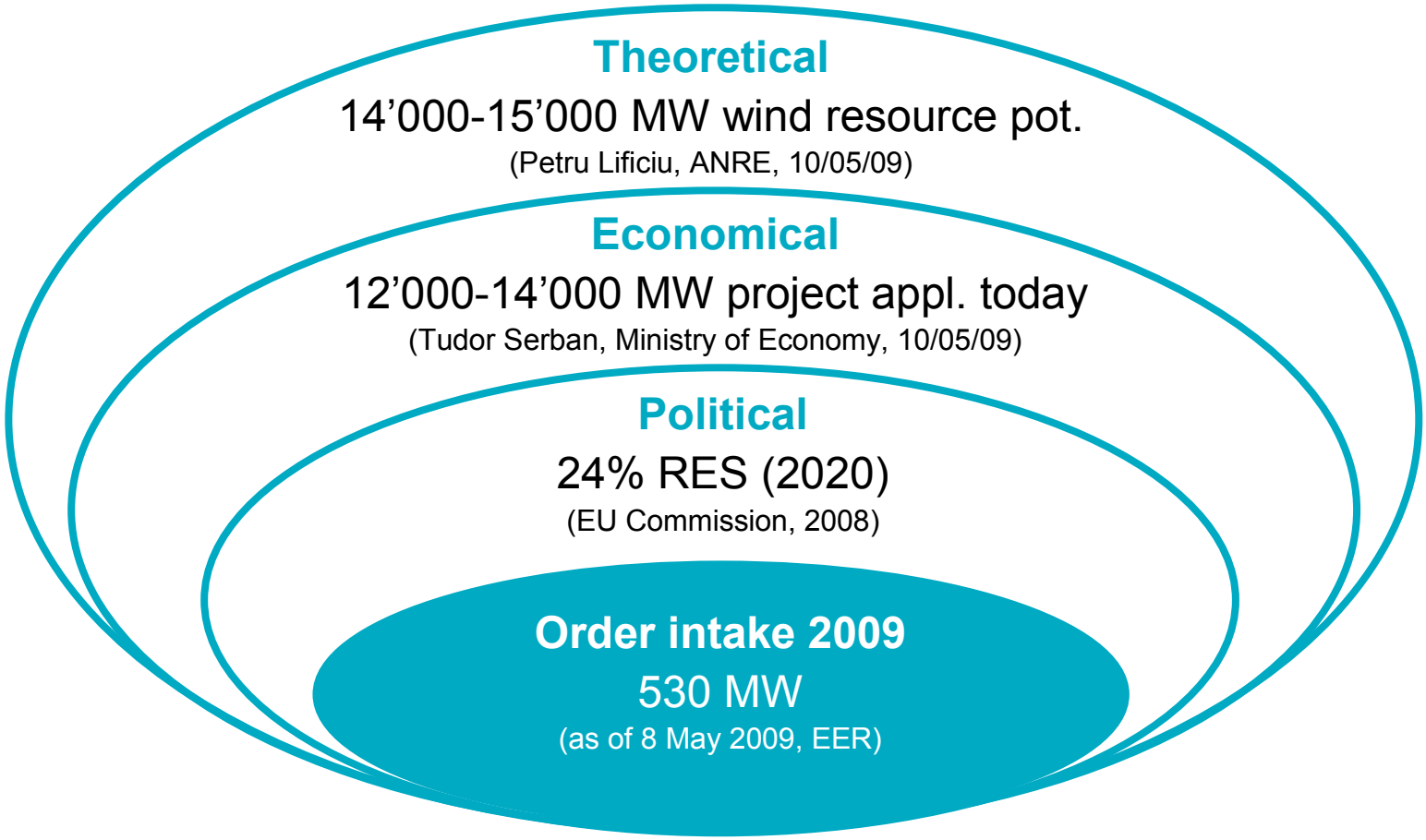
1. Romania's wind potential
2. Wind benefits for Romania
3. Barriers and recommendations – and Vestas' contribution
4. Outlook



Vestas

# Romania's Wind Potential

The wind power potential of Romania depends on how you look at it…

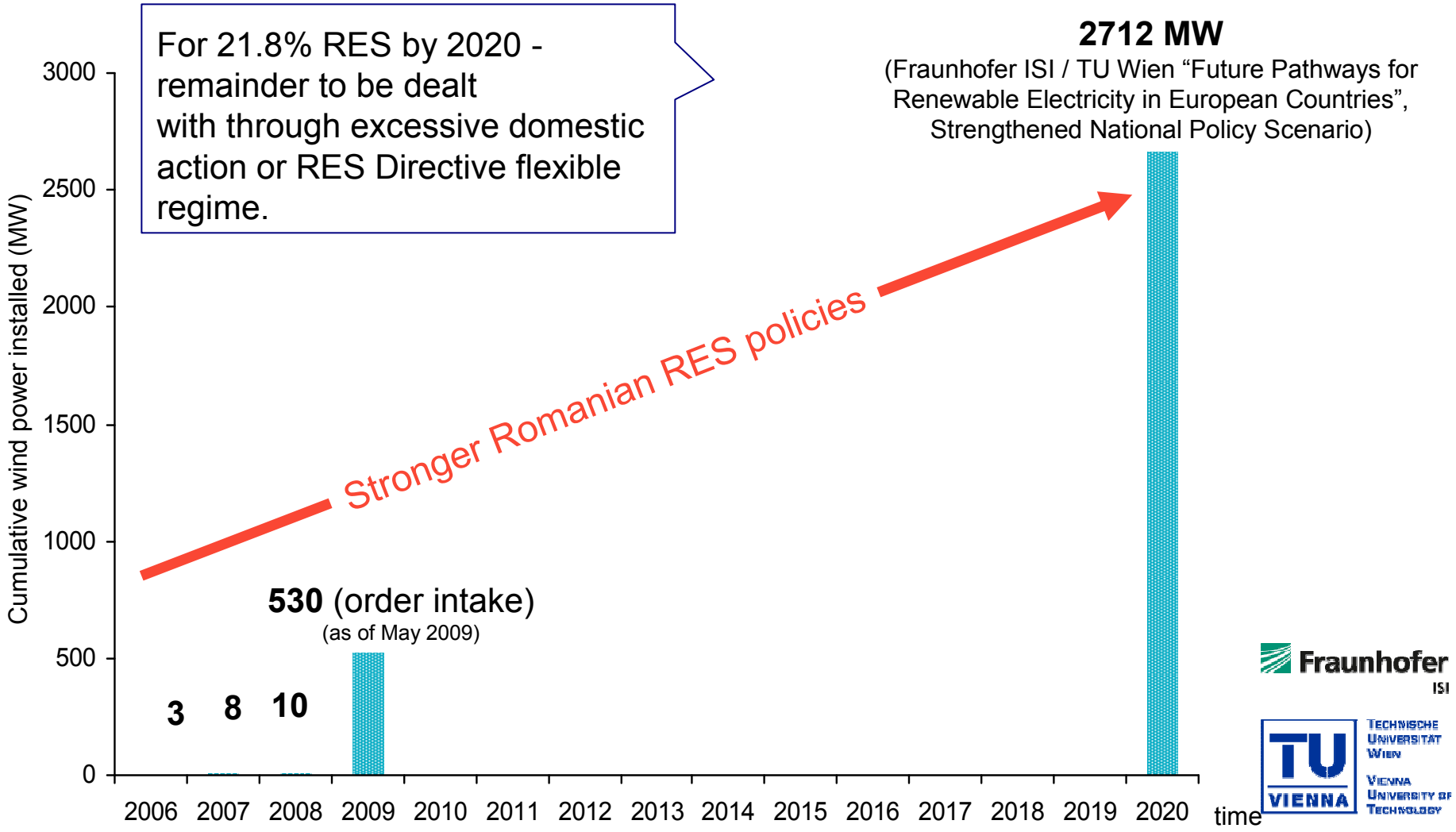



Sources: Various (see above)



Vestas

# To Unleash the Wind Potential and Get Closer to EU-RO Target of 24% RES in 2020: Strengthen Policies




Sources: EER (2009), EWEA (2009), Fraunhofer ISI; TU Wien (2009)

# MW Growth Scenarios for Romania Fraunhofer / TU Wien

***"Wind onshore represents the key RES-E technology option for power generation in Romania within both policy cases"***

| Breakdown by RES-electricity category | | New RES-E installations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | BAU (Business as usual) | | | | Strengthened national policies | | | |
| | | [Unit] | 2006-2010 | 2011-2015 | 2016-2020 | 2006-2020 | 2006-2010 | 2011-2015 | 2016-2020 | 2006-2020 |
| Biogas | BG | MW | 56 | 60 | 94 | 210 | 70 | 201 | 430 | 701 |
| (Solid) Biomass | BM | MW | 271 | 111 | 139 | 521 | 279 | 193 | 328 | 800 |
| Biowaste | BW | MW | 41 | 41 | 41 | 122 | 45 | 65 | 20 | 129 |
| Geothermal electricity | GE | MW | 4 | 1 | 3 | 9 | 4 | 1 | 2 | 8 |
| Hydro large-scale | HY-LS | MW | 395 | 307 | 213 | 915 | 477 | 492 | 248 | 1,216 |
| Hydro small-scale | HY-SS | MW | 14 | 0 | 48 | 62 | 14 | 20 | 145 | 179 |
| Photovoltaics | SO-PV | MW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solar thermal electricity | SO-ST | MW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tide & Wave | TW | MW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wind onshore | WI-ON | MW | 237 | 349 | 929 | 1,515 | 237 | 1,265 | 1,210 | 2,712 |
| Wind offshore | WI-OFF | MW | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| RES-E TOTAL | RES-E | MW | 1,018 | 870 | 1,466 | 3,355 | 1,126 | 2,236 | 2,384 | 5,746 |

Green-X Model calculations on MW installations by Fraunhofer / TU Wien.
Key assumptions based on PRIMES & FORRES 2020
(= basis for EU commission studies), amongst others:

- Pre-credit-crunch
- Standard TGC support scheme (not technology-specific)

Sources: Fraunhofer ISI; TU Wien (2009)

# Benefits: Modern Energy's High 5


1. Competitive
2. Predictable
3. Independent
4. Fast
5. Clean



Vestas

# Benefits: Wind Triggers Local Investments

| | INVESTMENT (€1,000/MW) | SHARE OF TOTAL COST % | |
|---|---|---|---|
| Turbine (ex works) | 928 | 75.6 | Preferrably local |
| Grid connection | 109 | 8.9 | Naturally local |
| Foundation | 80 | 6.5 | Naturally local |
| Land rent | 48 | 3.9 | Naturally local |
| Electric installation | 18 | 1.5 | Naturally local |
| Consultancy | 15 | 1.2 | Preferrably local |
| Financial costs | 15 | 1.2 | Preferrably local |
| Road construction | 11 | 0.9 | Naturally local |
| Control systems | 4 | 0.3 | Preferrably local |
| **TOTAL** | **1,227** | **100** | |

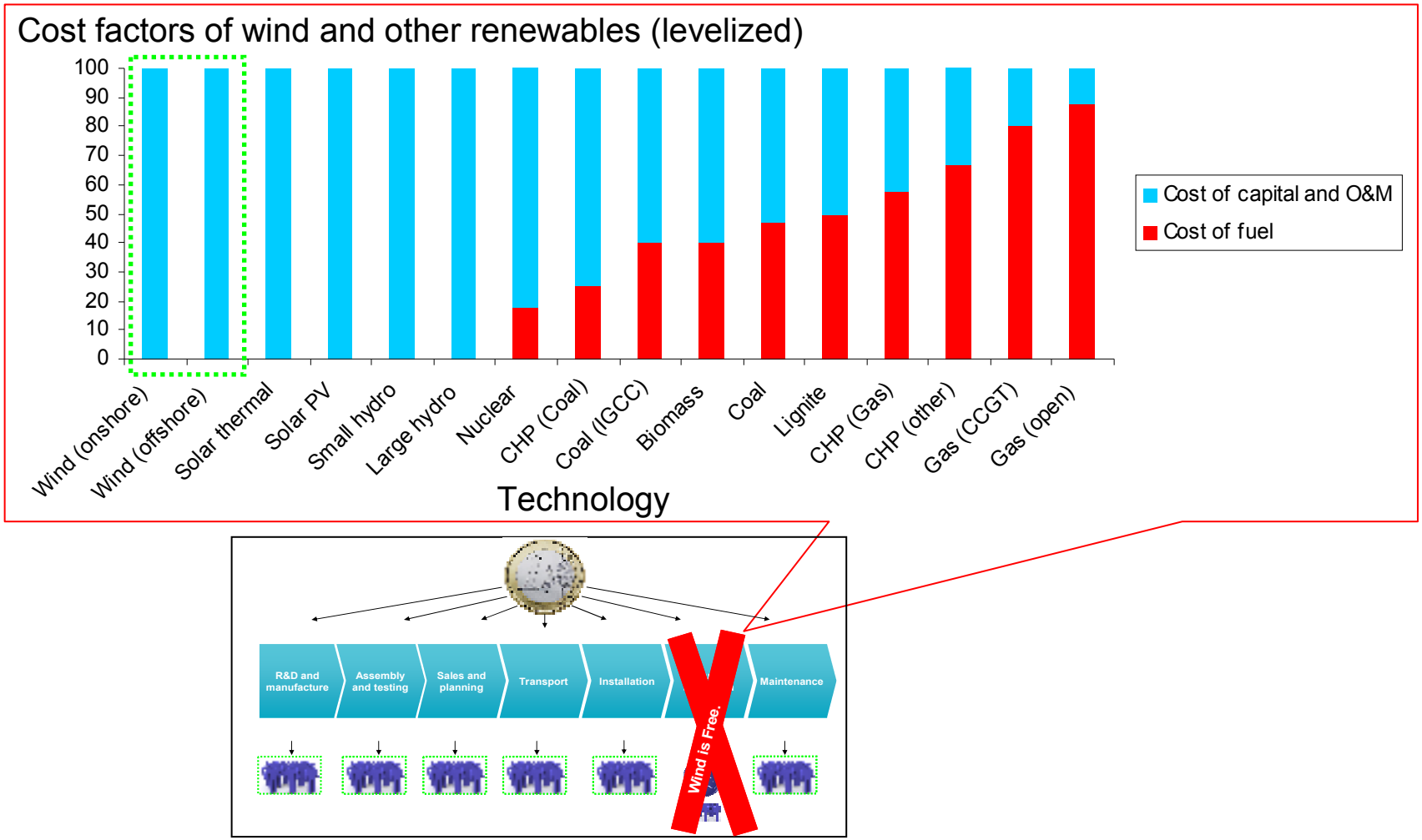
Note: Calculated by the author based on selected data for European wind turbine installations


Sources: EWEA (2009)



Vestas

# Benefits: More Local Green Jobs Per Energy Budget



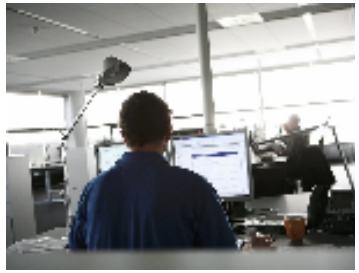

Sources: NEA & IEA (2005), World Bank (2009)



Vestas

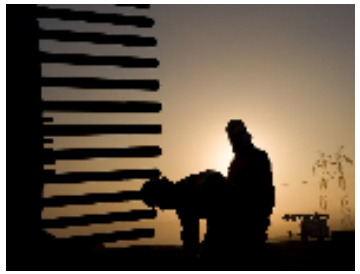
# Wrapping Up: (Benefits x Potential) = (Investments + Jobs)

368'000 wind jobs by 2020 in EU



**2712 MW wind energy capacity = up to 3.327 bn € investments + 4794 full time wind jobs in strengthened policy scenario**

How is this calculated?



Sources: EWEA (2009); for 2020 MW potential: Fraunhofer ISI; TU Wien (2009)



Vestas

# To Unleash Potential Benefits…

## …Romania should further increase business case certainty for wind investors.

**We have prepared 4 recommendations for Romania:**

1. Stabilize political framework
2. Increase grid capacity
3. Enhance grid integration

---

4. Vestas contribution: Optimize wind power production control (VestasOnline™ SCADA)



Vestas

# Recommendation 1: Stabilize Political Framework

Romania's incentive system has seen major improvements now, but…

1. Ex-post downward adjustment of quota target creates high uncertainty and distrust
2. No energy or carbon taxes on any type of fuel or energy
3. Lack of administration's knowledge of financial support

1. **Reliable, transparent and long-term plan for certificate quantity on the market**
2. **Long-term energy & carbon taxes as in other EU countries**
3. **Educated, enhancing administration personnel**

Fraunhofer ISI

TU VIENNA Technische Universität Wien Vienna University of Technology

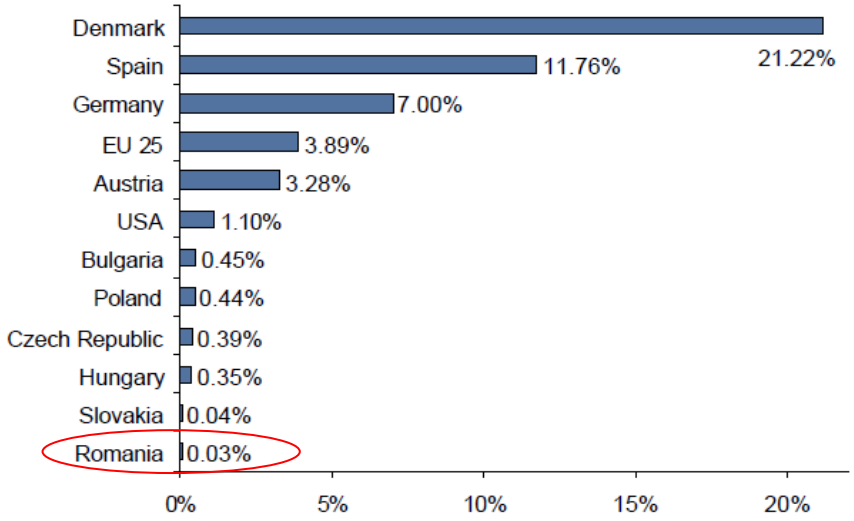
Vestas

**Sources: Fraunhofer ISI; TU Wien (2009)**

# Recommendation 2: Increase System Capacity

- 3’000 MW de facto current system capacity and high concentration in Dobrogia region (Constanţa, Tulcea)
- 2’000 MW max. capacity being said earlier -> uncertainty: What is the real capacity?
- Other countries have shown it is possible:

**Regional wind share of electricity demand**




**DK TSO brochure available – “The Danish Wind Case”**

**Sources: EWEA in Erste Bank (2009), Romanian Business Standard, 23/04/09**



Vestas

# Recommendation 3: Enhance Grid Integration

1. No reliable grid extension plan
2. Grid connection costs 100%, reinforcement costs partly borne by wind power producer
3. No extension / reinforcement incentives for TSO
4. Threat of increasing balancing costs for wind power producers

1. **Development of national wind integration action plan**
2. **Shallow grid connection charging (reinforcement costs by TSO)**
3. **Incentivizing cost pass through mechanisms for RES-E to TSO**
4. **Transparent and efficient balancing mechanisms**

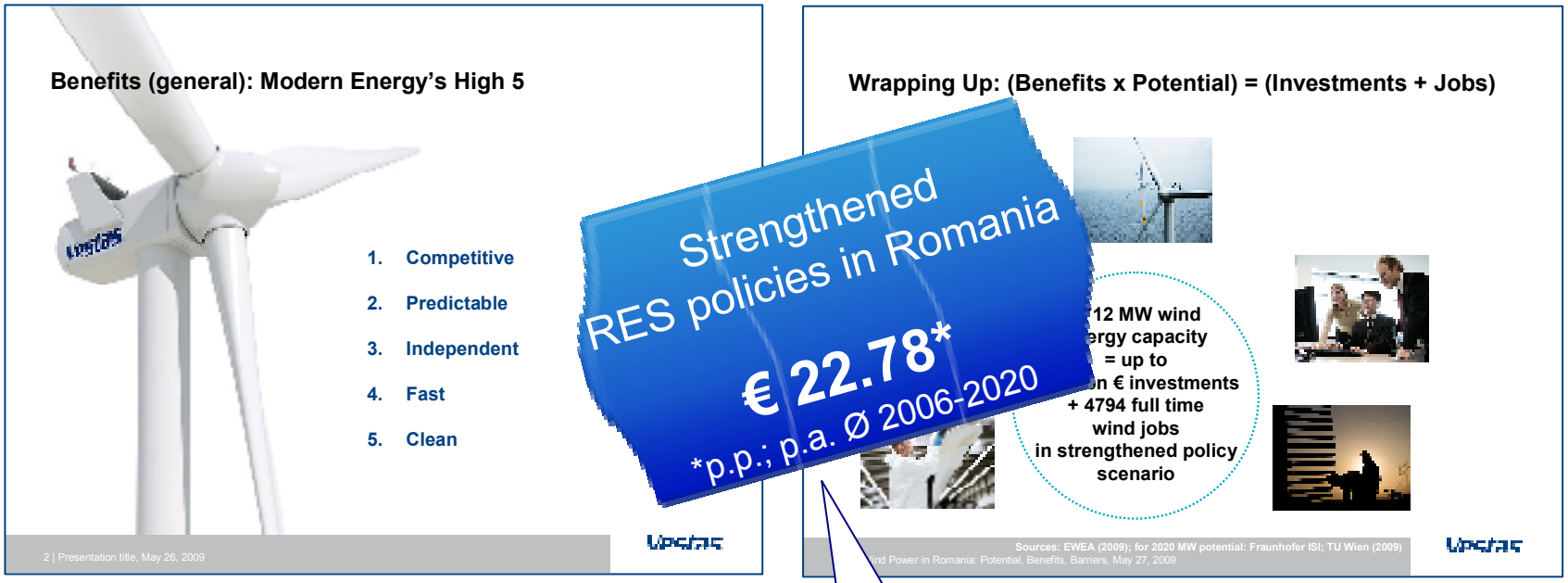
Fraunhofer ISI

TU VIENNA Technische Universität Wien / Vienna University of Technology

Vestas

**Sources: Fraunhofer ISI; TU Wien (2009)**

# How Much Do Stronger RES Policies for Romania Cost?




How is this calculated?

# EU National Action Plan Is A Good Starting Point

The Romanian National Action Plan to be submitted by 30 June 2010 to EU is:

- Instrumental to planning how to reach 24% of gross energy demand through Renewable Energy by 2020
- The ideal way to implement the strengthened policies recommended to capture the full potential of wind energy in Romania

http://www.vestas.com/en/modern-energy/political-initiatives/policy-recommendations.aspx

**Vestas policy advise available on the Internet**



Vestas

# Recommendation 4: Vestas Contribution – Optimize Wind Power Production Control / VestasOnline™ SCADA

Why a Supervisory Control & Data Acquisition System like VestasOnline™?

Standard:

- *Plant Layout view*
- *Event notification*
- *Basic Statistics*
- *Online Production View*
- *Event View*
- *24/7 surveillance*
- *Standard Production Reports*

Optional:

- *Production Control*
- *Grid Control*
- *3rd Party grid integration*
- *Plant Customization*
- *Maximized production at PCC*
- *Customized Reports*

**Vestas advise: Get more info / references and your VestasOnline brochure after this session**

**The most advanced system on the market today to meet both power producers' and TSO's requirements in Romania**

Vestas

# Vestas Contacts at Your Disposal

## Policies

**Jannik Termansen**
**Director Group Government Relations**
Vestas Wind Systems A/S
Hedegaardsvej 88
DK – 2300 Copenhagen S
Tel. +45 9730 7849
Mob. +45 2537 6586

## Commercial

**Daniel Rascu**
**Sales Engineer**
Vestas Österreich GmbH
Concorde Business Park B4/29
AT – 2320 Schwechat
Tel. +43 1701 3824
Mob. +43 664 8843 7224

## Technical

**Ruslan Caraus**
**Electrical Engineer**
Vestas Central Europe
Otto-Hahn-Str. 2-4
DE – 25813 Husum
Tel. +49 4841 9712 703
Mob. +49 1511 6138 120

# Thank you for your attention


Vestas

back-up

# Wrap-Up: Benefits x Potential: Jobs

New wind jobs created for 2712 MW in Romania with the strengthened national policy scenario according to Fraunhofer / TU Wien

= Ø annual additional installations per year through 2009-2020 (Fraunhofer / TU Wien's SNP and EWEA's statistic on MW installed in RO as of end 2008) x new jobs created per MW installed (EWEA, 2009)

+ Accumulated MW by 2020 (acc. to Fraunhofer / TU Wien's SNP) x new jobs created per MW O&M (acc. to EWEA, 2009)

= (((2712-10)/11)*15,1)+(2712*0,4)

**= up to 4794 wind jobs created by 2020**

If RO's RES policies are strengthened! How?

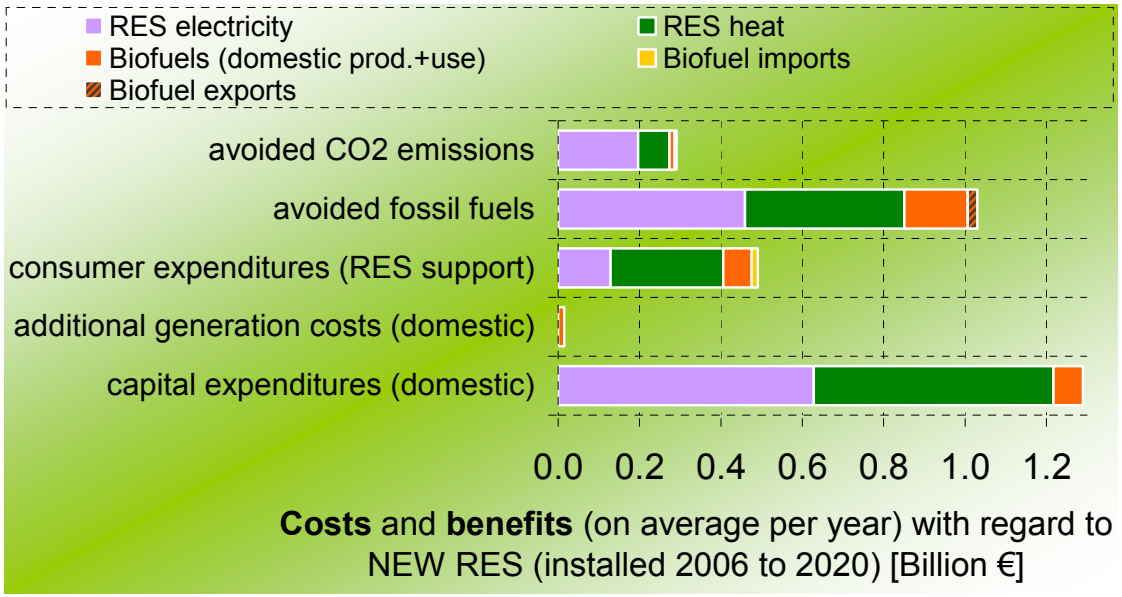
Sources: EWEA (2009); Fraunhofer ISI; TU Wien (2009)



Vestas

back-up

# Costs & Benefits of Strengthened RES Policies (On Average 2006-2020, p.a.)



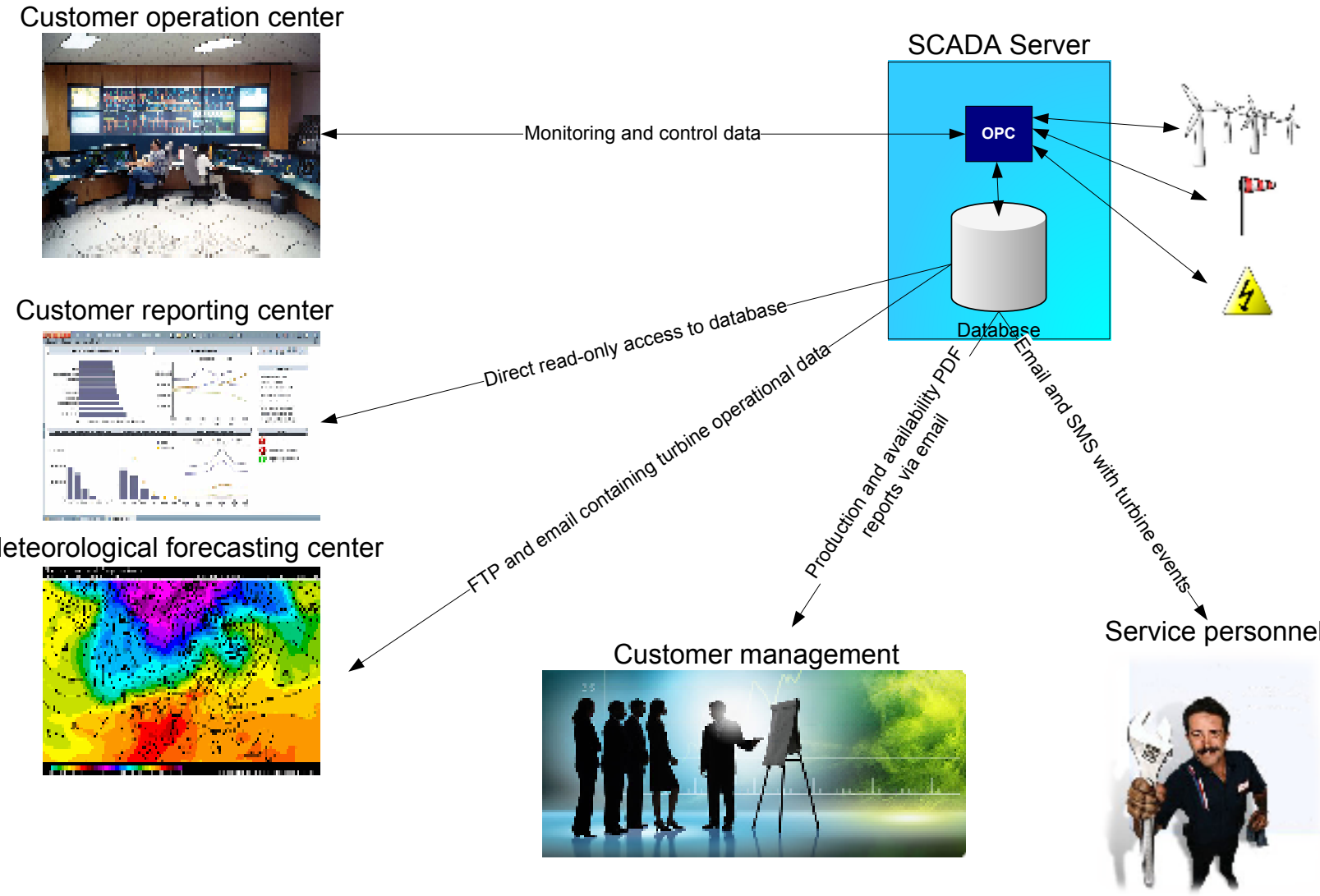

Green-X Model calculations on MW installations by Fraunhofer / TU Wien.
Key assumptions based on PRIMES & FORRES 2020
(= basis for EU commission studies), amongst others:

- Pre-credit-crunch
- Standard TGC support scheme (not technology-specific)

Sources: Fraunhofer ISI; TU Wien (2009)

# VestasOnline™ SCADA: The Key To Information

The information flow in the VestasOnline system






Vestas