California Urban Water Management Economic Tool

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CWEMF

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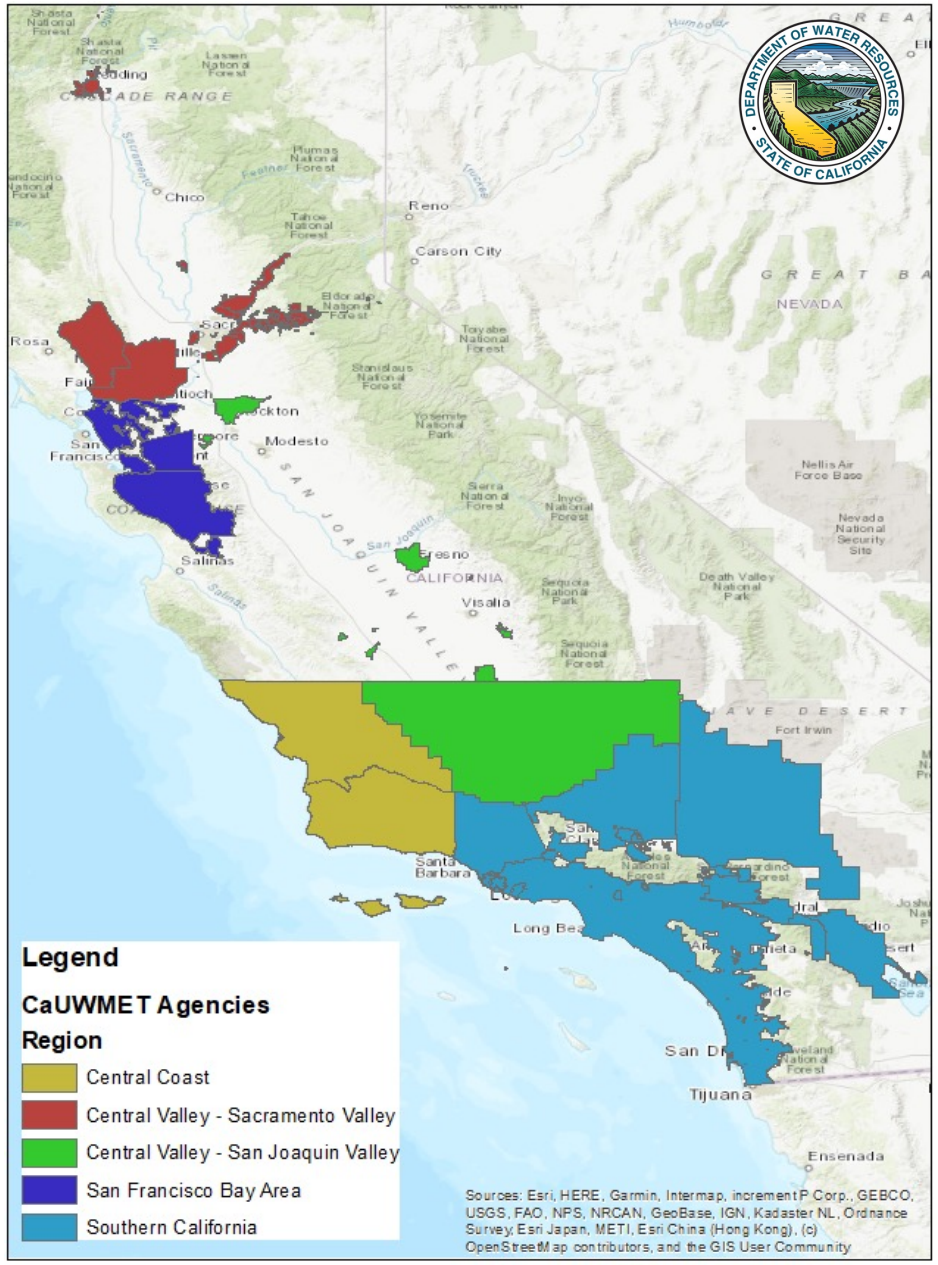
CaUWMET Overview

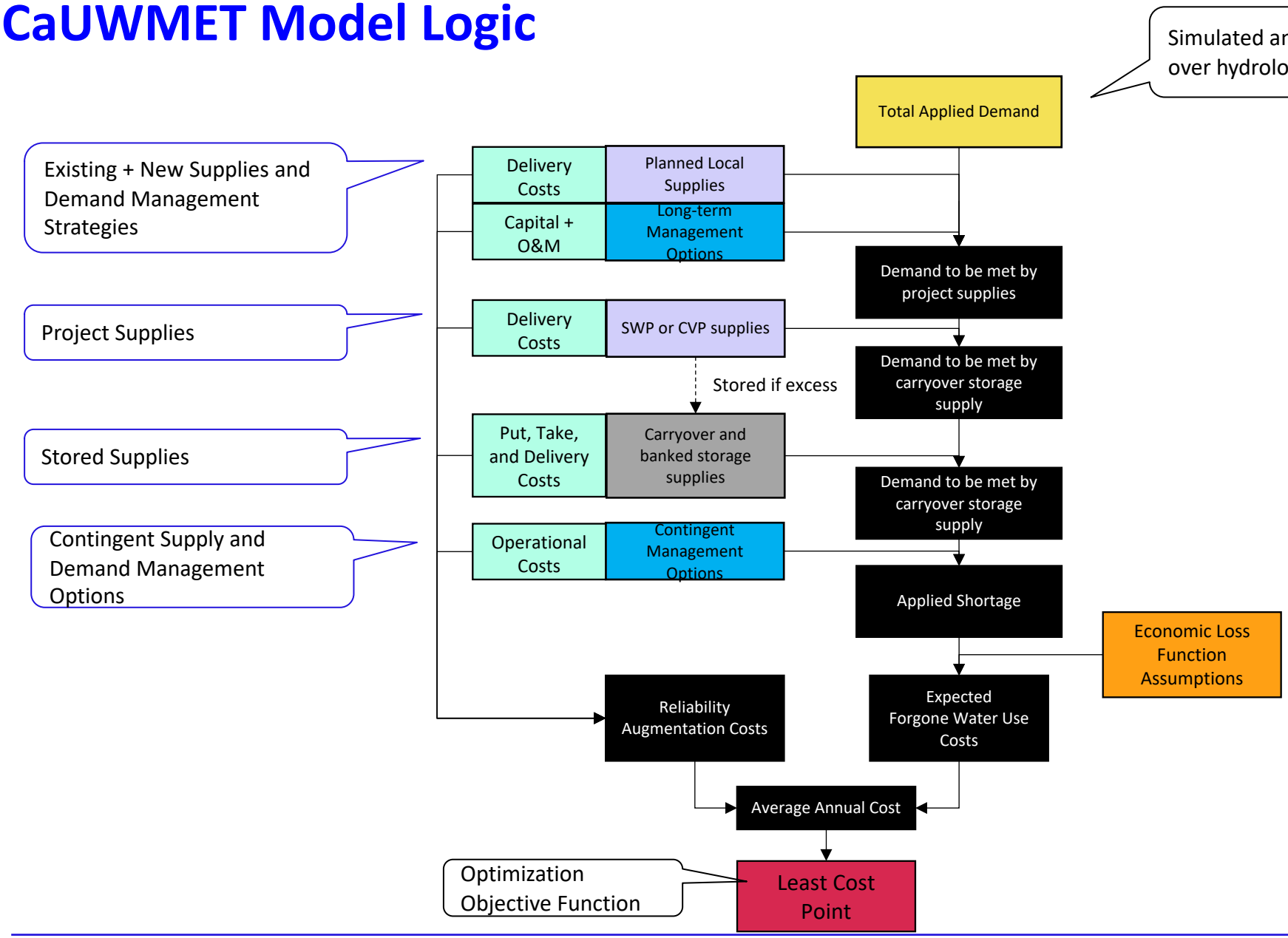
- Builds upon legacy economic tools:
  - Least Cost Planning Simulation Model (LCPSIM)
  - California Water Economic Supply Tool (CWEST)

- Includes all **urban** State Water Project and Central Valley Project contractors

- Input data aligning with:
  - UWMPs (Planning Horizon 2025 – 2040)
  - SGMA
  - WSIP
  - Calsim II and 3



CaUWMET Model Logic



Legend

Model Logic Steps

Water Balance Input Assumptions

- Demand Assumptions
- Supply Assumptions
- System Operations Assumptions

*Iterated over annual time series

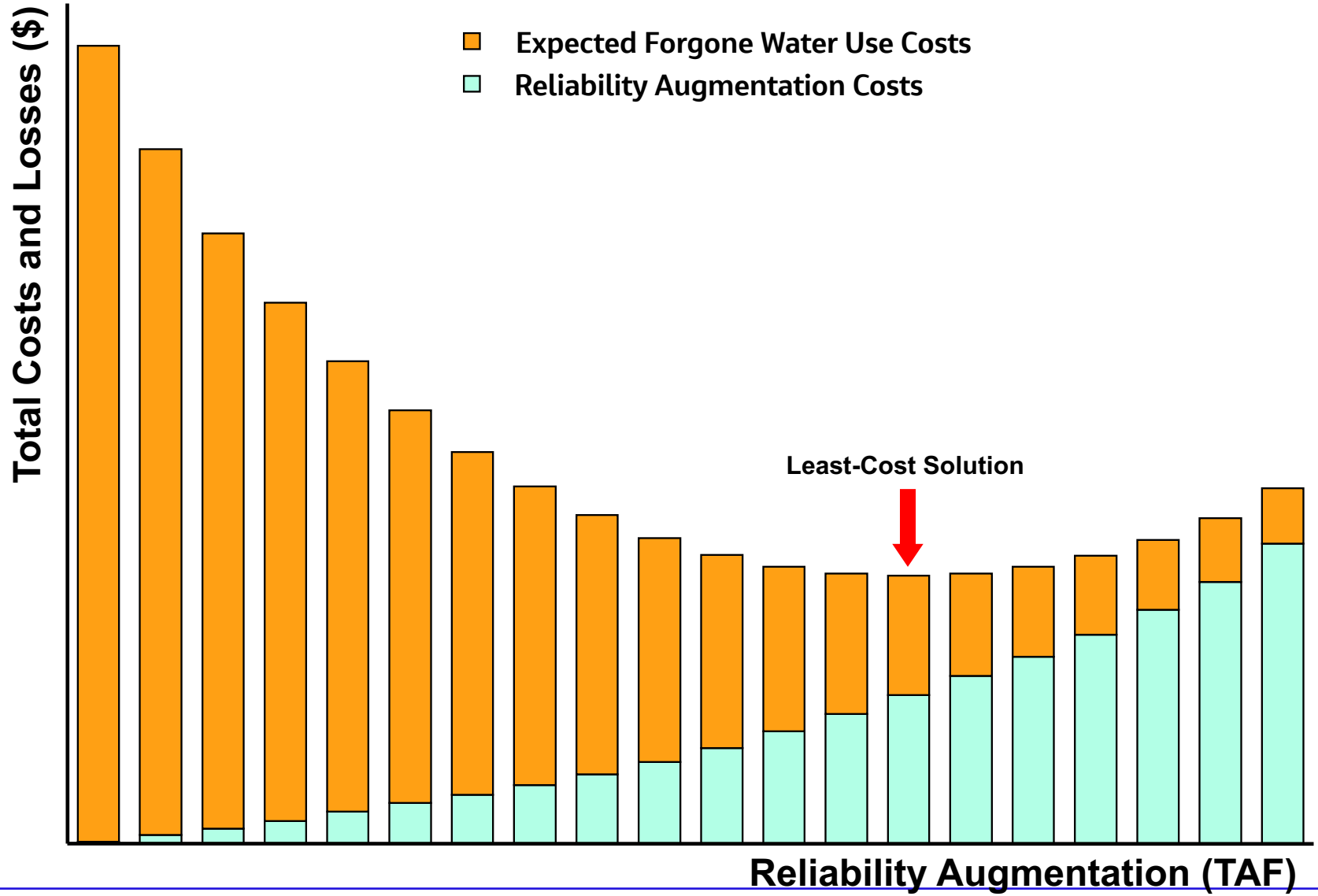
- Water Management Options Assumptions

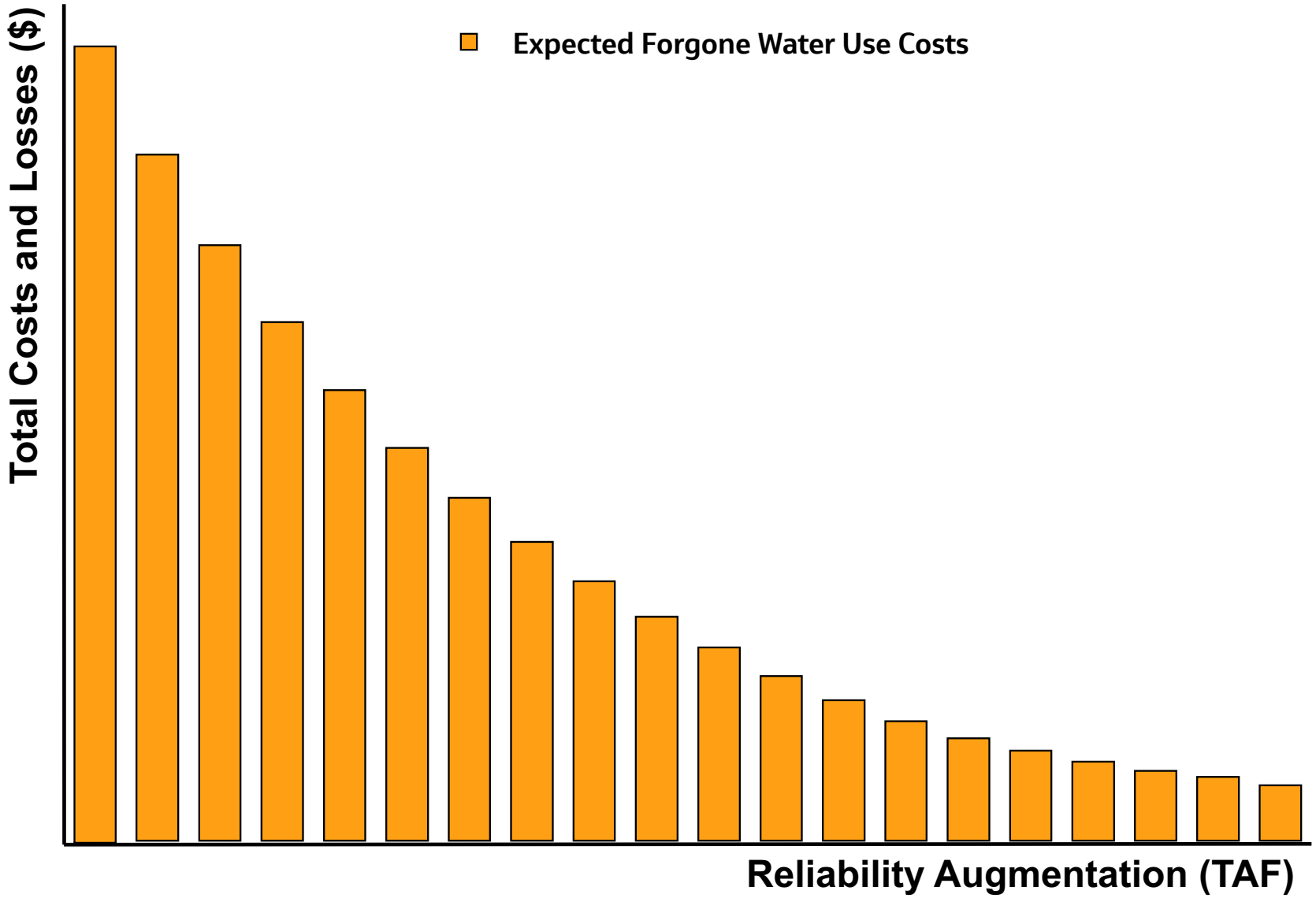
*Iterated over various quantities

Economic Input Assumptions

- Reliability Augmentation Costs
- Expected Forgone Water Use Costs

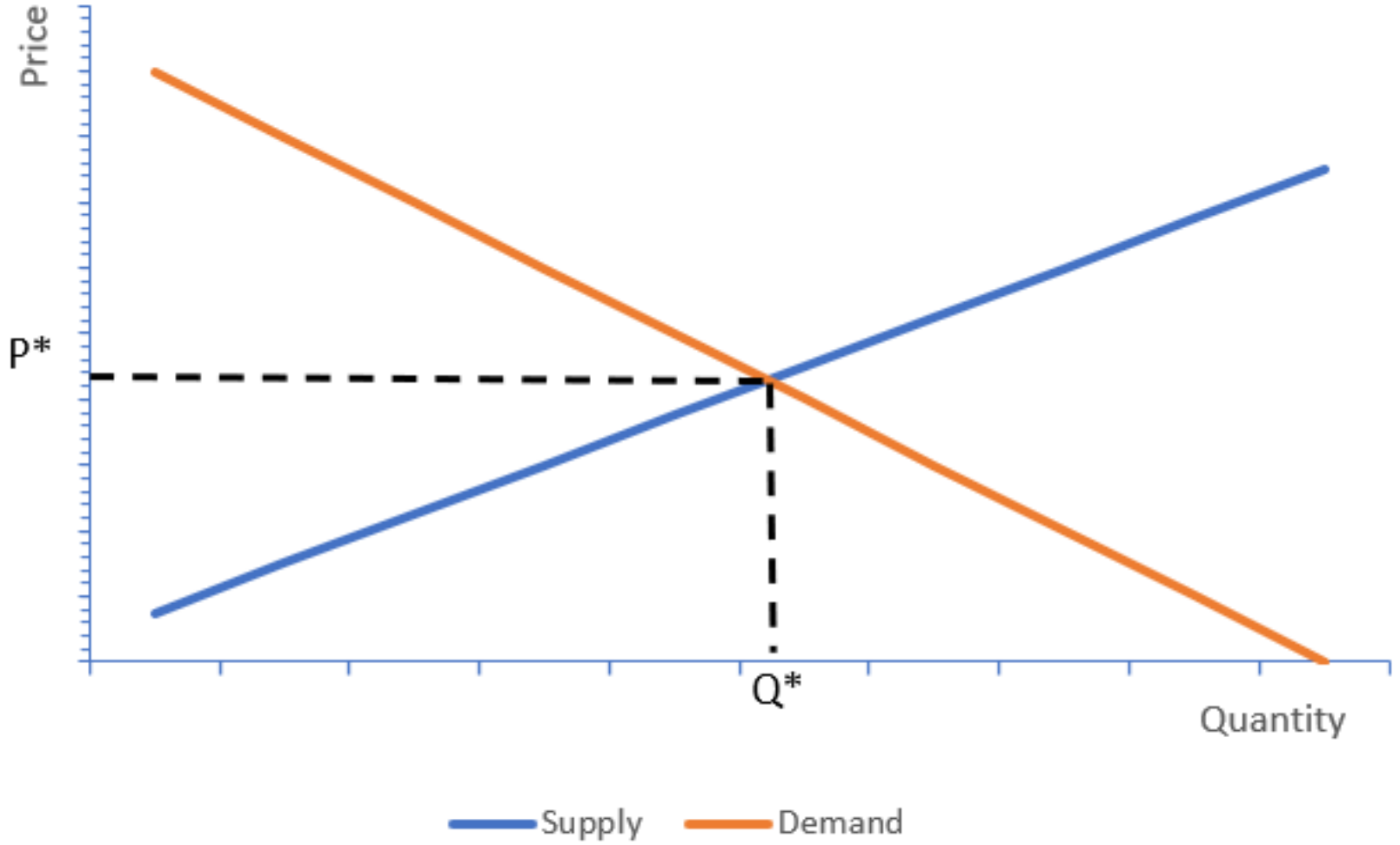
CaUWMET Objective




Total Costs and Losses ($)
Expected Forgone Water Use Costs
Reliability Augmentation (TAF)

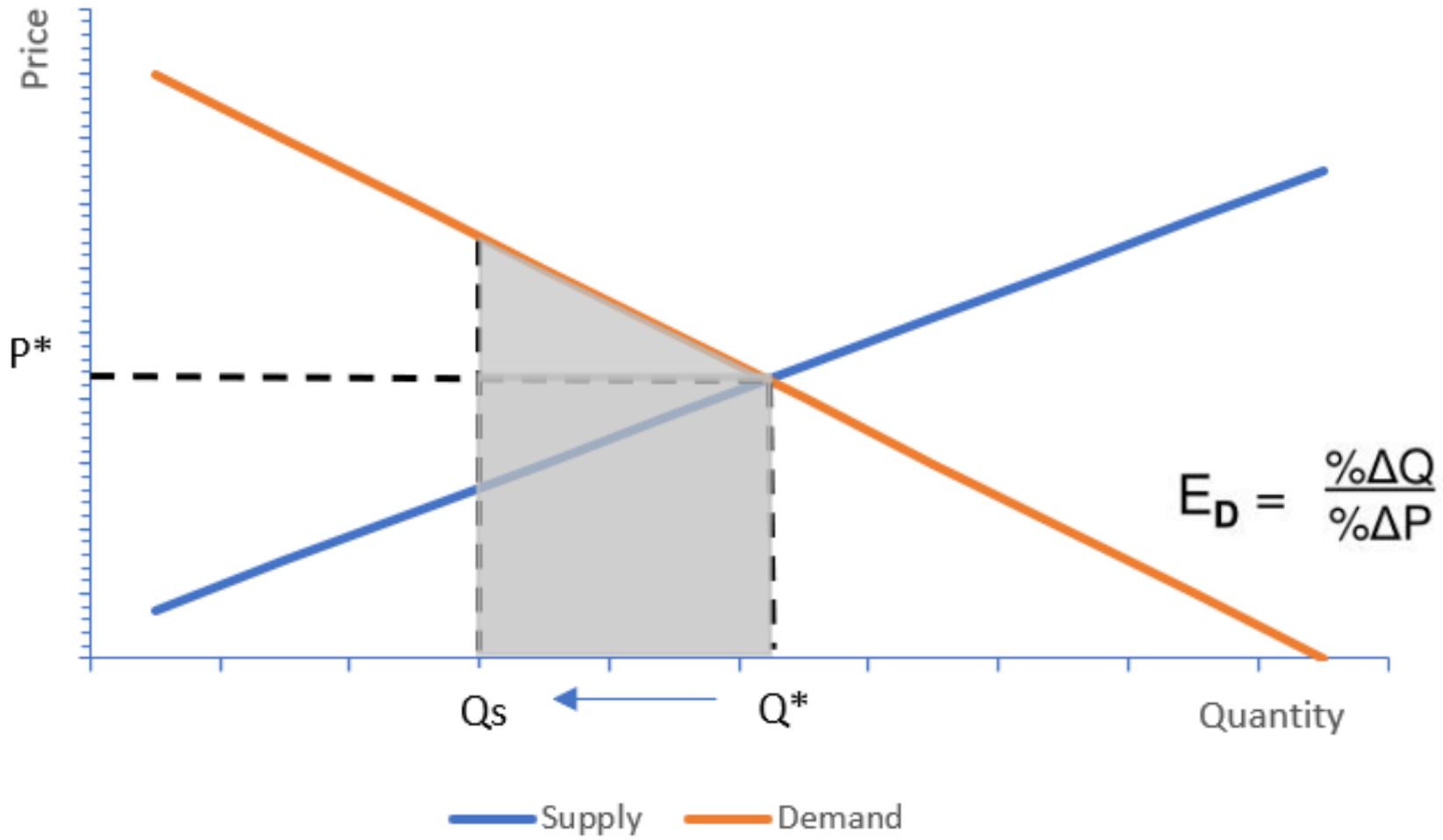
Expected Forgone Water Use Costs

- constant elasticity of demand (CPED)



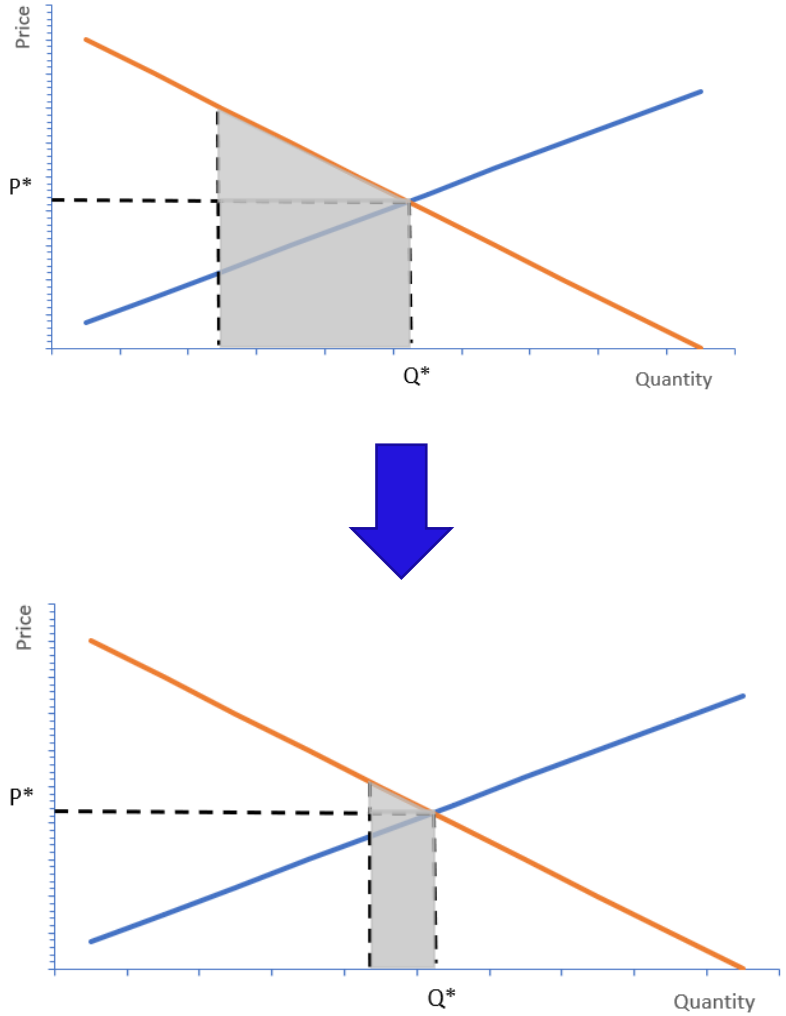
Expected Forgone Water Use Costs

- constant elasticity of demand (CPED)

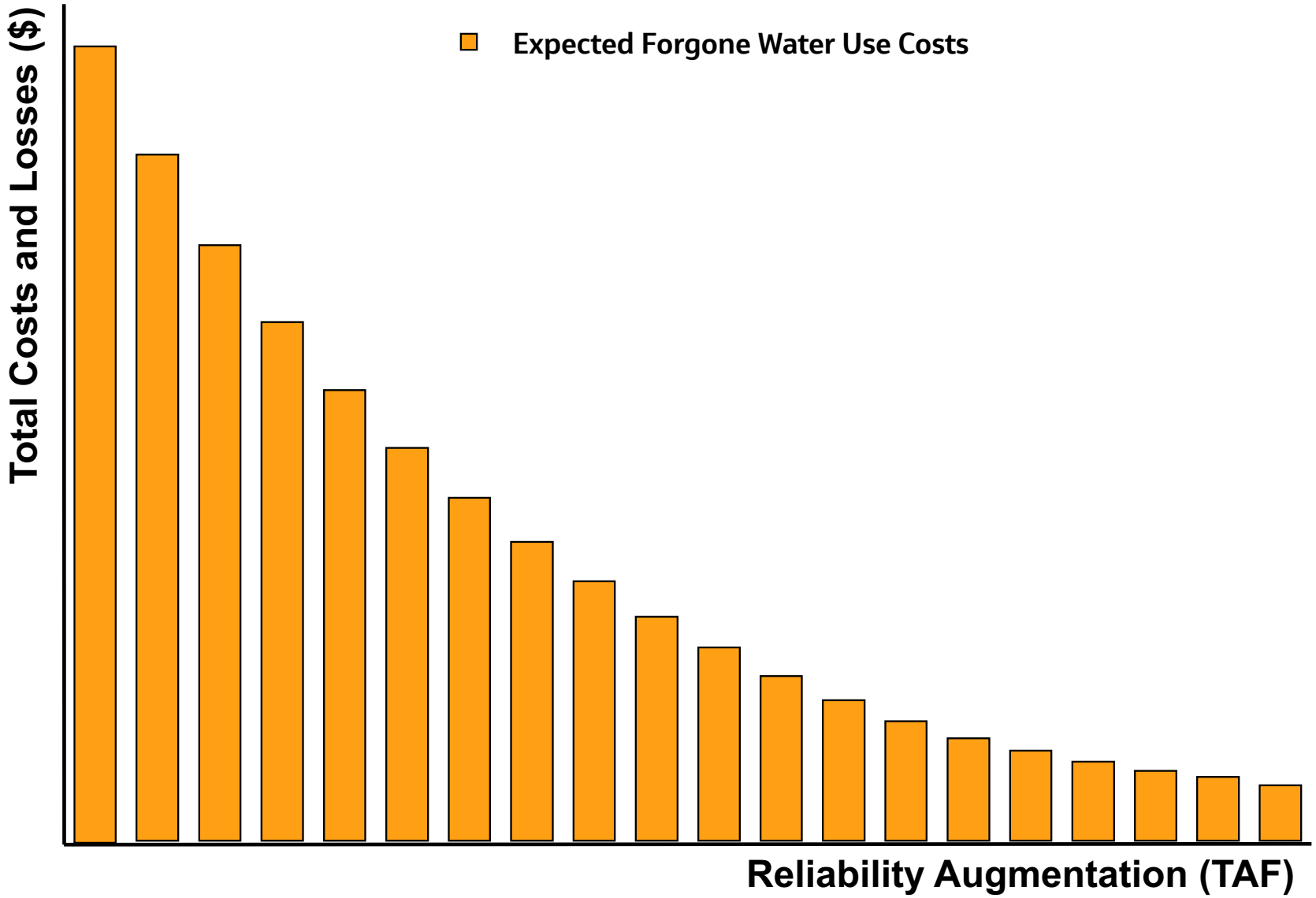


Expected Forgone Water Use Costs

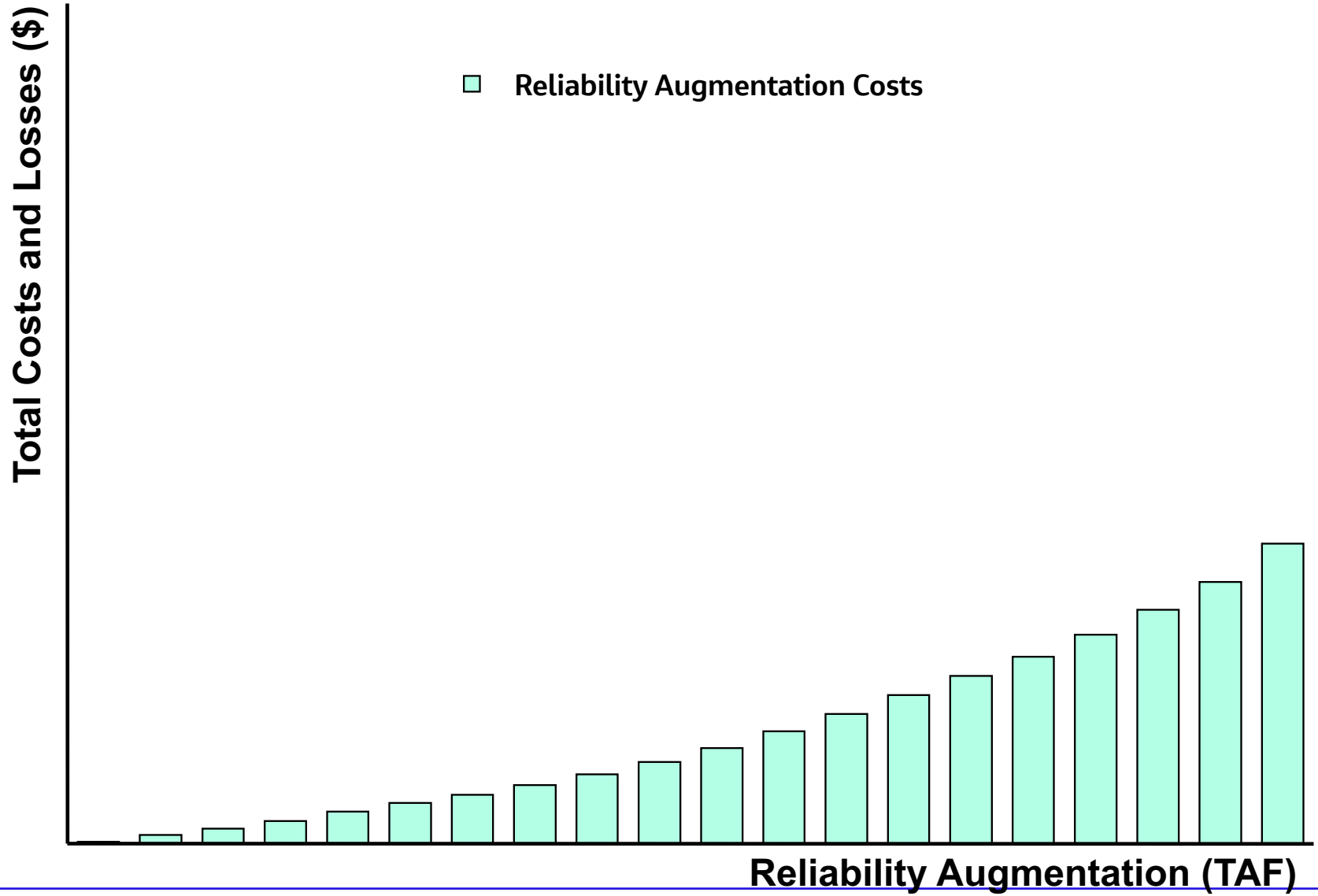
Reliability Augmentation (acre-feet)	Foregone Use (shortage %)	Sum of Losses	Value of Foregone Use $/acre-foot
10,000	8%	$33,557,232	$839
20,000	6%	$23,523,687	$784
30,000	4%	$14,696,346	$735
40,000	2%	$6,903,086	$690
50,000	0%	$0	$0



Additional complexity: market segments, shortage distribution, conservation adjustment, etc.


Expected Forgone Water Use Costs
Total Costs and Losses ($)
Reliability Augmentation (TAF)

CaUWMET Objective: Reliability Augmentation Costs

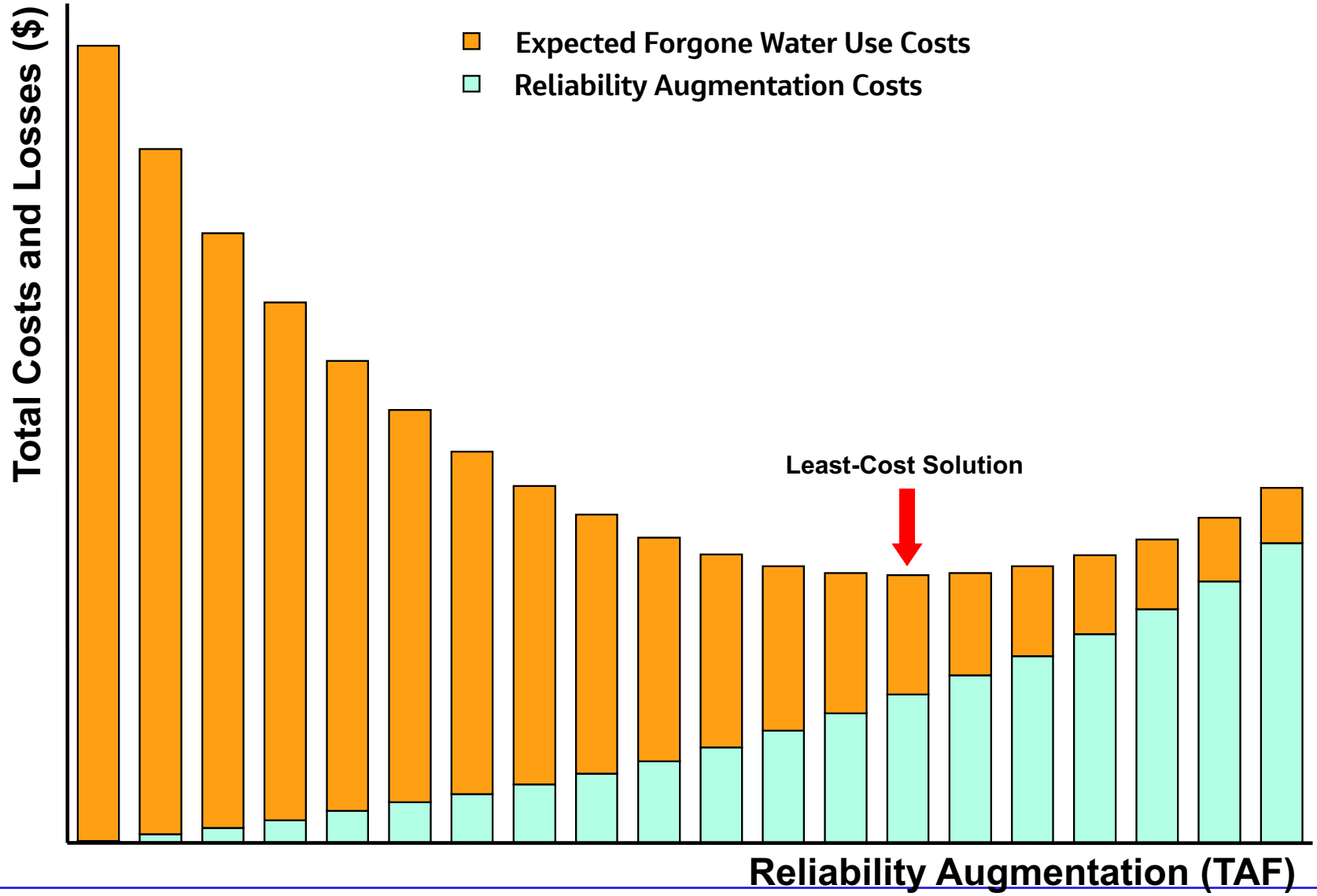


Reliability Augmentation Cost

- Water Transfers—WSIP unit values by region, water year type
- Recycled Water—USBR WaterSMART Grants
- Desalination—Operational desal plant reported costs
- Groundwater—Modeled based on depth to groundwater and energy cost
- Conservation—Based on reported agency conservation costs

Escalations--Costs are escalated over time based on CA energy price forecasts

CaUWMET Objective



CaUWMET Applications

- Evaluate potential new local supply and/or demand management options
- Evaluate economic impacts of changes in SWP and CVP supply reliability

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Reinventing tomorrow.

LCPSIM Input Data
LCPSIM Residential User Polynomial Loss Function
Example Willingness-to-Pay (WTP) Values

Forgone Use (% of use)	Value Forgone[1] ($)	Average Value[2] ($/AF)	Marginal Value[3] ($/AF)
0.0%	$0	$1,064	$1,064
5.0%	$80	$1,600	$2,124
10.0%	$211	$2,111	$3,108
15.0%	$390	$2,597	$4,014
20.0%	$611	$3,056	$4,838
25.0%	$872	$3,488	$5,579
30.0%	$1,168	$3,892	$6,235
35.0%	$1,494	$4,268	$6,802

[1]Value of forgone use based on one acre-foot of use (e.g., area under the curve between 0% and 5%). If annual use for a residence is 0.5 AF, then WTP is $40 to avoid forgoing 5% of use for one year (0.5 AF * 5% = 0.025 AF of forgone use), for example.

[2]Value forgone divided by acre-feet forgone (e.g., $80 ÷ 0.05 acre-feet = $1, 600 per acre-foot).

[3]Value per acre-foot of last increment (e.g., last mL) of use foregone.