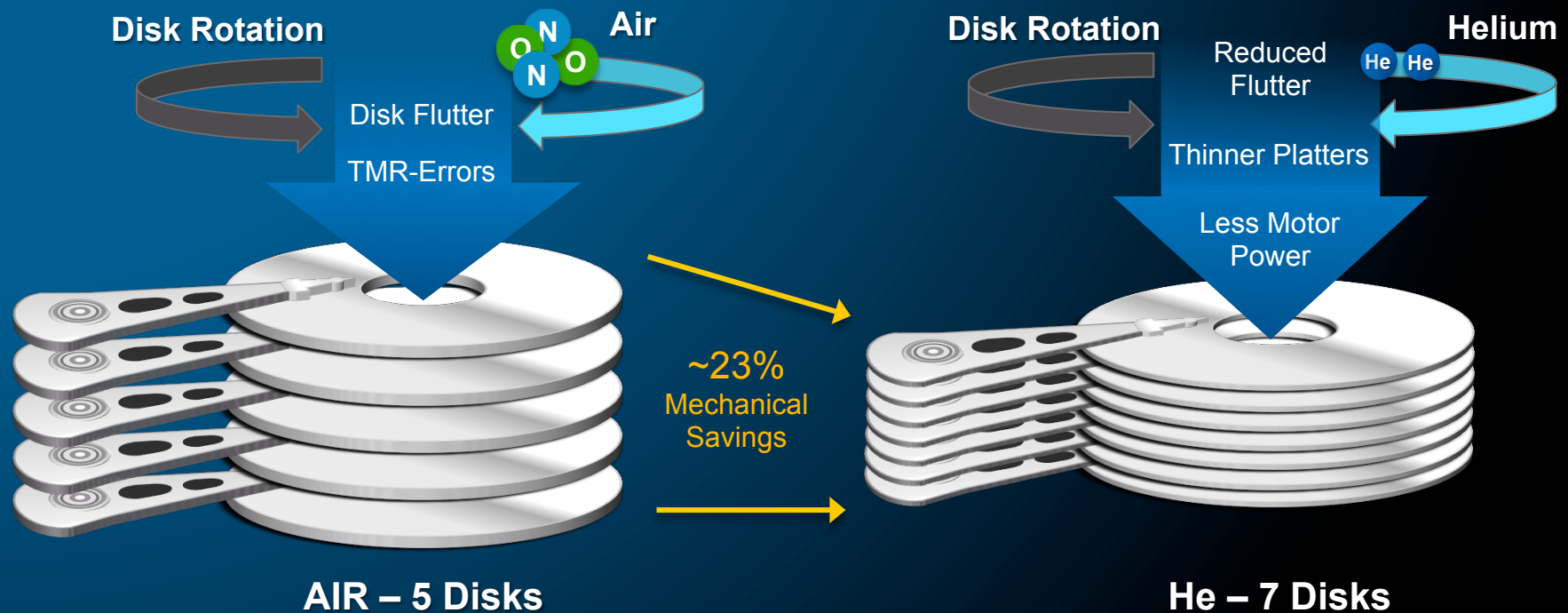


# How it works

- Reduces mechanical power dissipated in air shear
- Allows platters to be placed closer together enabling more capacity



N Nitrogen  
O Oxygen  
He Helium

- 4°C cooler
- 49% reduction in Watts/TB

# Helium is Safe



- Helium is non-toxic
  - Used by deep sea divers as a nitrogen substitute
- Helium and safety
  - “Less helium in each new HDD Platform product than in a birthday balloon”
  - Helium is light and hard to contain— it will immediately rise to the top of the room and escape faster than oxygen or nitrogen



## Ultrastar He<sup>6</sup> Helium Drive

# Benefits & Characteristics

### 50% More Capacity

Reduced “disk Flutter” and better TMR  
=  
More platters,  
Higher TPI

### Lower Power

Less drag = Lower motor power  
~1.6W lower power (idle)

### Similar Performance

Sealed HDD spins at 7200 RPM

### Cooler Operation

~4°C lower drive case temperature  
Lower power = less cooling needed

### More Robust

Hermetically sealed HDD is cleaner across broader environments

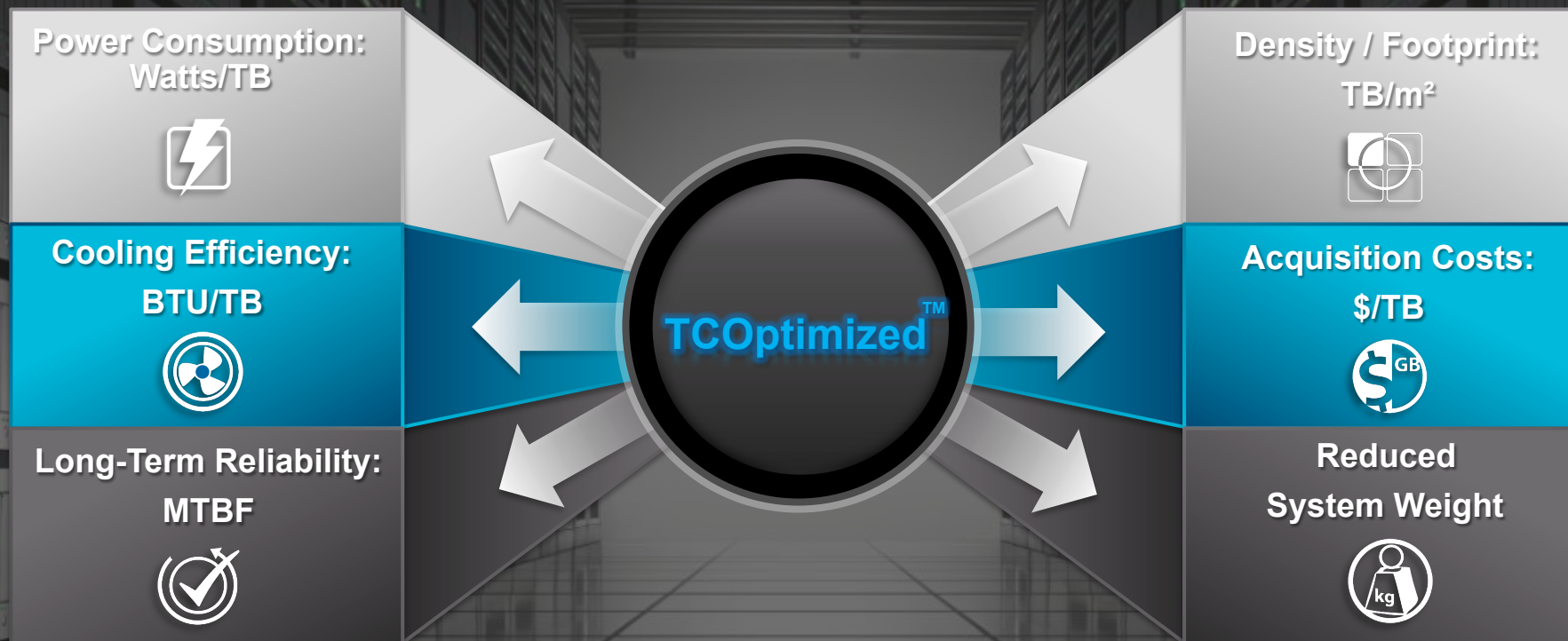
### Quieter

Less air resistance = less noise  
0.9 Bels lower during idle

### Same Form Factor

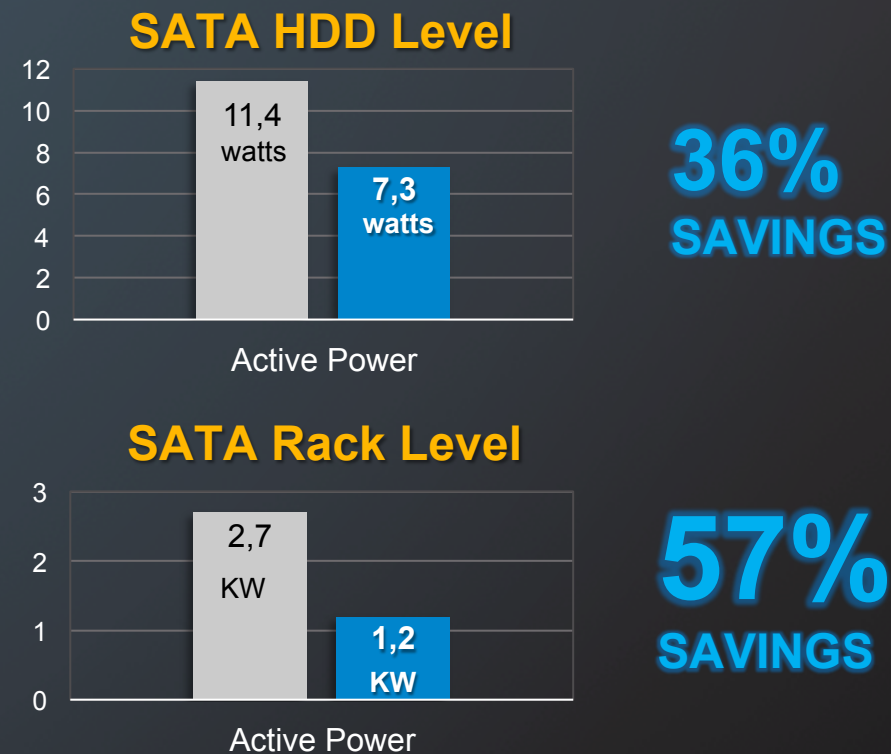
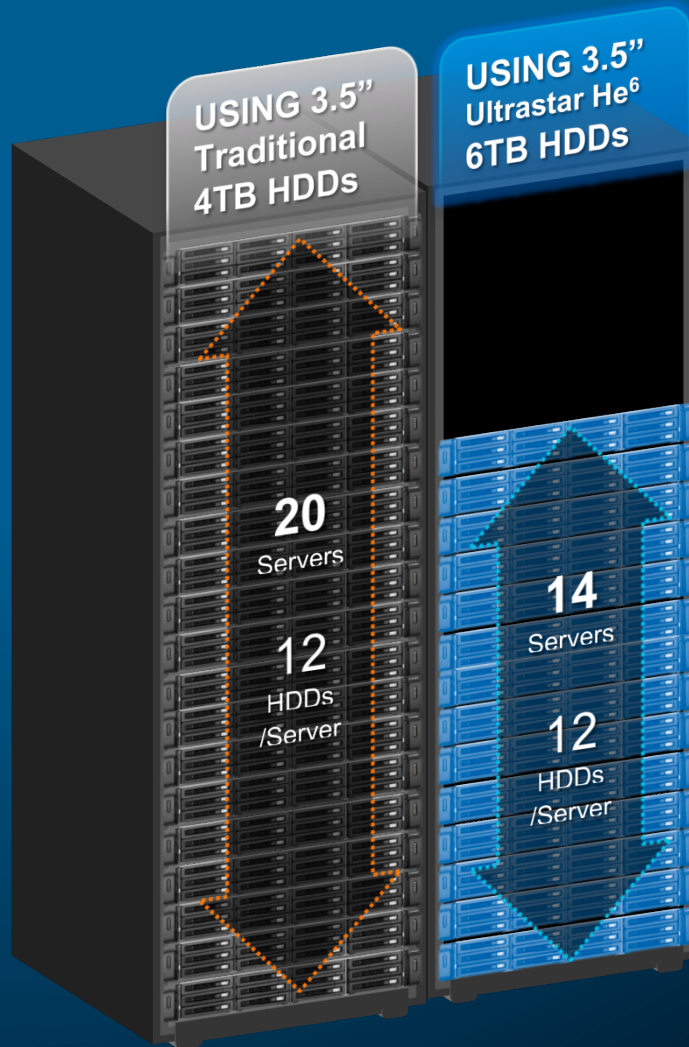
More platters in traditional 1” form factor

# Reducing TCO with Ultrastar He<sup>6</sup>





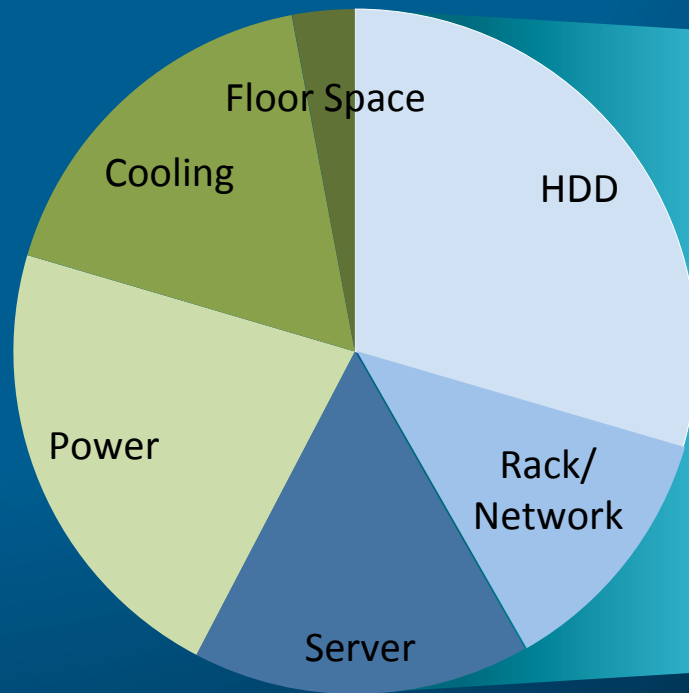
# Ultrastar He<sup>6</sup> Power Savings - System



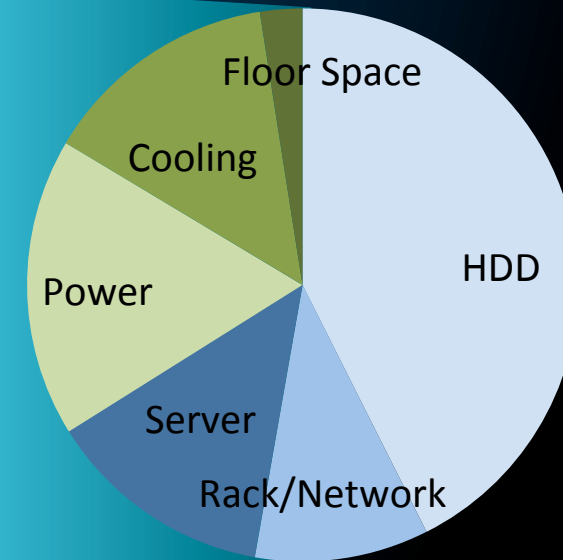
Note: ~1PB = 960TB using 20x12x4TB or 14x12x6TB (with partial server)

# Hyperscale Datacenter TCO

Conventional 5D HDDs



Ultrastar He6 with HelioSeal Platform



**22-33%  
TCO  
Savings**

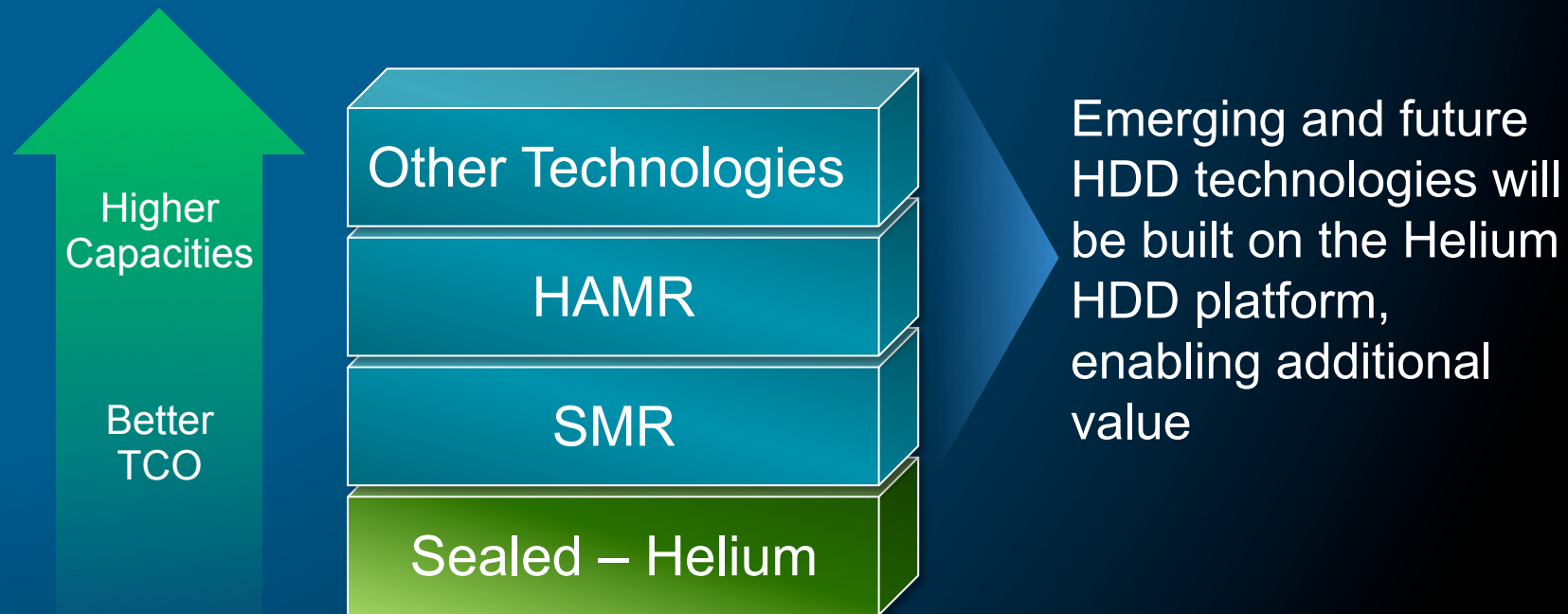
- Reductions in both CAPEX & OPEX
- Cooler, Lower-Power HDDs Reduce Power & Cooling Costs
- Fewer, Denser Servers = Less Networking infrastructure, Less Space, Less Power, Less Cooling
- Lower Complexity, Less Maintenance

*The above TCO's are estimates only. Individual TCO may vary*

*Costs include TOR and aggregator costs & power into "rack cost"; "Server cost" is the customer cost of a complete 2U-12 server without HDDs. TCO savings vary based on PUE, cost of power, server type/density*

# A Foundation For The Next 10+ Years

*Much More Than a Capacity Bump*



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Helium HDD Platform provides immediate benefits and will add to the value of other HDD innovations

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# Capacity & Trademark Statements

One gigabyte (GB) is equal to one billion bytes, one terabyte (TB) equals 1,000GB (one trillion bytes), and one petabyte (PB) equals 1,000TB (one quadrillion bytes) when referring to hard drive or solid state drive capacity. Accessible capacity will vary from the stated capacity due to formatting and partitioning of the drive, the computer's operating system, and other factors.

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