Ex post evaluation and relevance to decision-making

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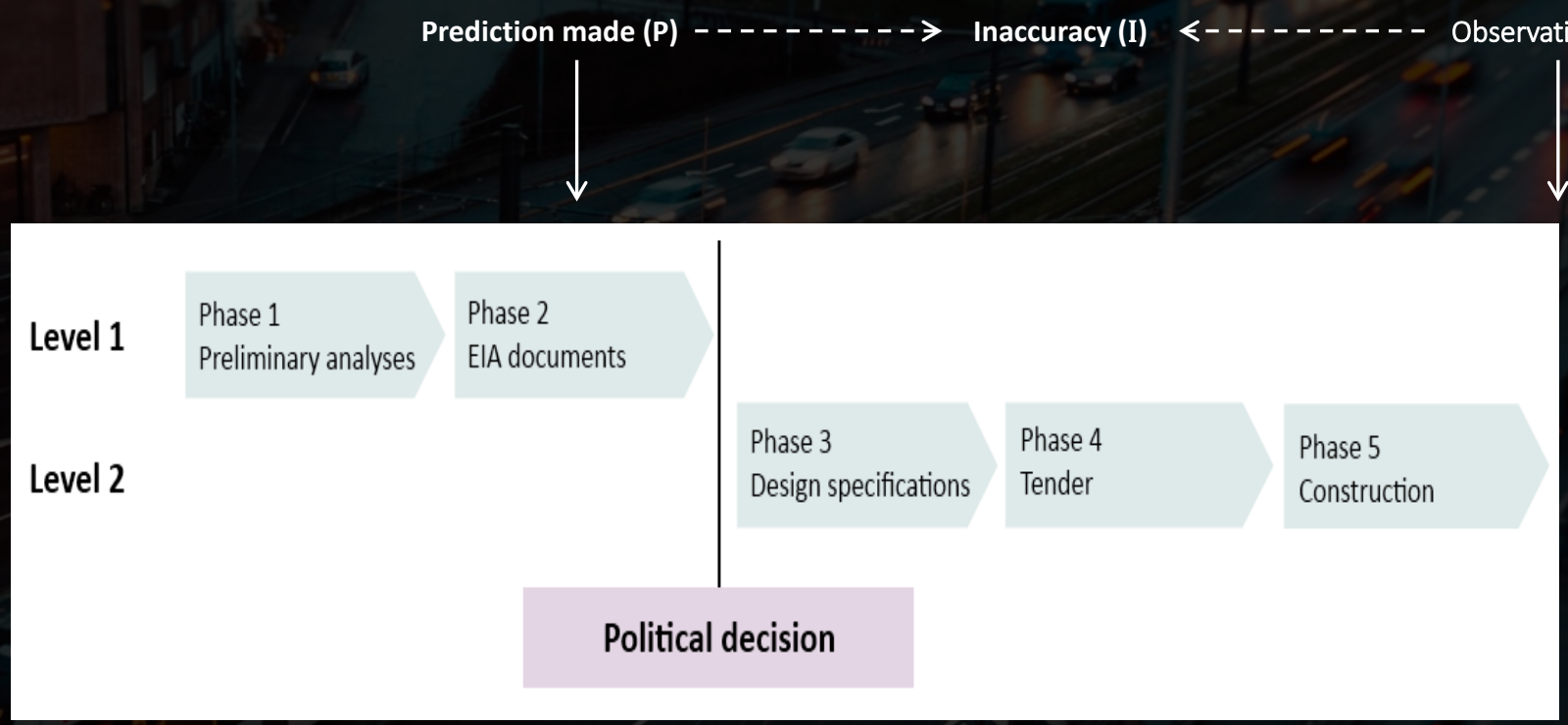
CITY OF AARHUS



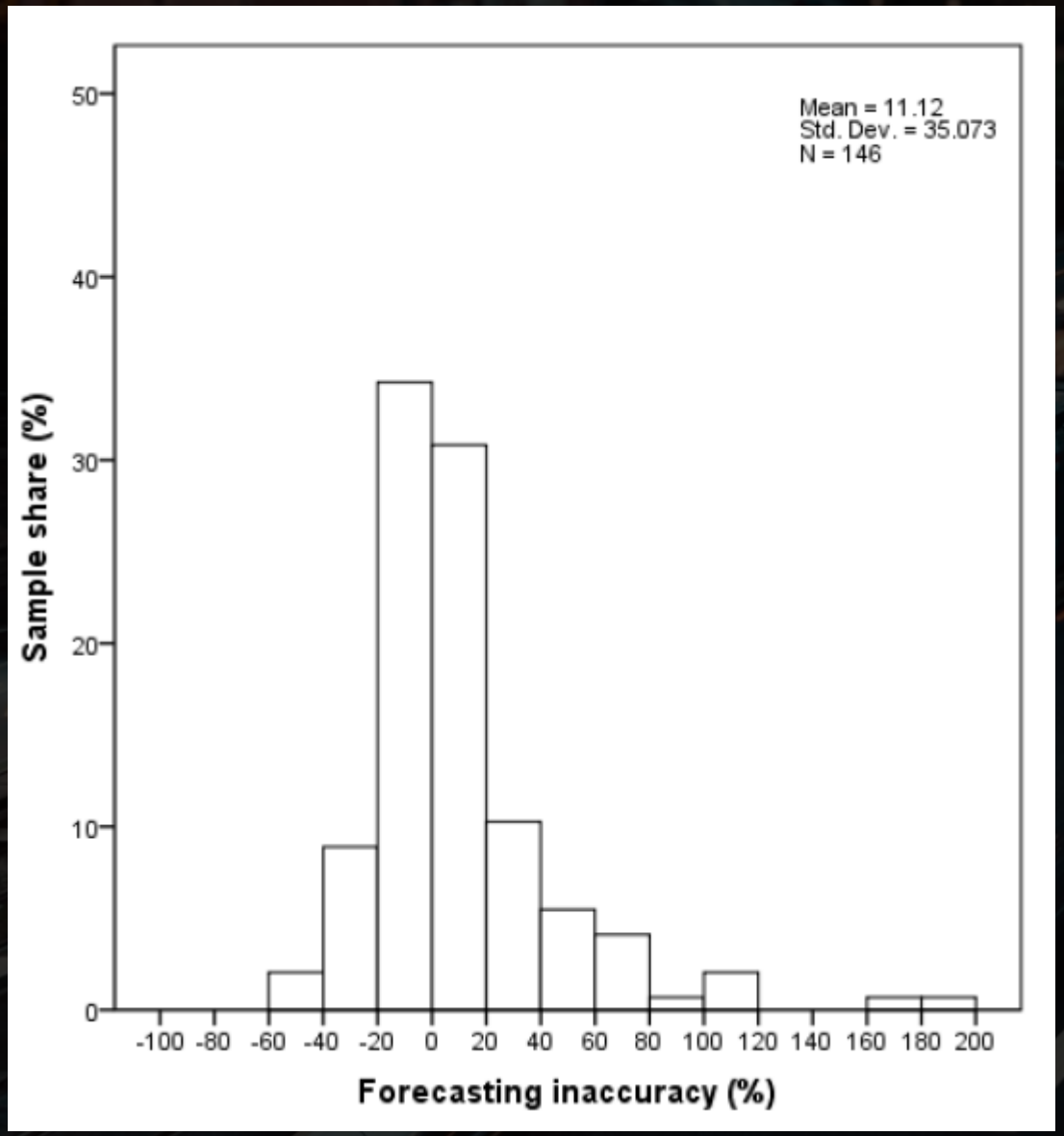
$$I = \frac{O - P}{P} \times 100$$

General findings across ex-post studies

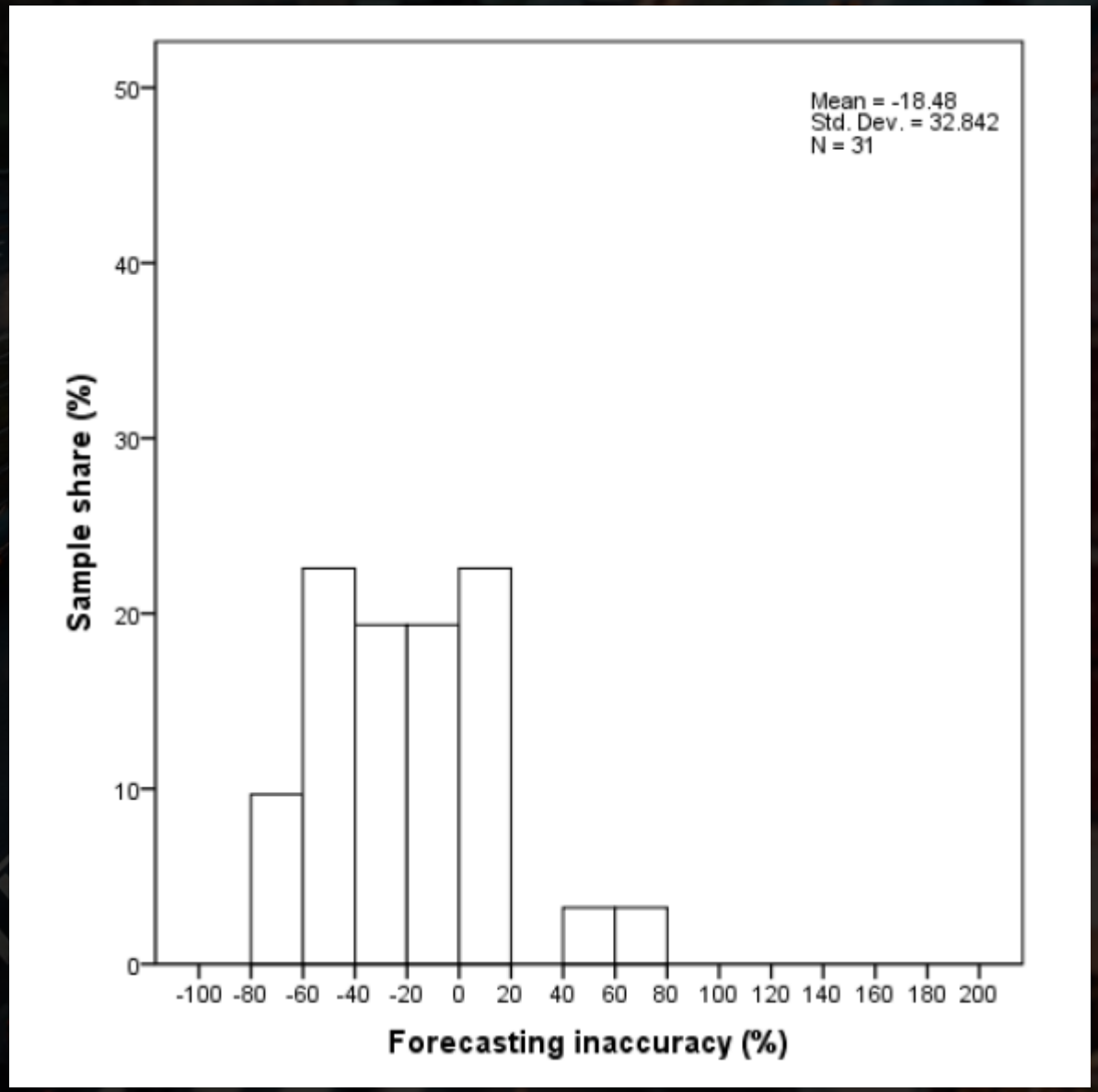
1. Construction costs are underestimated (as is the case for most larger projects)
2. Demand forecasts are biased (i.e. the mean inaccuracy is non-zero)
3. Demand forecasts are highly imprecise (i.e. the standard deviation of inaccuracy is rather large)
4. Appraisals do not adequately address economic effects (e.g. property values, lost opportunity costs, effects on parking, etc)
5. Appraisals do not adequately address non-economic effects (e.g. environmental and social effects)

Accuracy of demand forecasts

Road projects



Rail projects

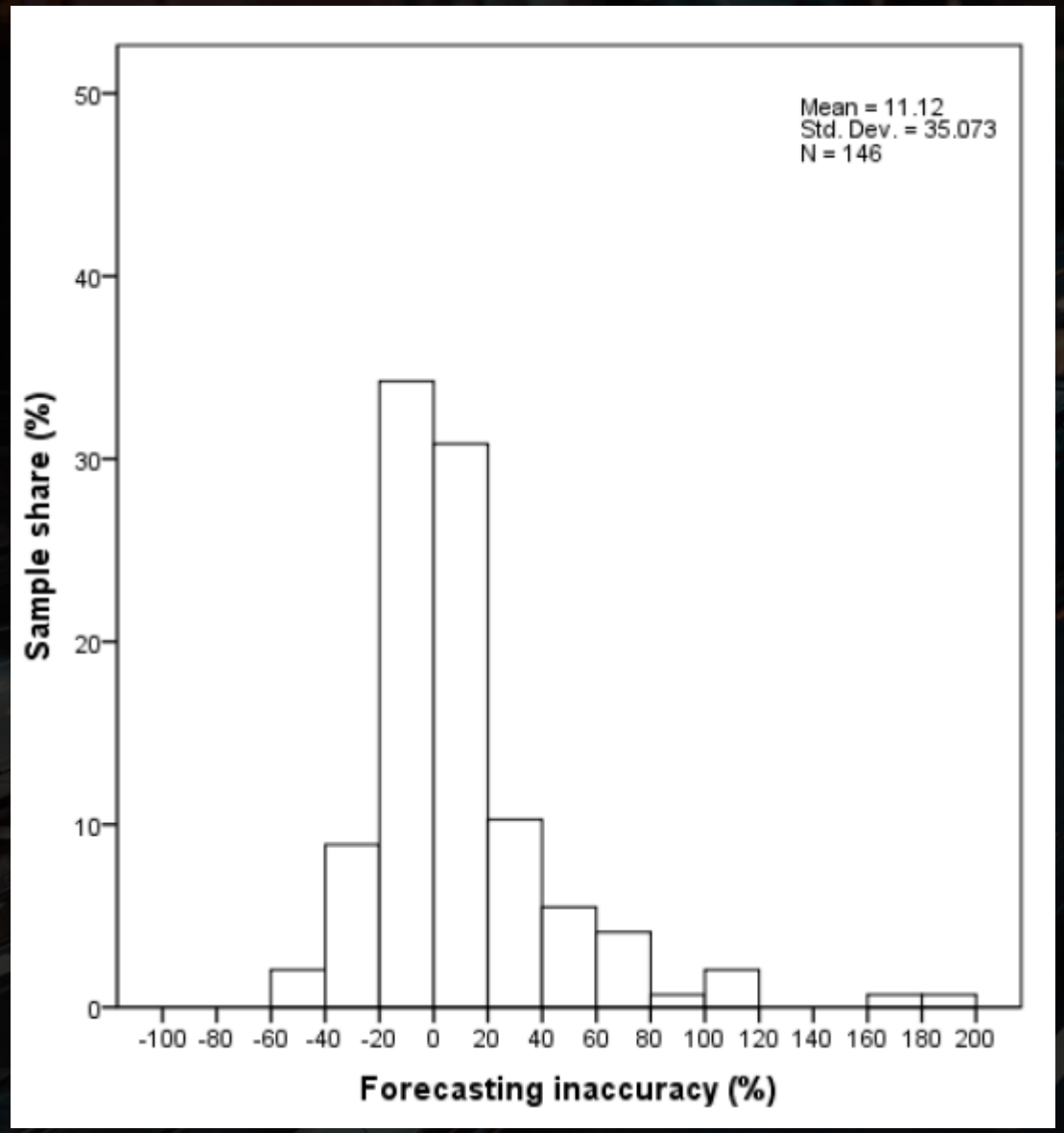


Takeaway: Road projects typically experience more demand than expected while rail projects experience less demand than expected (at least at an initial glance) – but there are large differences among individual projects

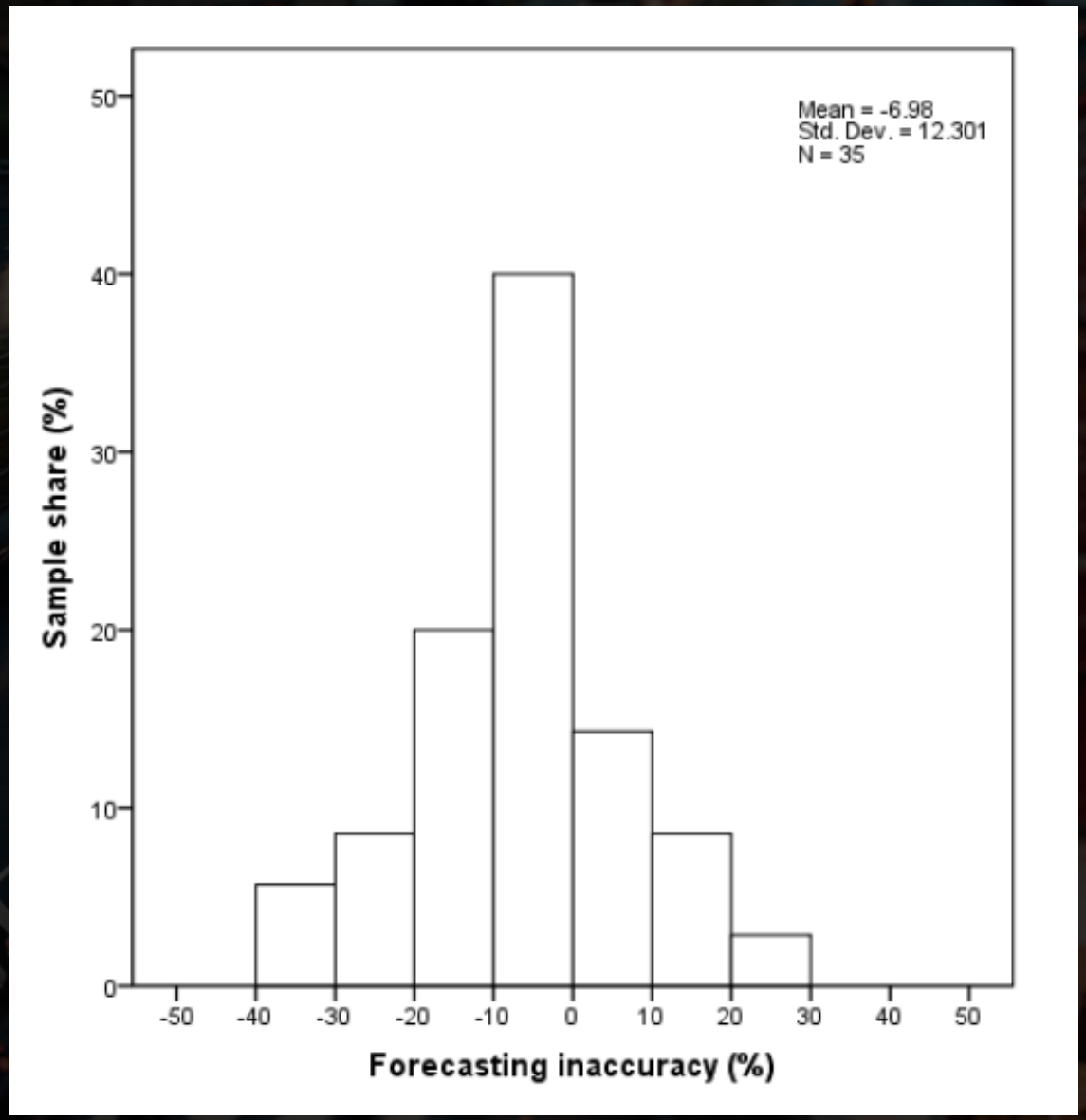
Nicolaisen (2012)

Accuracy of demand forecasts

Road projects (completed alternative)



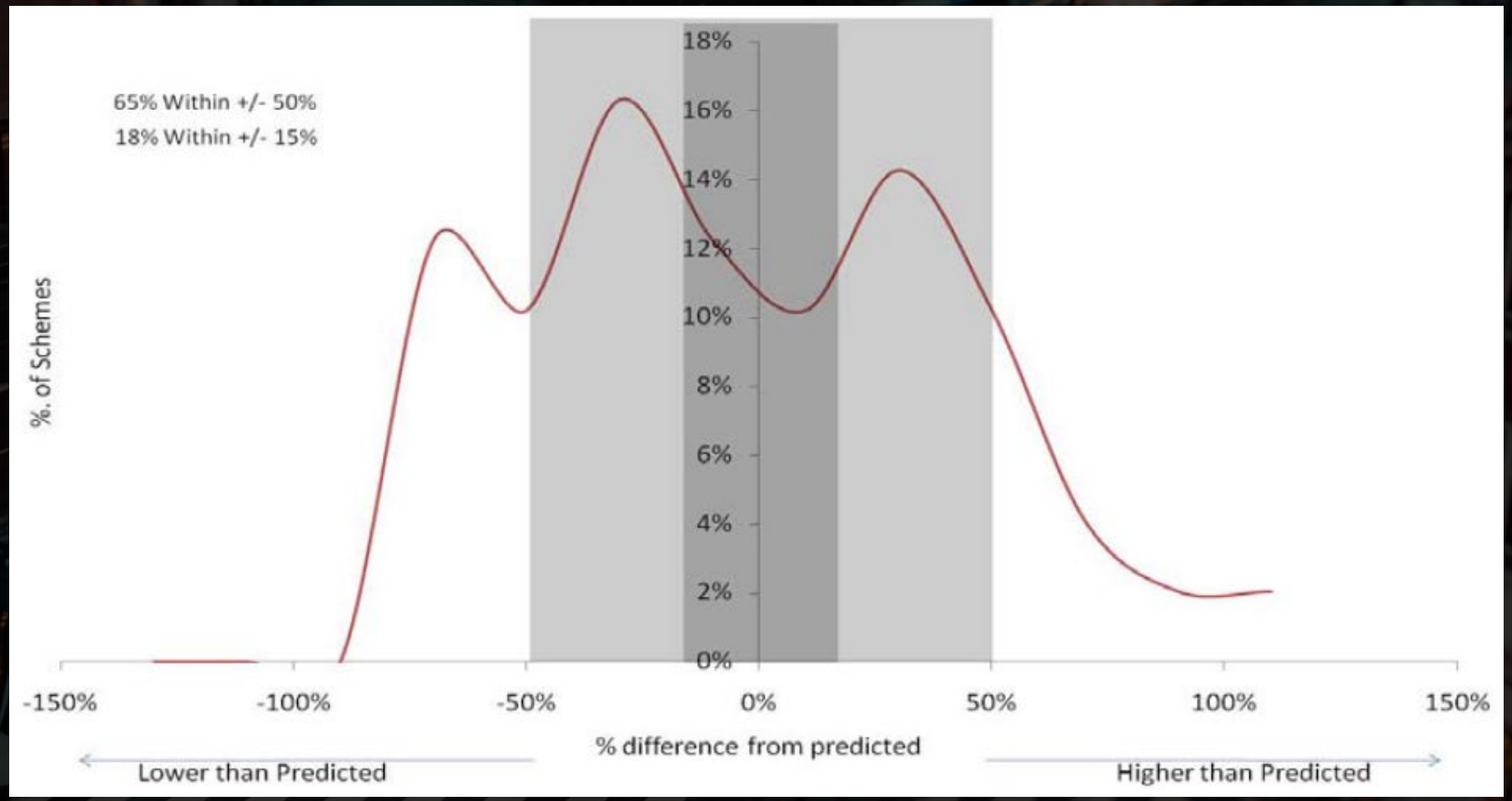
Road projects (zero alternative)



Takeaway: Traffic volumes most often do not continue to grow as predicted if road capacity is not expanded

Nicolaisen (2012)

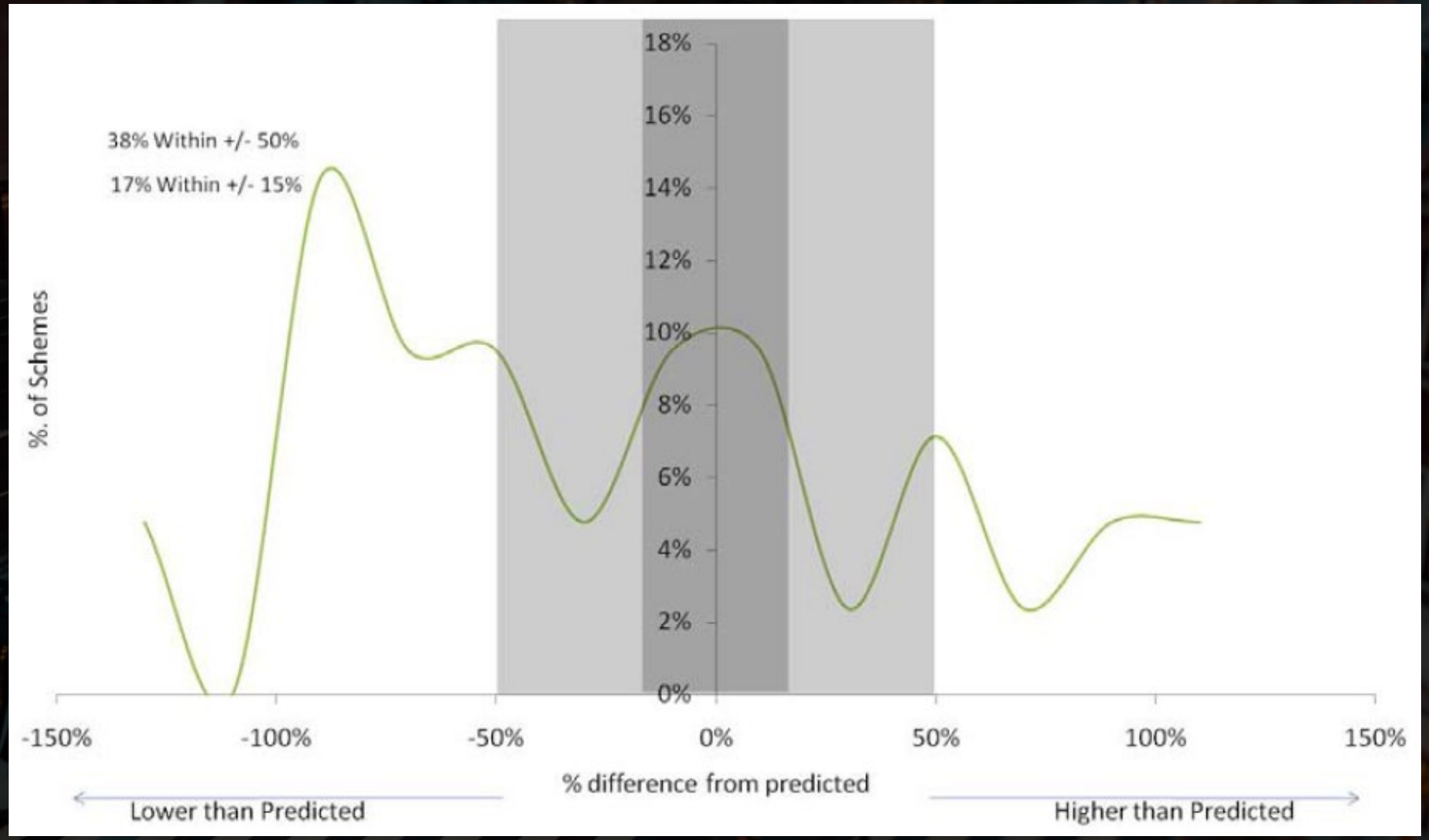
Accuracy of forecasts for travel time savings (road projects)



Takeaway: Forecasts of travel time savings are only accurate in 18% of projects

Highways Agency (2011)

Accuracy of forecasts for accident reduction rates (road projects)



Takeaway: Forecasts of accident reduction are only accurate in 17% of projects

Highways Agency (2011)

Accuracy of forecasts for sub-objectives (road projects)

Sub-objective	Outturn score				Comparison with prediction		
	Neutral	Adverse	Benefit	Not assessed	Better than Expected	As Expected	Worse than Expected
Noise	26	13	40	1	21	43	12
Local Air Quality	17	13	49	1	20	46	9
Greenhouse gases	15	48	5	12	33	7	21
Landscape	15	61	3	1	6	60	13
Townscape	11	4	13	52	0	22	2
Biodiversity	26	49	3	2	5	62	11
Heritage	27	43	10	0	12	65	3
Water	36	27	16	1	12	61	6
Physical Fitness	36	1	32	11	2	38	4
Journey Ambience	10	1	61	8	1	42	2

Takeaway: Forecasts of greenhouse gas emissions are only accurate in 11% of projects

Highways Agency (2011)

$$I_P = \frac{O - P}{P} \times 100$$

P: predicted value, O: observed value

5 year gap

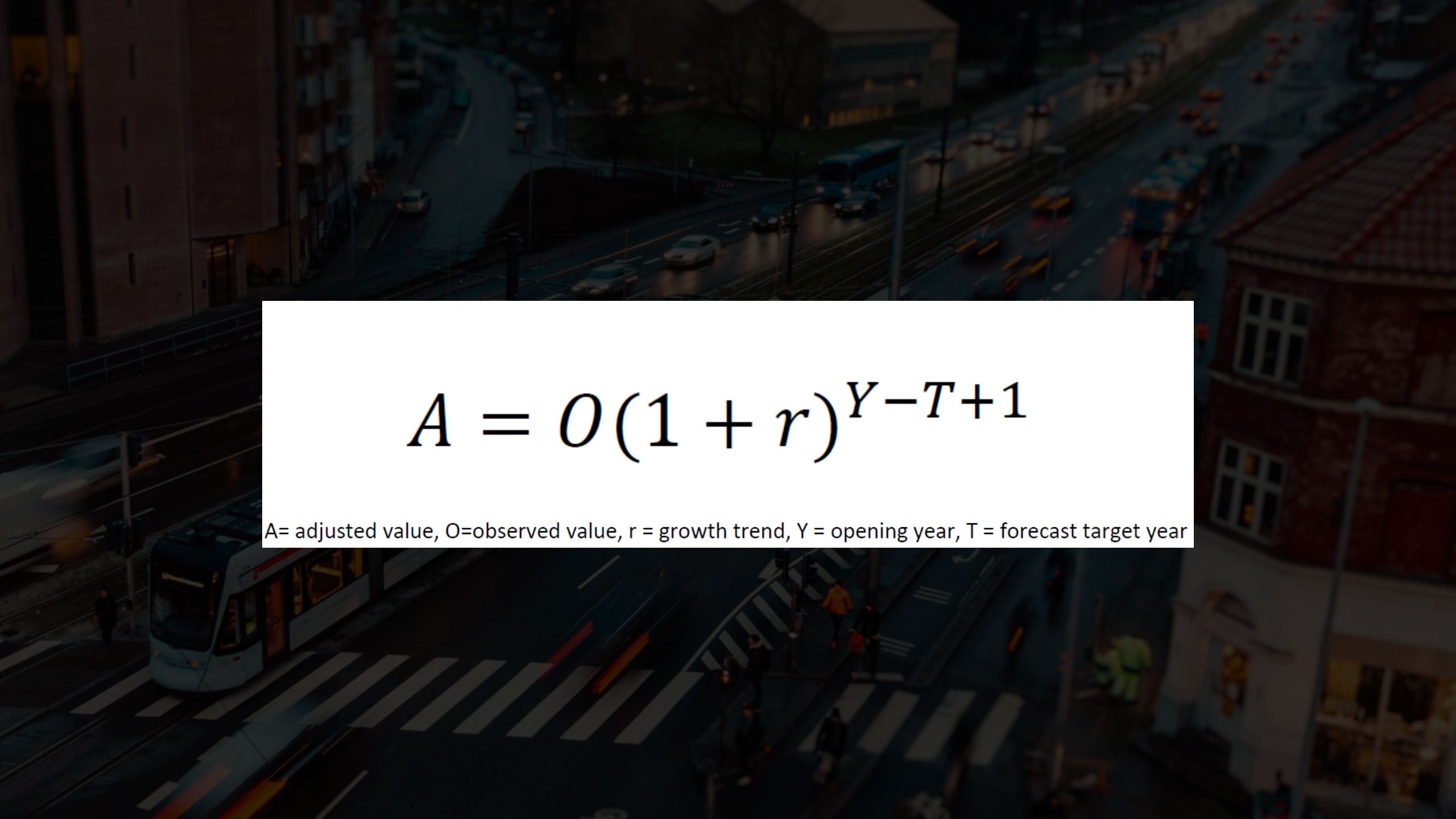
O ◄- ► P

Prediction is made
(e.g.2020)

Opening year of project
(e.g.2030)

Prediction target year
(e.g.2035)

Takeaway: Important to compare observed demand with actual target year for forecasts

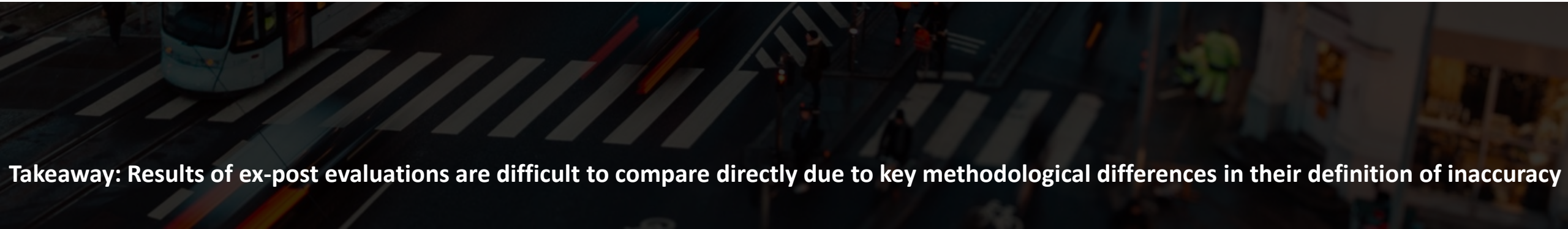


$$A = O(1 + r)^{Y-T+1}$$

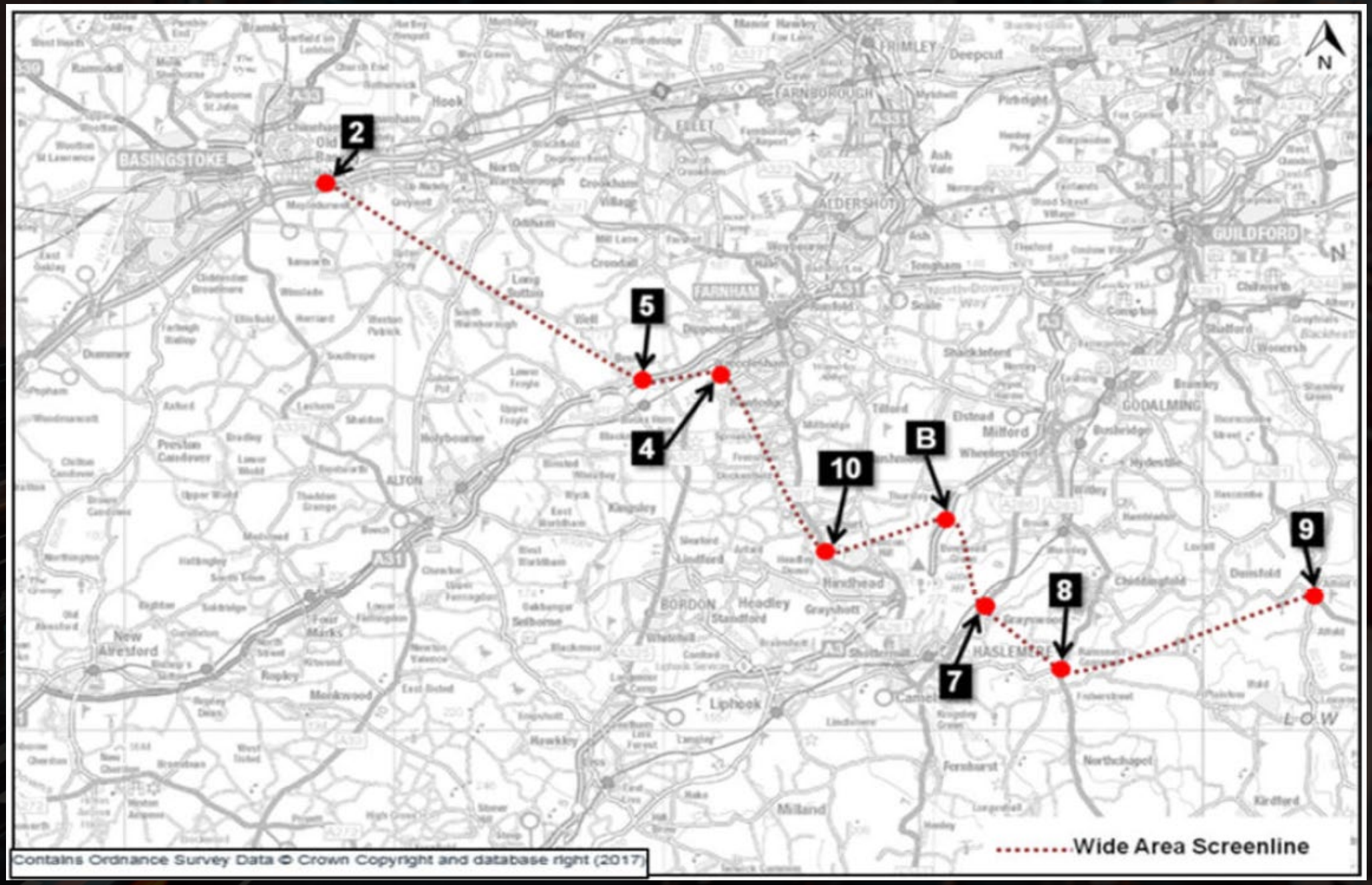
A= adjusted value, O=observed value, r = growth trend, Y = opening year, T = forecast target year

$$I_S = \frac{B + (P - B)\left(\frac{10}{T_P - T_B}\right) - B + (O - B)\left(\frac{10}{T_O - T_B}\right)}{B + (O - B)\left(\frac{10}{T_O - T_B}\right)} \times 100$$

B = base value, P: predicted value, O: observed value, $T_{X:}$ year of measure for variable X



Takeaway: Results of ex-post evaluations are difficult to compare directly due to key methodological differences in their definition of inaccuracy



Highways England (2017)

Map Ref.	Site Name and Description	Average Weekday Traffic (AWT)			% change: before to FYA
		Before (2007)	FYA (2016)	Net difference	
2	M3, J5-6	106,700	103,800	-2,900	-3%
5	A31, Bentley Bypass	22,200	22,500	300	2%
4	A325, Wrecclesham Hill	17,900	15,000	-2,900	-17%
10	A287, Churt Rd, Churt	7,300	6,100	-1,200	-15%
B	A3, E of A287	31,500	-	19,200	62%
	A3 Hindhead Tunnel	-	50,100		
7	A286, Grayswood Rd	11,000	7,800	-3,200	-29%
8	A283, Cripplecrutch Hill	7,900	8,300	400	5%
9	A281, Horsham Rd	9,900	9,800	-100	-1%
Total		214,400	223,400	9,600	4.4%

Takeaway: Large volumes of induced demand on new road projects may simply be diverted network traffic

Highways England (2017)

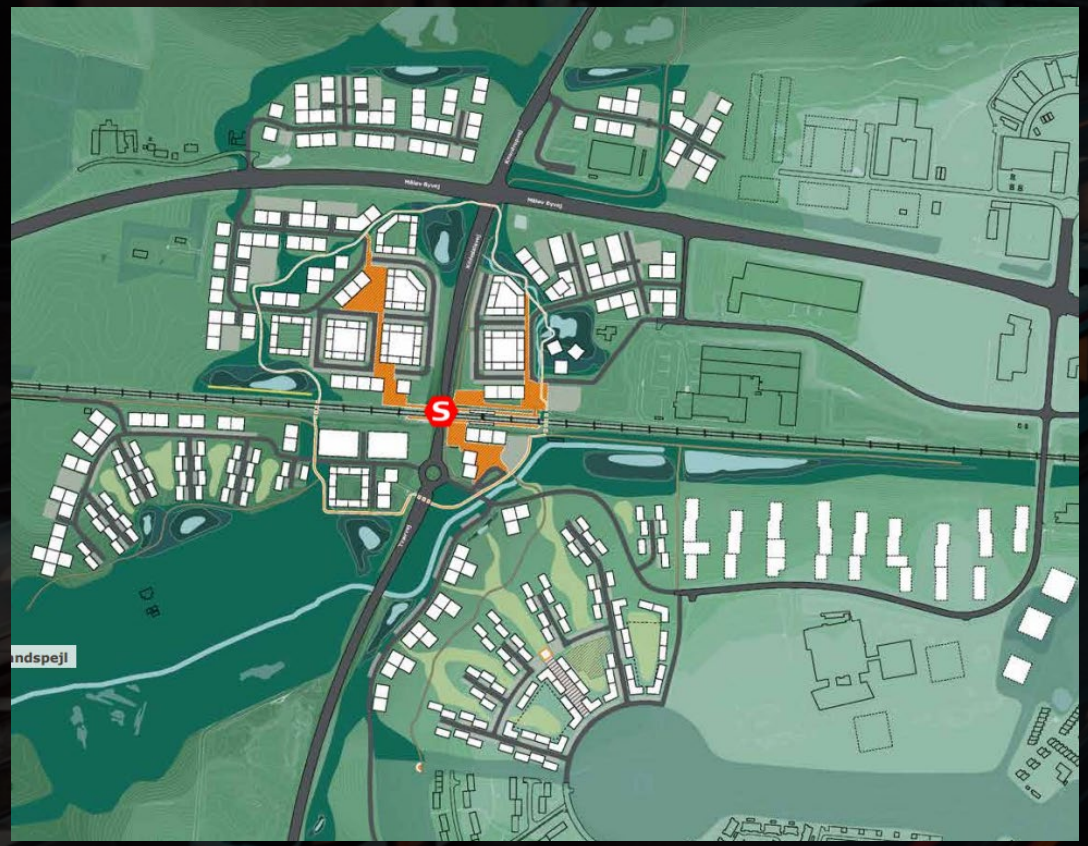
Takeaway: Rail projects can offer system benefits that are not assessed in individual projects

	Transport BCR	Non-transport BCR	Overall	Proportions – transport and non-transport
CTRL	0.5: 1	1.5:1	2.0:1	25:75
CL	1.8:1	0.8:1	2.6:1	70:30
JLE 1991	0.95:1	0.8:1	1.75:1	54:46
JLE 2004	1.75:1	1.0:1	2.75:1	64:36

Takeaway: Rail projects often have large non-transport related economic benefits (which are not assessed in appraisal)

Banister & Thurstain-Goodwin (2011)

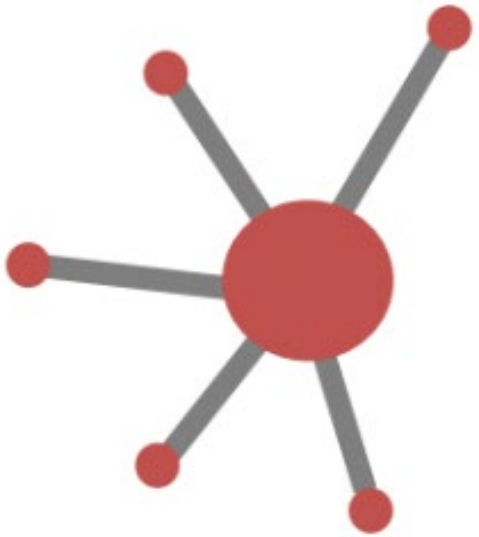
Development plan around Kildedal Station (DK)



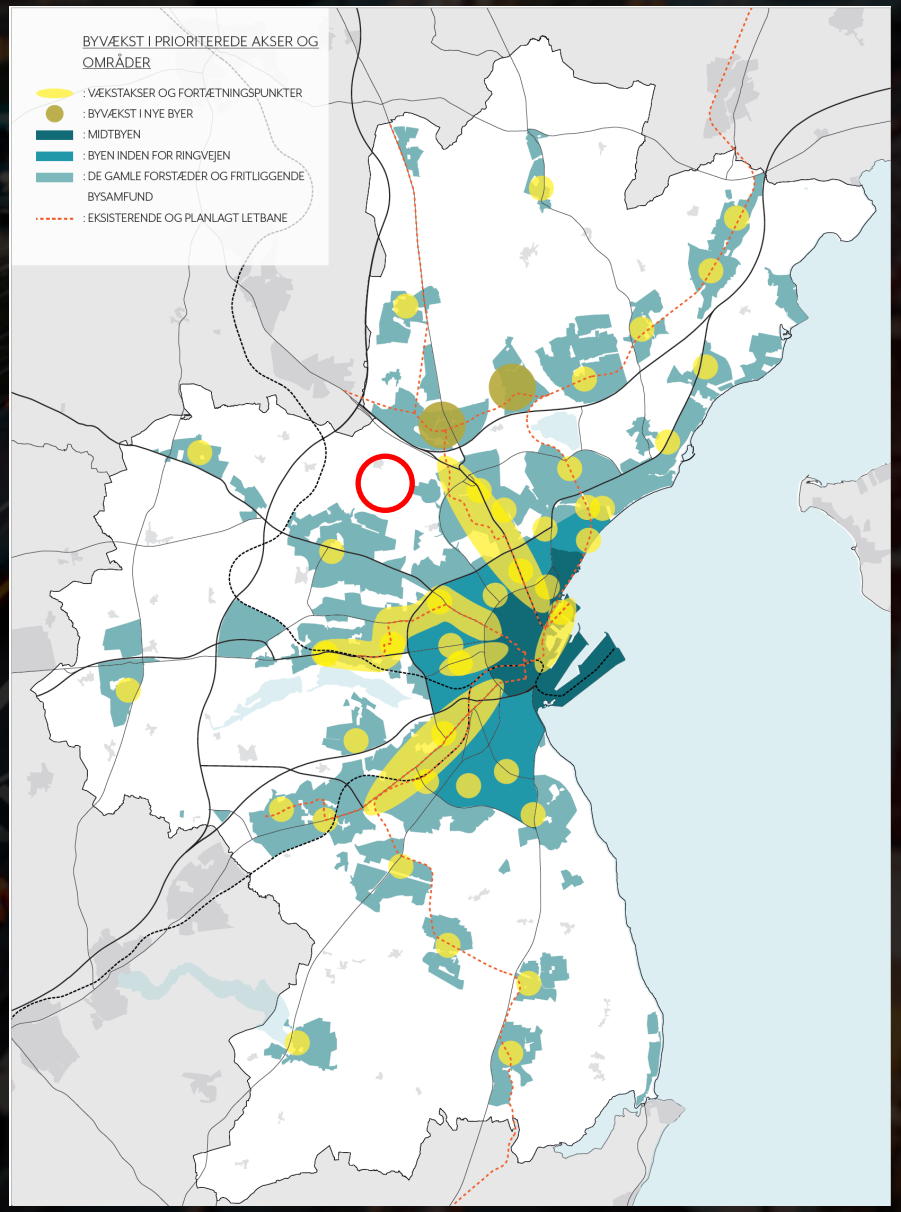
Actual development around Kildedal Station (DK)

Takeaway: Ridership shortfalls for rail projects are often connected to changes in fundamental forecast assumptions

Vision



Anti-vision



2009 – prior to any intervention, original baseline

Google (2021)

2014 – bus lanes implemented, buildings demolished, capacity reduction for cars, new baseline

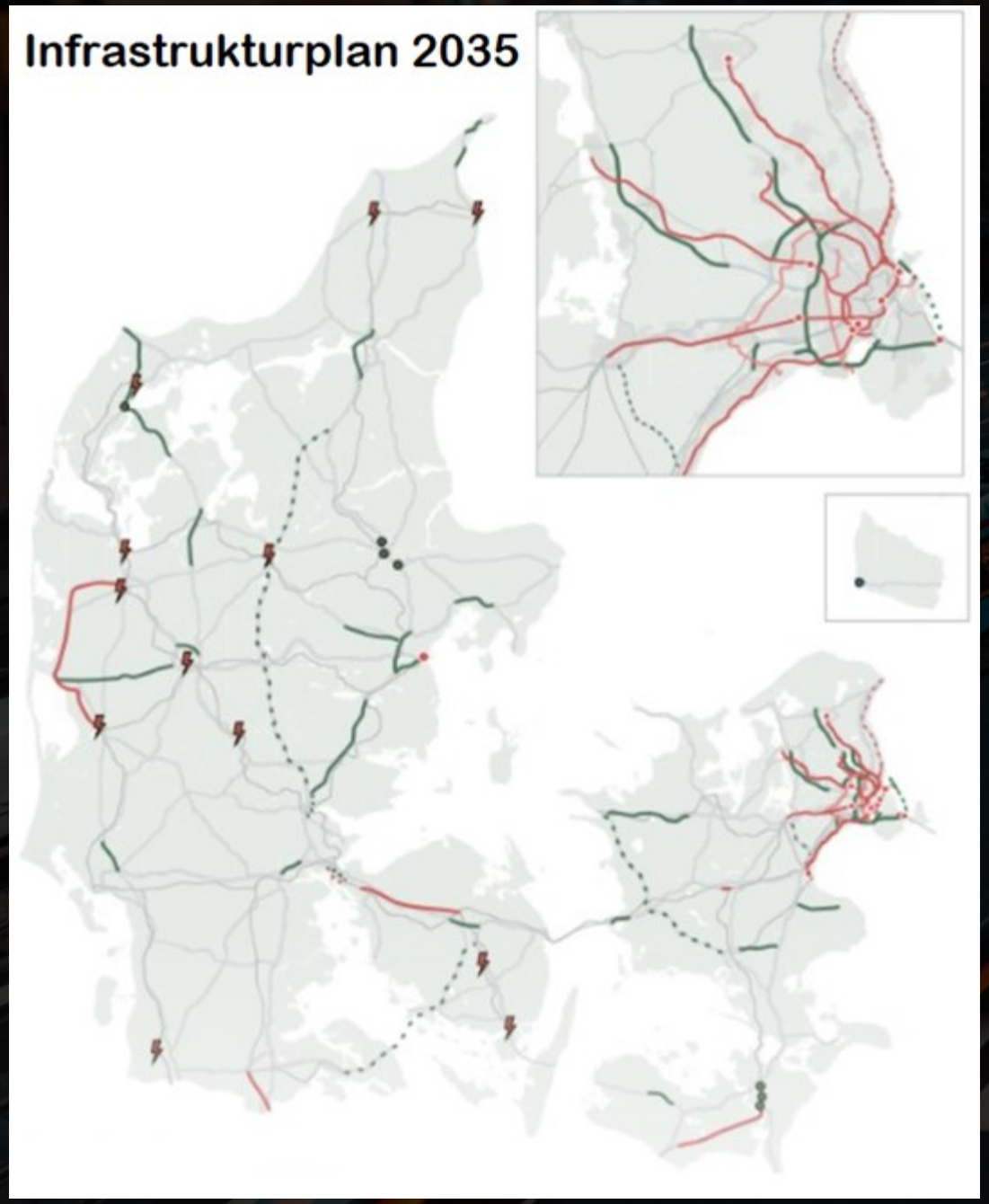
Google (2021)

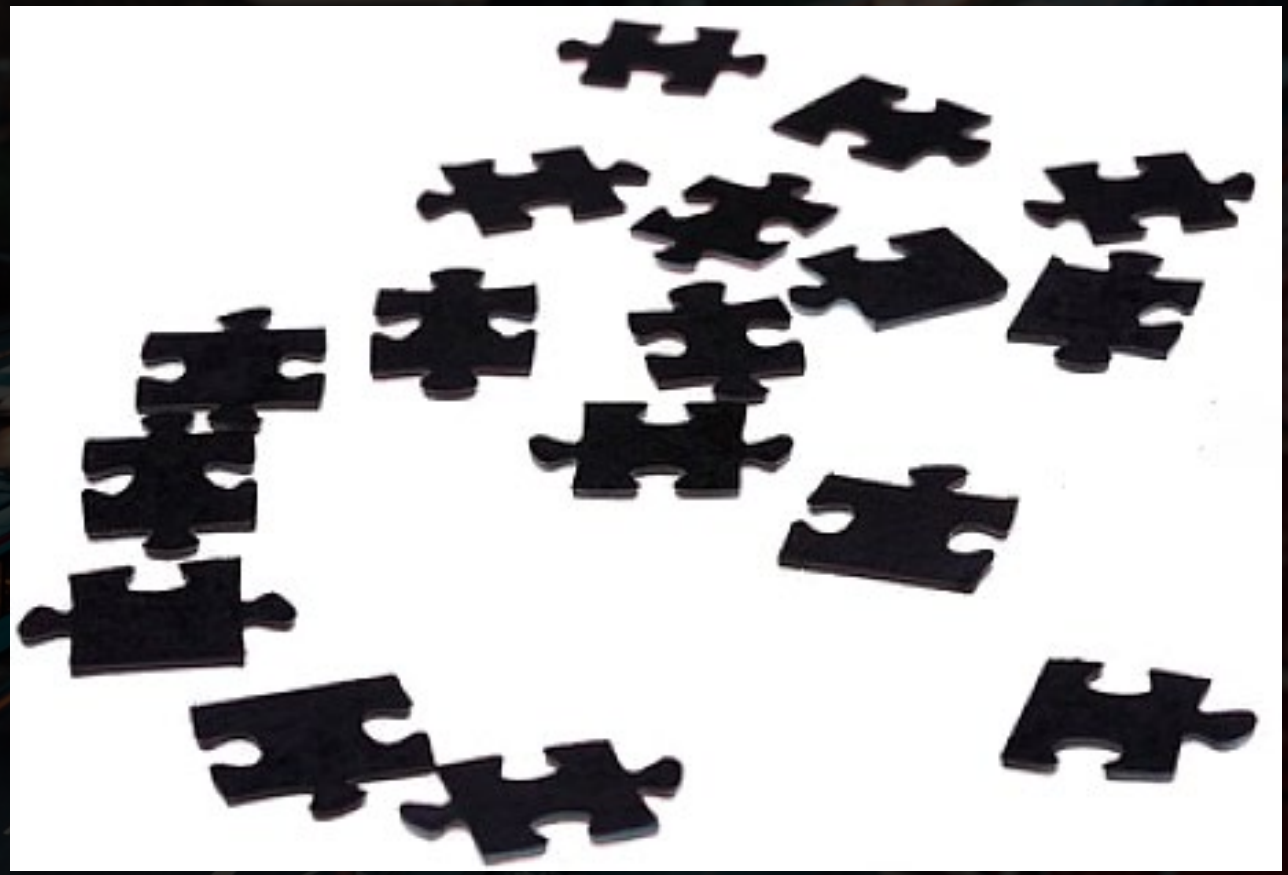

2019 – light rail implemented, socioeconomic effects based on 2014 baseline rather than 2009 baseline
Randersvej
P-OLESEN.DK
Google (2021)

Takeaway: Urban transport infrastructure projects should seek to incorporate <u>local policy priorities for urban development</u>

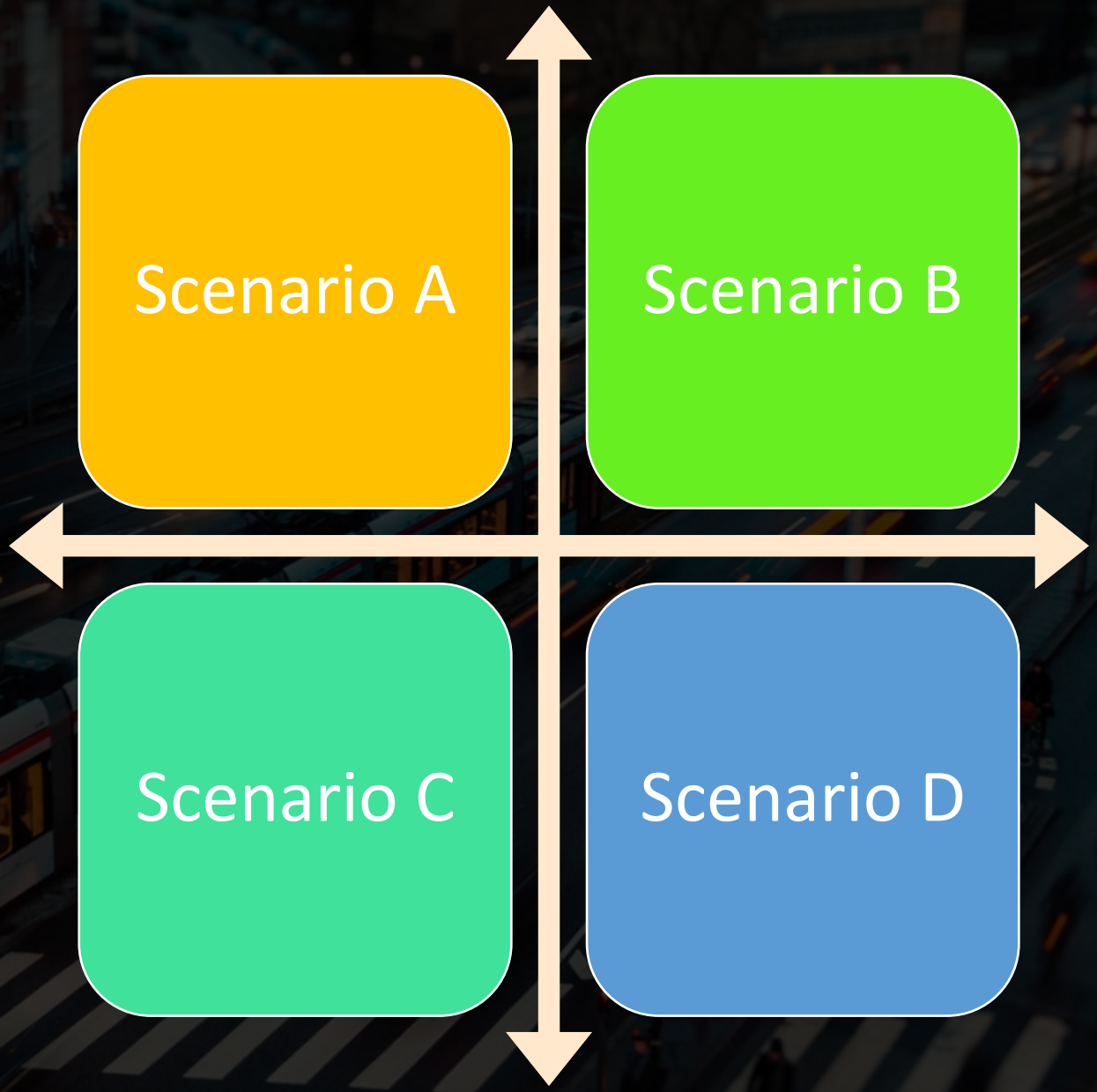
Google (2021)

Takeaway: Urban transport infrastructure projects should seek to incorporate derived costs as well as lost opportunity costs





Takeaway: National transport plan to guide appraisal of individual projects



Takeaway: Appraisal could focus more on the robustness of a plan of multiple projects across a range of scenarios rather than minor sensitivity analyses to inputs of individual inputs

Takeaway: Ex-post evaluation needs to be standardised and mandatory to best utilize results and reduce the risk of availability bias (e.g. POPE in the UK)

Summary of recommendations

1. Systematic evaluation schemes
2. Induced/dynamic demand effects
3. Holistic appraisal approaches
4. National transport plans
5. Strategic scenario planning


Thank you