Prospects for renewable energy expansion and cooperation for the WB countries – bottom-up economic assessment of Joint Projects

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Overview

Joint projects

Benefits

Project design elements

Case study (wind)

Take home messages

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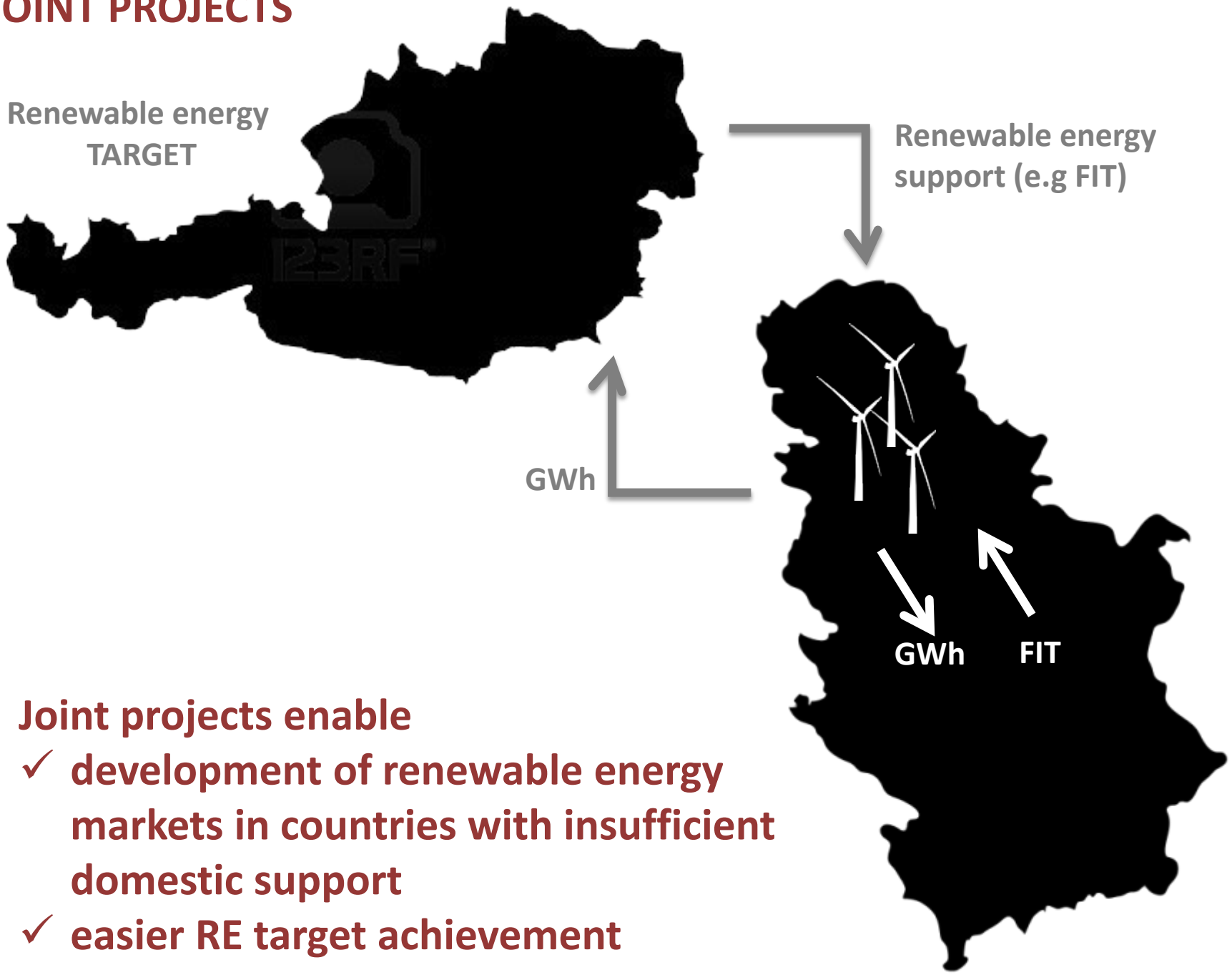
JOINT PROJECTS



Joint projects enable

- ✓ development of renewable energy markets in countries with insufficient domestic support
- ✓ easier RE target achievement

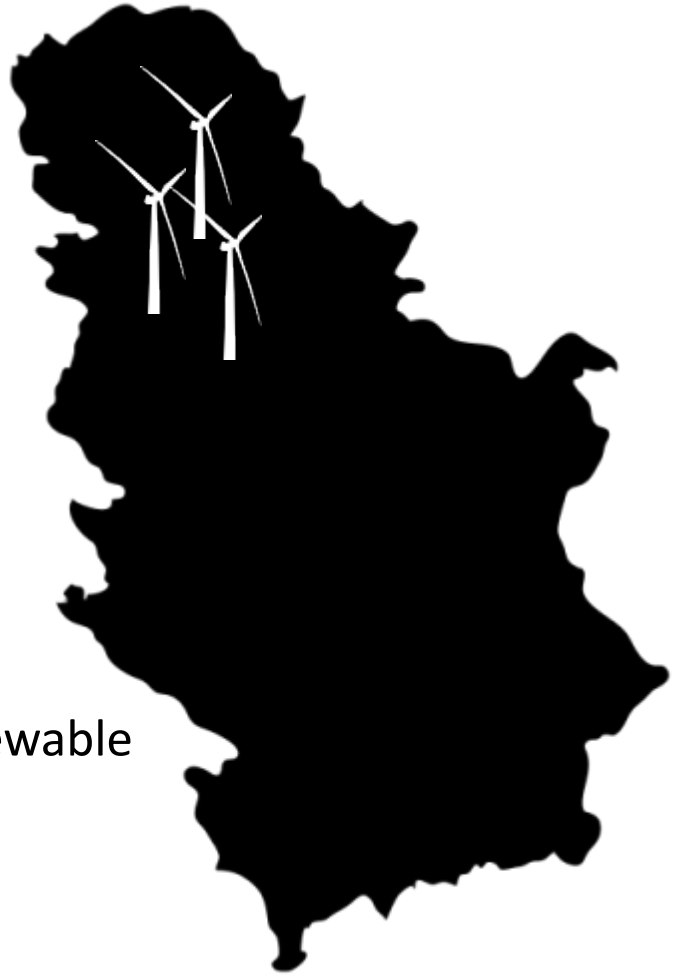
BENEFITS

BENEFITS FOR BOTH

- ✓ Launching long term cooperation
- ✓ Security of energy supply

INVESTOR COUNTRY

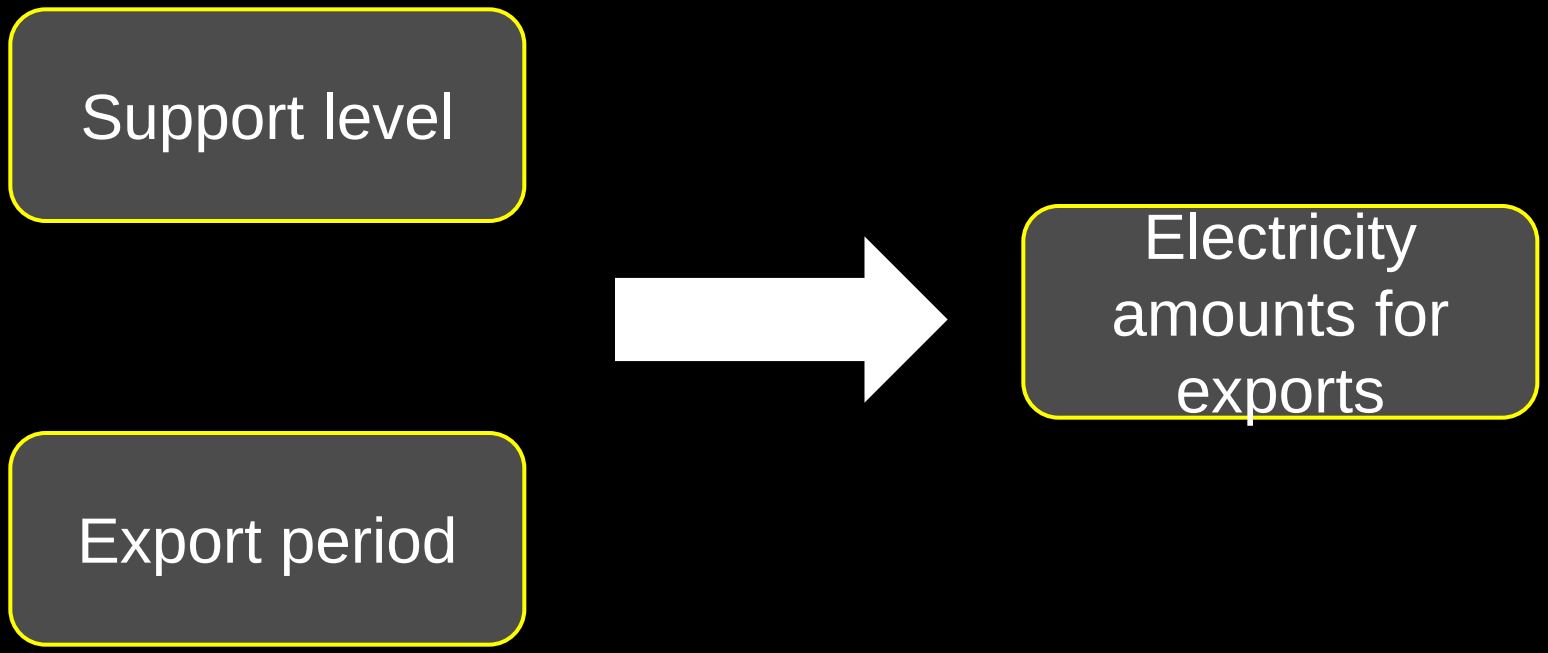
- ✓ Cheaper production of renewable electricity
- ✓ Business opportunities



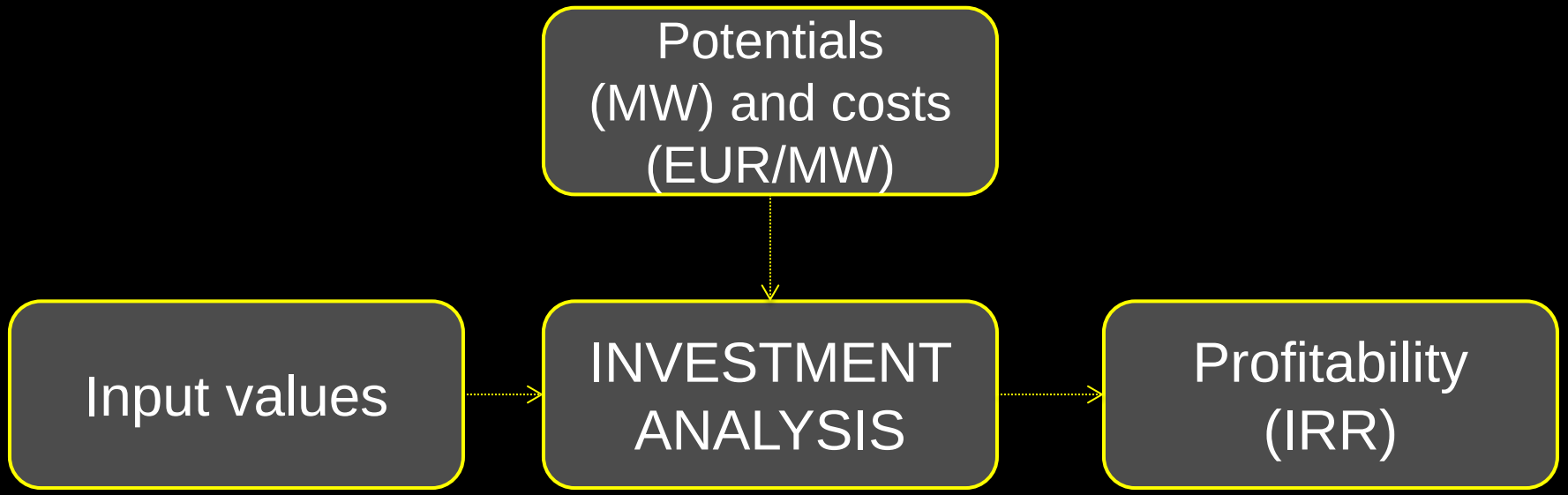
HOST COUNTRY

- ✓ Development of the renewable energy market
- ✓ More jobs
- ✓ Technology transfer

PROJECT DESIGN ELEMENTS
based on European Commission guidance



MODEL INPUT & OUTPUT



Input variables for the model

Variable	Unit	Base scenario Variables 1	Export scenario Variables 2
Discount rate	%	7	-
Tax rate	%	10	-
Depreciation period	year	15	-
Bank interest rate	%	8	-
Loan period	year	10	-
Share of loan	%	65	-
Export price	EUR/MWh	0	90
Export share	%	0	30
Export period	year	0	20
Domestic price	EUR/MWh	81	-
Concession period	year	20	-
Operation start	year	1	-
Crediting period (CDM)	year	7	-
Carbon price	EUR/t	0	-
O&M	EUR/kW	36	-
Investment costs	EUR/kW	1300	-
Emission factor average	tCO2eq/GWh	0,39	-
Threshold for rentability	%	15,0%	

Price range for support (production finance)

Export share if same rate assumed for all projects

Export period

Rentability threshold

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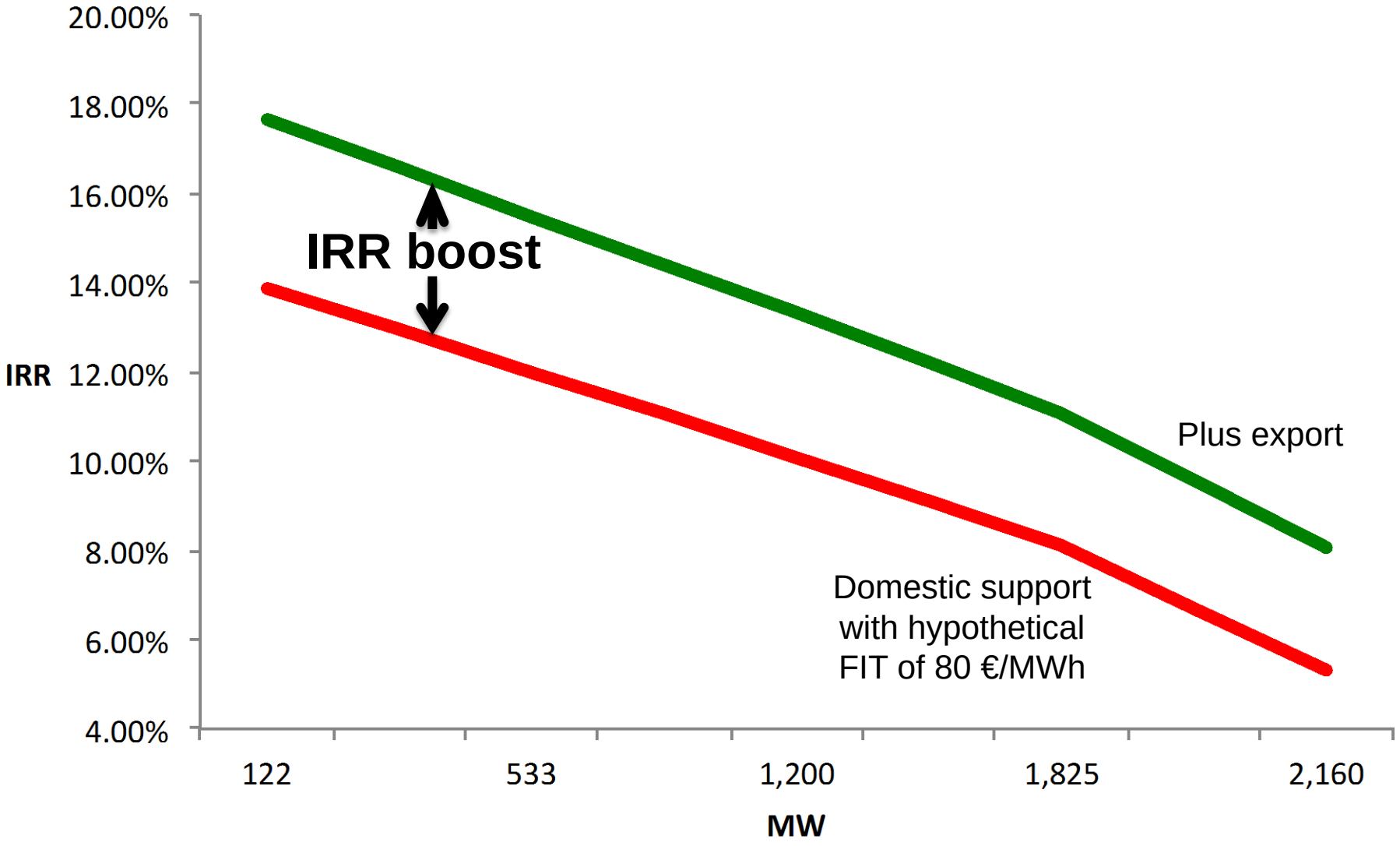
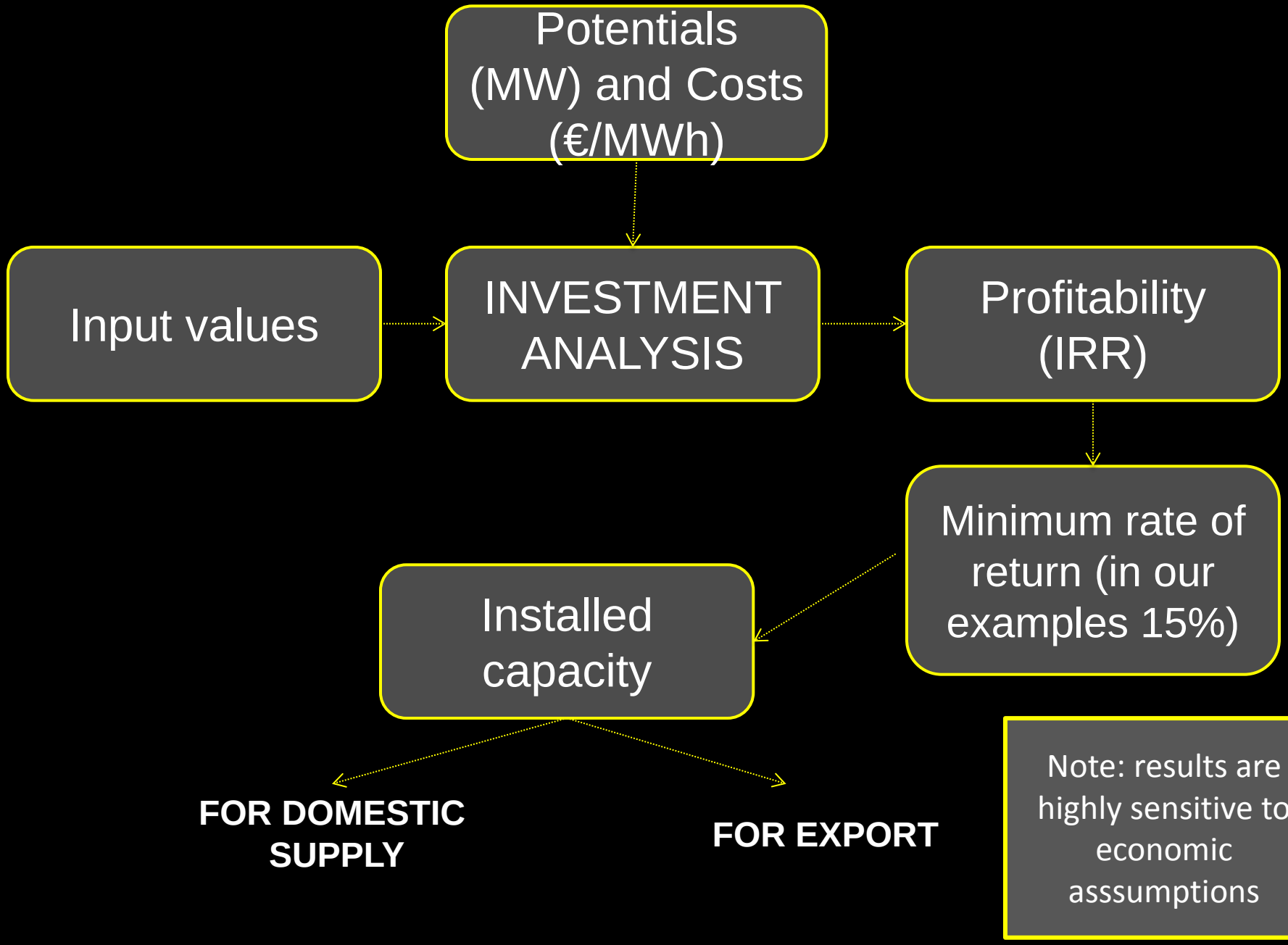
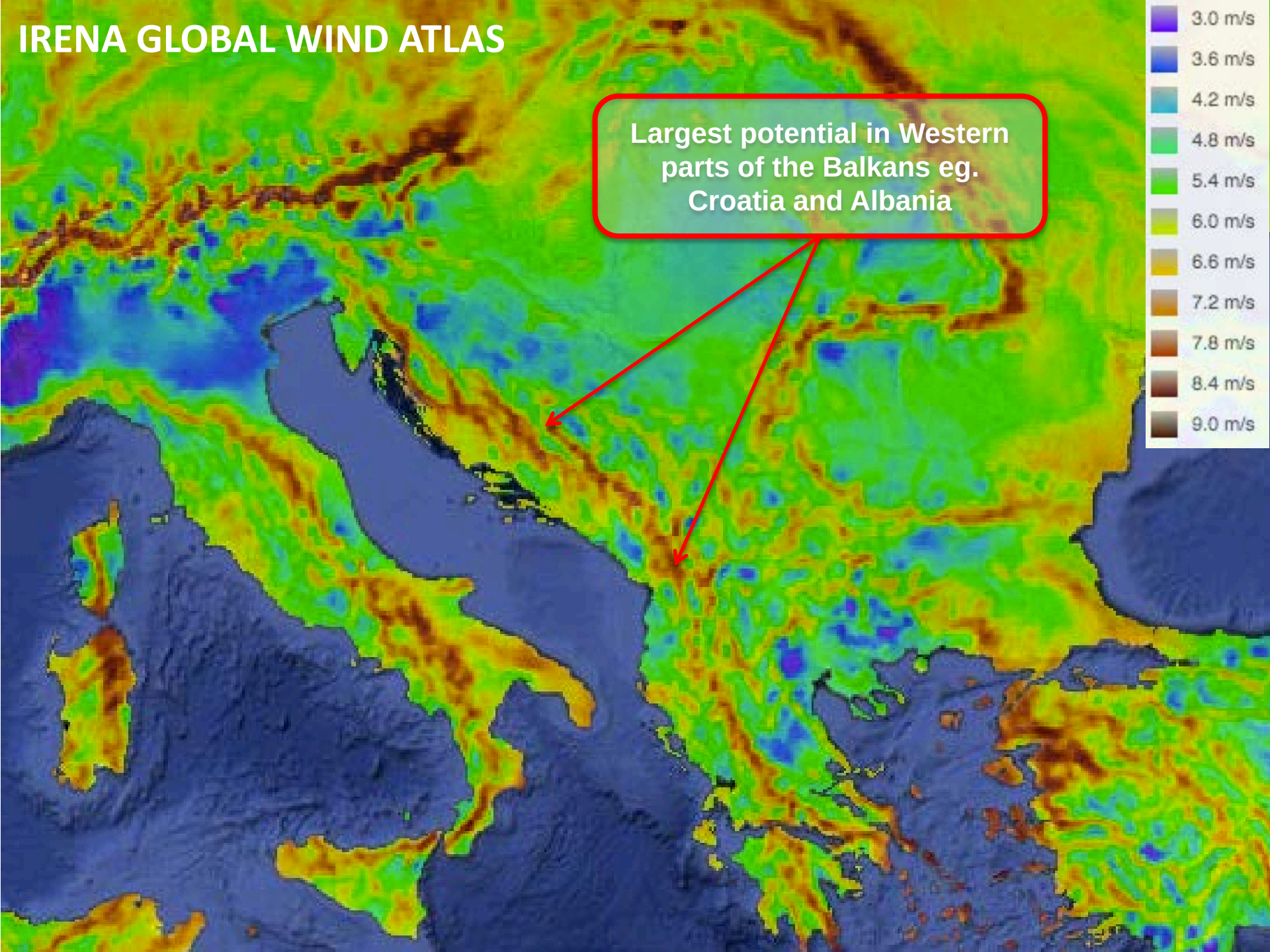
Model outputs

Potentials	Capacity MW	Domestic support only IRR	Domestic support and export IRR
Cheap	122	13,86%	17,64%
	179	12,97%	16,60%
	232	12,01%	15,49%
	338	11,06%	14,40%
	329	10,12%	13,33%
	318	9,12%	12,19%
	308	8,12%	11,06%
	196	6,70%	9,56%
Expensive	140	5,28%	8,06%

Joint projects can boost the rentability of renewable energy projects (Example wind Albania)




Potentials (MW) and Costs (€/MWh)
Input values
INVESTMENT ANALYSIS
Profitability (IRR)
Minimum rate of return (in our examples 15%)
Installed capacity
FOR DOMESTIC SUPPLY
FOR EXPORT
Note: results are highly sensitive to economic asssumptions


IRENA GLOBAL WIND ATLAS
Largest potential in Western parts of the Balkans eg. Croatia and Albania
3.0 m/s
3.6 m/s
4.2 m/s
4.8 m/s
5.4 m/s
6.0 m/s
6.6 m/s
7.2 m/s
7.8 m/s
8.4 m/s
9.0 m/s

Methodological basis

Each country has following options:

- **Domestic projects** > only domestic support applies
- **Joint projects with partial export** > domestic and foreign support apply to different shares
- **Joint projects with full export** > only foreign support applies while host country provides the location of the projects and necessary legal support

The share each country has in the project determines renewable elecricity consumed in each country counting towards their renewable energy targets if not yet achieved.

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Methodological basis

Importance of **exporting**

- increases the profitability of projects if domestic support is lower than support of importing country
- may enable higher renewable electrícity supply and facilitate target achievement for host and investor country
- the more costly a project is in the host country the more export is needed to make it profitable

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Methodological basis

Model assumptions

- The **cost-potentials** are adopted from TU Vienna Green X model and they represent bundles of wind energy potentials that are differentiated in estimated size and load hours

- Export conditions
  - ☑ Export share is **optimized** for each bundle of wind potentials so that the IRR of the projects is at our assumed renatability threshold (15% in our case)**
  - ☑ Assumed export price of 90 EUR/MWh*

*except Serbia where we assume 95 EUR/MWh, because it allready has a FIT of 91 EUR/MWh

** we reckognize that some investors might accept lower or require higher IRRs

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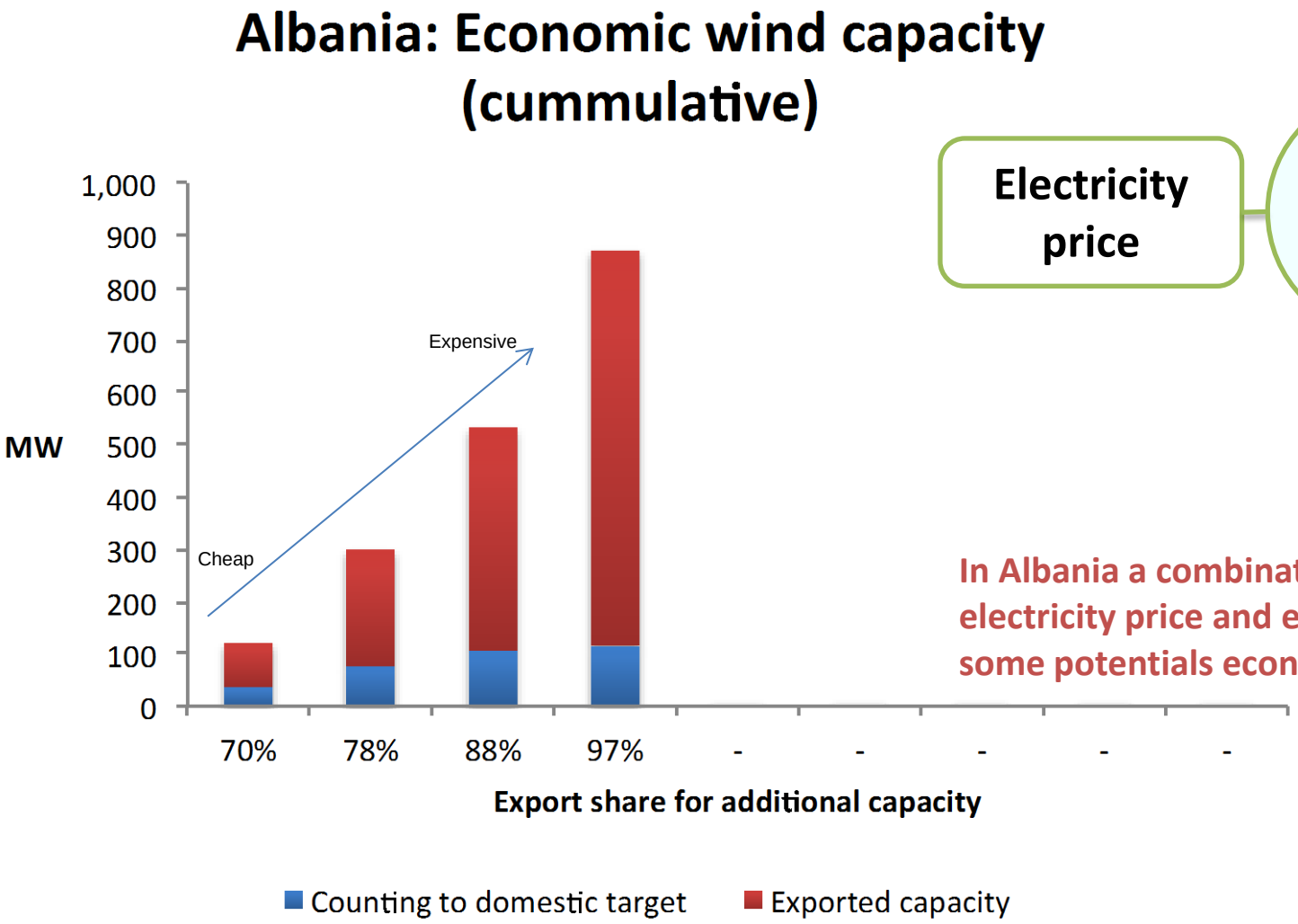
Albania Case 1:
Combination of domestic electricity price and export



Electricity price **65 €/MWh**

In Albania a combination of domestic electricity price and export makes some potentials economically viable

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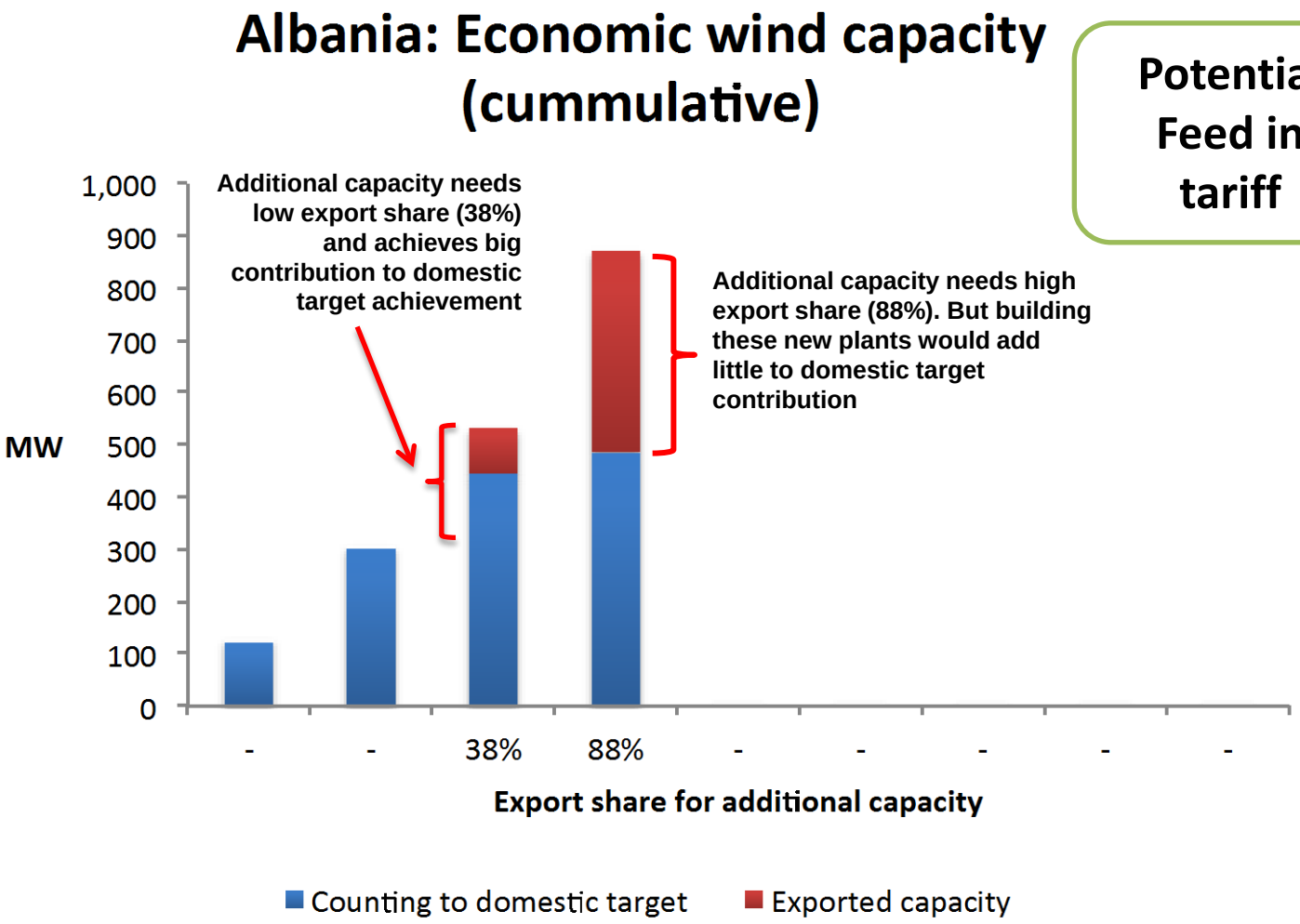
Albania Case 2:
A potential FIT of 85€ and export models



Potential Feed in tariff

85 €/MWh

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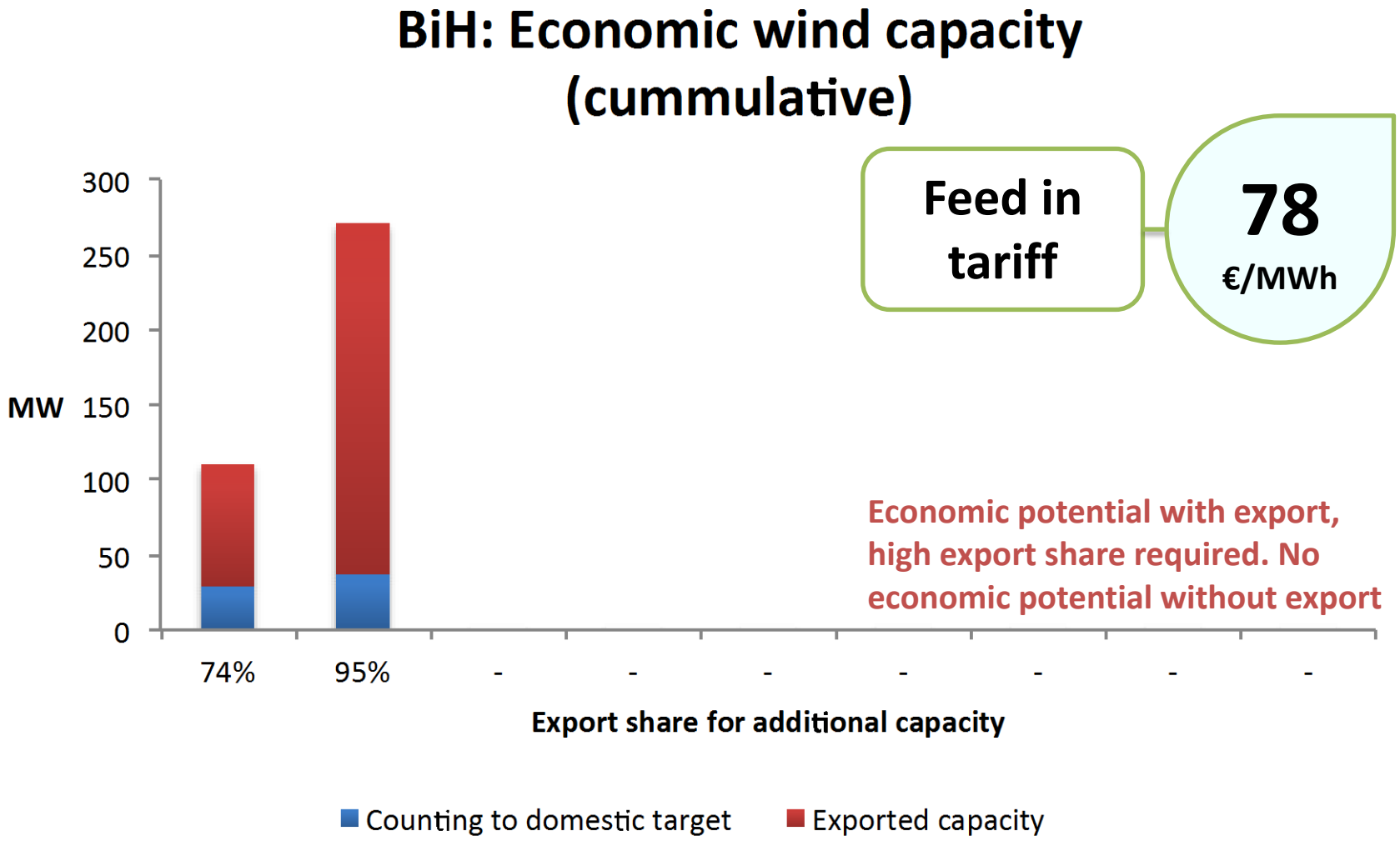
Federation of BiH:
A FIT of 78€/MWh and export models



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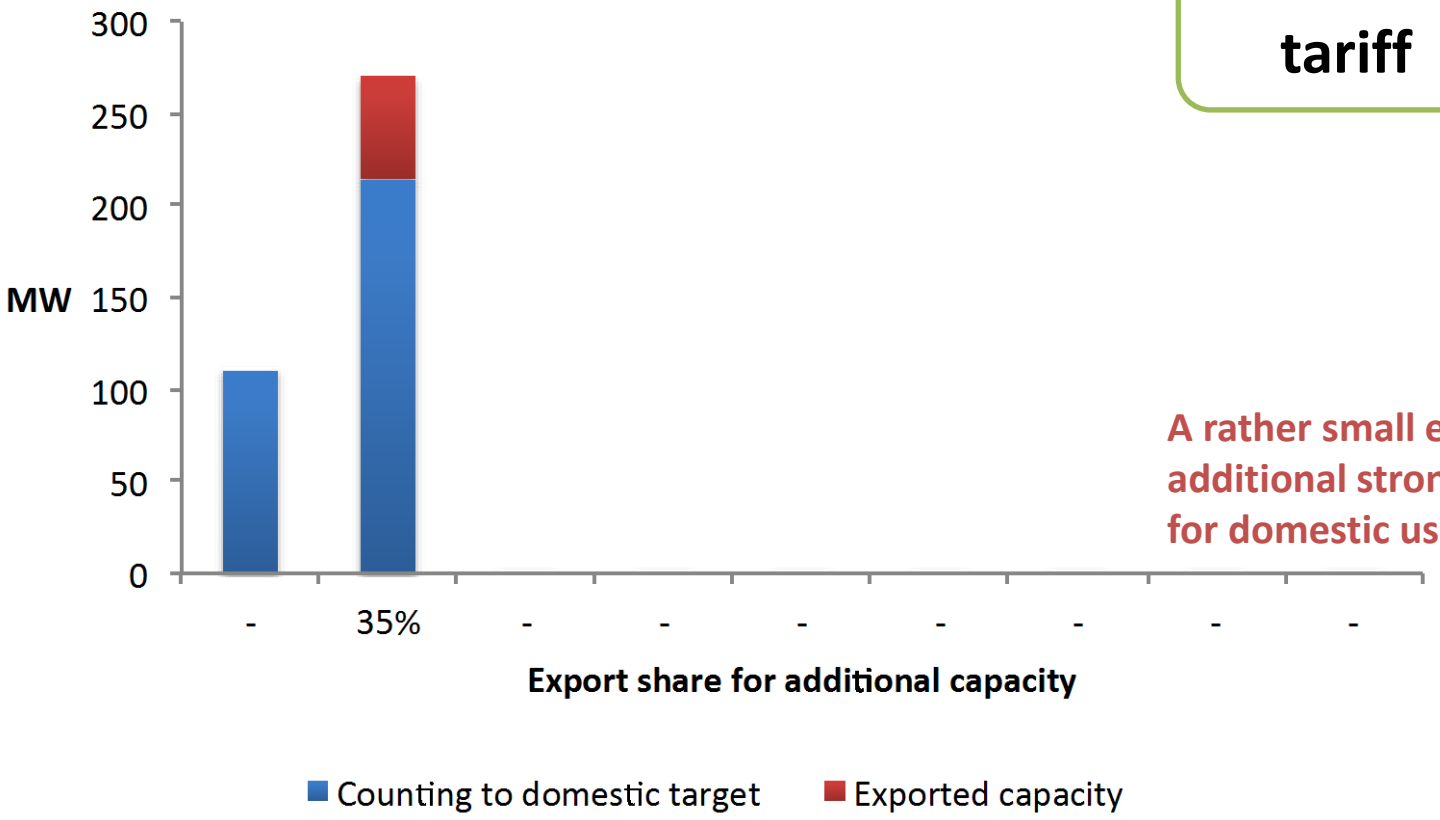
Republika Srpska:
A FIT of 88€/MWh

Republika Srpska: Economic wind capacity (cummulative)



Feed in tariff **88 €/MWh**

A rather small export share triggers additional strong capacity increase for domestic use

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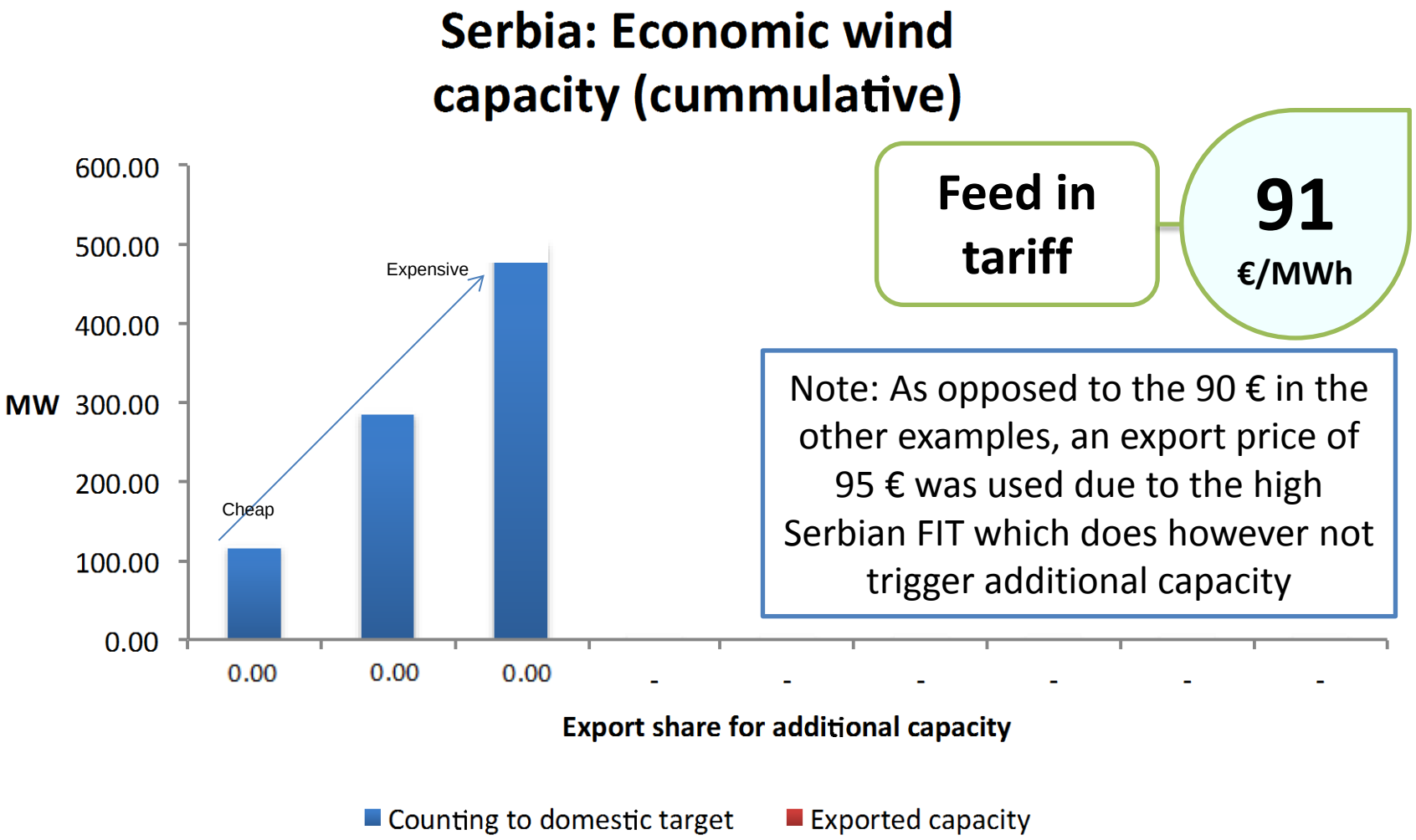
Serbia:

Current FIT sufficient for domestic market development – no requirement for export



Feed in tariff

91 €/MWh

Note: As opposed to the 90 € in the other examples, an export price of 95 € was used due to the high Serbian FIT which does however not trigger additional capacity

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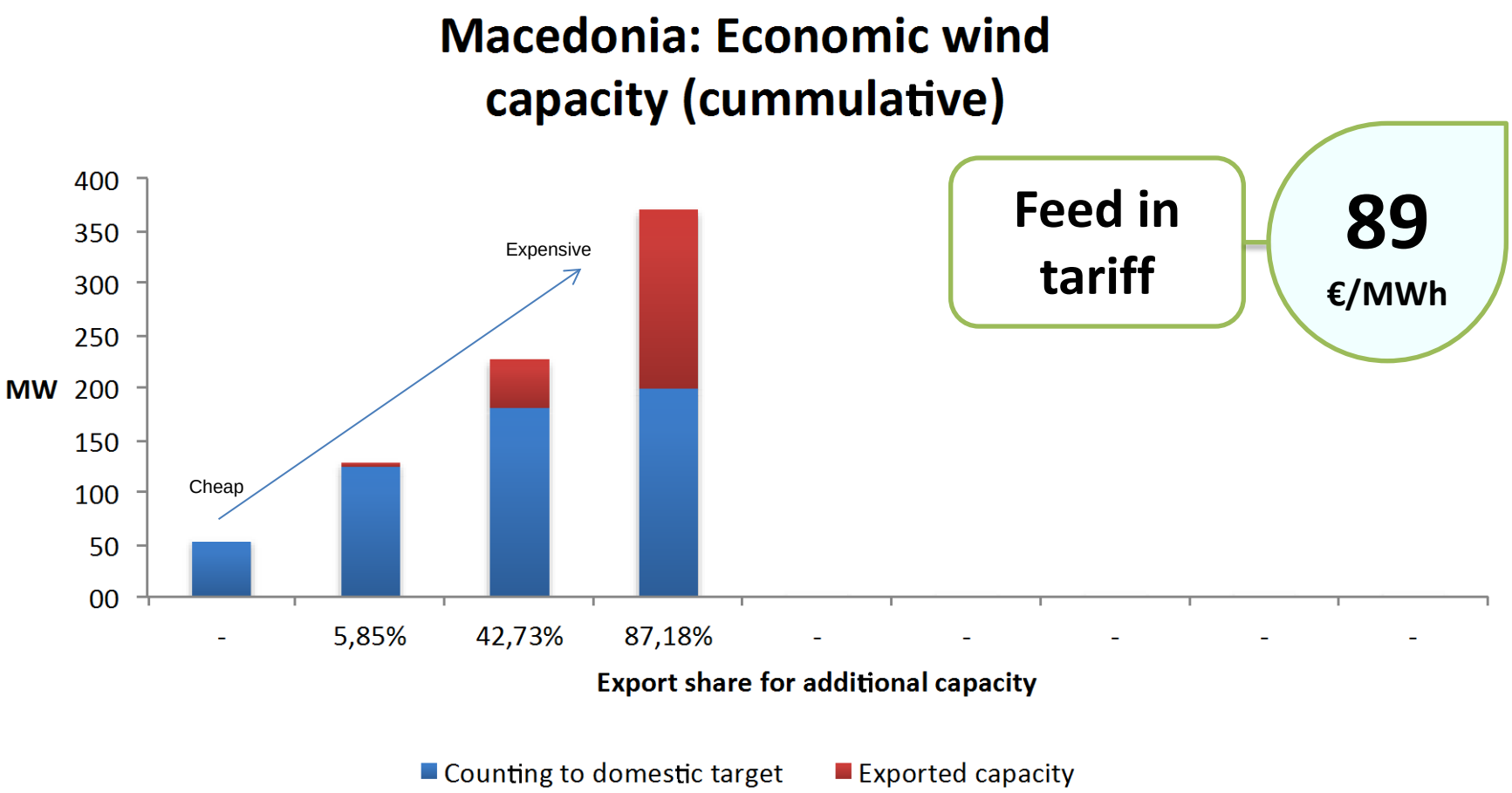
Macedonia:

Economic potential without export, substantial export for higher price potentials



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Take home messages

- **Export can boost the profitability of renewable energy projects**
- **Export can increase the domestic supply of renewable energy potentially helping to achieve targets**
- In order to rely on exports for increasing domestic renewable energy supply **robust international export agreements** would be needed

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Thanks for your attention

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