

An Eight Step Approach to Prioritizing Transportation Projects



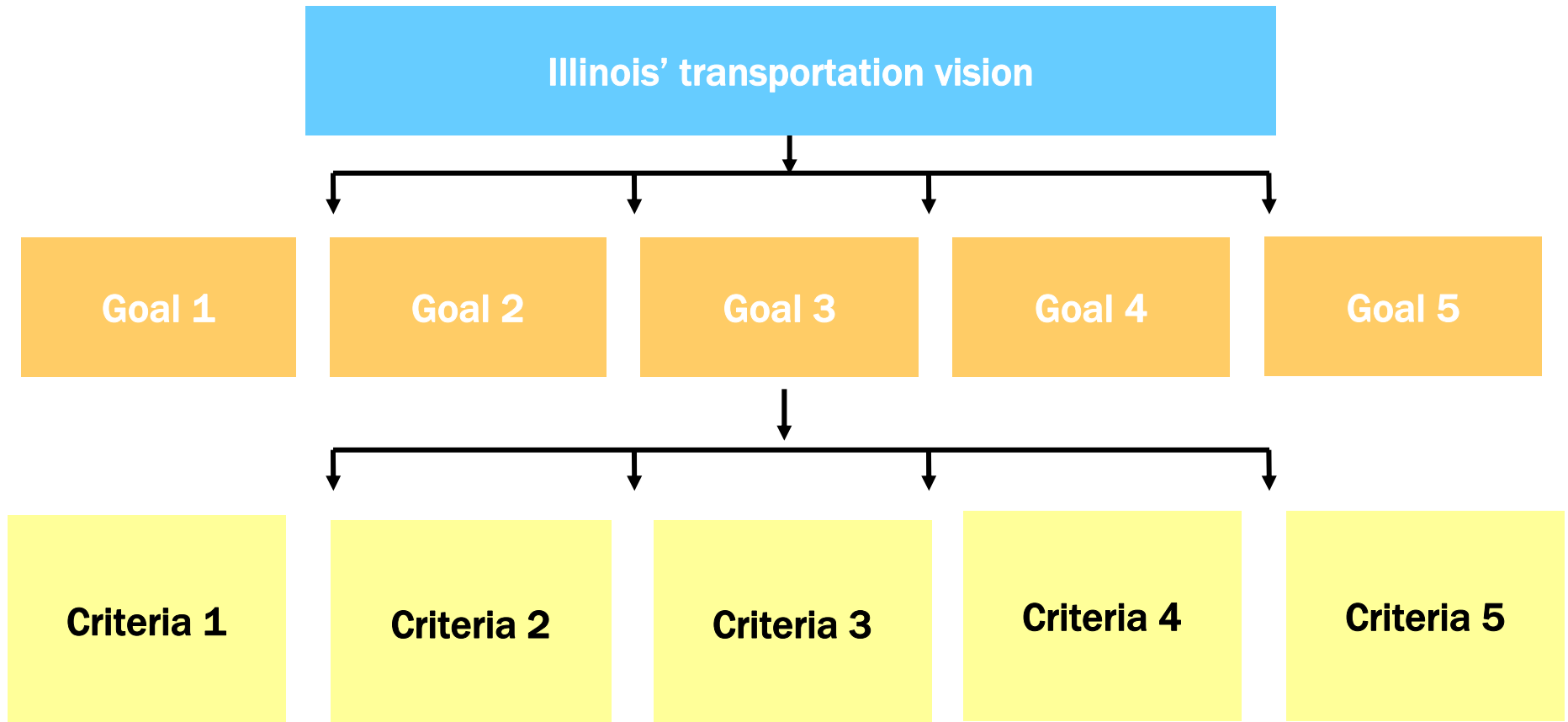
METROPOLITAN PLANNING COUNCIL

The eight basic steps of ranking capital projects

- Step 1:** Create criteria based on state goals
- Step 2:** Weight criteria
- Step 3:** Measure project performance for each criteria
- Step 4:** Calculate project benefit for each criteria
- Step 5:** Calculate total project benefit
- Step 6:** Calculate per capita cost score
- Step 7:** Calculate overall project score
- Step 8:** Rank projects by score

Project Rank (High-Low)	
Project	Benefit/Per Capita Cost
Project D	24.28
Project A	23.63
Project C	14.08
Project B	6.72
Project E	3.70
Project F	1.81
Project G	1.23

Step 1: Create criteria based on state goals



Step 2: Weight criteria

$$\begin{array}{c} \text{Criteria 1} \\ 40\% \end{array} + \begin{array}{c} \text{Criteria 2} \\ 25\% \end{array} + \begin{array}{c} \text{Criteria 3} \\ 15\% \end{array} + \begin{array}{c} \text{Criteria 4} \\ 10\% \end{array} + \begin{array}{c} \text{Criteria 5} \\ 10\% \end{array} = 100\%$$

Performance Measure										
Project	Criteria 1		Criteria 2		Criteria 3		Criteria 4		Criteria 5	
	weight:	40%	weight:	25%	weight:	15%	weight:	10%	weight:	10%
Project A										
Project B										
Project C										
Project D										
Project E										
Project F										
Project G										

Step 3: Measure project performance for each criteria

Performance Measure										
Project	Criteria 1		Criteria 2		Criteria 3		Criteria 4		Criteria 5	
	weight:	40%	weight:	25%	weight:	15%	weight:	10%	weight:	10%
Project A		36		22		14		30		65
Project B		89		75		82		92		82
Project C		54		33		71		31		67
Project D		23		24		53		75		34
Project E		72		30		35		68		71
Project F		41		57		48		19		56
Project G		90		77		86		75		62

Lowest score

Highest score



Step 4: Calculate project benefit for each criteria

Performance Measure										
Project	Criteria 1		Criteria 2		Criteria 3		Criteria 4		Criteria 5	
	weight:	40%	weight:	25%	weight:	15%	weight:	10%	weight:	10%
Project A		36		22		14		30		65
Project B		89		75		82		92		82
Project C		54		33		71		31		67
Project D		23		24		53		75		34
Project E		72		30		35		68		71
Project F		41		57		48		19		56
Project G		90		77		86		75		62

**Performance x Weight
= Benefit**

$54 \times 40\% = 21.60$

Benefit										
Project	Criteria 1		Criteria 2		Criteria 3		Criteria 4		Criteria 5	
	weight:	40%	weight:	25%	weight:	15%	weight:	10%	weight:	10%
Project A		14.40		5.50		2.10		3.00		6.50
Project B		35.60		18.75		12.30		9.20		8.20
Project C		21.60		8.25		10.65		3.10		6.70
Project D		9.20		5.94		7.95		7.50		3.40
Project E		28.80		7.50		5.25		6.80		7.10
Project F		16.40		14.25		7.20		1.90		5.60
Project G		36.00		19.25		12.90		7.50		6.20

Step 5: Calculate total project benefit

Benefit											
Project	Criteria 1		Criteria 2		Criteria 3		Criteria 4		Criteria 5		Total Benefits
	weight:	40%	weight:	25%	weight:	15%	weight:	10%	weight:	10%	
Project A		14.40		5.50		2.10		3.00		6.50	31.50
Project B		35.60		18.75		12.30		9.20		8.20	84.05
Project C		21.60 +		8.25 +		10.65 +		3.10 +		6.70 =	50.30
Project D		9.20		5.94		7.95		7.50		3.40	33.99
Project E		28.80		7.50		5.25		6.80		7.10	55.45
Project F		16.40		14.25		7.20		1.90		5.60	45.35
Project G		36.00		19.25		12.90		7.50		6.20	81.85

Step 6: Calculate per capita cost score

$$\frac{\text{Life-Cycle Cost}}{\text{Affected Population}} = \text{Per Capita Cost}$$

Per Capita Cost			
Project	Life-Cycle Cost	Affected Population	Per Capita Cost
Project A	\$ 1,000,000	750,000	1.33
Project B	\$ 5,000,000	400,000	12.50
Project C	\$ 25,000,000	7,000,000	3.57
Project D	\$ 7,000,000	5,000,000	1.40
Project E	\$ 15,000,000	1,000,000	15.00
Project F	\$ 50,000,000	2,000,000	25.00
Project G	\$ 1,000,000,000	15,000,000	66.67

Step 7: Calculate overall project score

Benefit Score / Per Capita Cost Score = Benefit/Per Capita Cost Ratio

Per Capita Cost-Benefit Analysis			
Project	Benefit	Per Capita Cost	Per Capita Cost-Benefit
Project A	31.50	1.33	23.63
Project B	84.05	12.50	6.72
Project C	50.30	3.57	14.08
Project D	33.99	1.40	24.28
Project E	55.45	15.00	3.70
Project F	45.35	25.00	1.81
Project G	81.85	66.67	1.23

Step 8: Rank projects by score

Project Rank (High-Low)	
Project	Benefit/Per Capita Cost
Project D	24.28
Project A	23.63
Project C	14.08
Project B	6.72
Project E	3.70
Project F	1.81
Project G	1.23

