

Case Study: Cost Estimation of a Wireless Communication Network

A request by the German Parliament

Key details of the proposal

- ▶ The German parliament's Finance Committee is reviewing a government proposal to build a wireless communication network (WCN)
- ▶ Key info:
 - ▶ Capital cost = EUR 1,500 million
 - ▶ Annual operating&maintenance cost = EUR 50 million
 - ▶ 20 year lifecycle
 - ▶ 425 towers
 - ▶ 35,000 WCN users
 - ▶ 40,000 end-user device

Data from the 12 'comparative' jurisdictions

Jurisdiction	Capital Cost (m)	Annual Operating and Maintenance Cost (m)	Lifecycle (Years)	Network users (number)	Towers (number)	End-User Devices (Number)
German WCN	1,500,000,000	50,000,000	20	35,000	425	40,000
1	160,000,000	10,000,000	20	19,000	84	19,000
2	270,750,000	11,500,000	15	78,000	324	81,228
3	81,700,000	4,500,000	12	10,000	73	18,000
4	13,000,000	1,000,000	15	17,068	92	17,000
5	1,200,000	10,500,000	15	11,000	86	9,000
6	36,000,000	2,100,000	15	12,000	255	9,000
7	12,000,000	2,300,000	15	10,000	50	10,000
8	78,600,000	3,000,000	10	18,725	69	17,025
9	361,900,000	14,000,000	15	62,000	230	52,000
10	434,000,000	15,000,000	20	27,000	332	22,000
11	215,852,089	21,000,000	15	68,000	244	66,351
12	18,000,000	3,600,000	15	12,500	50	12,000

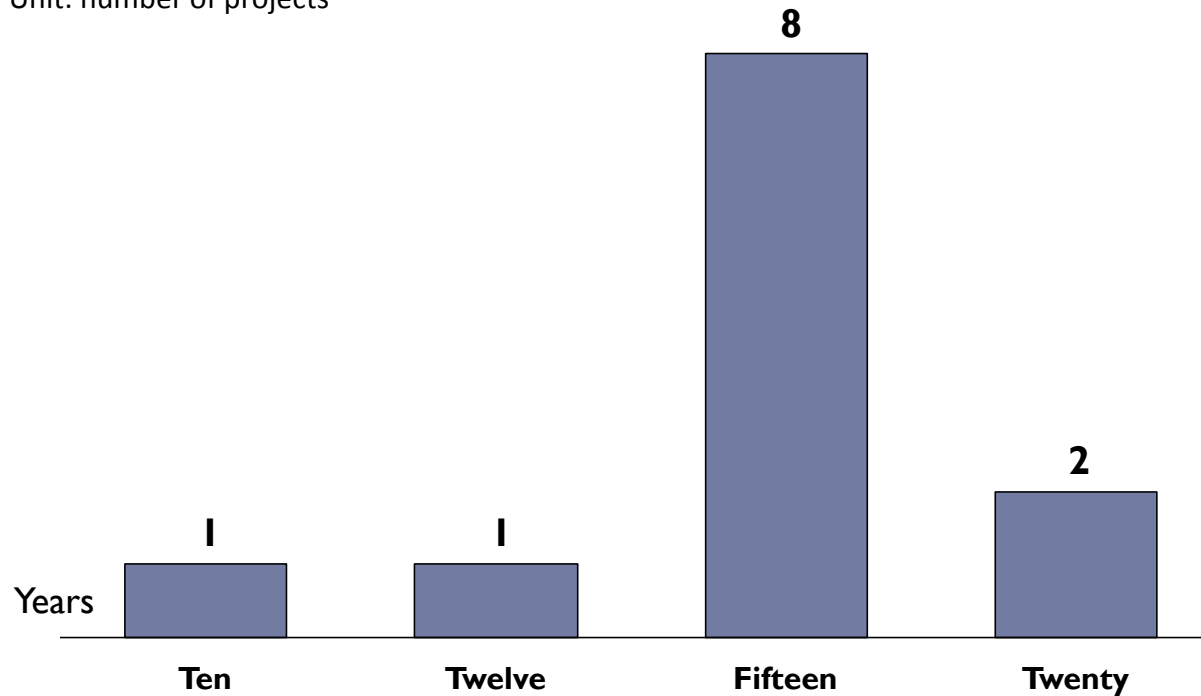
Group exercises

- ▶ Based on the data collected, what would be your advice to the Finance Committee?
- ▶ Please take the following steps in your analysis:
 - ▶ 1) Determine the appropriate lifecycle for the network
 - ▶ 2) Determine the likely cost driver. Use it to estimate the cost (be sure to consider the total cost!)
 - ▶ 3) Consider a sensitivity analysis

1) Determine the appropriate lifecycle for the network

Life cycle of the wireless communication networks

Unit: number of projects

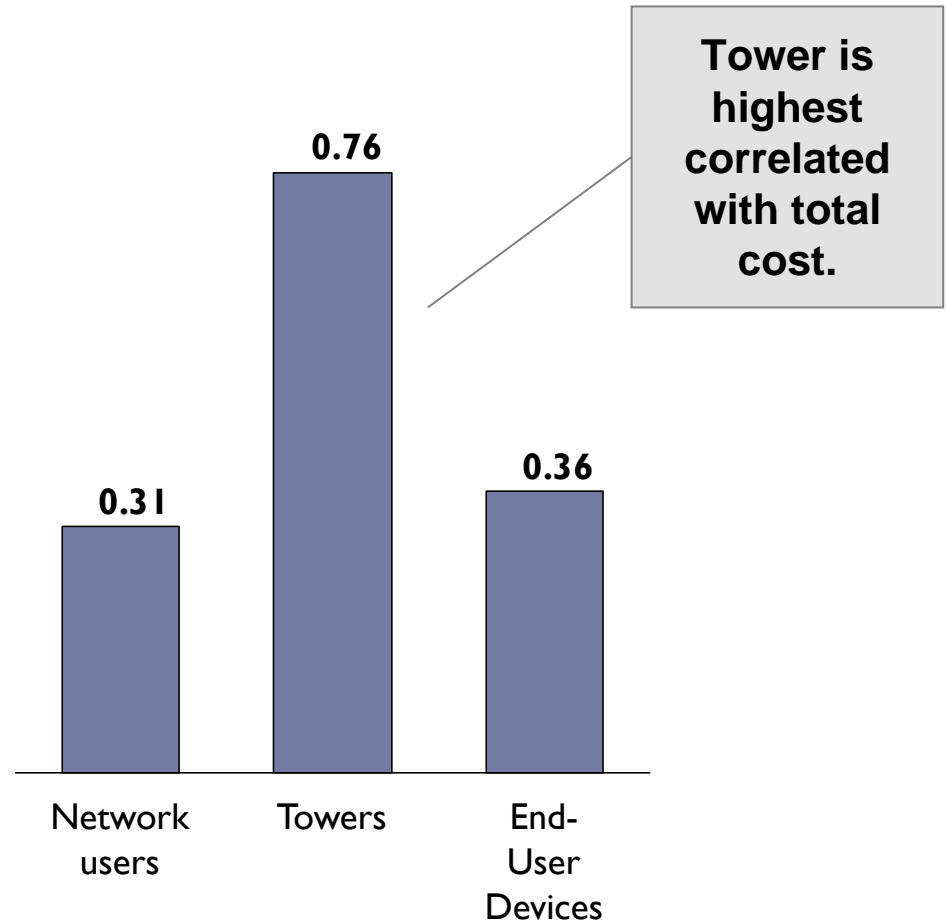


Average life cycle is roughly 15 years. PBO should inform the parliament that the proposed life cycle appears to be much higher than peers

2) Determine the likely cost driver. Use it to estimate the cost

Jurisdiction	Total Cost (m)
German WCN	2,500,000,000
1	360,000,000
2	443,250,000
3	135,700,000
4	28,000,000
5	158,700,000
6	67,500,000
7	46,500,000
8	108,600,000
9	571,900,000
10	734,000,000
11	530,852,089
12	72,000,000

Correlation with Total Cost



2) Determine the likely cost driver. Use it to estimate the cost

Jurisdiction	Total Cost (m)	Per tower cost (m)
German WCN	2,500,000,000	5,882,353
1	360,000,000	4,285,714
2	443,250,000	1,368,056
3	135,700,000	1,858,904
4	28,000,000	304,348
5	158,700,000	1,845,349
6	67,500,000	264,706
7	46,500,000	930,000
8	108,600,000	1,573,913
9	571,900,000	2,486,522
10	734,000,000	2,210,843
11	530,852,089	2,175,623
12	72,000,000	1,440,000

- ▶ Average per tower cost = 1.7 million
- ▶ Using the tower cost as our cost driver, we estimate the total cost to be
= $425 * 1.7$
= 734.7 million

3) Consider a sensitivity analysis

Jurisdiction	Total Cost (m)	Per tower cost (m)
German WCN	2,500,000,000	5,882,353
1	360,000,000	4,285,714
2	443,250,000	1,368,056
3	135,700,000	1,858,904
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- ▶ Jurisdictions 1, 4 and 6 are likely outliers
- ▶ Removing those jurisdictions,
 - ▶ the average cost per tower rises slightly to 1.8 million
 - ▶ Estimated cost becomes 750.3 million

Bottom line

- ▶ The German government's proposed cost appears to be expensive relative to other benchmark jurisdictions
- ▶ PBO should further determine the root causes driving the relatively higher total cost so that the Finance Committee can be better informed

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