Cost-effective Potential for PV Generation in SE Europe

Prof. Andrej F. Gubina

Head of Energy Policy Laboratory, Faculty of Electrical Engineering,

University of Ljubljana, Slovenia

andrej.gubina@fe.uni-lj.si

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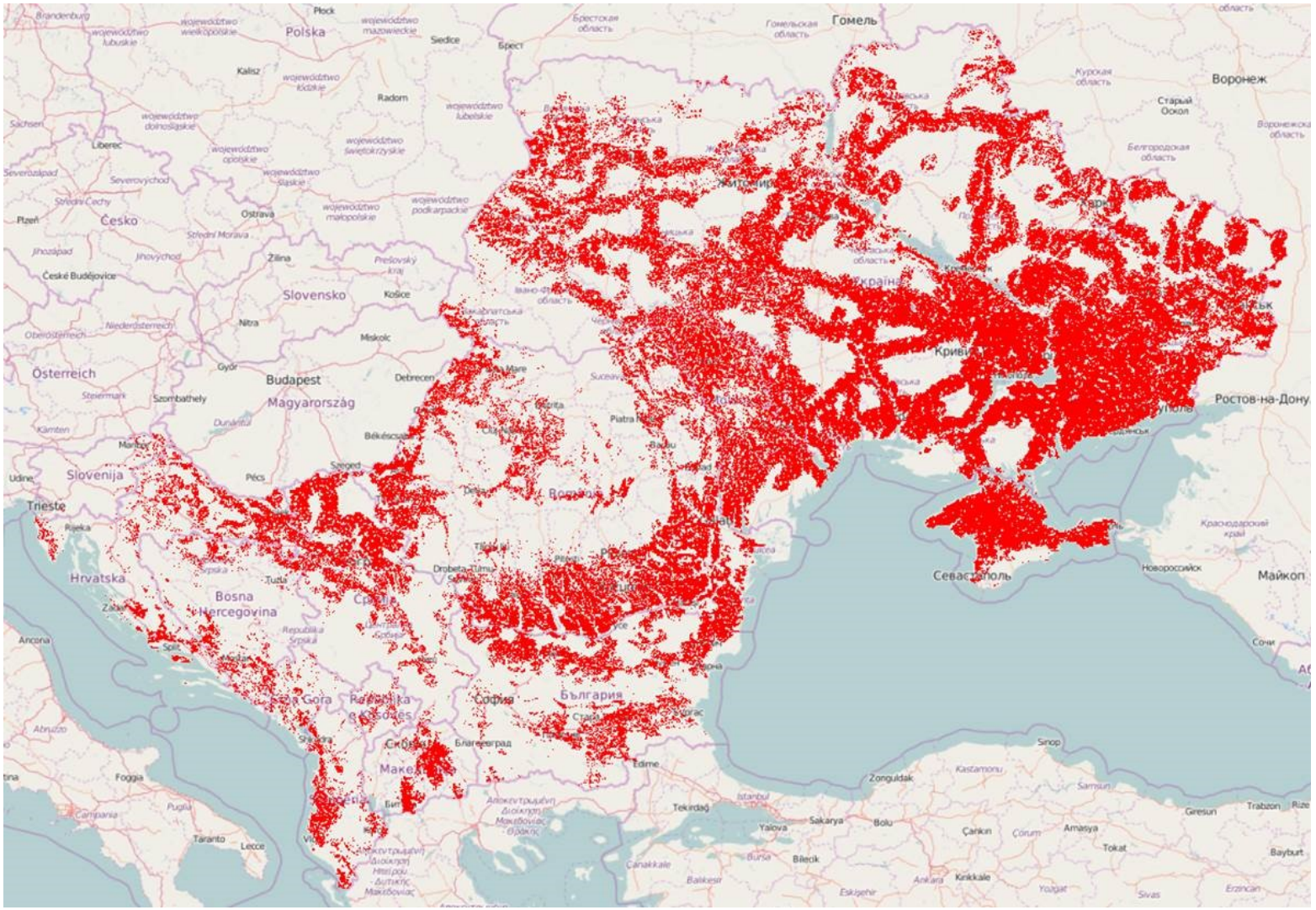
Practical PV potential in SE Europe

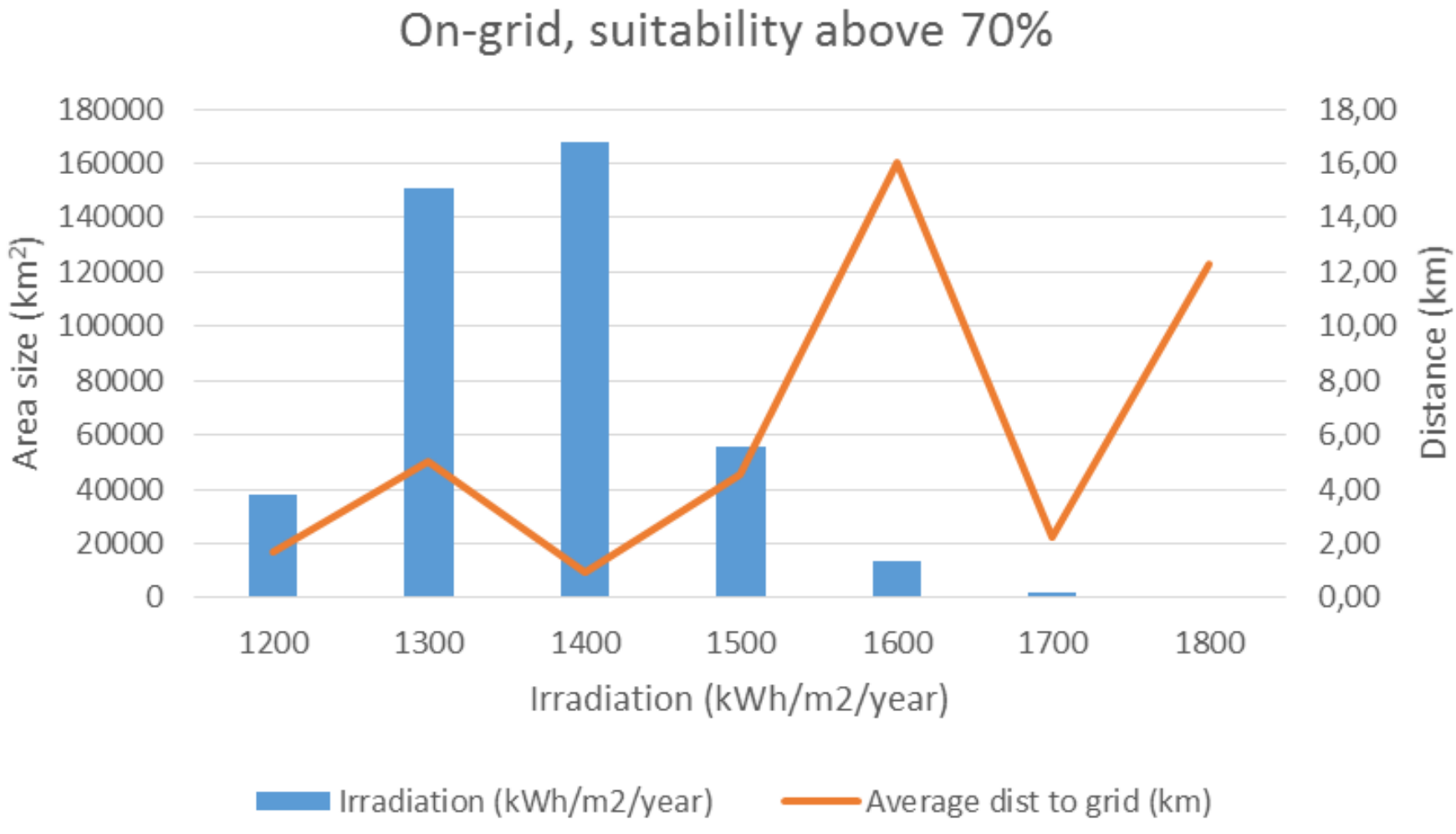
- 12 Countries and territories covered in the report

Country	ISO code	Country	ISO code
Albania	AL	Moldova	MD
Bosnia and Herzegovina	BH	Montenegro	ME
Bulgaria	BG	Romania	RO
Croatia	HR	Serbia	SR
Kosovo*	XK	Slovenia	SI
FYR of Macedonia	MK	Ukraine	UE

Solar PV On-Grid, suitability >70%

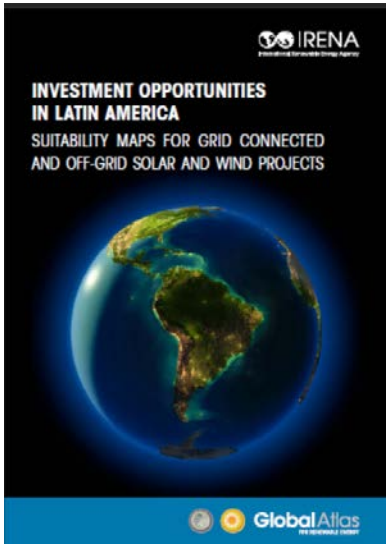


Solar PV - On-grid

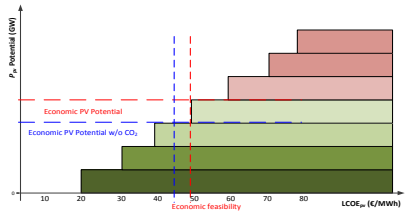


IRENA Suitability Methodology

- IRENA Global Atlas
  - Largest collection of most recent and accurate public maps of RES.
- IRENA Opportunity based approach
  - Outcome is a display of availability for RES projects on land
  - Simple and replicable suitability approach
  - 6 factors are used to estimate suitability in each point of a map
    - Resource intensity, Distance to power grid, Population density, Land cover, Topography and Protected areas.
  - Multiple factors of every area unit (AU) combined
    - Final suitability level of every AU obtained
    - Maps associated with suitability-levels
- Suitability >70% used for SEE area

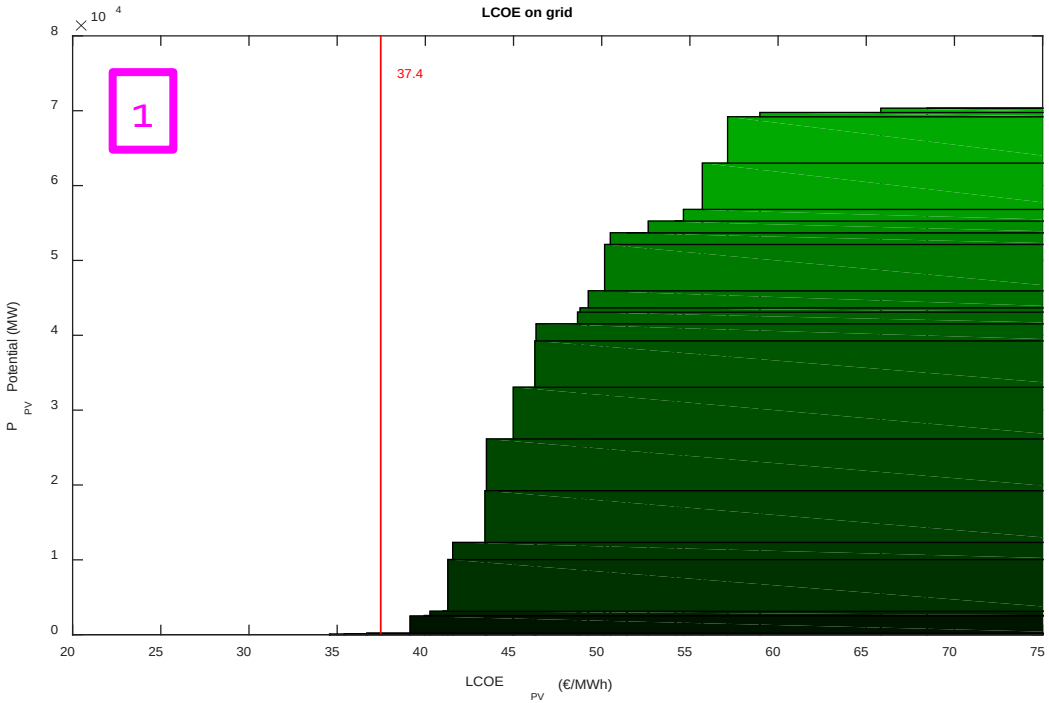


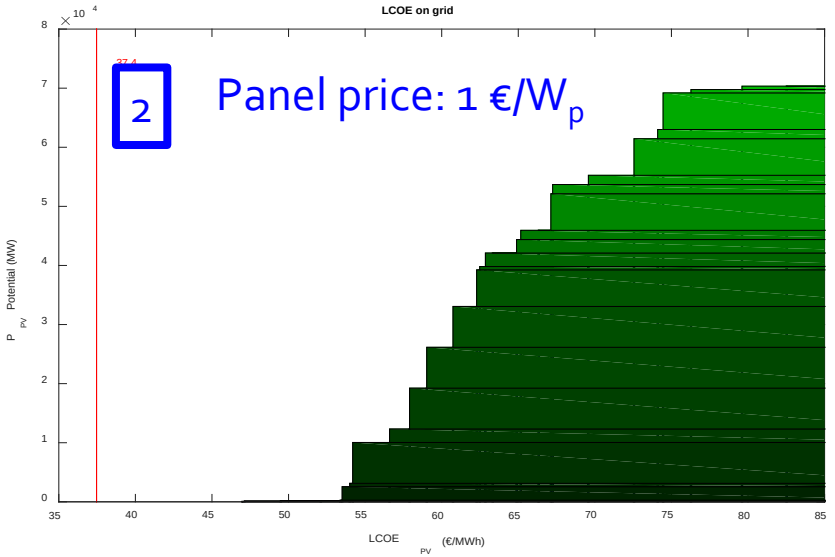
LCOE: On Grid, S>70%

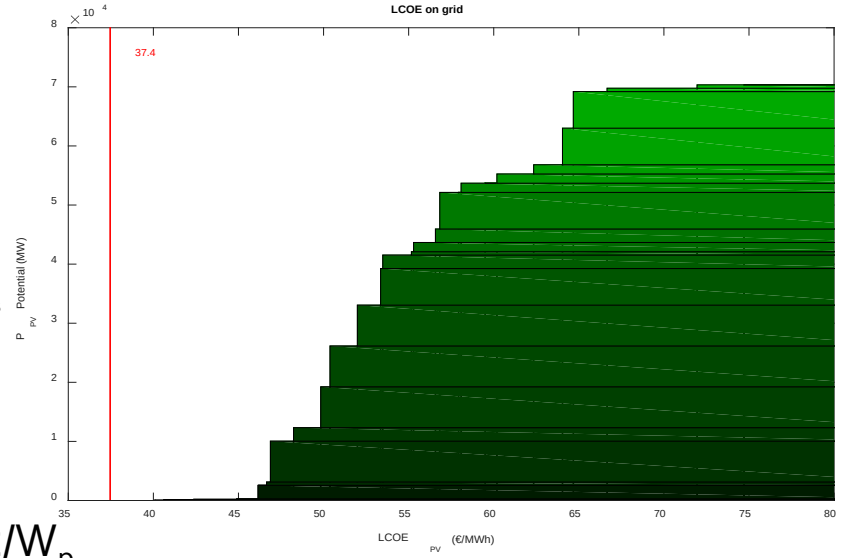


- 2016

Panel price: 0.64 €/W_p



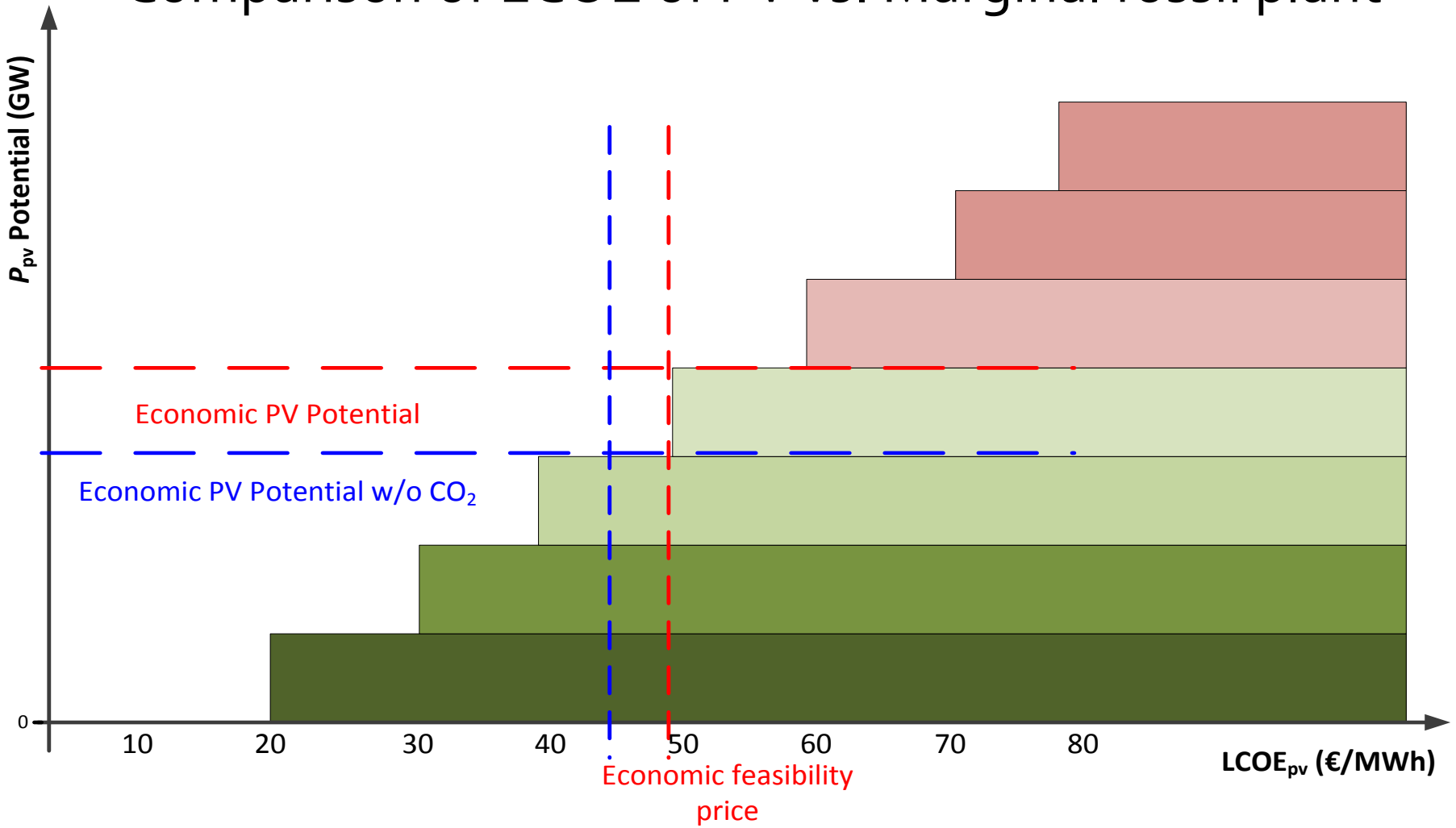




Panel price: 0.80 €/W_p

Cost-effective PV potential

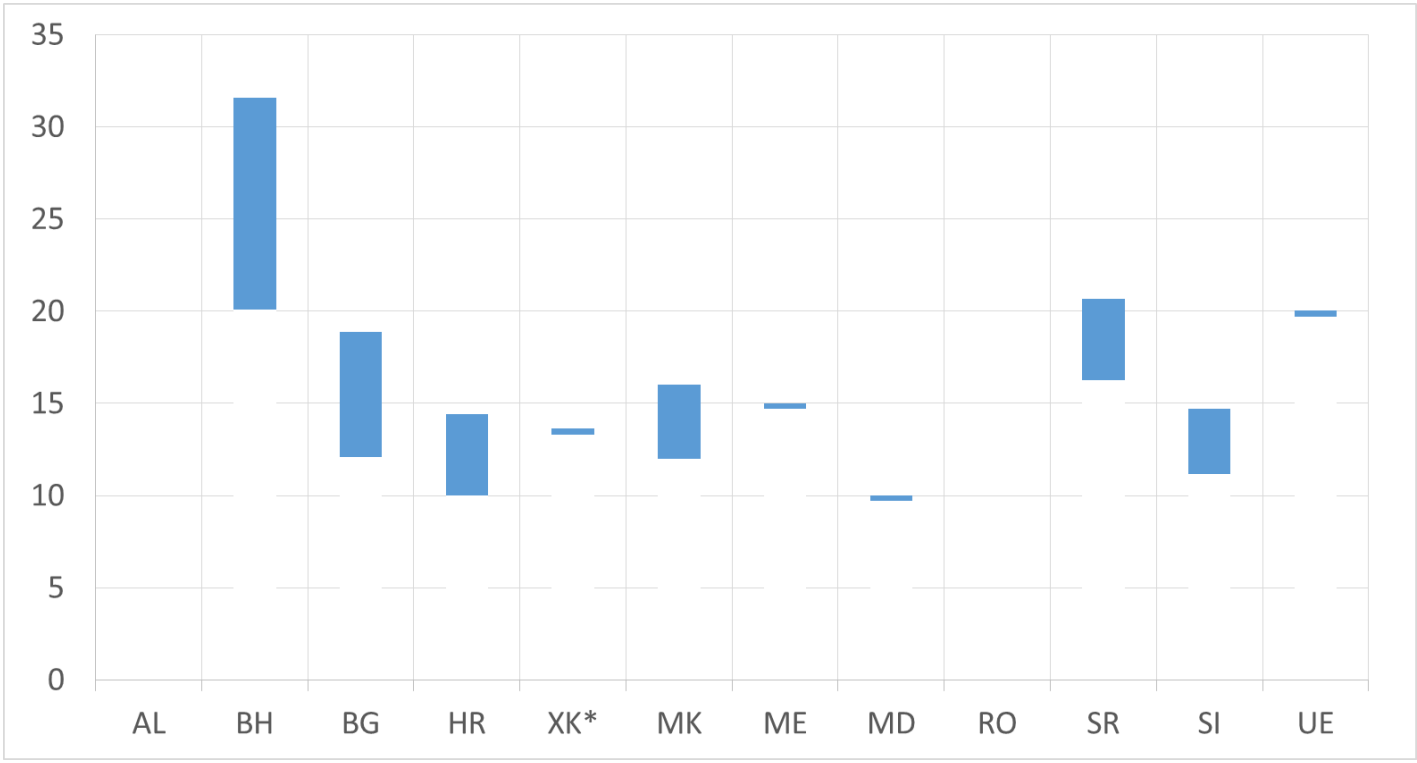
- Comparison of LCOE of PV vs. Marginal fossil plant



Feed-in tariffs, SE Europe

- The FiT levels differ among the SEE countries

Country	High	Low	Year
AL	/		
BH	31.60	20.10	
BG	18.87	12.08	2013
HR	14.41	10	
XK*	13.64		2015
MK	16	12	
ME	15		
MD	10		
RO	/		
SR	20.66	16.25	
SI	14.70	11.16	2013
UE	20.03		2015



Future technology scenarios

Scen. No	Year	Int. Rates	Panel+ inverter price	r loan (%)	r deposit (%)
1	2016	Initial	Initial	8,84	3,57
2	2020	Low	Initial	6	2,42
3	2020	Low	Low	6	2,42
4	2020	Initial	Initial	8,84	3,57
5	2020	Initial	Low	8,84	3,57
6	2020	High	Initial	12	4,85
7	2020	High	Low	12	4,85
8	2030	Low	Initial	6	2,42
9	2030	Low	Low	6	2,42
10	2030	Initial	Initial	8,84	3,57
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12	2030	High	Initial	12	4,85
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Results 2016

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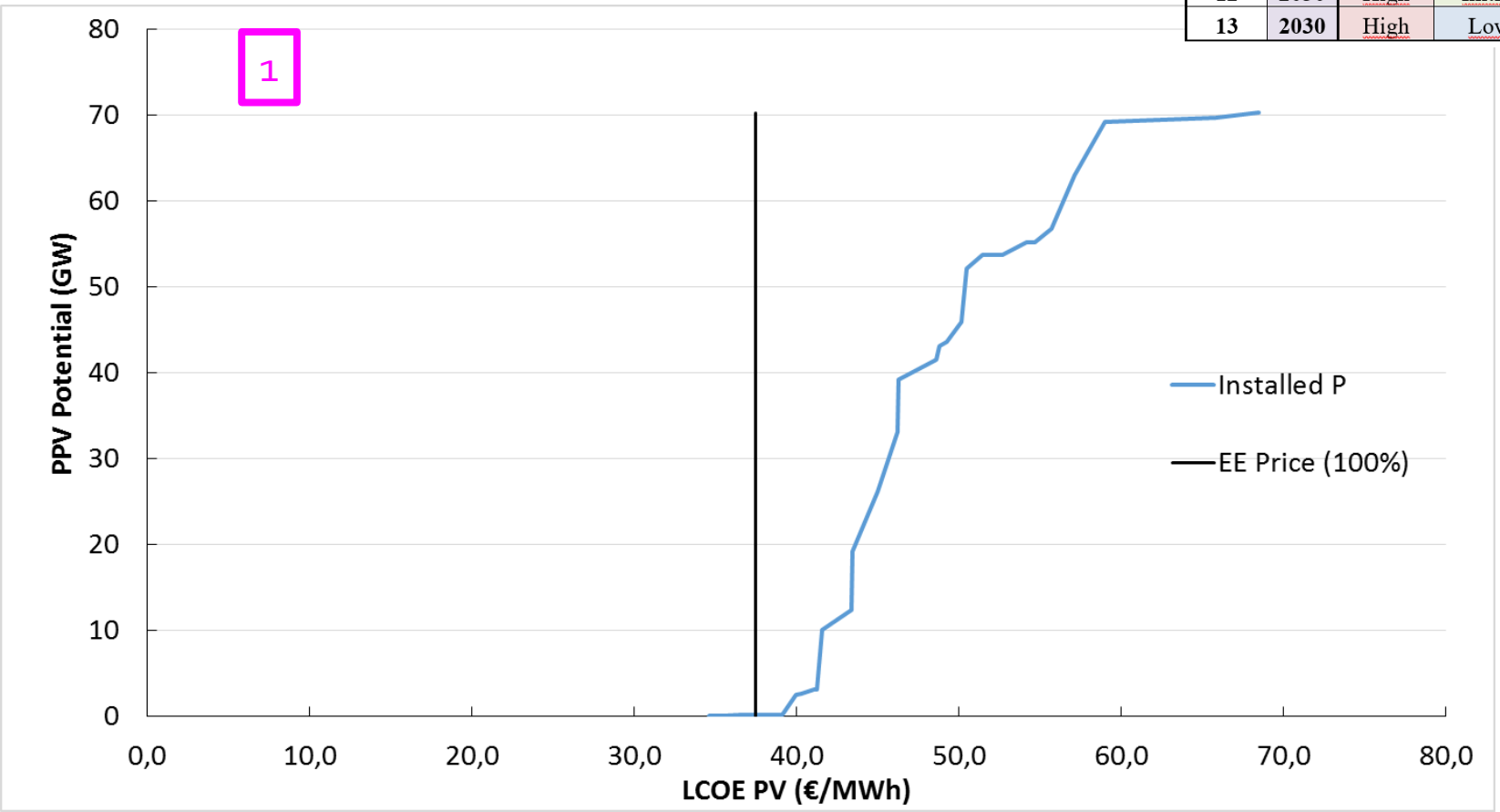

Results 2030

- Initial: r=8.84%
  - Panel price: 0.52 €/W_p

Scen. No	Year	Int. Rates	Panel+ inverter price	r loan (%)	r deposit (%)
1	2016	Initial	Initial	8,84	3,57
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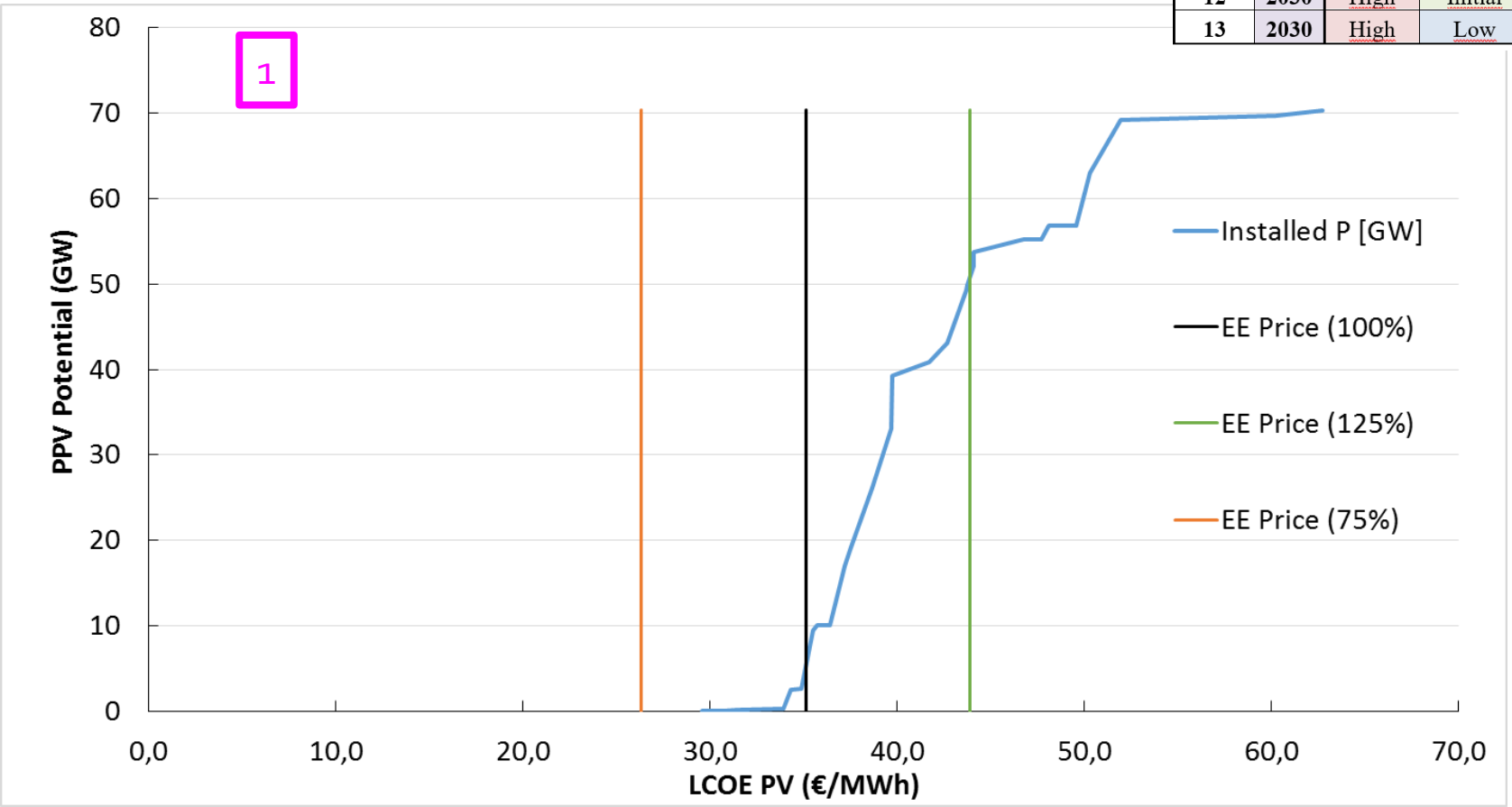

Results 2030

- Conservative: r=12%
  - Panel price: 0.52 €/W_p

Scen. No	Year	Int. Rates	Panel+ inverter price	r loan (%)	r deposit (%)
1	2016	Initial	Initial	8,84	3,57
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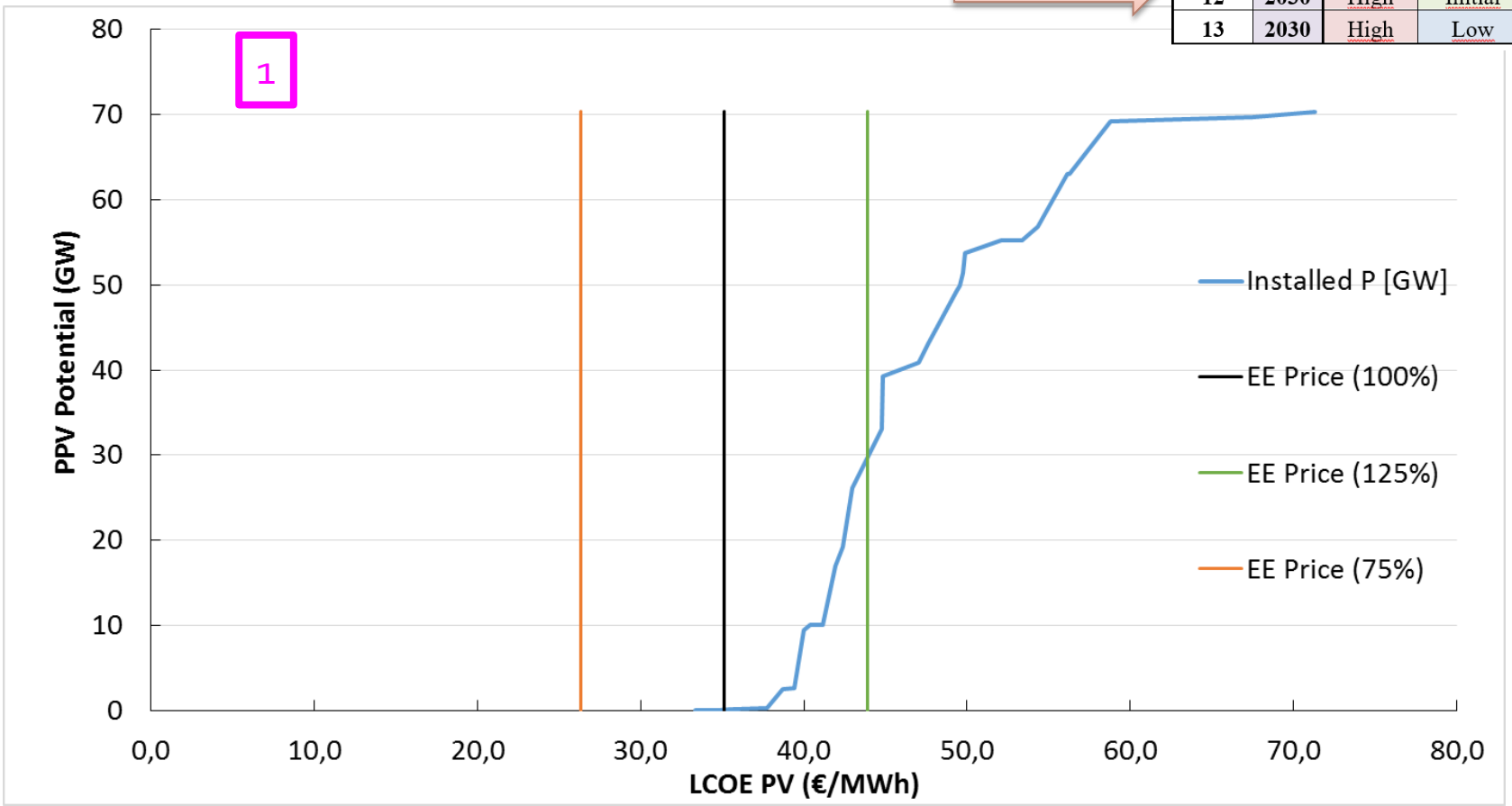

Results 2016

- Panel price: 1 €/W_p

Scen. No	Year	Int. Rates	Panel+ inverter price	r loan (%)	r deposit (%)
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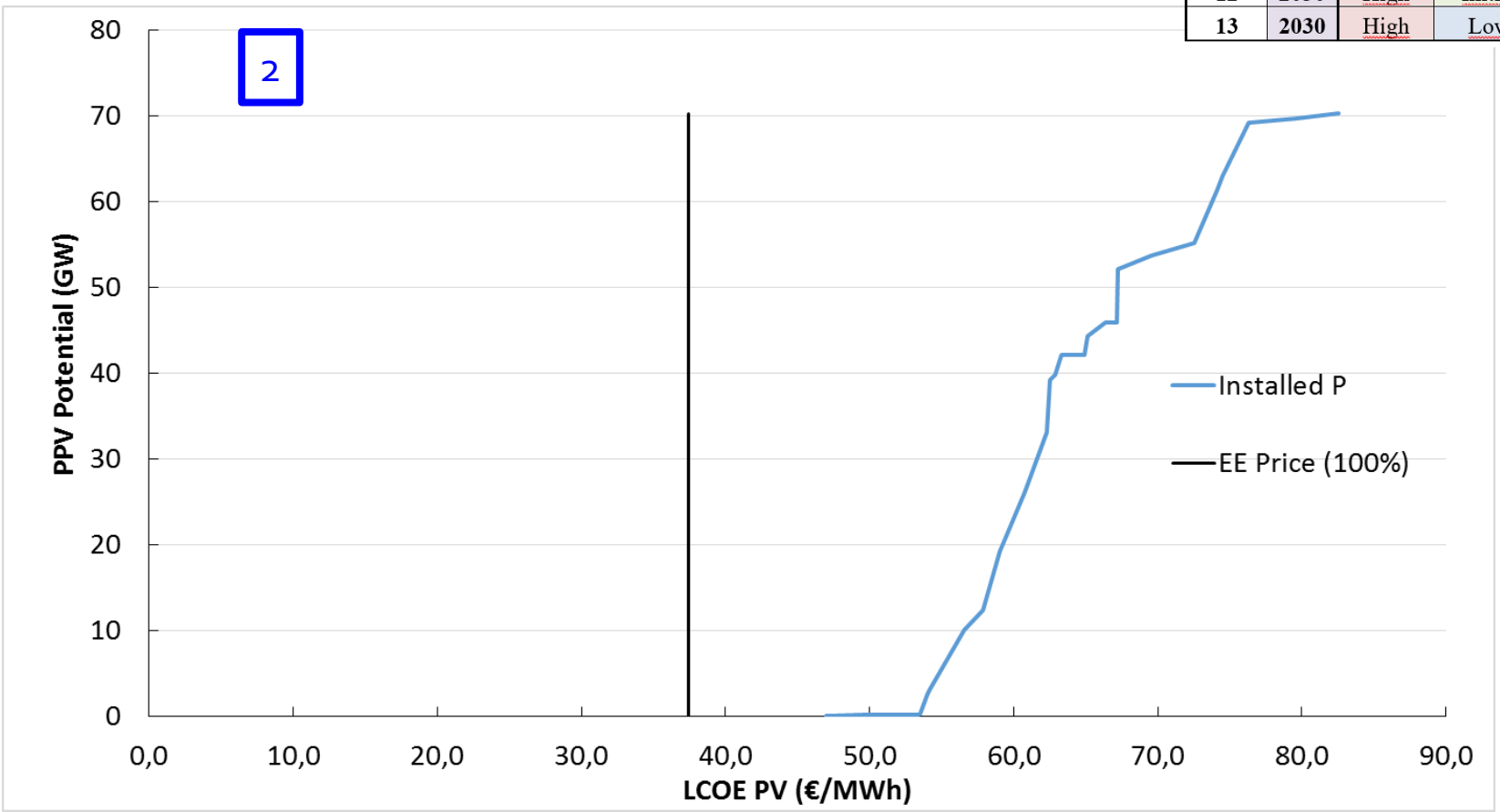

Results 2030

- Initial: r=8.84%
  - Panel price: 0.80 €/W_p

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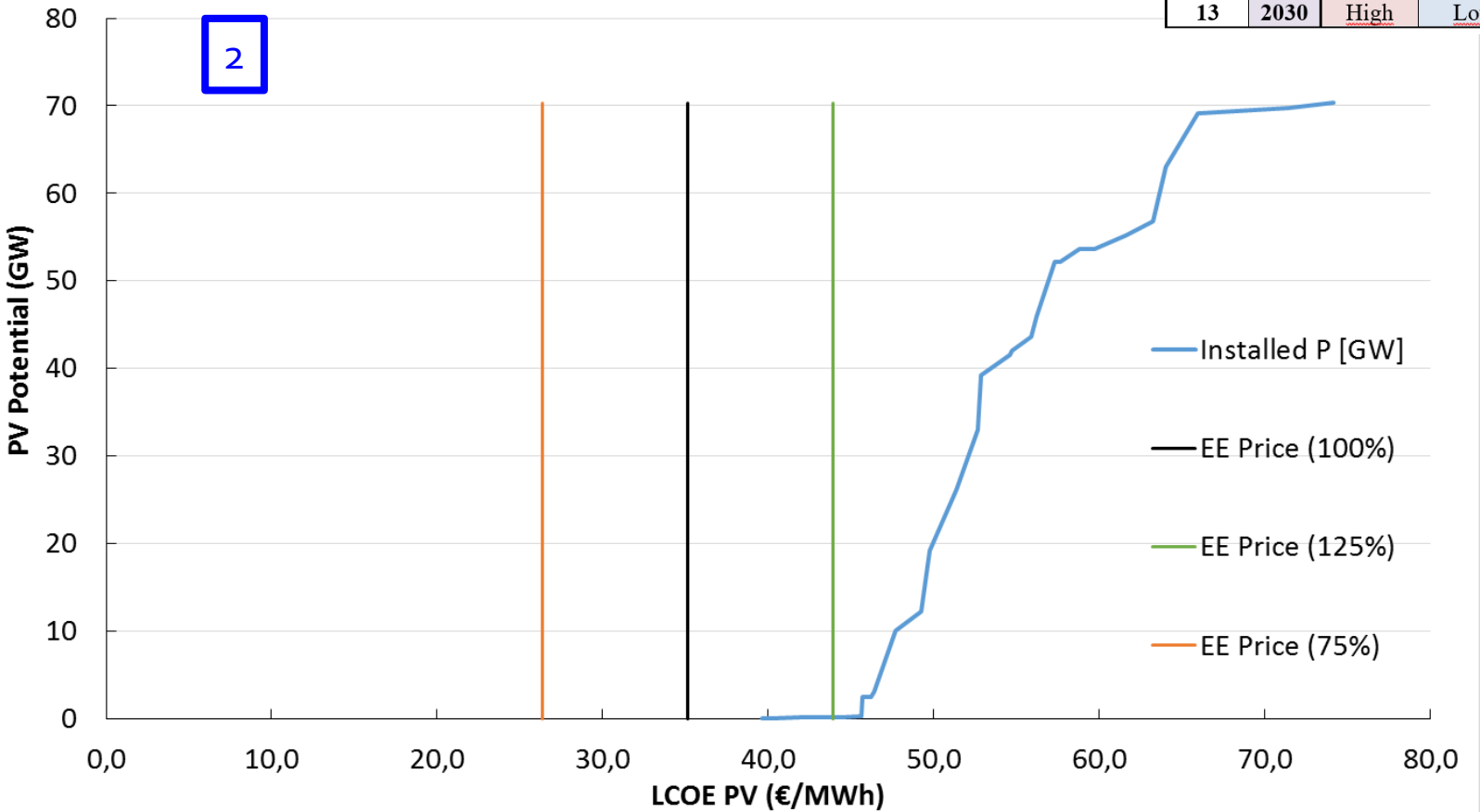

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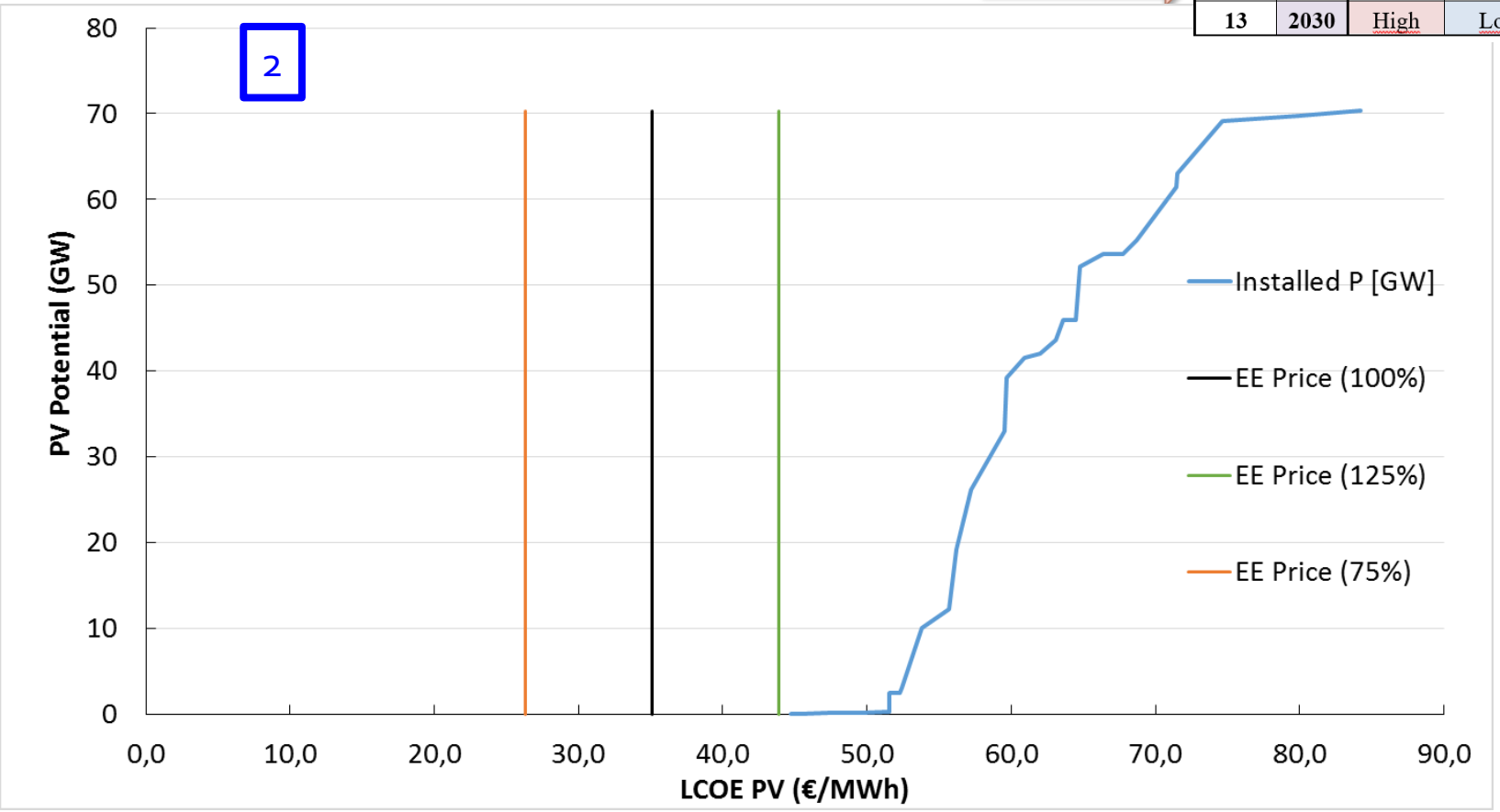

Discussion

- The results presented reflect regional focus
  - In the report, the country-specific approach will also be addressed.
- Suitability >70% map: conservative
  - Only the most promising potential is shown
  - Less conservative data (for >50 and >60%) considerably higher
- Results reflect the riskiness of the investment
  - Interest rate reflects country risk
  - In the study, the decision was to treat it conservatively
  - For non-EU countries, 12% is the reference
    - E.g. Ukraine: 20-30%
  - EU countries have lower IR than EnC countries
    - Currently Bulgaria r = 6-8%

Discussion

- Practical potential
  - This is „the technical price“
  - No administrative costs included
  - Shows the possible range of FiT
    - Set high at the beginning
    - Initial overcompensating to stimulate the investors
- Per-country analysis forthcoming
- Questions for discussion
  - What extra costs are not included here, but should be?
  - What other prices influence costs and should be modelled?
  - What could be the cost of admin barriers?