



**LEX COORS**  
**VP DTEG &**  
**Chief Engineering Officer**

# ABOUT INTERXION

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11 Countries

13 Cities

36 Datacenters

75% of sustainable Energy

Approx. 80,000 m<sup>2</sup> Customer space



# MILESTONES

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- 2000 DER
- 2000 Standardization of vendor
- 2000 Modular buildout
- 2003 Energy Overhead monitoring (later called PUE)
- 2004 Pioneered Cold aisle containment
- 2006 Energy efficiency (Design PUE 1.3)
- 2007 Founding member of Uptime Institute EMEA
- 2008 One of the first EMEA companies to join “The Green Grid”
- 2008 Stakeholder European Commission JRC
- 2009 Member of TGG Tech Committee
- 2010 Member of TGG Advisory Council
- 2011 Coalition group for the Uptime M+O program
- 2012 ASHRAE (Associate and Speaker)
- 2013 Vice Chair position GEC (Governmental Engagement Committee)

# DATA CENTER RATING TIERS & SPACE

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## Tier I

non-redundant capacity components and a single, non-redundant distribution path serving the computer equipment.

## Tier II

redundant capacity components and a single, non-redundant distribution path serving the computer equipment.

## Tier III

Concurrently maintainable data center has redundant capacity components and multiple independent distribution paths

## Tier IV

Fault Tolerant data center has multiple, independent, physically isolated systems that provide redundant capacity components and multiple, independent, diverse, active distribution paths simultaneously serving the computer equipment

# BE CAREFUL WITH THE NINES

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SLA of 99.999% which is commonly interpreted to mean unavailability of 5.26 minutes/year or 0.44 minutes/month.

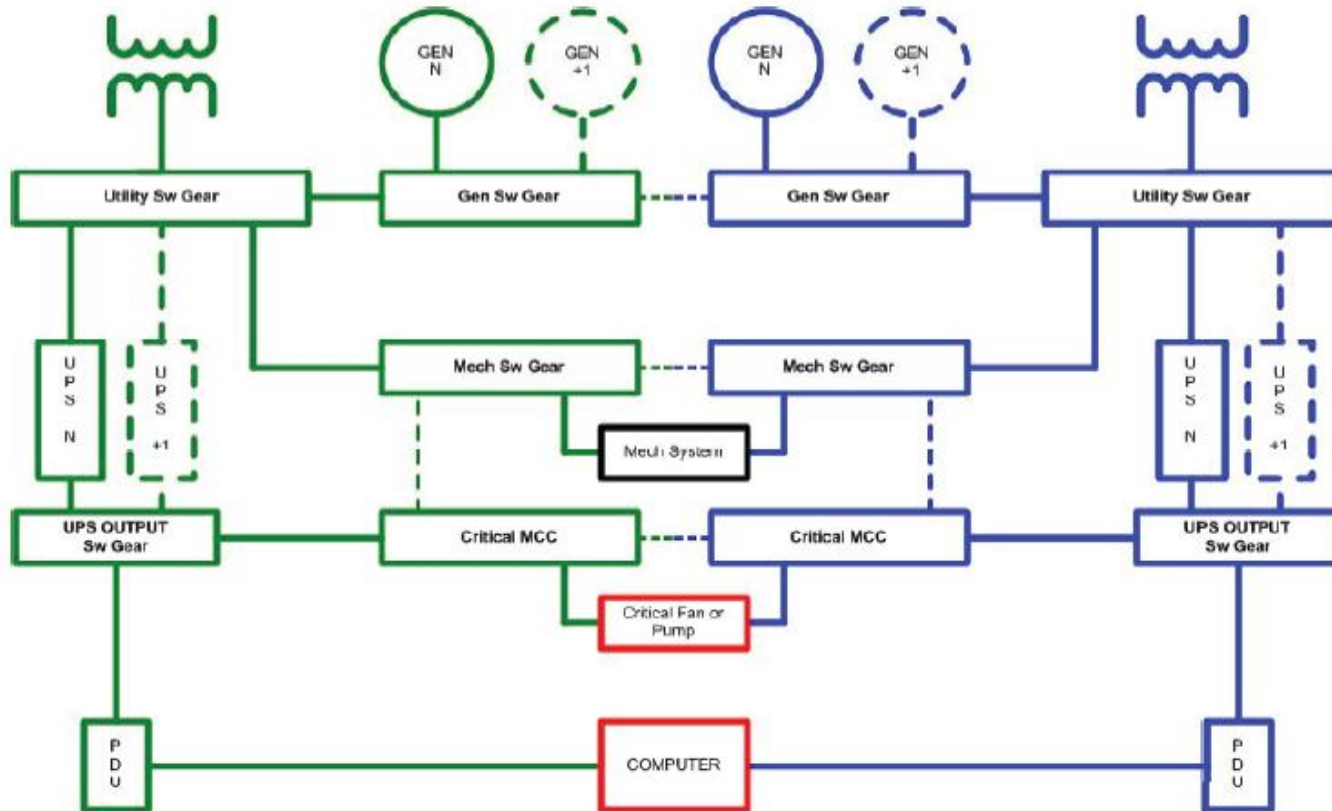
Does this look good to you?

99.999% availability means 0.44 minutes/month unavailability or 26.4 seconds/month???

Losing the data centre once every month for 20 seconds I would still stay within SLA.

NOT TO SPEAK of 1000 outages a month of 20 msec

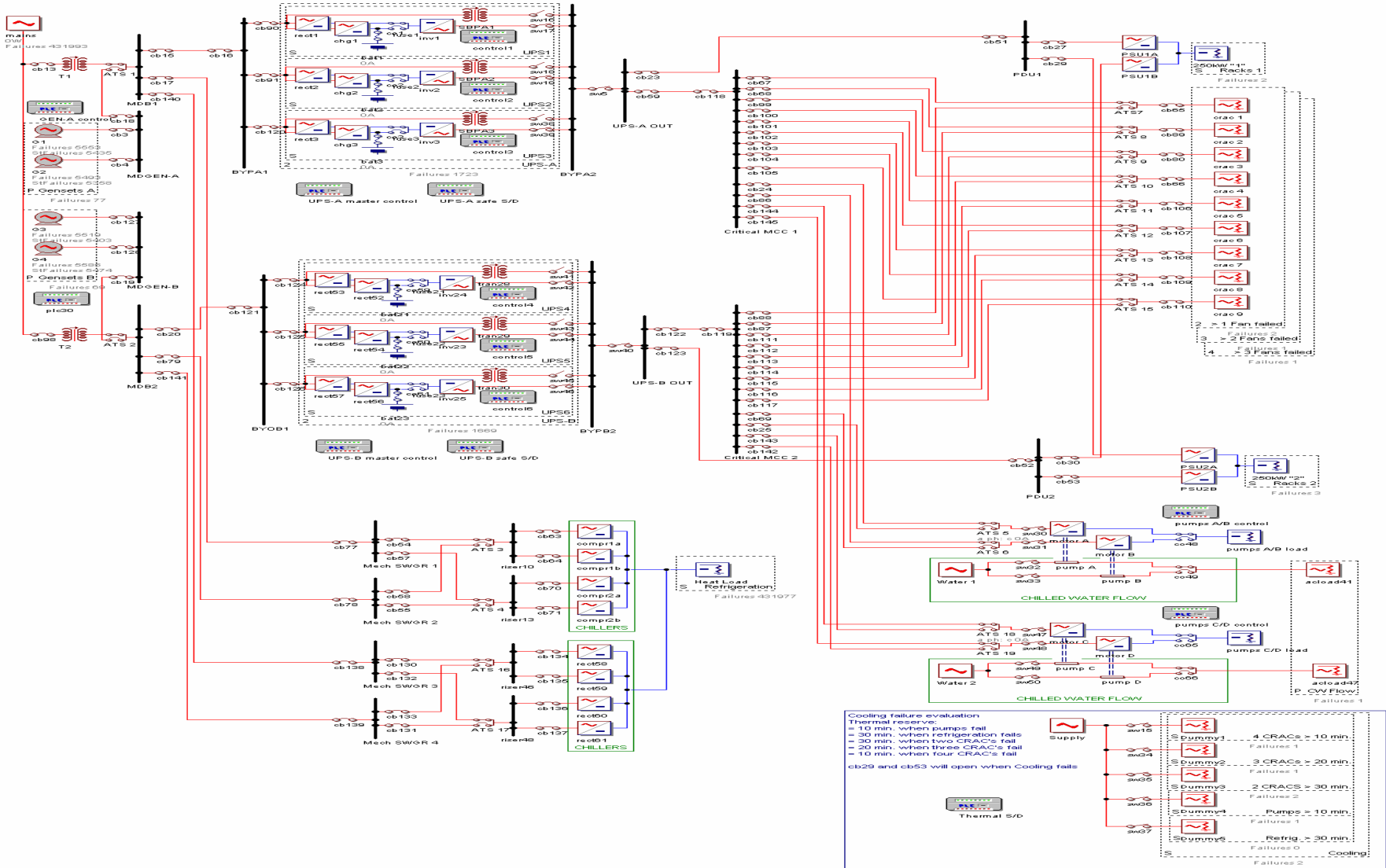
# DESIGN



# DESIGN

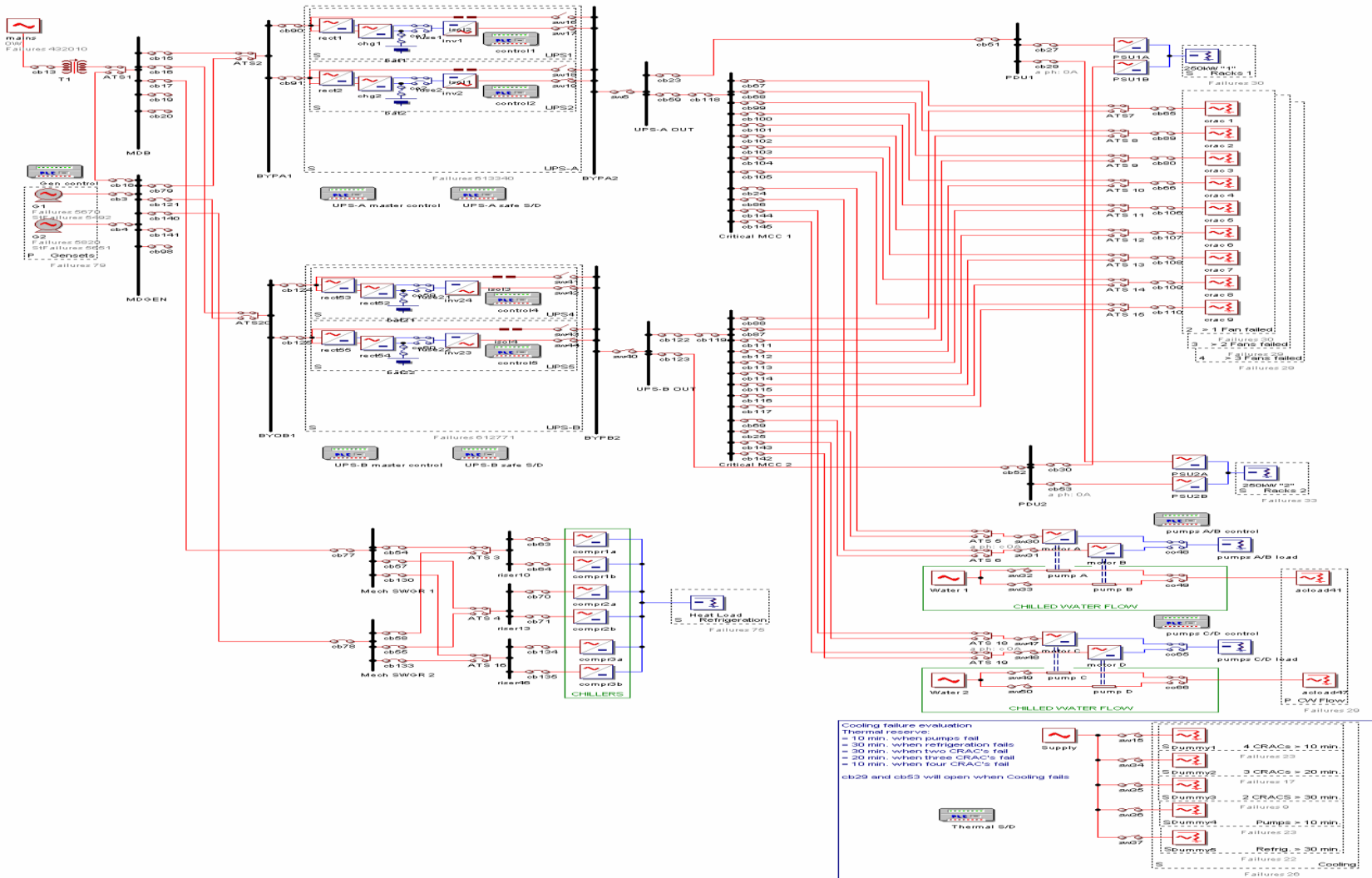
## Tier IV as per the old Uptime

Component	NumFailures	MTBF(yrs)	MTTR(hrs)	Av(%)
Racks 1	2	114155	4.77964	99.99999952
Racks 2	3	76103.5	5.07108	99.99999924
Cooling	2	114155	5.67529	99.99999943
Gensets A	77	2965.07	5.72399	99.99997796
Gensets B	69	3308.85	5.73348	99.99998022
UPS-A	1723	132.507	2.97602	99.99974362
UPS-B	1669	136.794	2.93457	99.99975511



# Y2000 STANDARD

System	NumFailures	MTBF(yrs)	MTTR(hrs)	Av(%)
Racks 1	41	5568.55	0.43206	99.9999911
Racks 2	43	5309.55	0.576087	99.99999876
Gensets	77	2965.07	6.04903	99.99997671
Cooling	24	9512.94	0.653932	99.99999922
UPS-A	613820	0.371249	6.02024	99.81522568
UPS-B	612185	0.372238	6.02481	99.81557608





# WHY DO WE CARE

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## Observations from the studies:

There is hardly a difference in the “statistical” availability

# CAPEX

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Let us assume a 1,000 m<sup>2</sup> virtual data centre designed for 2 kVA/m<sup>2</sup> customer load

The CAPEX savings vs. Tier IV as per Uptime doc. looking at components only and assuming 30 % mark-up for installation

2 \* 3,050 kVA generators = 1.2 million Euro

2 \* 1,000 kVA UPS = 0.8 million Euro

Extra Switchgear/ Panels/ Cables = 0.5 million Euro

Installation cost 30% = 0,8 million Euro

Total 3.3 million extra CAPEX/ 1,000 m<sup>2</sup>

Both for construction and for replacement

# OPEX

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## Efficiency

Idle infrastructure create extra losses

*A lean infrastructure typical PUE is 1.3*

On a yearly base 22,776 MWh

*A Tier IV typical PUE is 1.5*

On a yearly base 26,280 MWh

If we assume 70 Euro/MWh

Energy saving on design choice 245 k Euro/1,000 m<sup>2</sup>/ year

## Maintenance

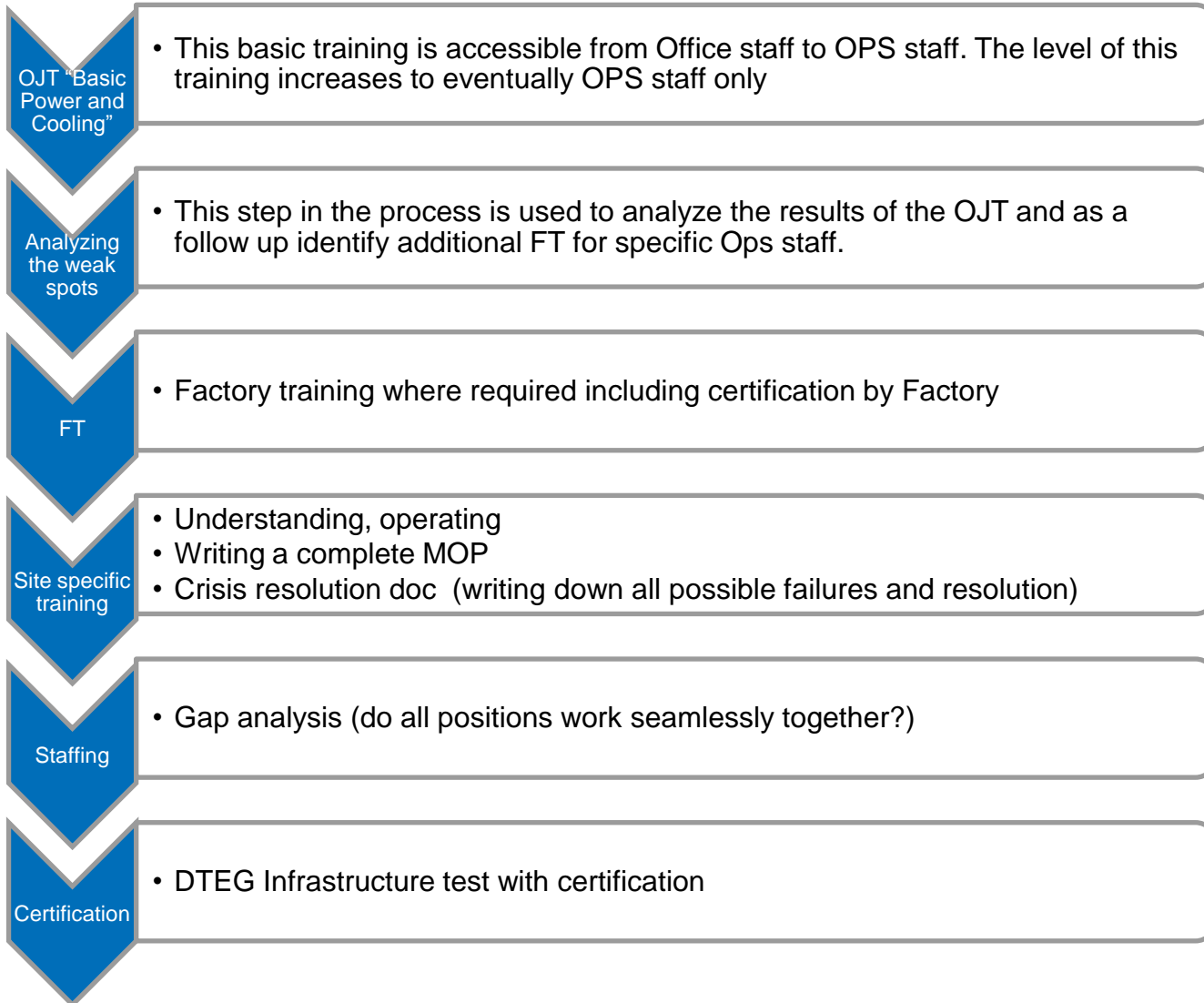
Approx. 30 k Euro/ 1,000 m<sup>2</sup>/ year

# EFFICIENCY AND SUSTAINABILITY

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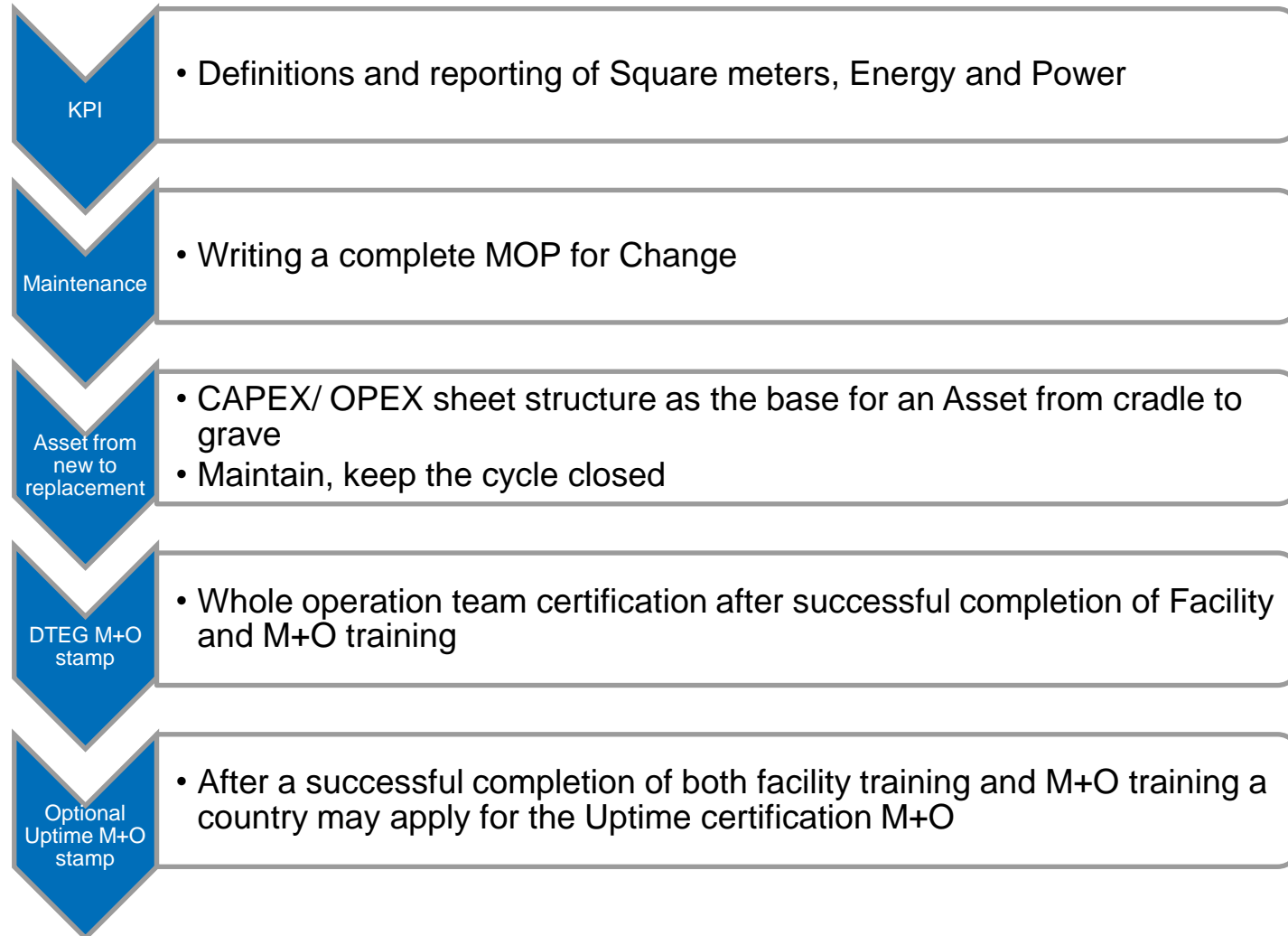
- 1999 UPS systems with 96 % efficiency
- 2003 Measure and improve Energy Overhead
- 2005 UPS systems with 97 % efficiency
- 2005 New builds designed with free cooling
- 2006 Design PUE 1.3
- 2010 New builds designed with adiabatic “free cooling”
- 2010 Use of seawater cooling
- 2012 Use of salt water aquifer for cooling
- 2013 Design PUE 1.2
- 2013 Interxion is 75% of sustainable energy

# FACILITY TRAINING



# M+O TRAINING

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# TO SUMMARIZE

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## We Build & Operate

Modular, Energy efficient, Sustainable, Reliable,  
CAPEX and OPEX smart Datacenters

