

Review of RES potential in INOGATE Partner Countries

**New ITS Project Team
INOGATE**

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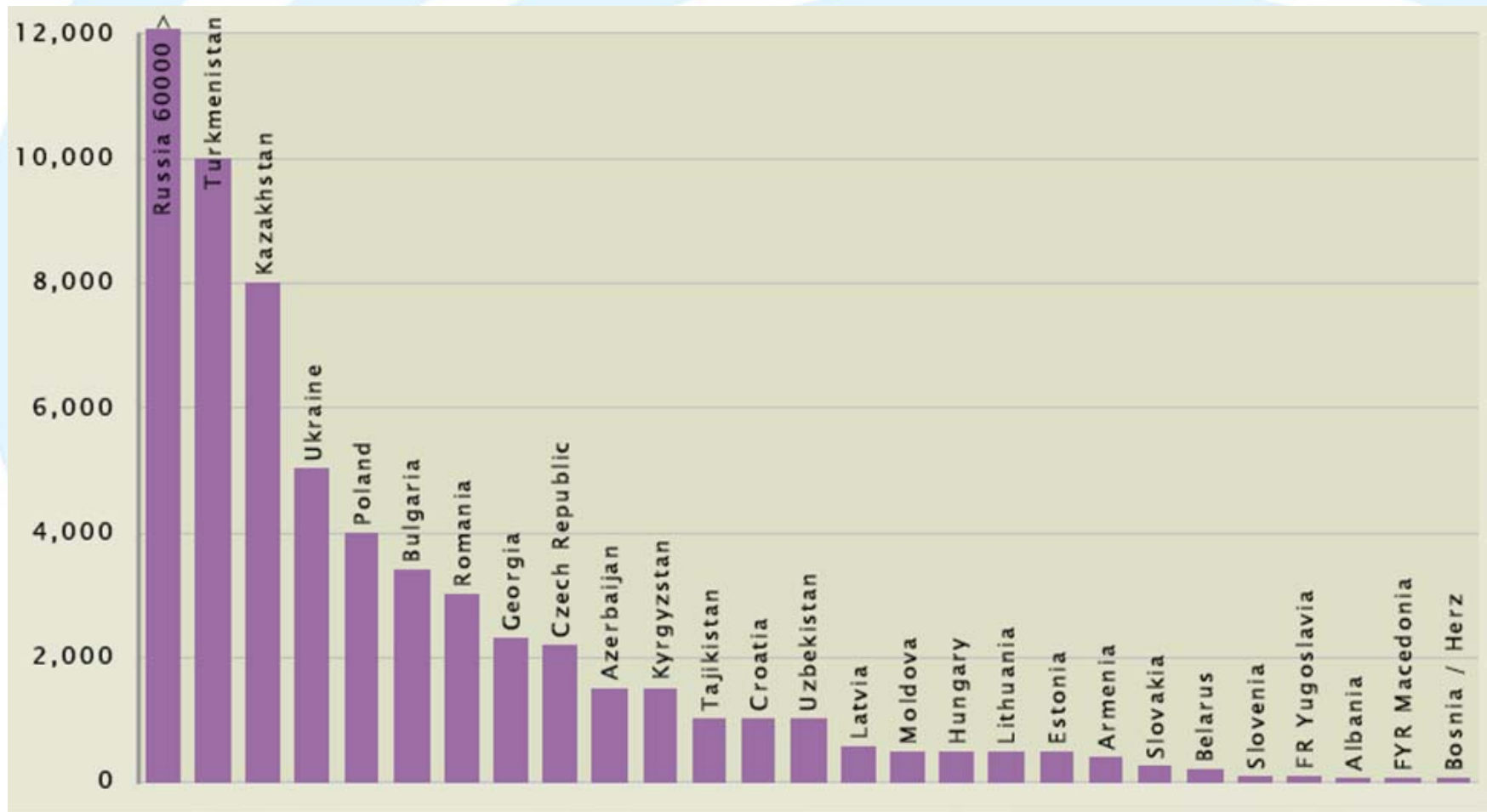
Outline

- Introduction
- Review of RES technical potential for INOGATE PCs
- Strategies, Policies
- Support Schemes
- Barriers
- RES projects, ongoing and planned

Introduction

- INOGATE PCs: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan
- Most common types of RES: Wind, solar, hydro, geothermal, biomass
- Lack of reliable data & technical studies on RES potential for PCs
- Vast potential of RES, largely untapped except for large hydro power.
- Little initiative from private sector to invest in RE projects

Wind Technical Potential (MW_e)



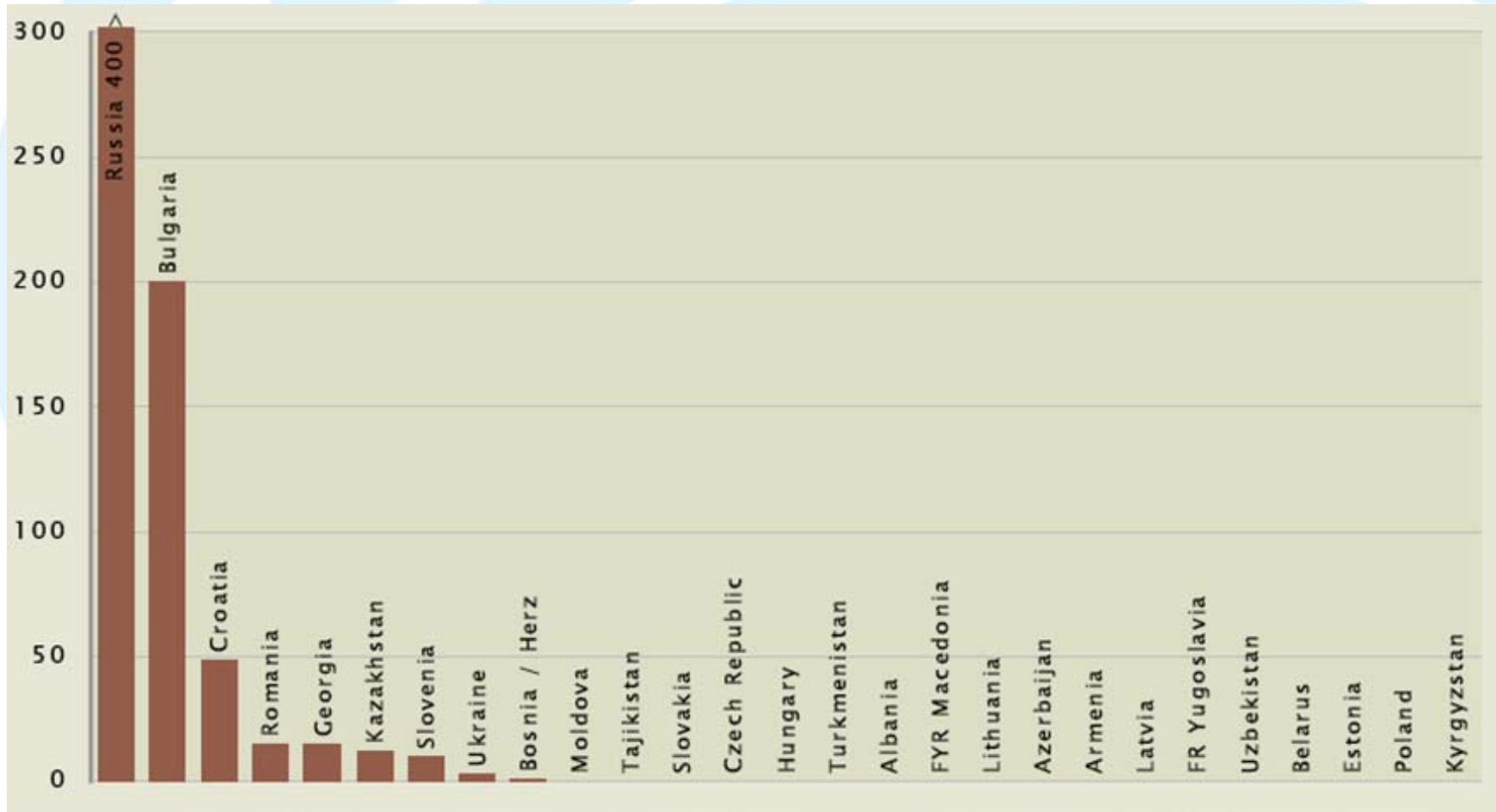
source: EBRD

Solar Annual Insolation (kWh/m²/day)



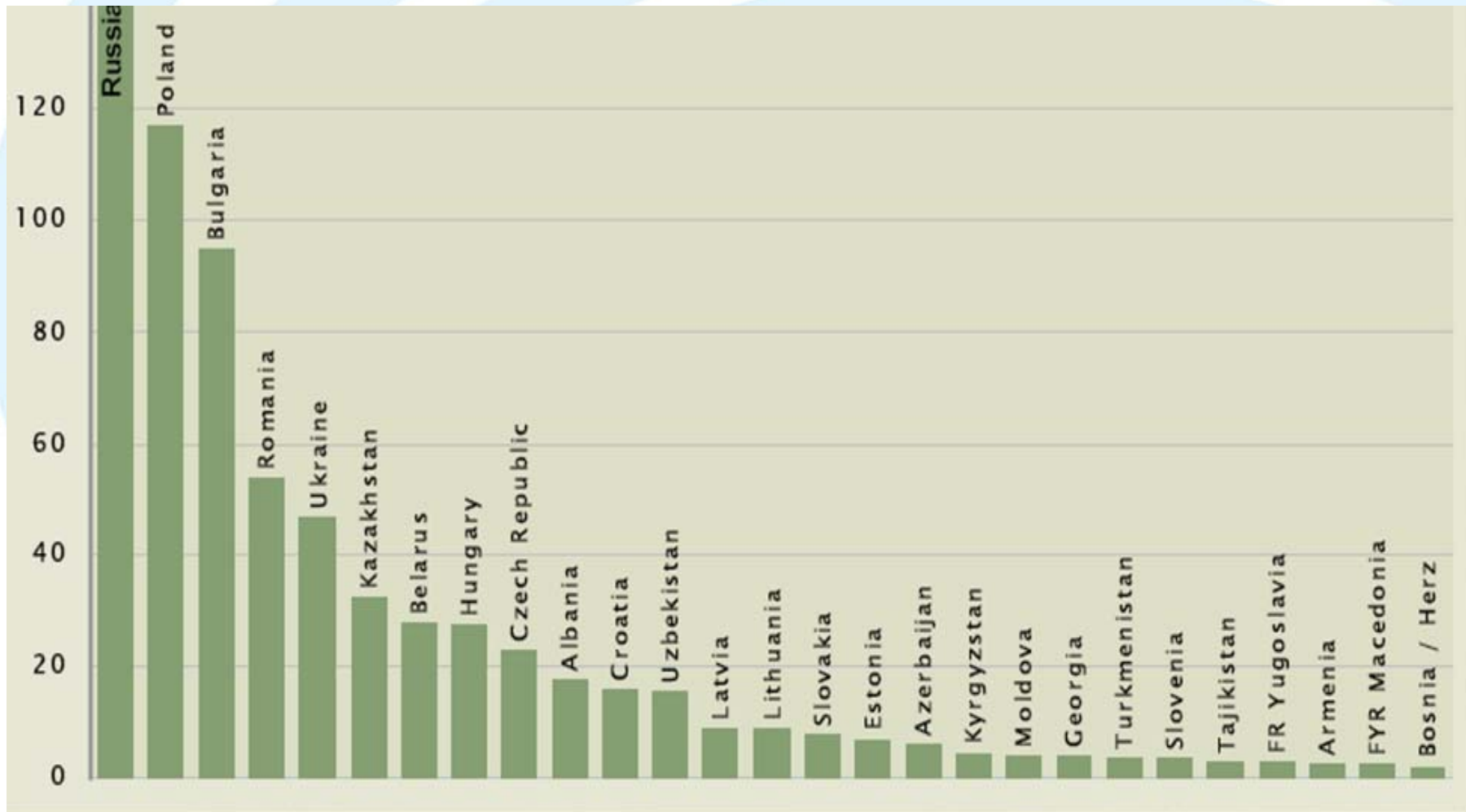
source: EBRD

Geothermal Technical Potential (MW_e)



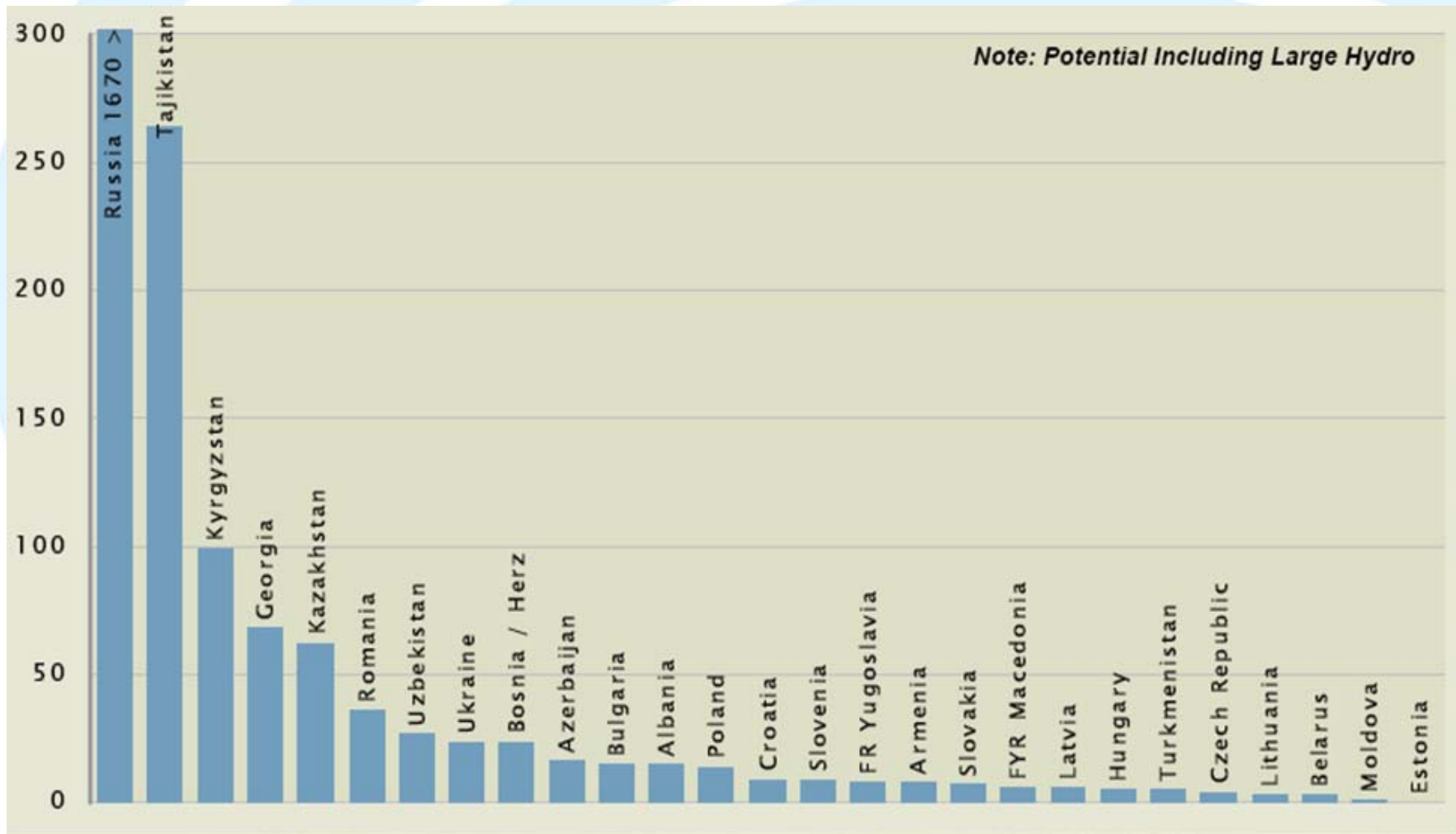
source: EBRD

Biomass Technical Potential (TWh_{th})



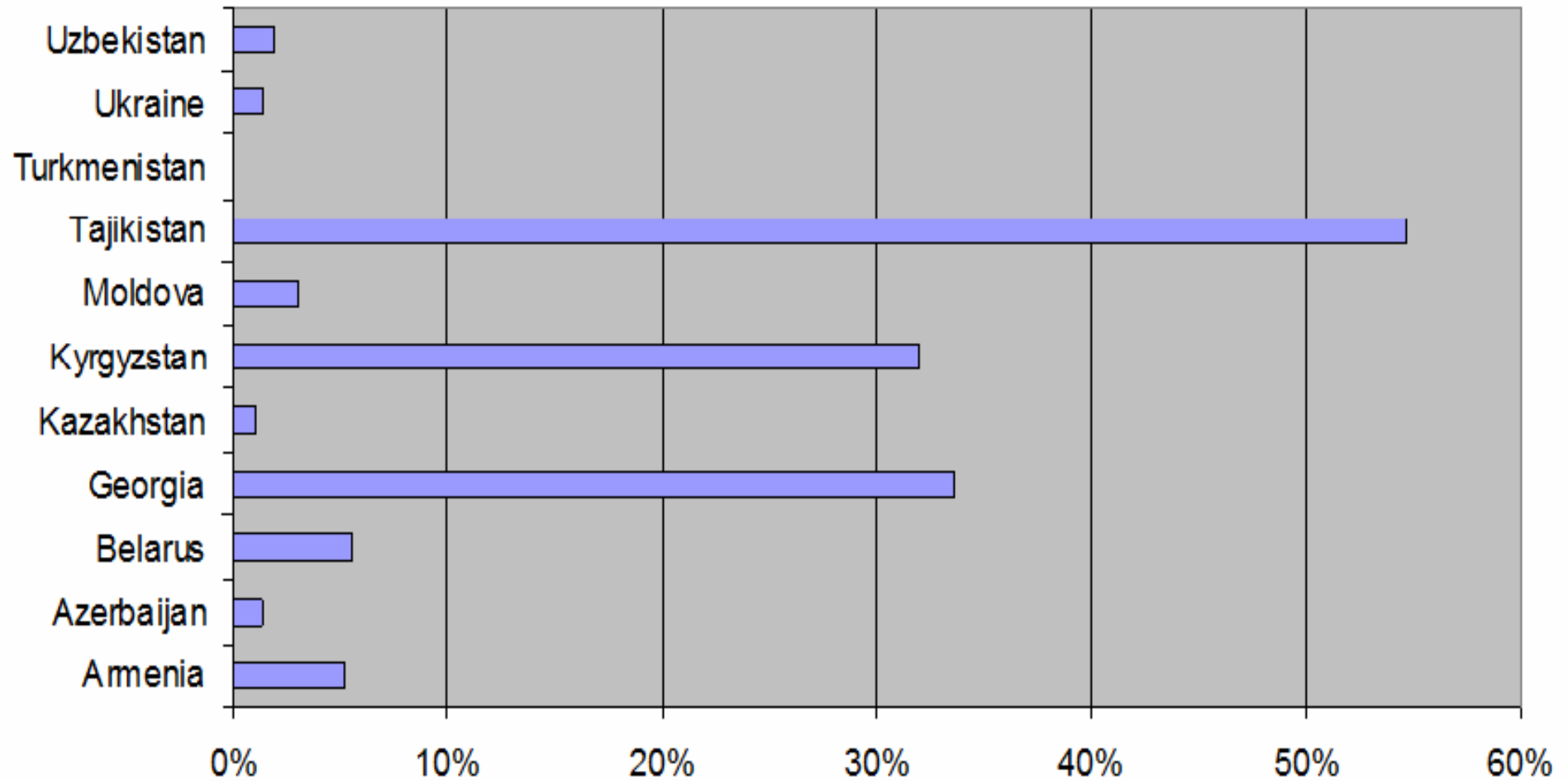
source: EBRD

Hydro Technical Potential (TWh_e)



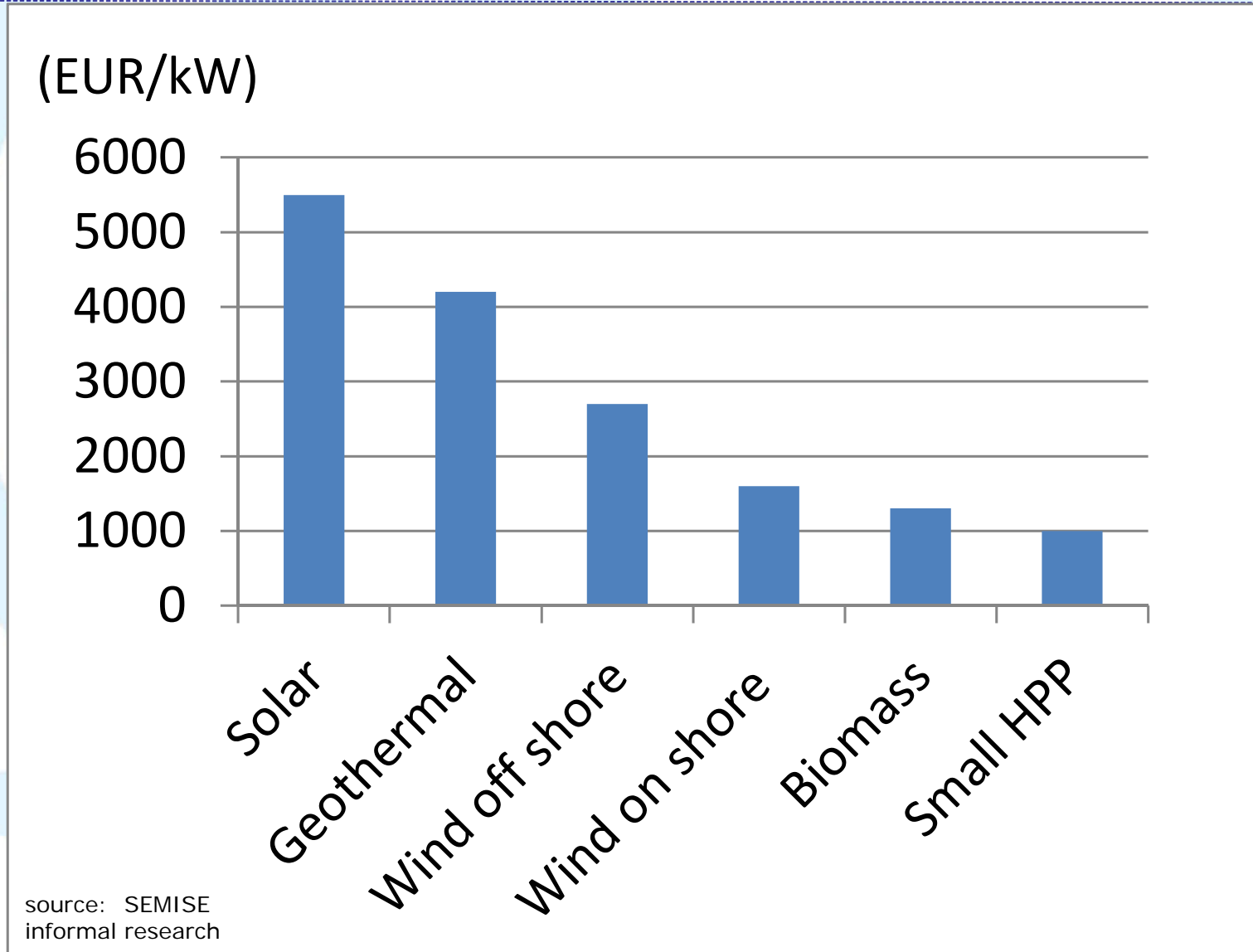
source: EBRD

Share of Renewables in total energy supply (2008)



source: IEA

Installed Costs of RES Electricity Capacity



Strategies, Policies

Political commitments and adopted strategy or policy

Country	Commitment	Strategy/Policy
<i>Armenia</i>	Yes	National Programme for Renew ables & Energy Efficiency
<i>Azerbaijan</i>	Yes	State Programme for Renew ables
<i>Belarus</i>	Yes	National Programme on Energy Efficiency/Law on Renew ables
<i>Georgia</i>	Yes	State Programme for Renew ables
<i>Kazakhstan</i>	Yes	Law on supporting the use of Renew ables
<i>Kyrgyzstan</i>	Yes	National energy programme/Strategy for fuel & energy sector development
<i>Moldova</i>	Yes	National energy strategy/Law on energy efficiency
<i>Tajikistan</i>	Yes	Programme for use of renew able energy
<i>Turkmenistan</i>	No	No specific policy or programme
<i>Ukraine</i>	Yes	National energy strategy
<i>Uzbekistan</i>	Yes	No specific policy or programme

source: ITS report 2011

Support Schemes East European PCs

- Belarus – Preferential tariffs for RES
(price premium coefficients)
- Moldova – Feed-in tariffs
(proposed for 15 years)
- Ukraine – Green tariffs
(wind power, hydropower, biomass,
solar power)

Support Schemes Caucasian PCs

- Armenia – Access to grid for 15 years and secured feed-in tariff, adjusted annually (for SHPP, wind, biomass)
- Azerbaijan – Preferential tariffs for wind & SHPP (feed-in tariffs under consideration)
- Georgia – SHPPs, priority for selling electricity to system operator, selling options for all non-contracted electricity

Support Schemes Central Asian PCs

- Kazakhstan – Feed-in tariffs and RE certificates
- Kyrgyzstan – No specific incentives
- Tajikistan – Preferential tariffs for SHPP plants
- Turkmenistan – No specific incentives
- Uzbekistan – No specific incentives

Barriers to RES Development

- Lack of understanding among decision-makers on benefits for the economy
- Competing energy resources
 - give RES development secondary role
 - ...especially in energy producing PCs
- Targets are voluntary, not mandatory
- Lack of knowledge on how to set performance indicators
- Limited statistics data on RES

More Barriers

- Lack of legal base (primary/secondary legislation) on RES
- Financial/fiscal incentives (if any) not sufficient to attract investors, domestic or foreign
- High cost of electricity supply from RES
- Low electricity tariffs; no demand charges

Low Tarrifs

Average prices for electricity and gas paid by households in the INOGATE Partner Countries

Country	Electricity (€/kWh)	Gas (€/Gj)
<i>Armenia</i>	€ 0.05	€ 5.2
<i>Azerbaijan</i>	€ 0.06	€ 2.9
<i>Belarus</i>	€ 0.02	€ 3.1
<i>Georgia</i>	€ 0.07	€ 6.36
<i>Kazakhstan</i>	€ 0.04	€ 1.29
<i>Kyrgyzstan</i>	€ 0.02	€ 8.1
<i>Moldova</i>	€ 0.08	€ 7.8
<i>Tajikistan</i>	€ 0.01	€ 4.39
<i>Turkmenistan</i>	Free of charge (for up to 35KWh per person per month)	Free of charge
<i>Ukraine</i>	€ 0.02	€ 2.1
<i>Uzbekistan</i>	€ 0.02	€ 0.02 per person per month

Note: Data retrieved from the agreed Country Profiles of the Partner Countries (Annex IV)

...and More Barriers

- Unclear allocation of responsibilities amongst public institutions (to obtain authorizations)
- Very long administrative procedures
- Grid connection procedures not transparent
- Property ownership issues
- Lack of alternative sources of financing other than banks

RES Investment Examples Eastern Europe

- Moldova – planned biogas production plant, Swiss company Mercado Green Technology, investment € 25 M
- Ukraine – manufacturing of wind turbines, Kramatorsky Heavy Machine Factory, Fuhrlander, 40 turbines so far, ongoing

RES Investment Examples

Eastern Europe

- Ukraine – 80 MWe "Okhotnikovo" and 100 MWe "Perovo" PV solar installations recently commissioned in the Southern Ukraine
- Ukraine – 3 SHPPs (0.5, 0.3, 0.5 MW) being upgraded as result of INOGATE-SEMISE energy audits, 11 more potential SHPP upgrades in NovoSvit company

RES Investment Examples Caucasus

- Armenia – 0.8 MW_e biomass cogeneration plant, Lusakert poultry farm, Kyoto Protocol CDM project, 63 000 tCO₂_e/yr reduction,
- Armenia – Kyoto Protocol CDM SHHP (on-job) training support to three commercial banks in Armenia in 2010-2011 by INOGATE-SEMISE
- Georgia – 50 MW wind farm project, to be completed in 2015, seeking investor

RES Investment Examples

Central Asia

- Kazakhstan – planned solar power plant, Kazatomprom + French investors, investment € 170 M
- Tajikistan – 3 planned SHPPs (2.3, 4.7, 15.5 MW) to be built by Canog Energy Inc.