Methodology for the evaluation of transport policy instruments: TOPSIS approach

Alina Safronova

Introduction (I)
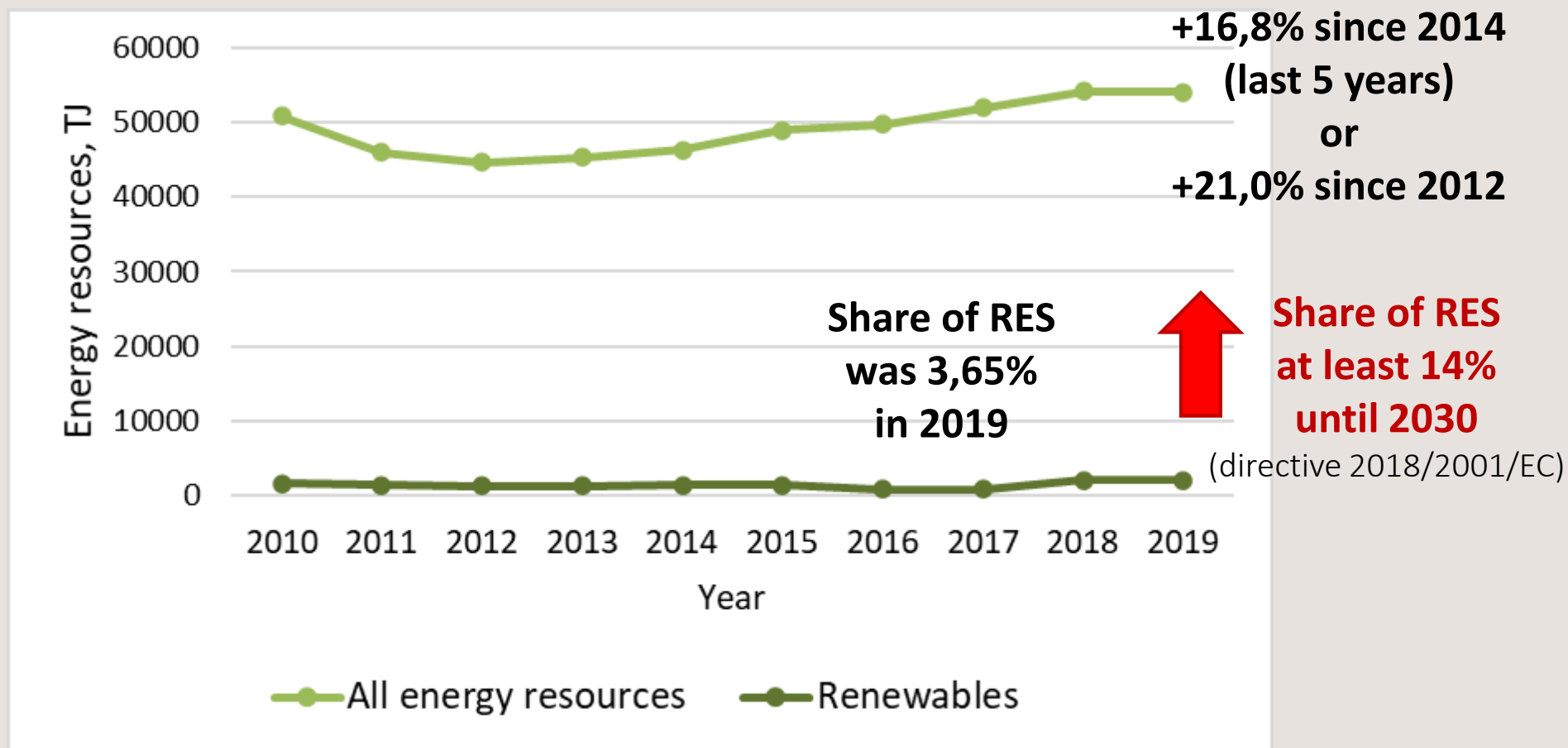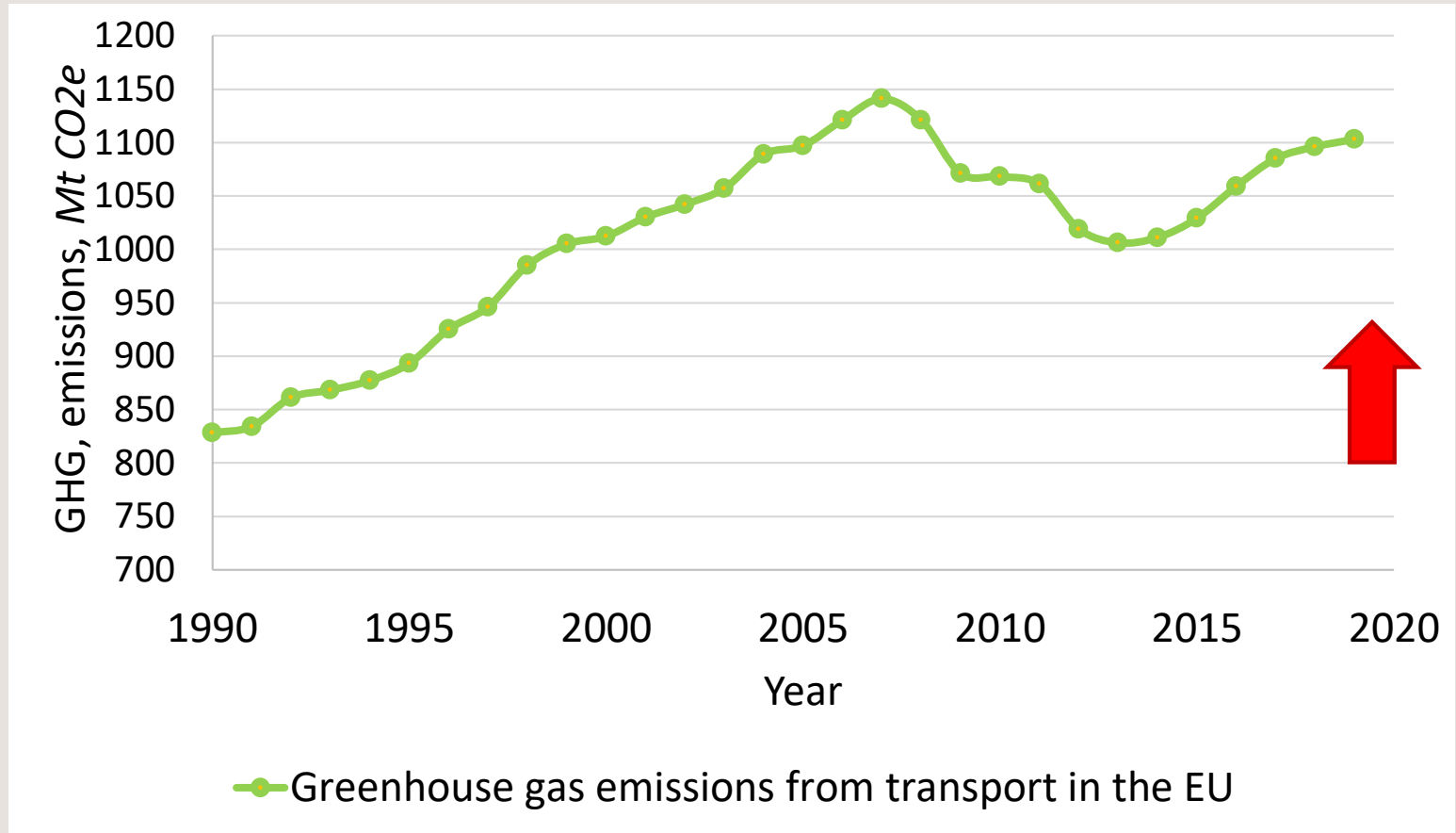
+16,8% since 2014 (last 5 years) or +21,0% since 2012

Share of RES was 3,65% in 2019

Share of RES at least 14% until 2030

(directive 2018/2001/EC)

Fig.1. Energy use of transport sector in Latvia.

Introduction (II)

Greenhouse gas (GHG) emissions keeps rising in EU

Greenhouse gas emissions from transport in the EU

Introduction (II)

Policy instruments need to be put in place **to reduce** future increases in energy consumption and GHG emissions.

The possibilities are many and varied, how to achieve this, but **how to choose the most promising direction?**

The methodology described in the study envisages conducting a **survey of industry experts**, as well as processing the obtained data with the *Technique for Order of Preference by Similarity to Ideal Solution* **(TOPSIS) method** to determine the most promising policy instruments.

Methodology (I)
Choice of policy instruments.

This phase is based on existing legislation as well as positive examples from other countries. The described methodology offers an evaluation of 28 policy instruments.

- **Taxes** (reduction for alternative fuels/ increasement for fossil fuels)
- Subsidies for **vehicles purchase**
- Establishment of alternative fuel cycling **infrastructure**.
- Increasing the **mandatory biofuel blend**.
- **Subsidization** of biofuel production / capital costs of biofuel plants
- **Free parking** for zero-emission and low-emission vehicles / Increasing parking fees for vehicles using conventional fuels
- Support of **public transport**
- etc.

Methodology (II)
Choice of evaluation criteria

Policy instruments are evaluated according to 4 criteria:

- **Required investments,** *where 1 - the implementation of the measure does not require financial investment, and 10 - the implementation of the measure requires significant financial investments*;

- **A monitoring mechanism,** *where 1 - the implementation and monitoring of the measure is simple, and 10 - The implementation and monitoring of the measure is difficult;*

- **RES promotion potential,** *where 1 - the measure has minimal or no effect on the increase of the share of RES, and 10 - the measure significantly affects the increase of the share of RES*;

- **Public support,** *where 1 - the measure has no support or there is (is expected to have) minimal support in society, and 10 - the event has (is expected to have) high public support.*

Methodology (III)
Evaluation of alternative fuels

- **Environmental aspect** *(how much the identified RES support will contribute to a negative impact on the environment?)*

- **Technological aspect** *(how developed is certain RES technology?)*

- **Social aspect** *(how much the support for the given technology will promote the creation of new jobs?)*
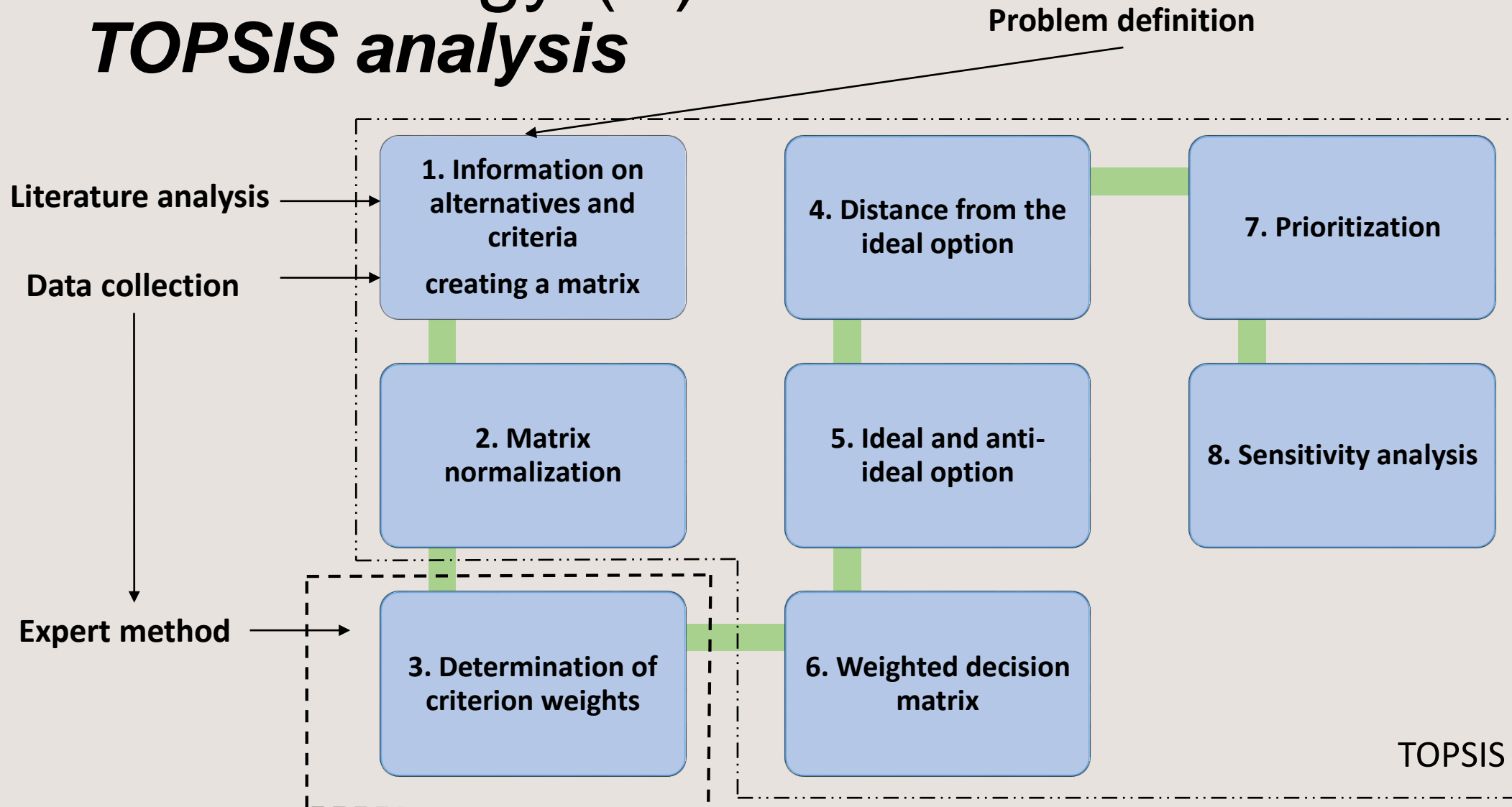
Methodology (IV)
Weighting

The sum of the weights is equal to 1

	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8
Social aspect								
Environmental aspect								
Technological aspect								

	0,1	0,2	0,3	0,4	0,5	0,6	0,7
Required investments							
A monitoring mechanism							
RES promotion potential							
Public support							

Methodology (V)
TOPSIS analysis

Conclusion

Using the proposed methodology, several policy instruments can be evaluated, which aim to increase the share of RES, not only in terms of **RES promotion potential**, but also in terms of necessary **investments**, **monitoring** mechanism, and **public support**, considering expert evaluation.

The second part of the survey allows legislators and researchers to assess **the most promising types of fuels** wich need more support.

The disadvantage of the method is its possible subjectivity. This can be avoided by interviewing only industry experts. It is also important to interview supporters of different types of alternative fuel vehicles (electricity, hydrogen biofuels, natural gas and biomethane) to get a broader view of the problem under study.

Thank you for your attention!