



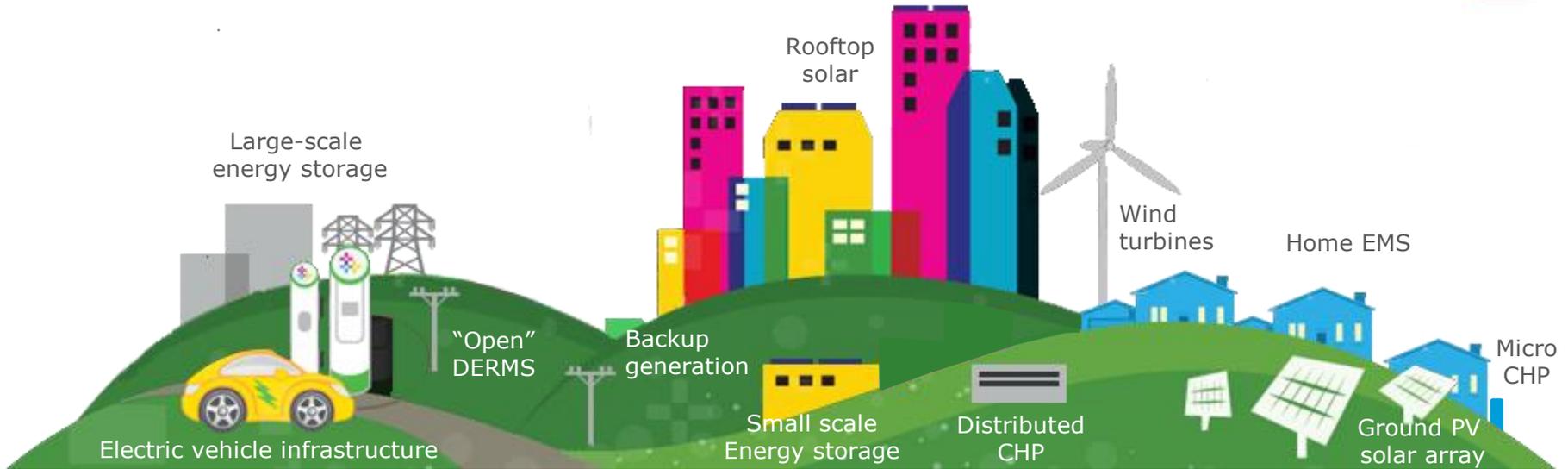
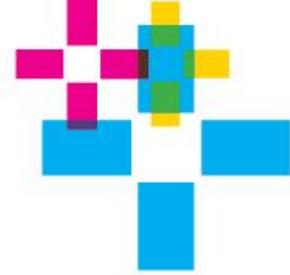
The Distributed Energy Future

Implications for
business and regulatory models
in the power sector

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A vision of the future...



Key Features

- New business model
- Competitively neutral distribution system operation (DSO)
- Platform for efficient, customer-facing DER deployment and utilization
- Grid imports and exports optimized

Benefits

- Customer at the center of the solution
- Clean energy “prosumers” manage demand and add to supply
- Private investment reduces utility revenue requirement and rates
- Development of energy partnerships (customer, 3rd party vendors, DSO)



Why are new models needed?



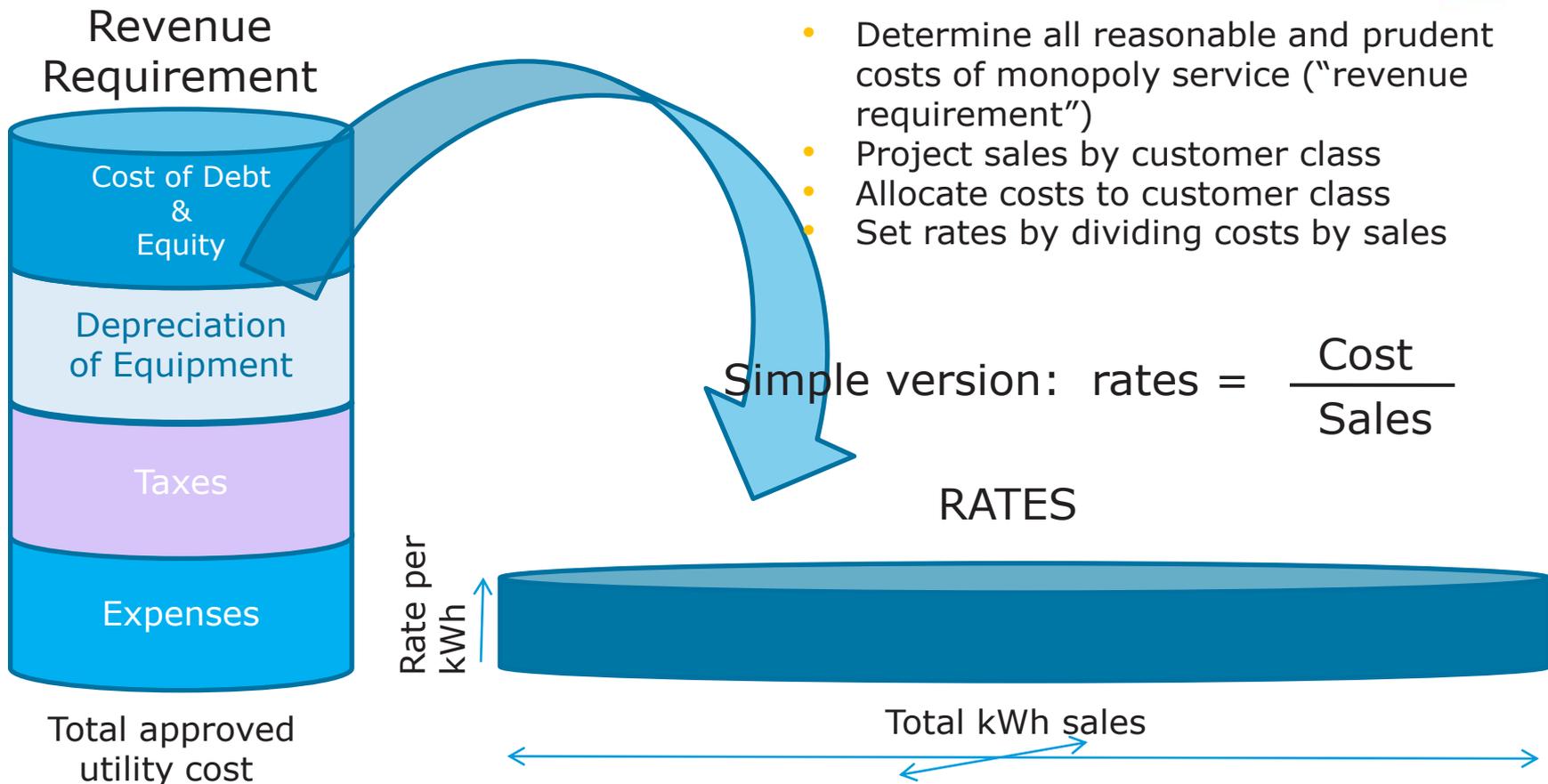
- Innovation and competition are driving down the cost of distributed energy resources (DERs).
- DERs are widely available and are especially in demand because of increasing power supply interruptions.
- At the same time, utility costs for T&D assets are rising persistently, driving distribution utility rates up over time
- Higher utility rates and lower DER costs are on a collision course – cheap DERs give customers increasing ways to avoid high utility rates by using less power
- This creates profound challenges to the current regulated utility business models



The best solution is to use competitive business models for DER and reserve cost-based utility regulation for core monopoly services.



Traditional utility ratemaking -- costs and rates



Ratecases

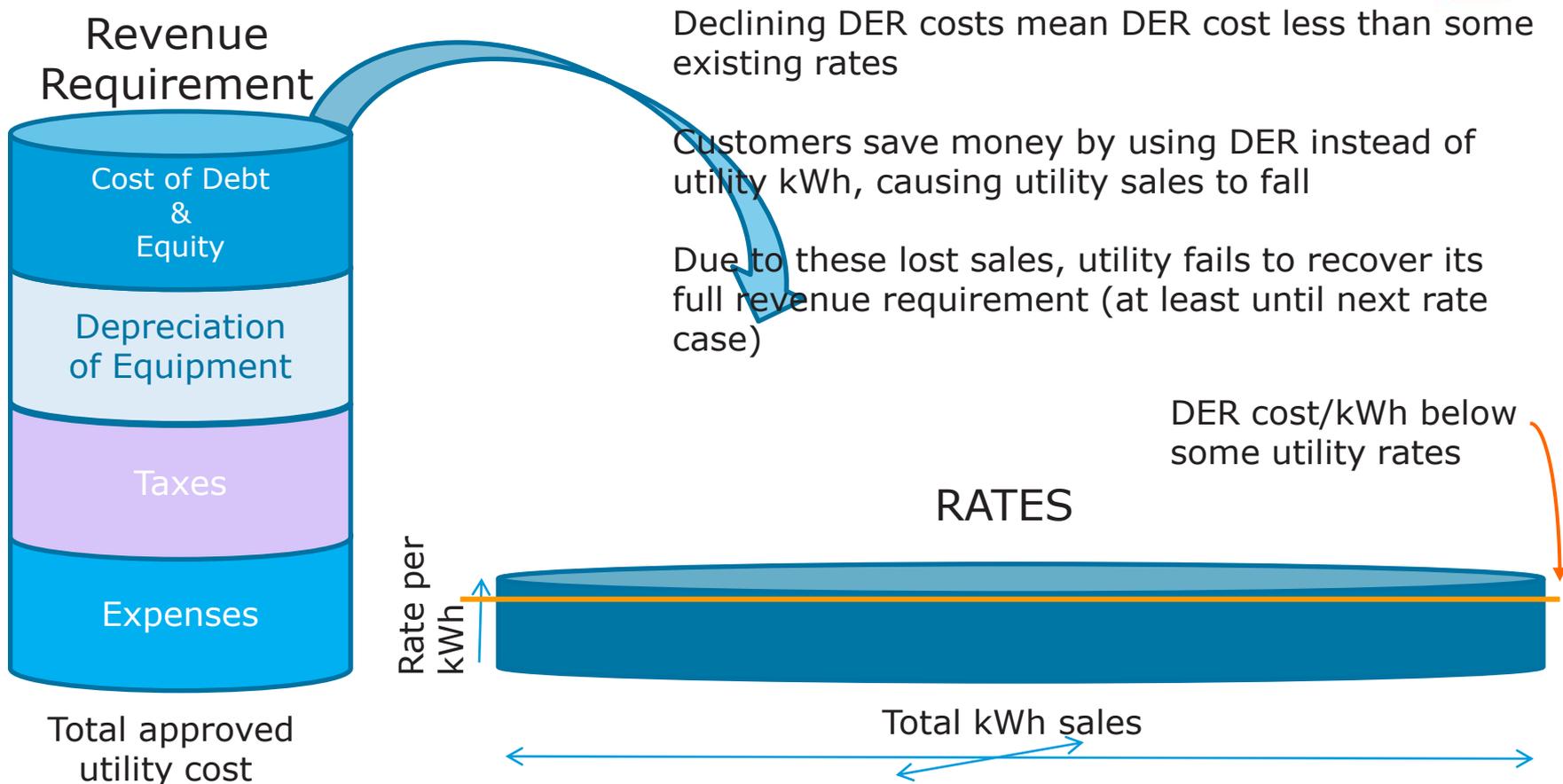
- Determine all reasonable and prudent costs of monopoly service ("revenue requirement")
- Project sales by customer class
- Allocate costs to customer class
- Set rates by dividing costs by sales



Higher costs or lower sales increase rates

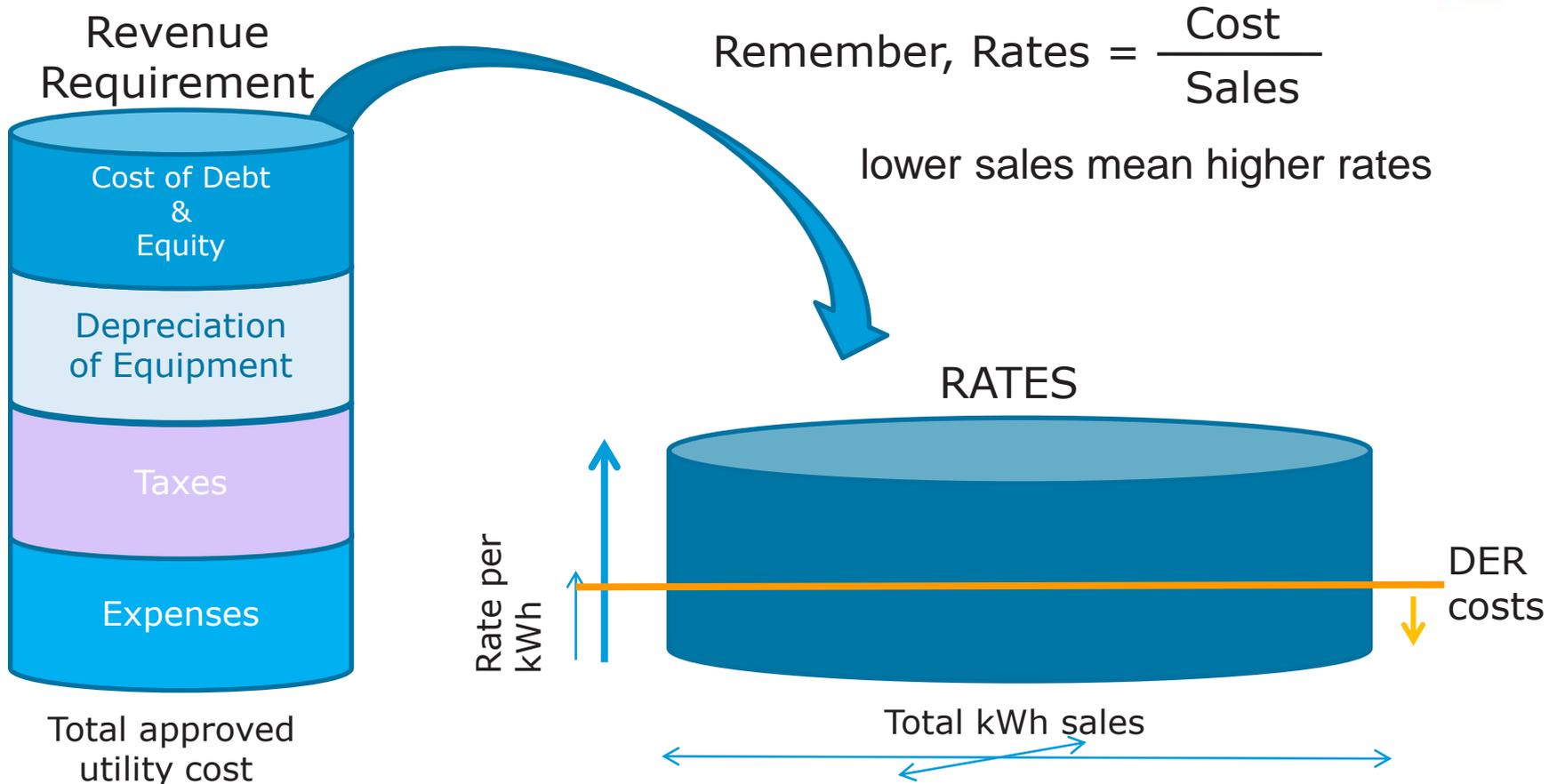
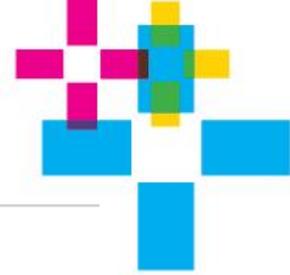


DER is becoming cheaper than traditional rates



This can trigger an unsustainable cycle

The impact – a feedback loop of ever higher rates and increasing loss of sales to DER



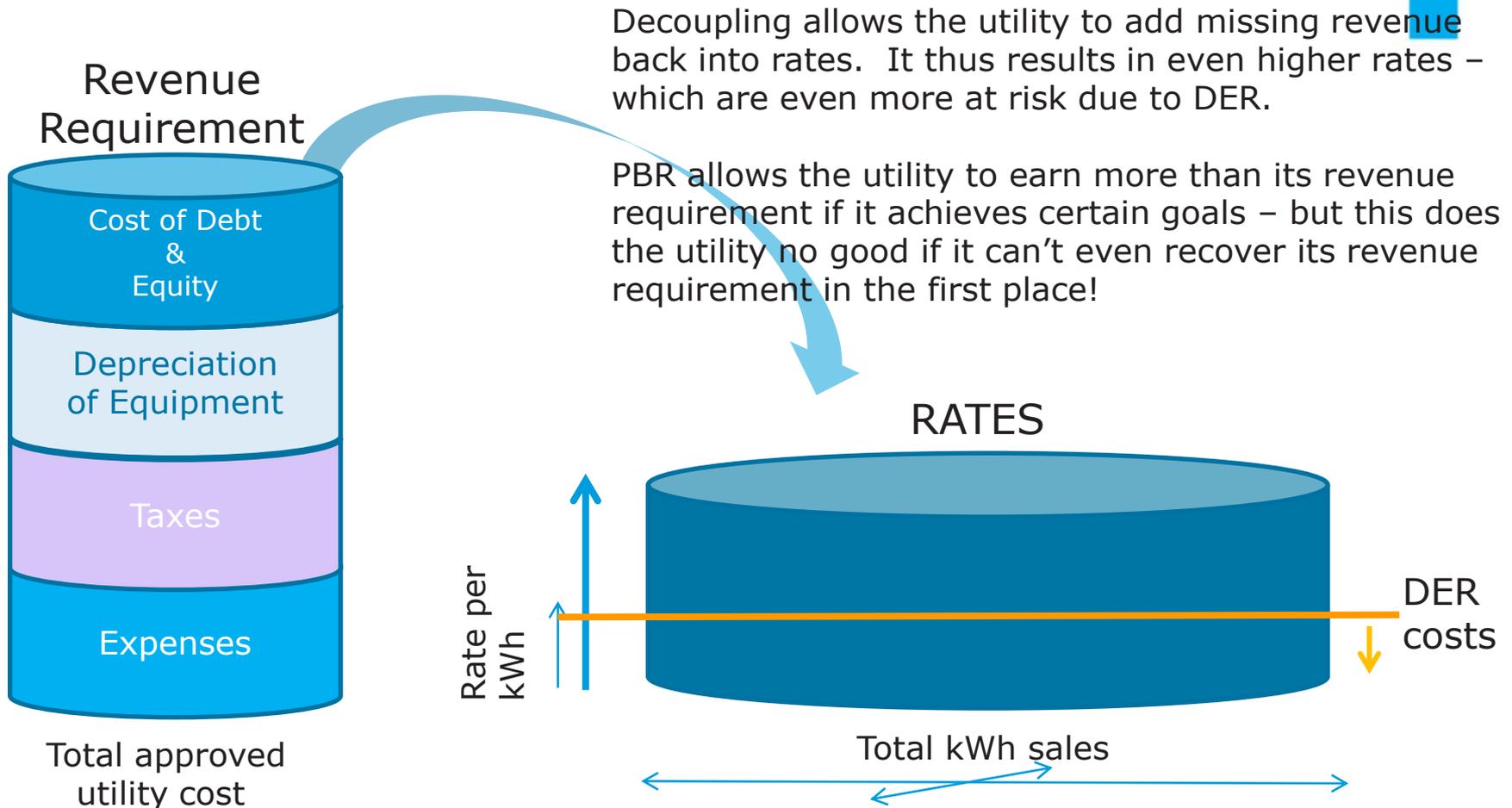
These higher rates make DER even more attractive, induce more DER entry and economies of scale, leading to even higher rates, and the cycle repeats.



This is "the death spiral."

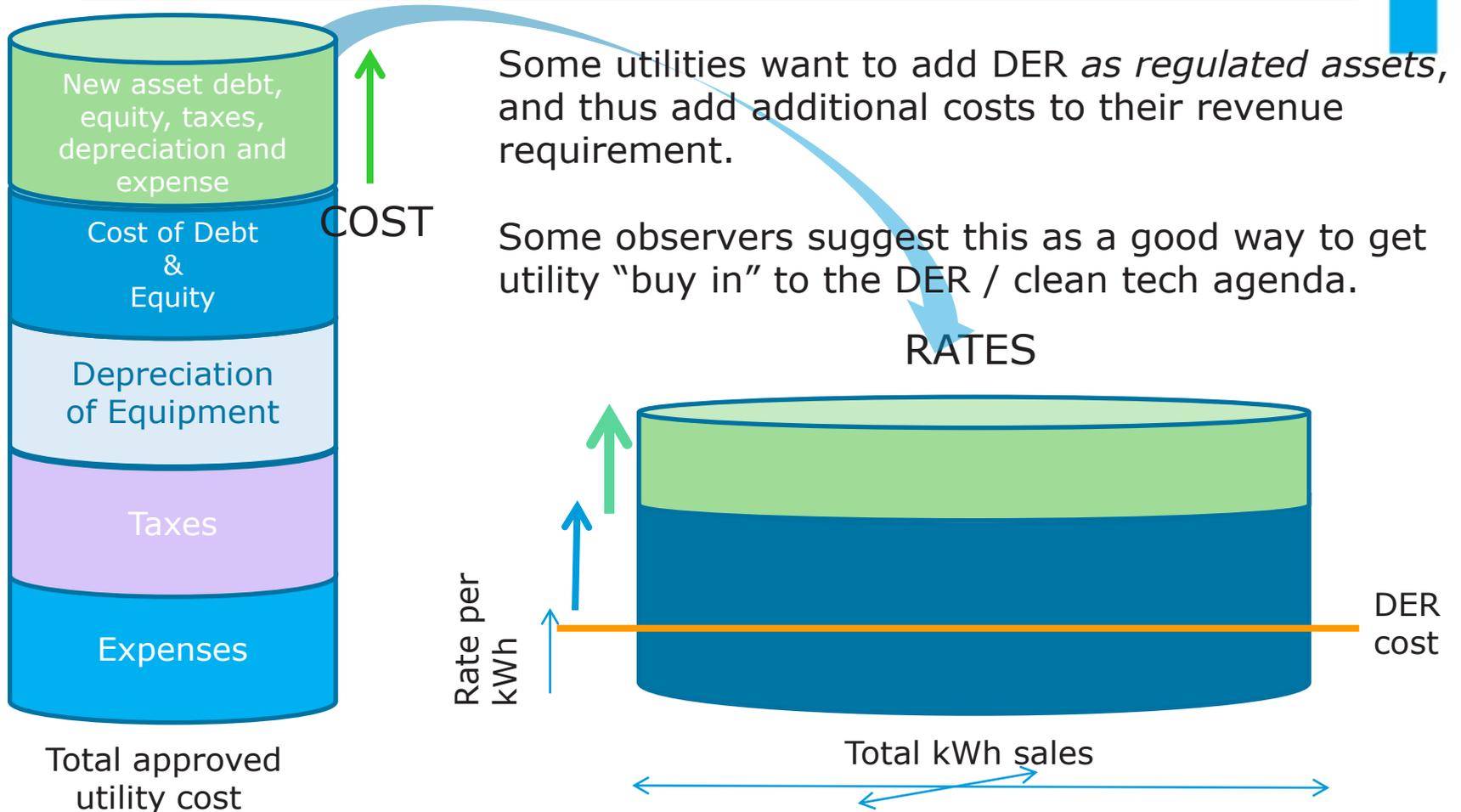
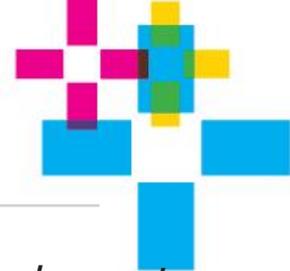


What about “decoupling” and “performance-based rates”?



Neither PBR nor decoupling change the basic math or avoid the “death spiral”

What about allowing (or requiring) the utility to grow by adding regulated DER to its ratebase?



Some utilities want to add DER *as regulated assets*, and thus add additional costs to their revenue requirement.

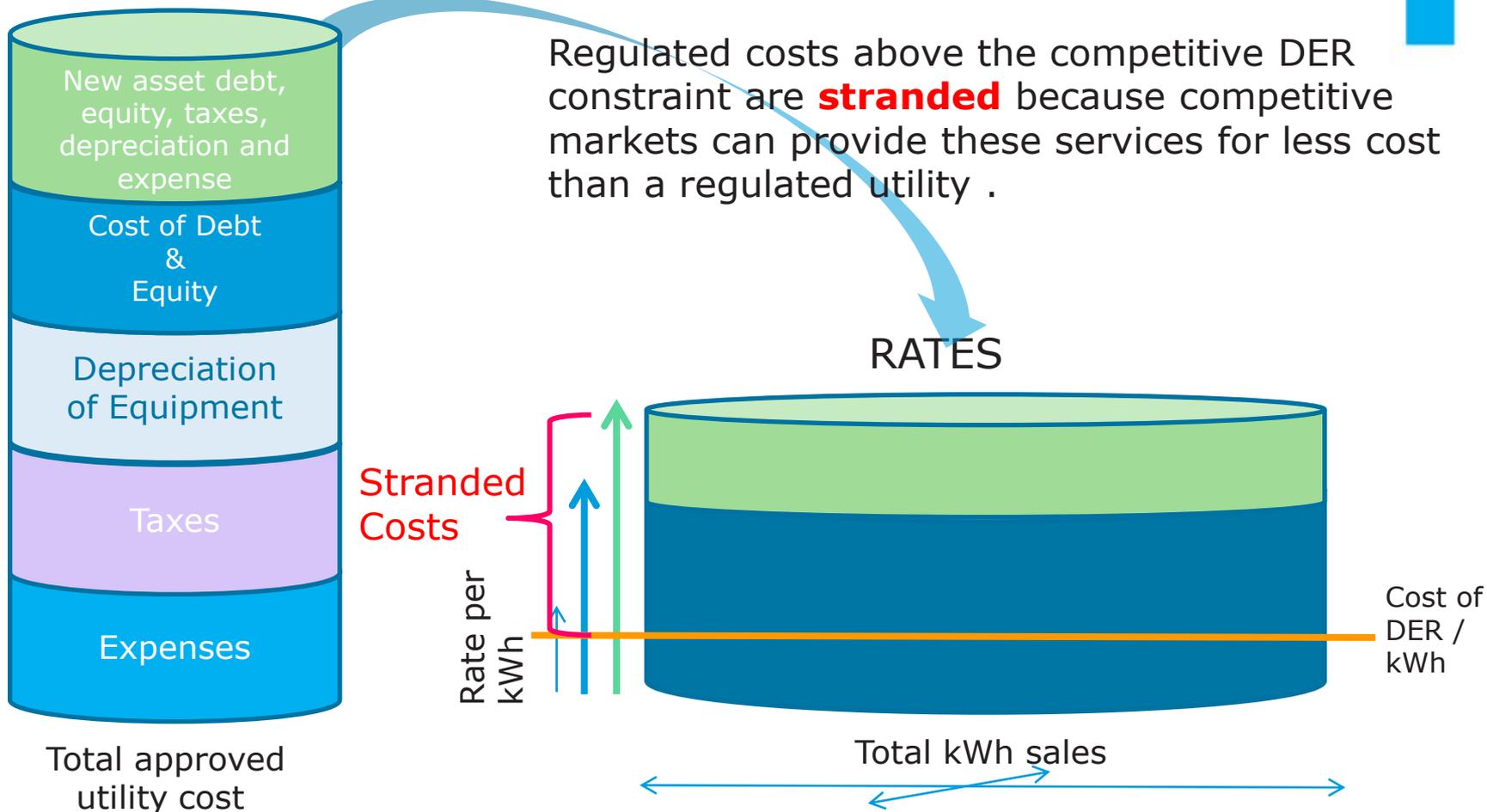
Some observers suggest this as a good way to get utility "buy in" to the DER / clean tech agenda.

Rate arithmetic suggests this is a poor strategy.

Higher costs & reduced sales can only accelerate the death spiral.

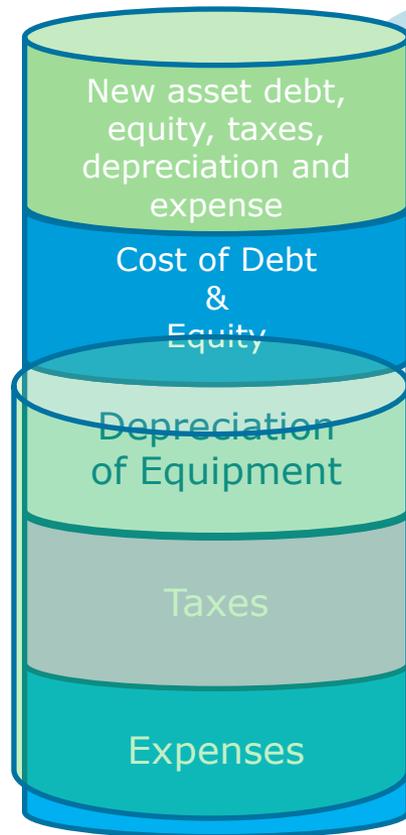


Regulated rates above the cost of competitive alternatives mean stranded costs and wealth destruction



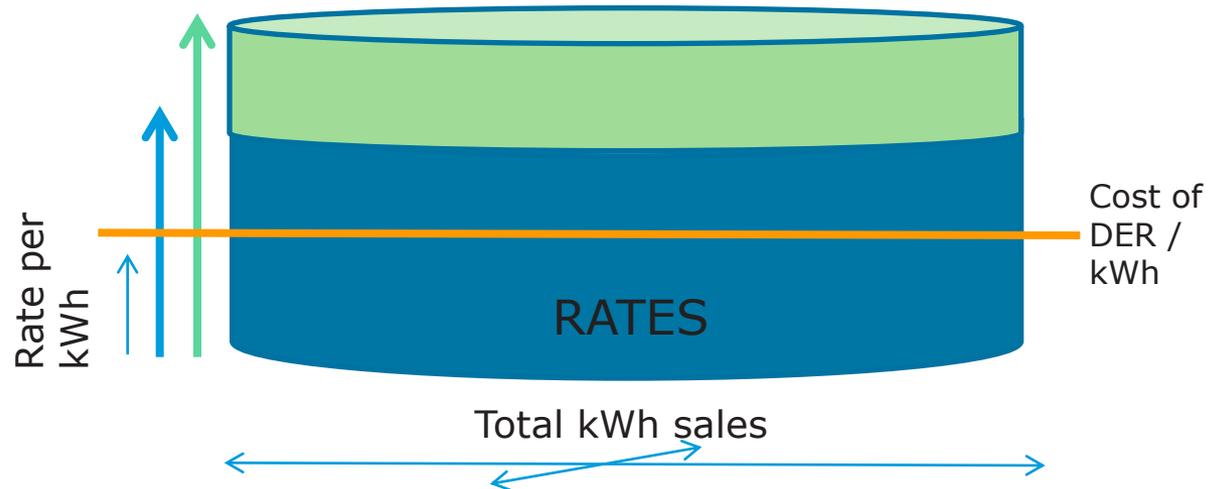
The best strategy is to avoid and minimize regulated stranded costs. The alternative is, in effect, a public bail-out of a monopoly that can't recover its cost in its rates.

If regulated DER growth, PBR, and decoupling don't work, what does?



Total approved utility cost

1. Don't add DER to ratebase
2. Shrink existing ratebase so rates cost less than DER
 - Substitute competitive resources and capital (microgrids, DG, controllable loads) for utility ratebase assets
 - Focus on op-ex that reduces cost and revenue requirement
3. Regulatory reform to create a competitively neutral DSO
4. Use PBR & decoupling, not to grow, but to sustain core



A “right-sized” regulated core that ensures universal service and a healthy return for investors, plus a competitive DER platform that delivers innovation, efficient deployment and customer value.

Forward-looking Policies & Business Models



Distributed Energy Resources (DERs) offer new benefits for customers and society

- Low/no carbon solutions that enhance resilience and reliability
- Increasingly competitive (cost and providers)

Digital technologies + distributed energy = entirely new ecosystems

Policy shift – from making clean technologies affordable to making them accessible

- “Capital projects” with significant initial costs per customer
- May replace an existing durable asset (HVAC, appliances, etc.)

Customer incentives + new business models accelerate adoption

Grid and DERs

- Cost of DERs will continue to fall while cost of grid increases
- But grid infrastructure will be needed for foreseeable future

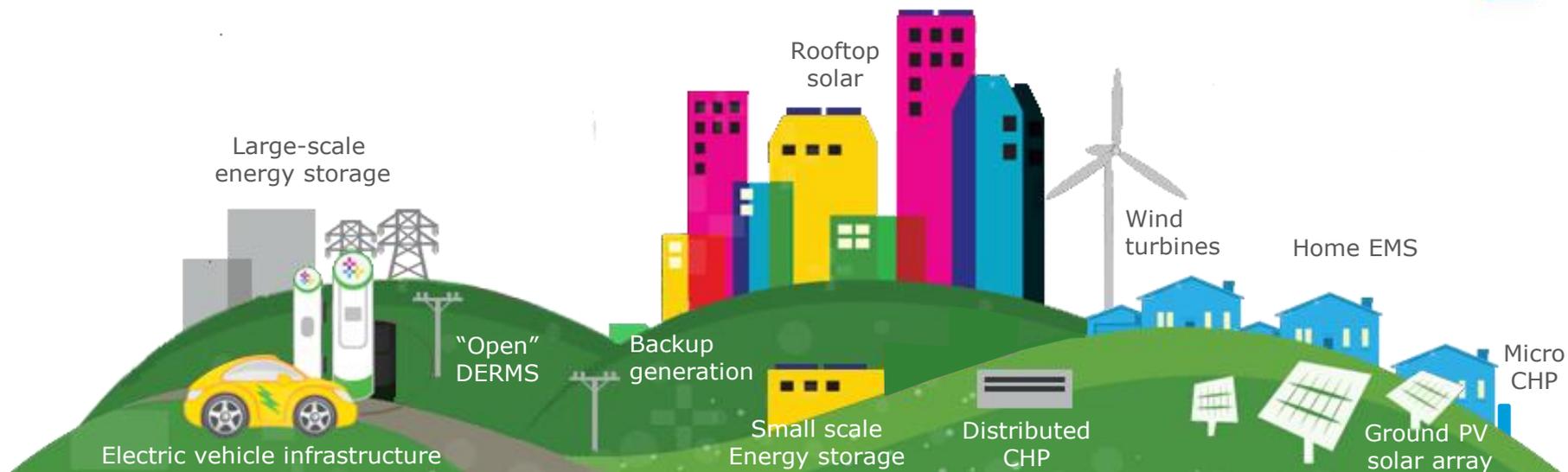
Policy needs to support DERs while assuring appropriate levels of support for infrastructure

Balance of System & “Soft Costs”

- Installation, permitting, customer acquisition and financing are more than half the cost of many systems

DER-friendly utility, regulator, and permitting authority can allow DER companies to slash these costs (German example)

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