Engineering Methods for Decision-Making

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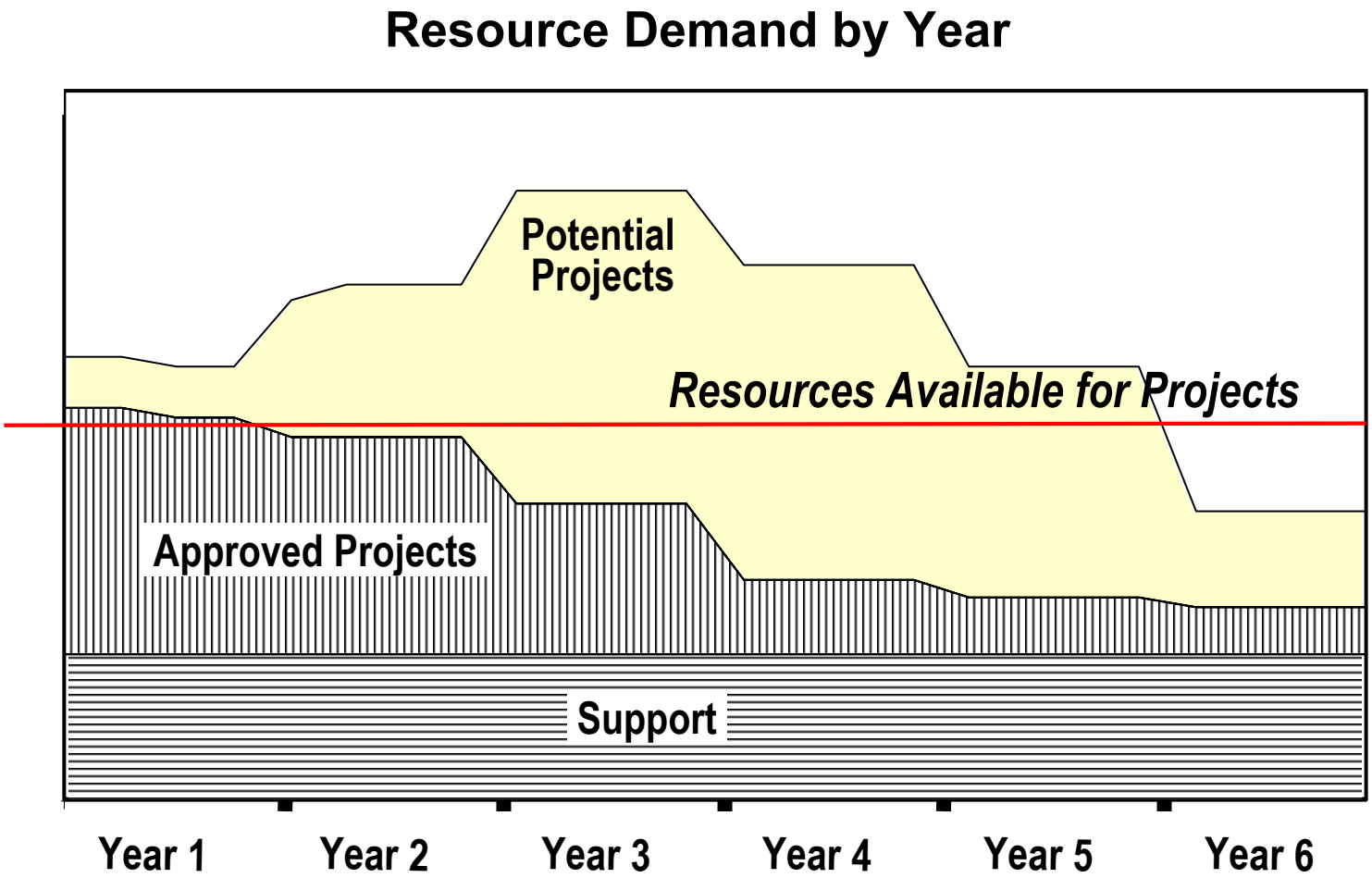
The Dilemma



Source: V. Chacon SDM Thesis MIT and NASA Dryden

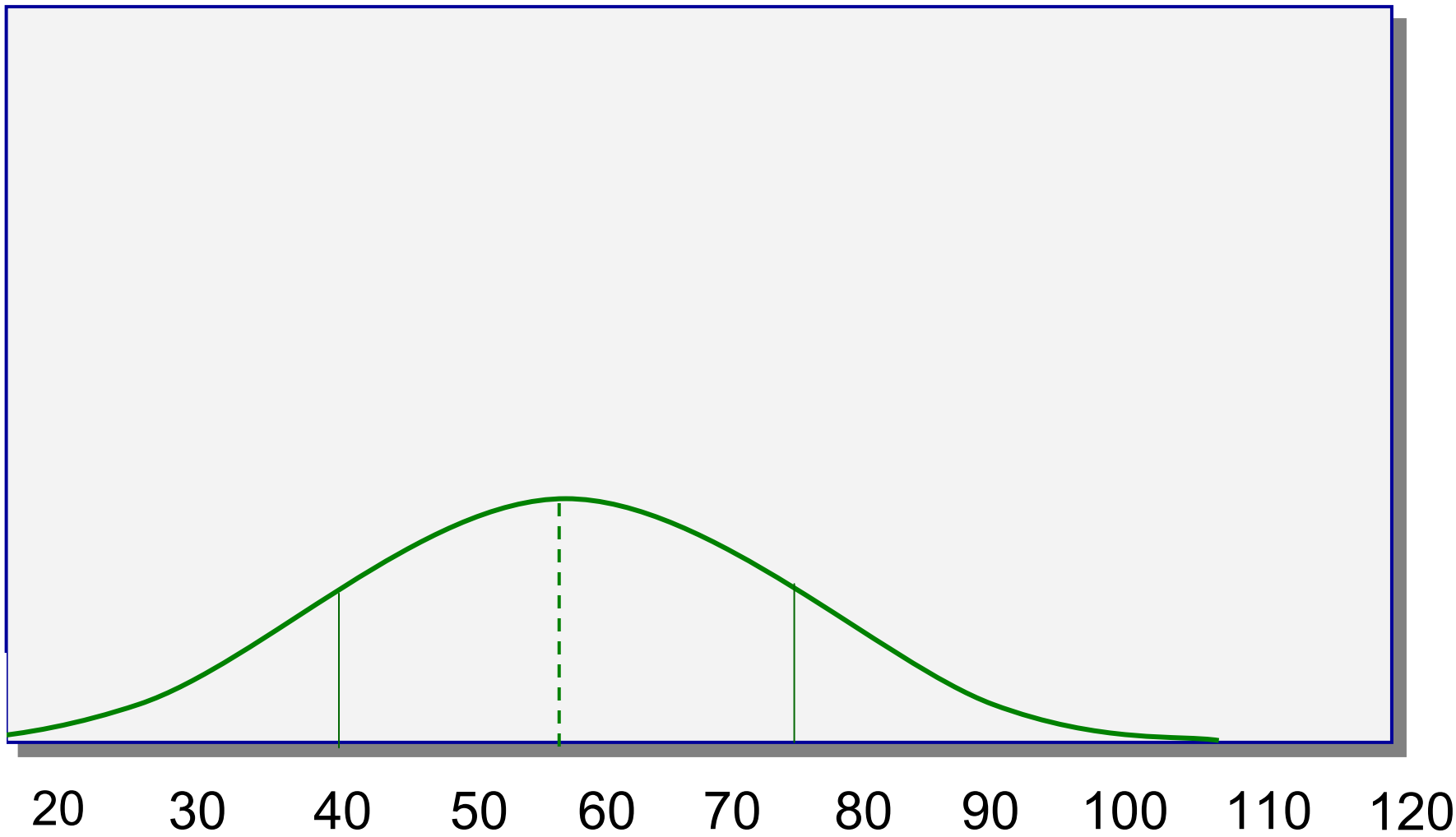
Objective Function

Objective: 3 to 5 year demand created by each project.

Measured by averaging the length of a project, the amount of staff used, and the stability of the demand created by the project; desired project length is 4 years, desired staff quantity is 50 people assigned.

Length	(Length of the project / 4 years) * 100
Staff	(# of the staff on the project / 50 staff) * 100
Stability	A measure of the changes or challenges experienced by a project (100 equates to no changes; 0 equates to major changes)
Demand	(Length + Staff + Stability) / 3

Historical Performance



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Controllable Factors

elements

Budget	[Planned/actual]*100
Budget stability	100=no changes → 0=major changes
Core capabilities	[core capabilities used/17]*100 17 total core capabilities available
Core capability need	Role of core capabilities in the project 100=leading, 65=assisting, 30=consulting
Customer dependency	Customer dependency on core capability 100=total dependency → 0=no dependency
In-house/contract mix	100=desired mix → 0=all in-house or all contract
Safety risk	Required risk mitigation level 100=high, 65=average, 30=low
Staff skill	Skill level of assigned staff 100=expert, 65=average, 30=trainee
Staff	[Planned/actual]*100
Staff stability	100=no changes → 0=major changes
Technical gain	Technical knowledge gained from project 100=high, 65=average, 30=low
Technical risk	Required risk mitigation level 100=high, 65=average, 30=low

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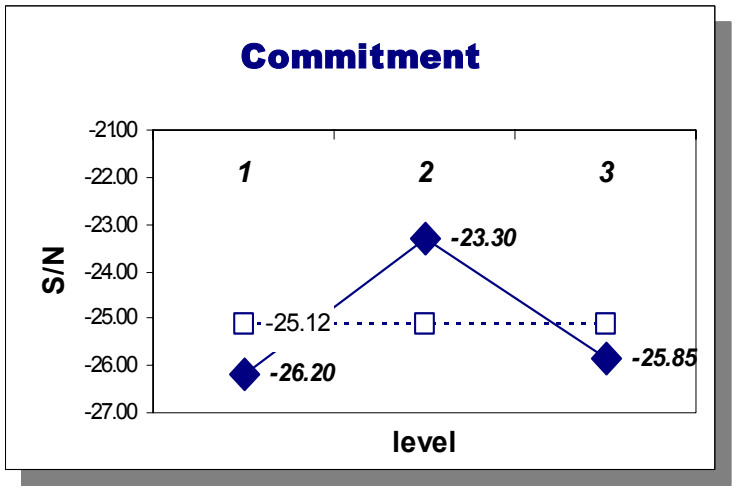
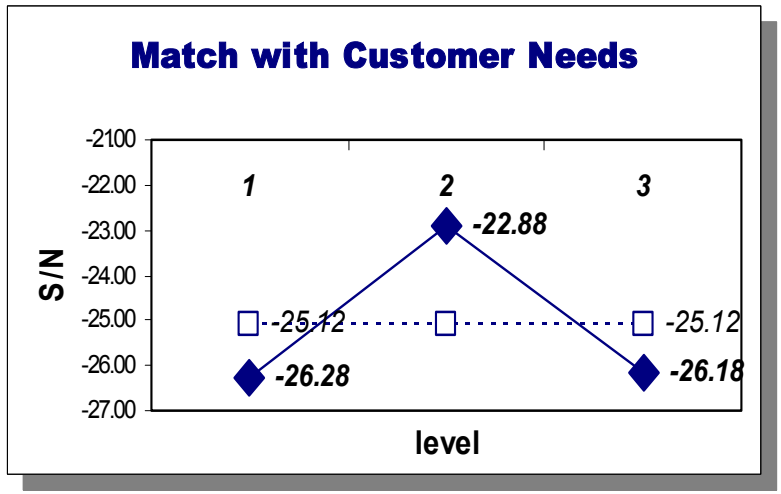
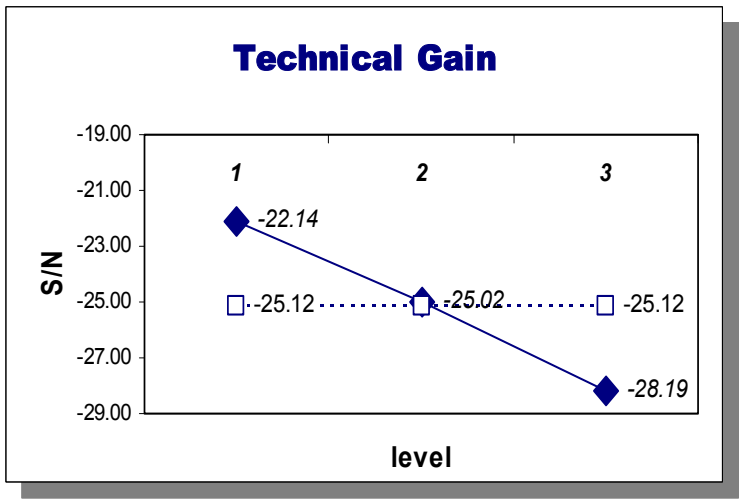
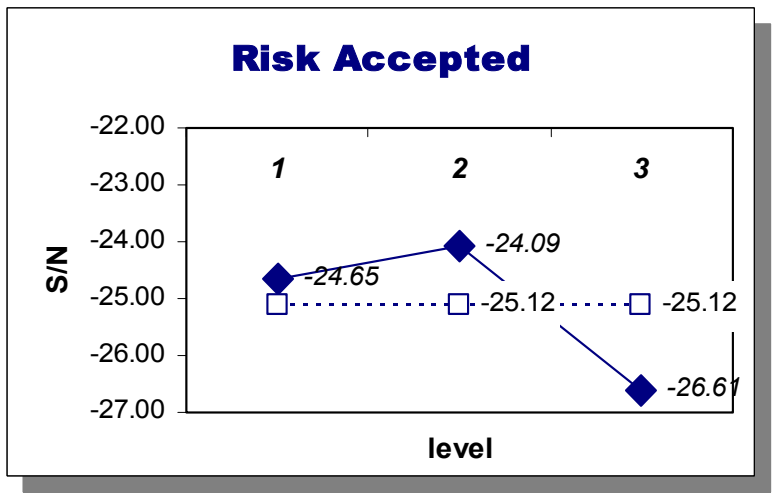
Factor Effect on S/N

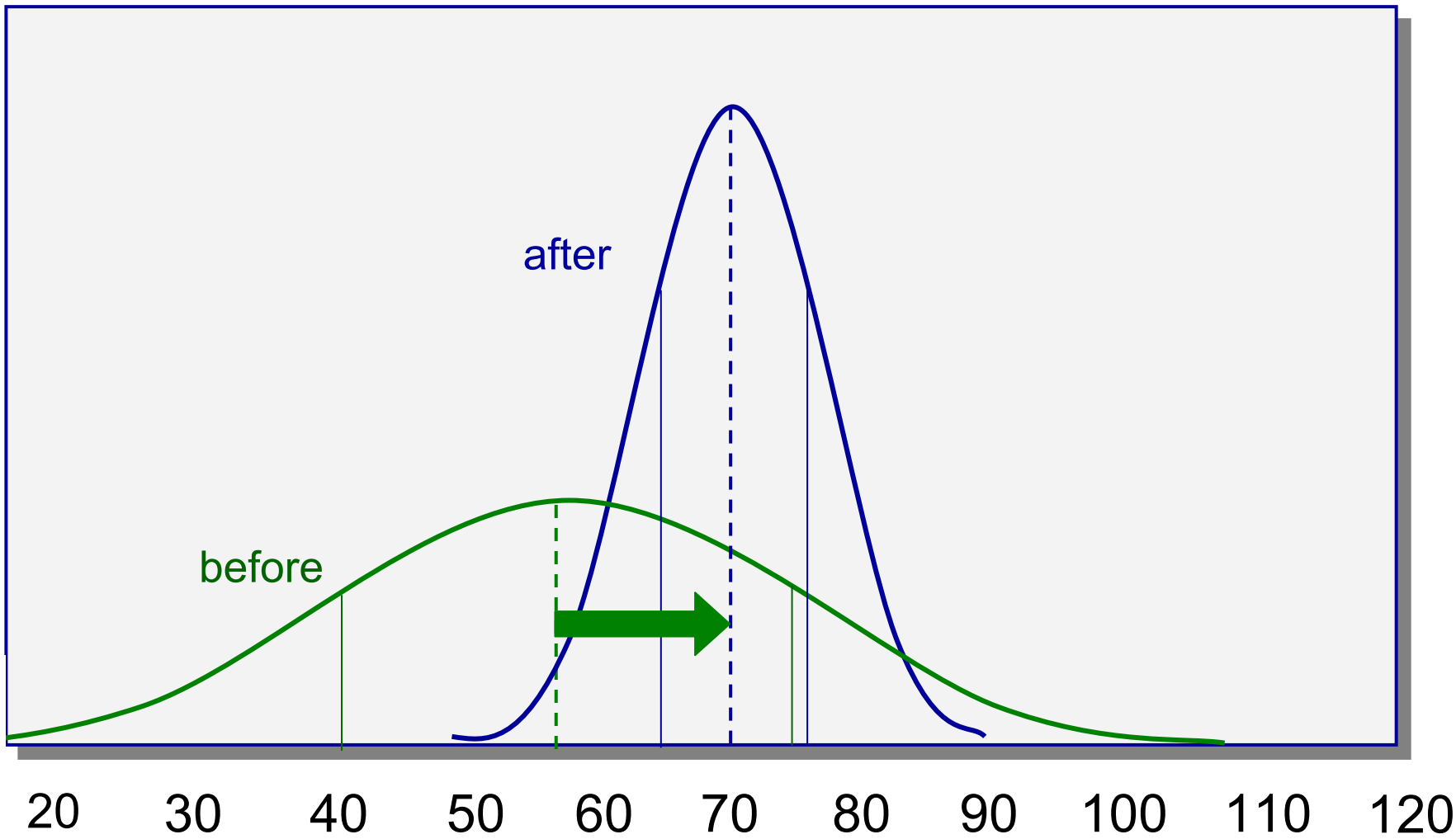








Predicted Improvements



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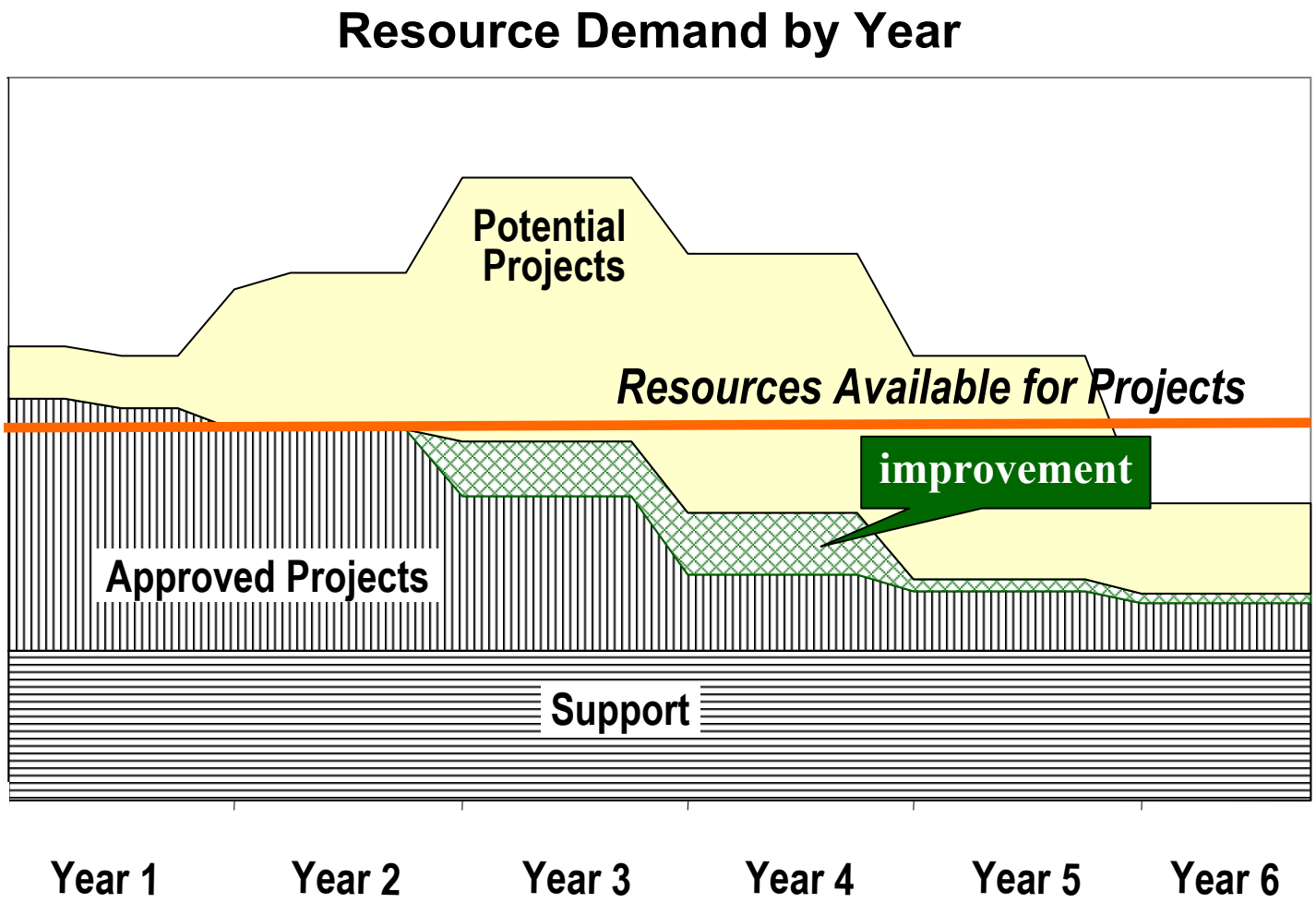
Improvement



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Benefits

- Reduce volatility of decision outcomes as a way for managing risk.
- A fresh approach to decision-making and the analysis and optimization of decision performance.
- A method that makes decisions' outcomes more immune to uncontrollable factors.
- Repeatable processes based on proven analytic engineering methods.