Promoting transparency of transport infrastructure investment decision-making in Finland

Utilizing results from cost-benefit analyses with a multi-objective optimization tool PRIO

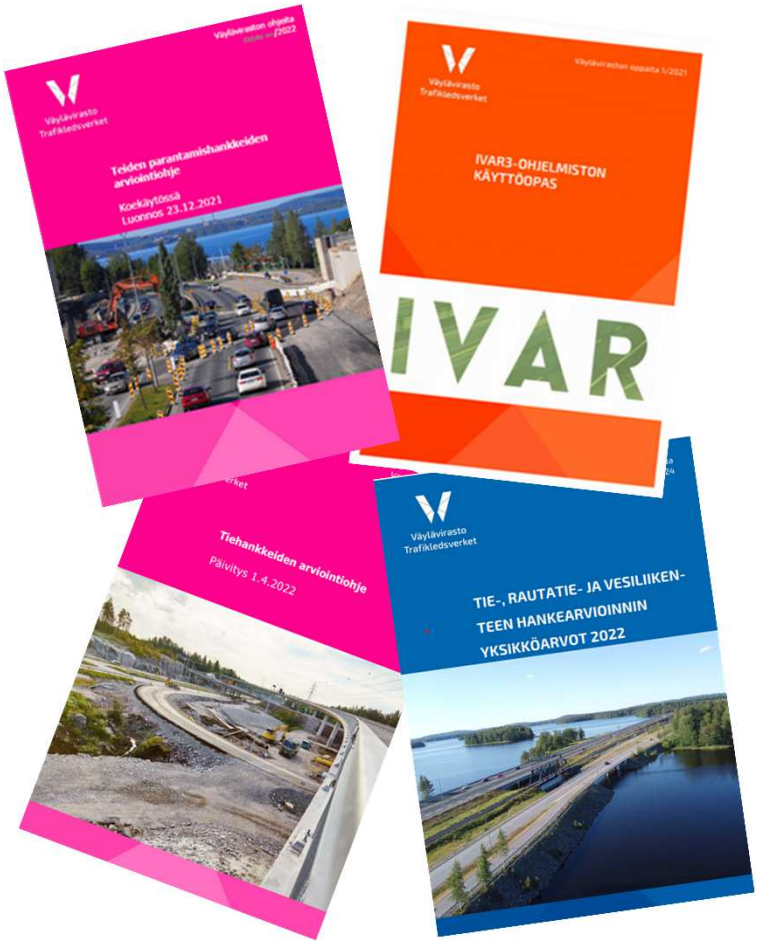
Taneli Antikainen
Finnish Transport Infrastructure Agency

Transport infrastructure investment appraisal in Finland

Background

Investment Appraisal & Impact Assessment in Finland

- Objective and fact-based expert evaluation of transport infrastructure investments impacts (monetary & non-monetary)
- National guidelines since 1994
  - Common general principles & calculation parameters for all modes
- Since 2018 legal requirement to make impact assessments for major road and rail projects



Transparency & systematic approach supporting decision-making

Motivation & solution

Motivation for a systematic approach

Problems in transport infrastructure investment decision-making

Lack of systematic method used in selection of projects and the reasoning behind selection non-transparent

Weak utilization of impact information from CBAs

Demand for larger analyses of how investments fulfil transport policy goals (in addition to CBAs).

Solution

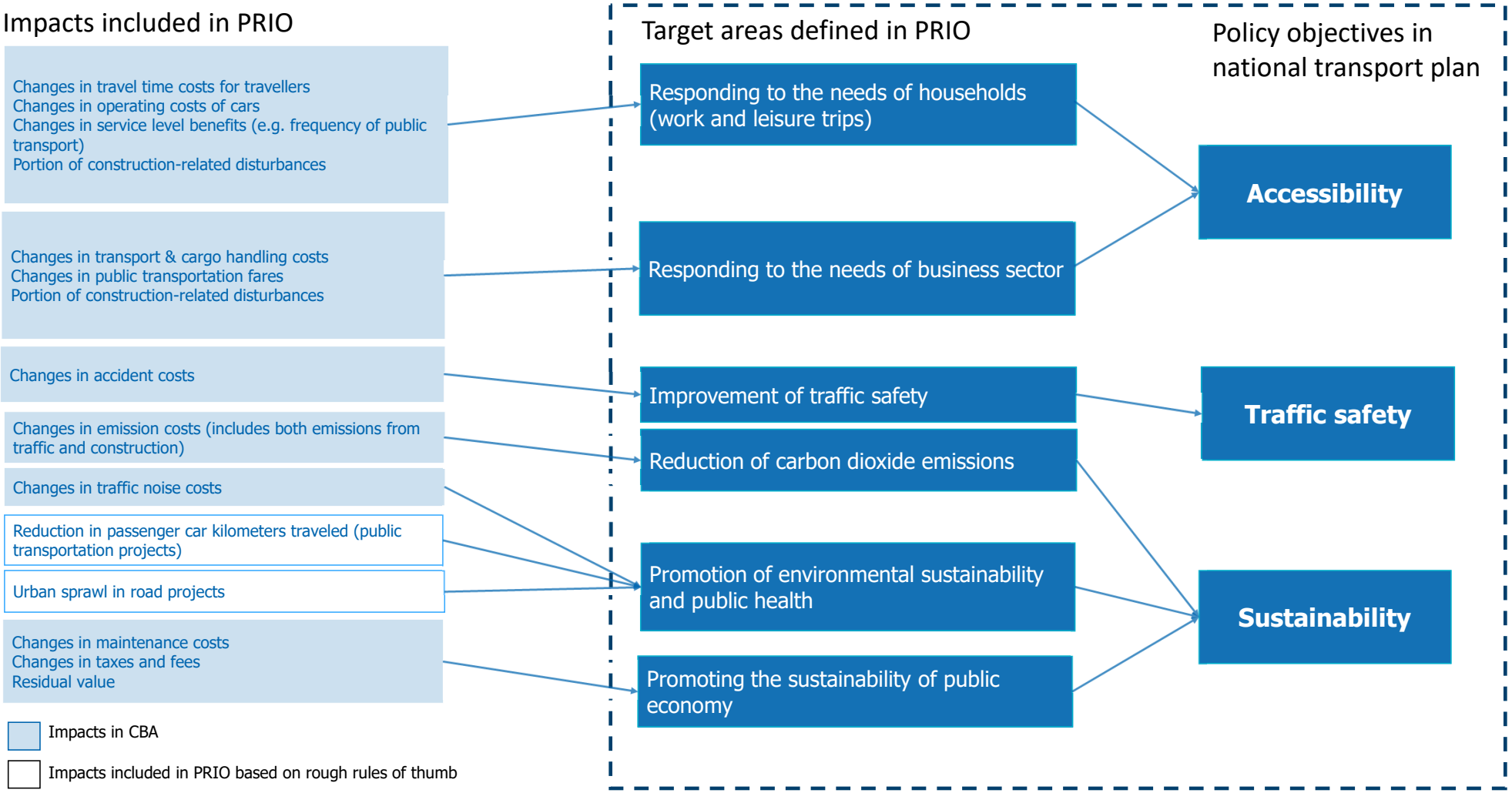
A method which efficiently utilizes the comprehensive impact information produced by CBAs and provides tools to make comparisons and prioritizations based on a large set of projects.

Project prioritization tool PRIO

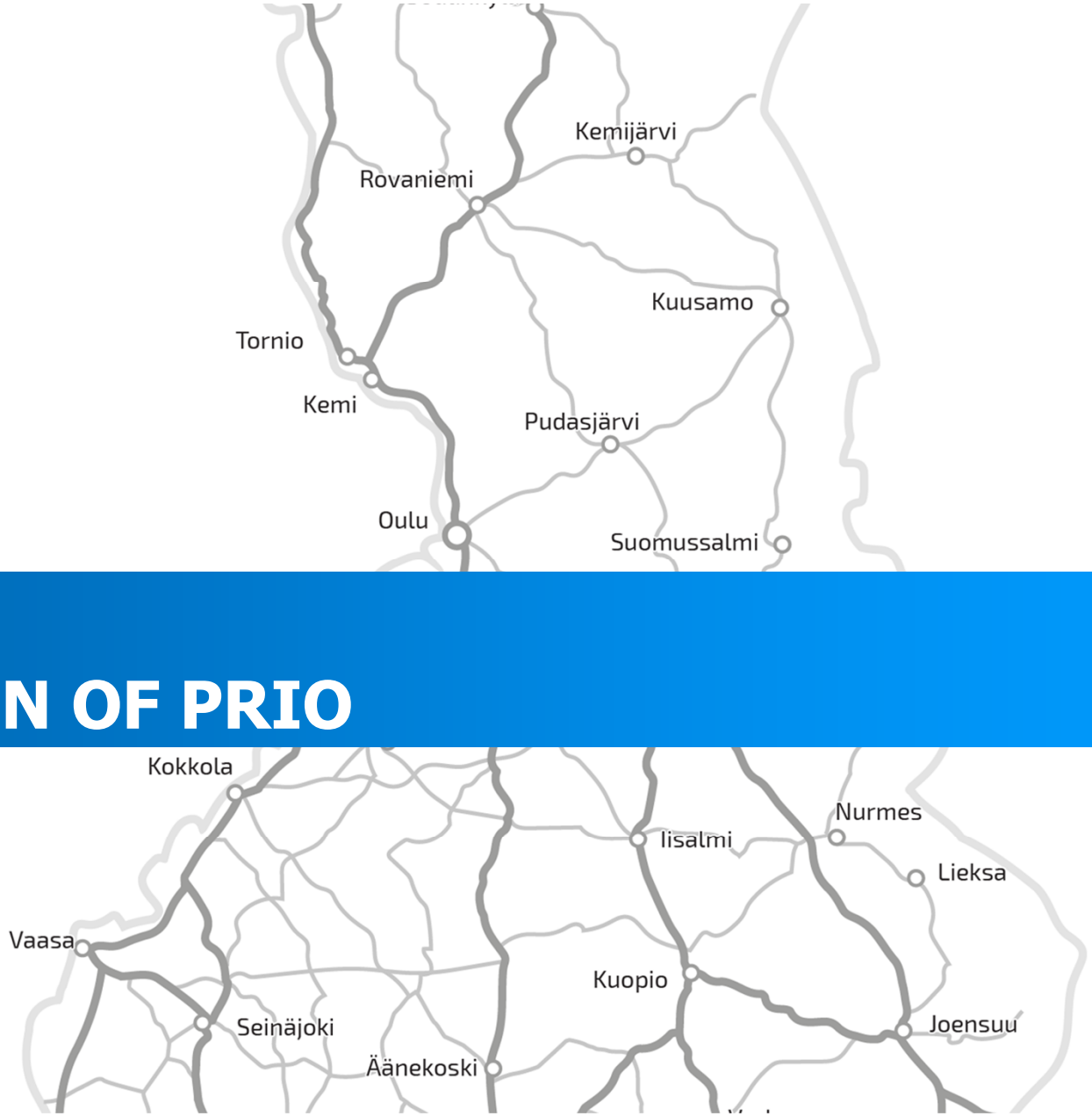
- Excel-based PRIO provides answers to how to **allocate limited resources** to transport infrastructure investments that **maximize targeted impacts.**
- PRIO supports decision-making by helping to conceptualize and manage complex choice situations.
- PRIO promotes the transparency and replicability of the decision-making process.
- PRIO includes a multi-objective optimization tool by which different weights can be given to different desirable objectives. PRIO selects projects in a weighted overall efficiency order up to the budget constraint, choosing the best project selection.

A big pile of CBA reports is not enough. The impact information should be in efficient use in a systematic manner!

Data in PRIO from CBAs



UTILIZATION OF PRIO



PRIO provides information on project efficiency across different target areas

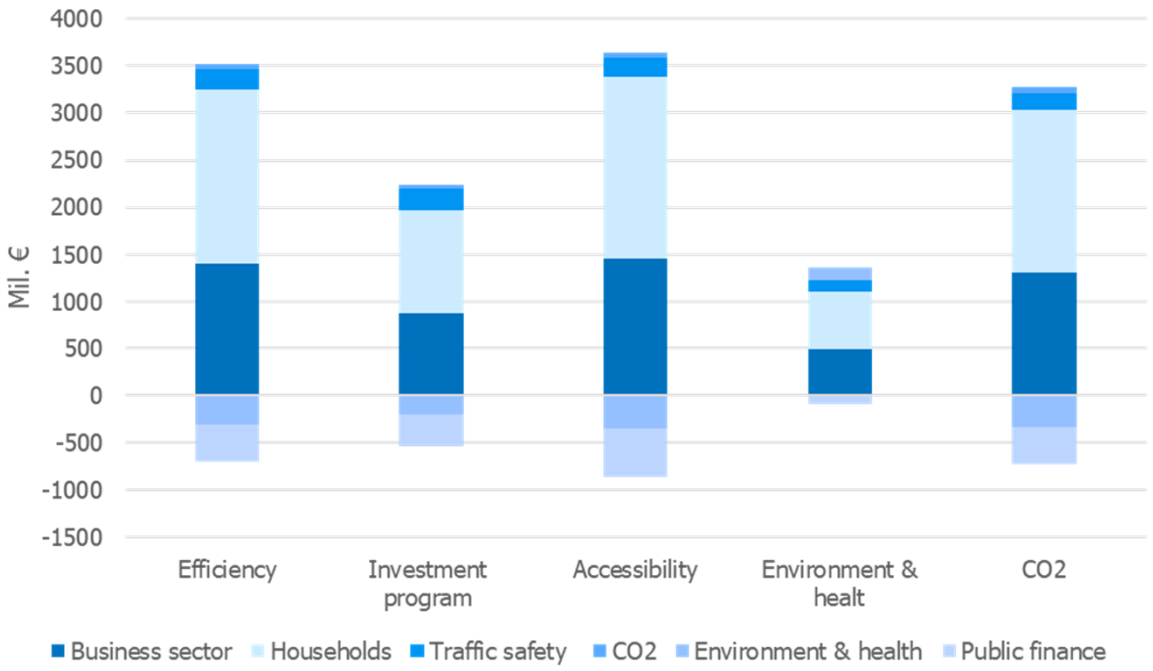
- It ranks projects based on their efficiency within each target area
- It defines which projects are included in project portfolios when putting varying weights on different policy objectives (multi-objective optimization)
- With a given budget constraint PRIO highlights undisputed choices and rejections, i.e. projects that are chosen or rejected by all target area priorities.

Hankkeet	BCR	Business sector	Households	Traffic safety	CO2	Environment & health	Public finance
Vt 4 Kehä I - Kehä III Ilmasillan etl	5,45	1,96	3,16	0,7	0,2	-1,32	-0,61
Vt 15 parantaminen välillä vt 7 - Paimenportti (Hyväntuulentie)	3,07	1,01	1,4	0,02	0	1,04	-0,69
Hätinvirran lossin korvaaminen sillalla	1,96	0,44	0,37	0	0	0	1,15
Vt 8 Kokkolan kohta, keskustajakso	1,81	0,94	1,06	0,14	0,04	-0,08	-0,46
Kivimon lossin korvaaminen sillalla	1,63	0,16	0,26	0	0,03	-0,06	1,18
Vt 3 Rokkakoski-Hanhijärvi*	0,45	0,05	0,03	0,37	-0,01	-0,04	-0,02
Vt 23 parantaminen Karvion kanavan kohdalla	0,06	0	0	0,01	0	0	0,05
Vt 21 Ailakkalahti-Kilpisjärvi	0,16	0,14	0,05	-0,01	0	-0,01	-0,03
Vt 9 Tampere - Orivesi (Alasjärvi - Käpykangas)	1,78	0,6	0,69	0,14	0	0,06	-0,06
Vt 4 Vaajakosken kohta VE 1 (Kanavuori-Haapalahti)	1,63	0,83	0,83	0,06	0,04	-0,15	-0,28
Vt 2 Ruskila- Haistila	0,64	0,12	0,14	0,43	0,02	-0,07	-0,07
Vt 3 ja Vt 19 Jalasjärven liittymä*	1,37	0,76	0,62	0,06	0,01	0,1	-0,57
Vt 15 Kotka–Kouvola (supistettu tavoitetila VE 2E)	0,6	0,17	0,11	0,32	0	-0,06	-0,02
Vt 2 Parantaminen Porin keskustan kohdalla	1,17	0,55	0,65	0,04	0,03	-0,21	-0,13
Vt 21 Palojoensuu-Maunu*	0,44	0,2	0,11	-0,01	0	-0,03	0,01
Vt 2 Humppilan kohta*	0,4	0,02	0,02	0,04	-0,01	-0,03	0,02
E18 Turun kehätie Raision keskusta	1,32	0,68	1,01	0,15	0,01	-0,07	-0,53
Vt 8 Vaasan yhdystie ja Mt 724 Alskatintie vaihe 1 (Vt 3-Sepänkyläntie)	1,33	0,52	0,78	0,07	0,02	-0,03	-0,17
Vt 25 välillä Hanko-Mäntsälä VE 1A	1,14	0,64	0,81	0,09	0,01	-0,08	-0,42
Vt 3 Alaskylä-Parkano	0,77	0,38	0,38	0,08	-0,04	-0,03	-0,1
Vt 3 Moreenin eritasoliittymä	1,38	1,09	0,55	-0,06	0,02	-0,16	-0,23

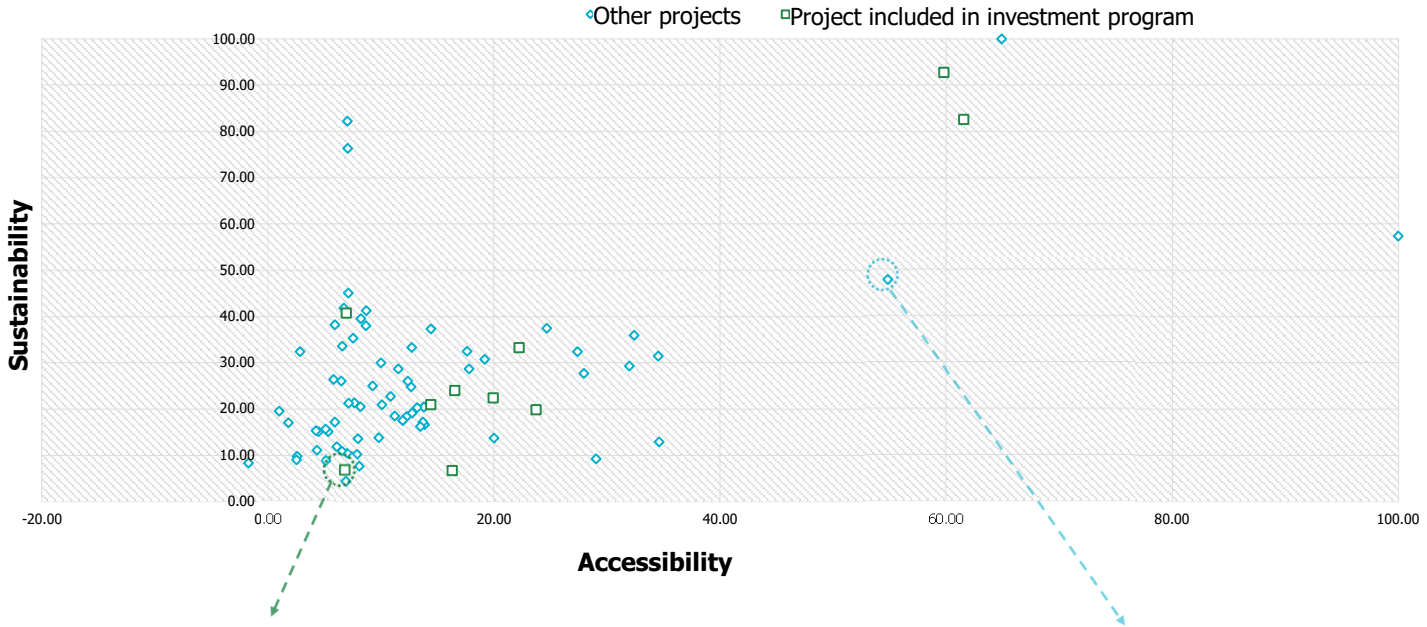
Hankkeen nimi	Efficiency	Investment program	Accessibility	Sustainability	Traffic safety
Vt 4 Kehä I - Kehä III Ilmasillan etl	2	2	1		
Vt 15 parantaminen välillä vt 7 - Paimenportti (Hyväntuulentie)	3	3	6	1	
Vt 1 Nihtisillan eritasoliittymä	6		13	6	4
Hätinvirran lossin korvaaminen sillalla	7	4		17	
Vt 8 Kokkolan kohta, keskustajakso	16	6	12		
Mt 180 Kurkela-Kuusisto	15		10		13
Vt 4 lisäkaistat välillä Kehä III - mt 148 (VE 2)	1		4	2	
Vt 25 Lohjan vesitornin eritasoliittymä	5		2		
Vt 12 Alasjärvi-Huutijärvi, Tampere-Kangasala (VE 1)	4		3		61 %

PRIO selects project portfolios that maximize benefits with different target area priorities and given budget constraints

- Different project selections can be compared based on their benefit-cost ratios
- In addition, based on their total benefits and costs (see figure)
- PRIO can evaluate an entire set of projects or subsets of projects: by transport mode, geographical region or planning phase.



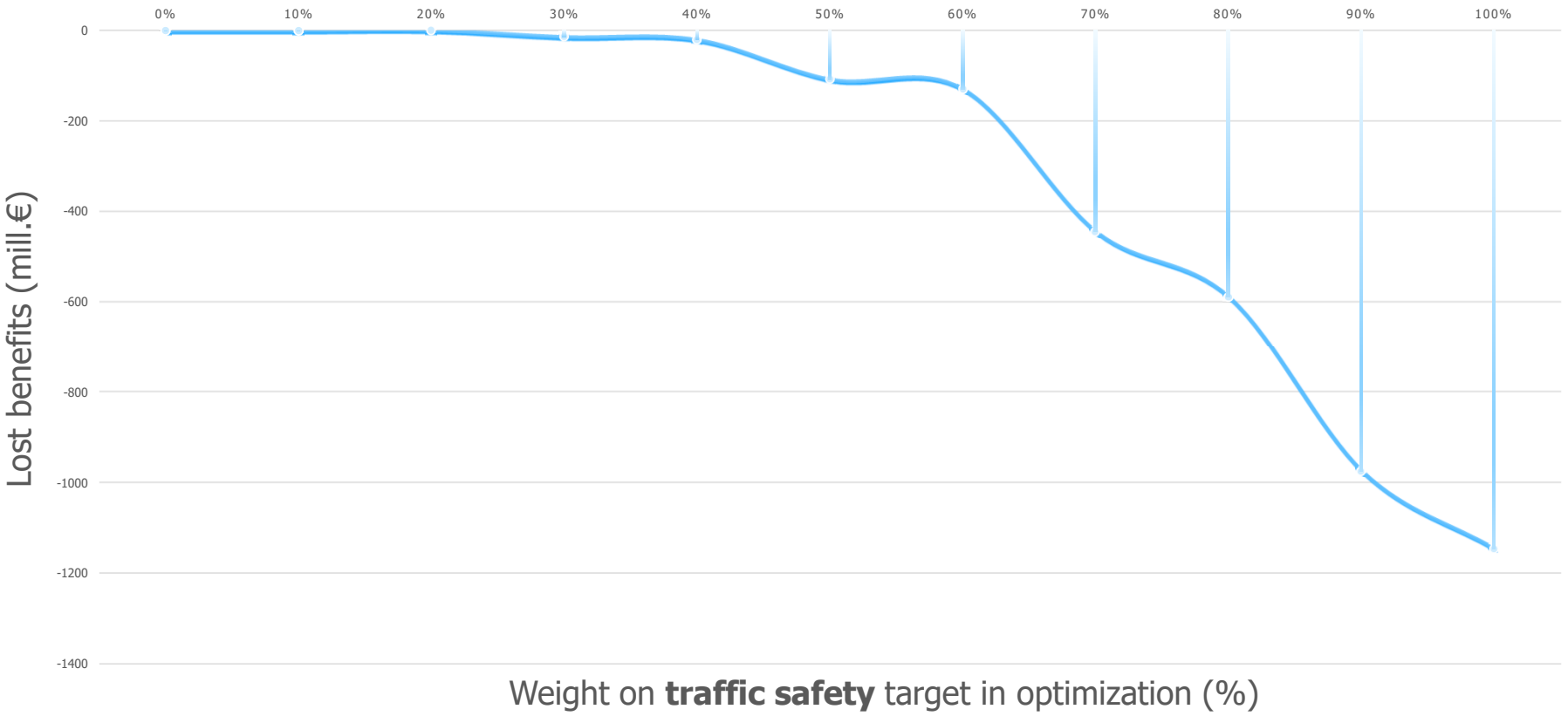
PRIO highlights project choices made with respect to impact data….



In a world of limited resources, not all projects can be realized, pointing to the need to justify the choices made. **How do we justify including a less efficient project in the program?**

Project performs well from the perspective of accessibility & sustainability. **How do we justify excluding it from the investment program?**

…..and trade-off situations



Thank you!

taneli.antikainen@ftia.fi
+358 40 825 44 66
www.ftia.fi