Allocating Ramping Costs

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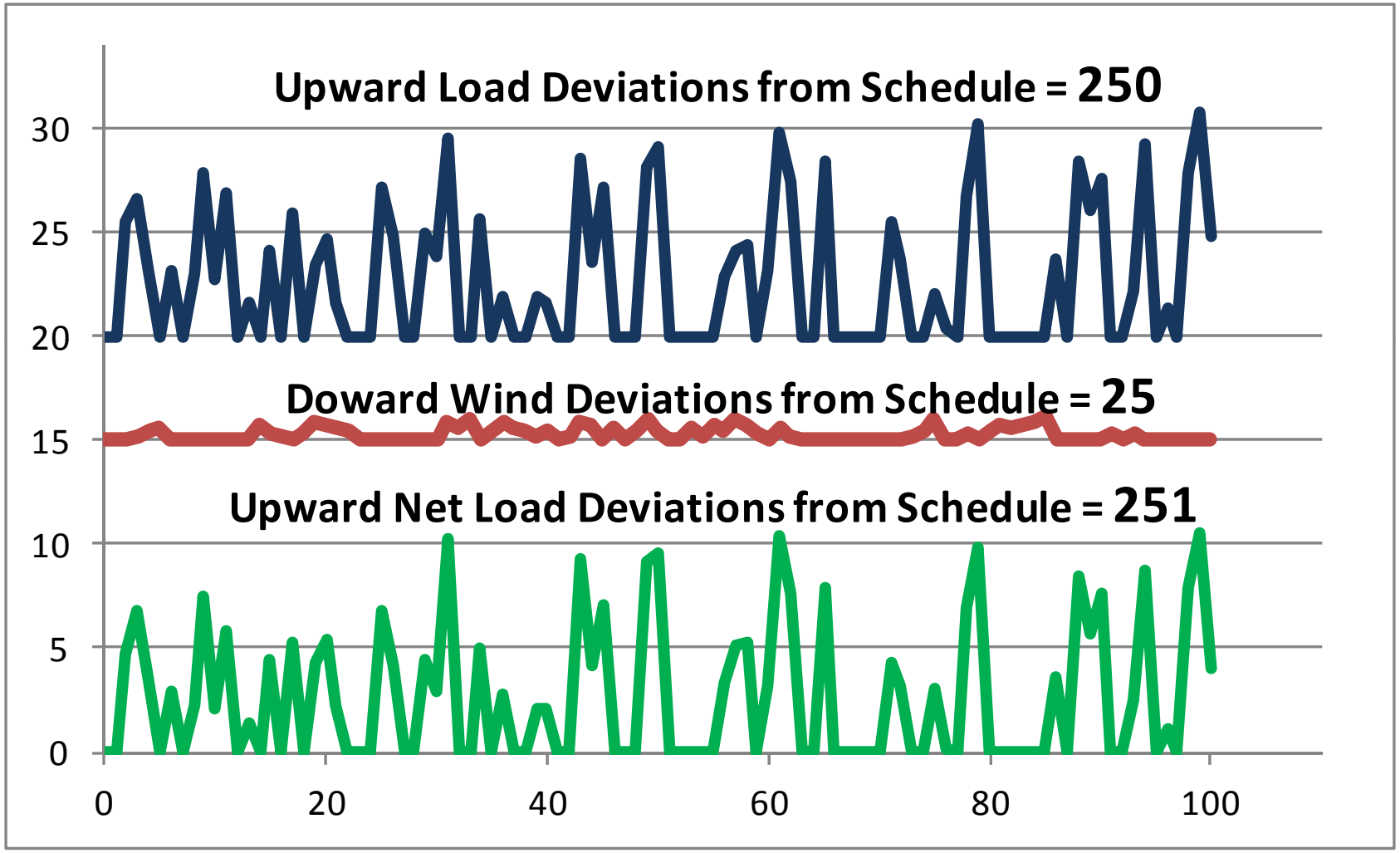
- Cost would be allocated to all market participants based on their deviations from their scheduled or instructed energy

Deviations:

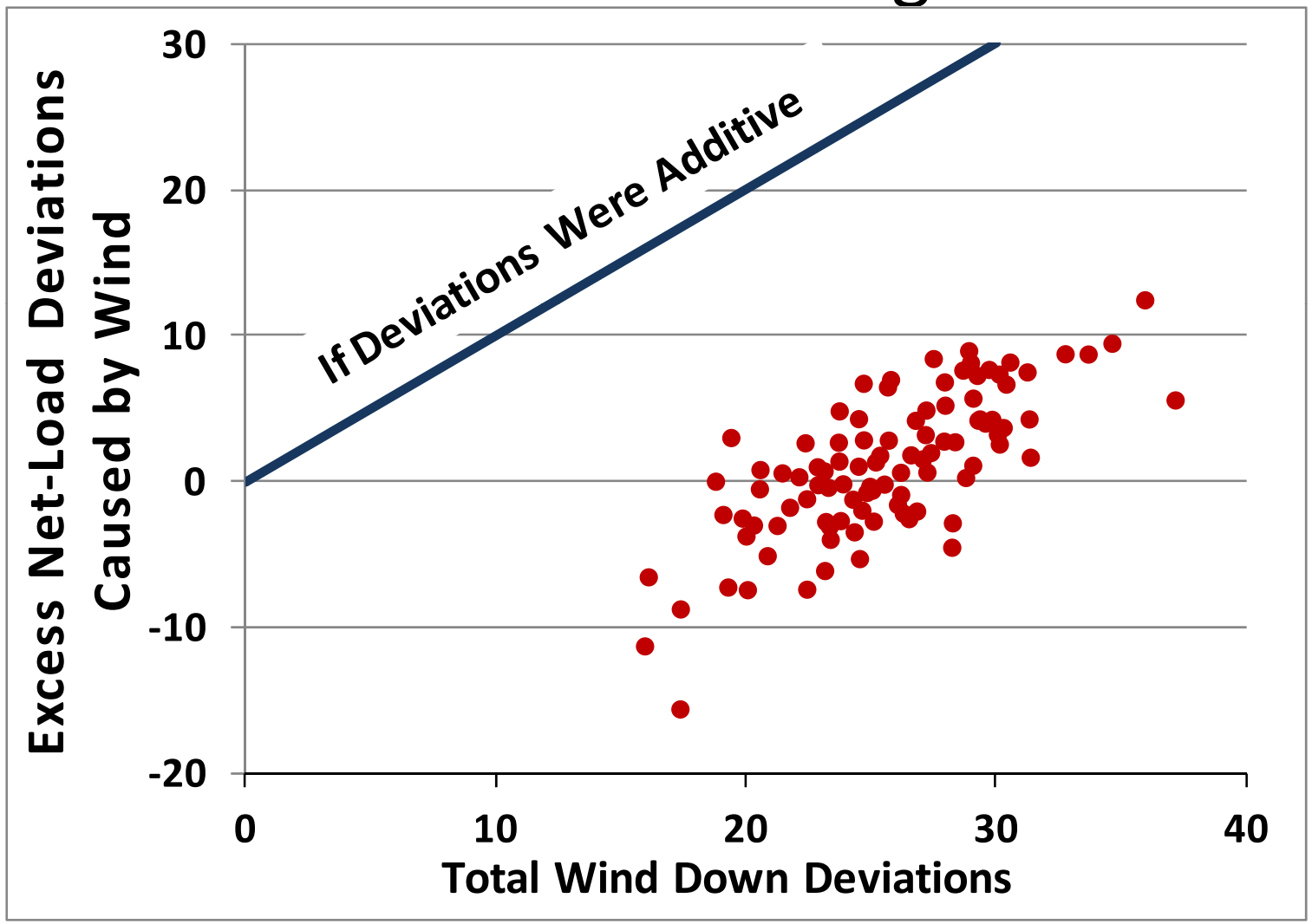
$$\Delta \text{ Supply} = \text{Supply}_{\text{Actual}} - \text{Latest}_{\text{Schedule}}$$

$$\Delta \text{ Load} = \text{Load}_{\text{Actual}} - \text{Load DA}_{\text{Schedule}}$$

Deviations Are Not Additive



The Impact of Wind Is Large, But Not on Average



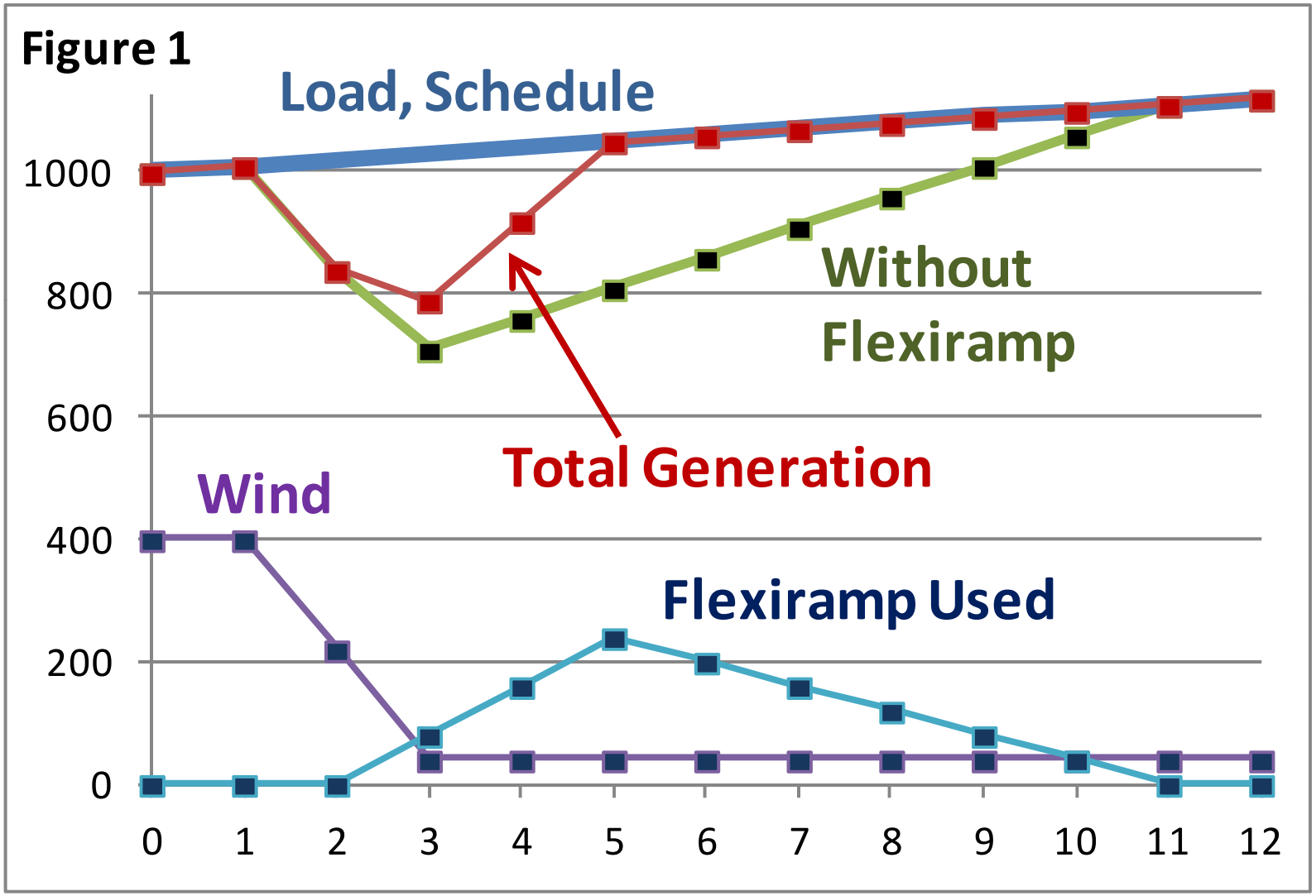
Finding a Good Statistic Is Hard

- One Alternative:

  Use real-time contributions to ramp

- These are additive.
- If you reduce the need for ramp you get paid
- If you increase it, you must pay.
- (Gen Pays – Gen is Paid) = Cost of Flexiramp

A Flexiramp Incident



Other Up-Ramp
Is Paid the Same as Flexiramp

Time Step	Included In Incident?	Wind Down-Ramp	Other Up-Ramp	Flexi Up-Ramp
1 – 2	Yes	180	0	0
2 – 3	Yes	180	40	80
3 – 4	Yes	0	40	80
4 – 5	Yes	0	40	80
Total		360	120	240

360 = 120 + 240

Wind pays for all up-ramp