Design and Operational Excellence for Enhanced Sustainability

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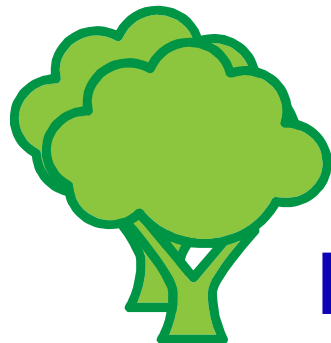
EPI INDIA

Going Green…

- ## Business drivers for going Green
    - Regulatory compliance
    - Maximizing power in the building
    - Corporate Governance
    - Saving the world
    - Marketing
    - Saving money……

- ## Saving money is often a key driver for the business
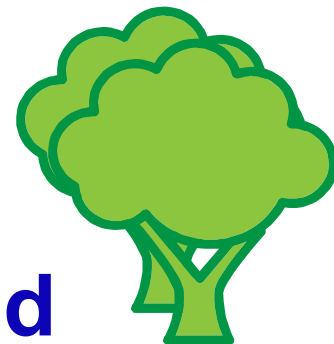
Going Green… the Current Issue

- More and more data centers make claims of being a Green Data Center but…..

- There is NO world-wide standard for defining what a Green Data Center is…

- Green/Energy Efficiency standards often ignore reliability and availability.

- Good options to start with (Indian Context):
  - The Green Grid
  - CII-IGBC (ECBC)

$$PUE = \frac{\text{Total Facility Power}}{\text{Total IT Equipment Power}}$$

- The Good news
  - PUE has now been adopted as 'Standard Measurement'

- The Bad news
  - Still much confusion about 'where' to measure
  - Still much confusion about 'what' to include
  - Does not take into account loading factors on the floor and new technologies which make Data Centre greener but creates a worse PUE etc.

Green Standards - ECBC

- ECBC strives to be an Efficiency Standard for Data Centers, Good starting point, but in its current form does need improvement.

- It does not take into account the inherent losses due to design considerations (Rated-1-4)

Are these standards comprehensive enough?

- PUE is just a small part of efficiency measurements and many more are making attempts to measure other factors such as:
  - CUE™ - carbon usage effectiveness
  - DCeP™ - data center energy productivity
  - ERE™ - energy reuse effectiveness
  - DCcE™ - data center compute efficiency
  - WUE™ - water usage effectiveness
- Whilst we have reasonably detailed coverage of measure areas in ECBC, there is still room for improvement.

Greenest Data Center in the World

- ## A Data Center in a Tent
  - No losses for lights
  - No losses for cooling
 - No losses for Power Conversion

Also remember lot of in-efficiency is at the IT layer as every 1kw extra on the floor leads to more consumption especially considering that additional kw on the floor has a multiplier to the facilities kw.
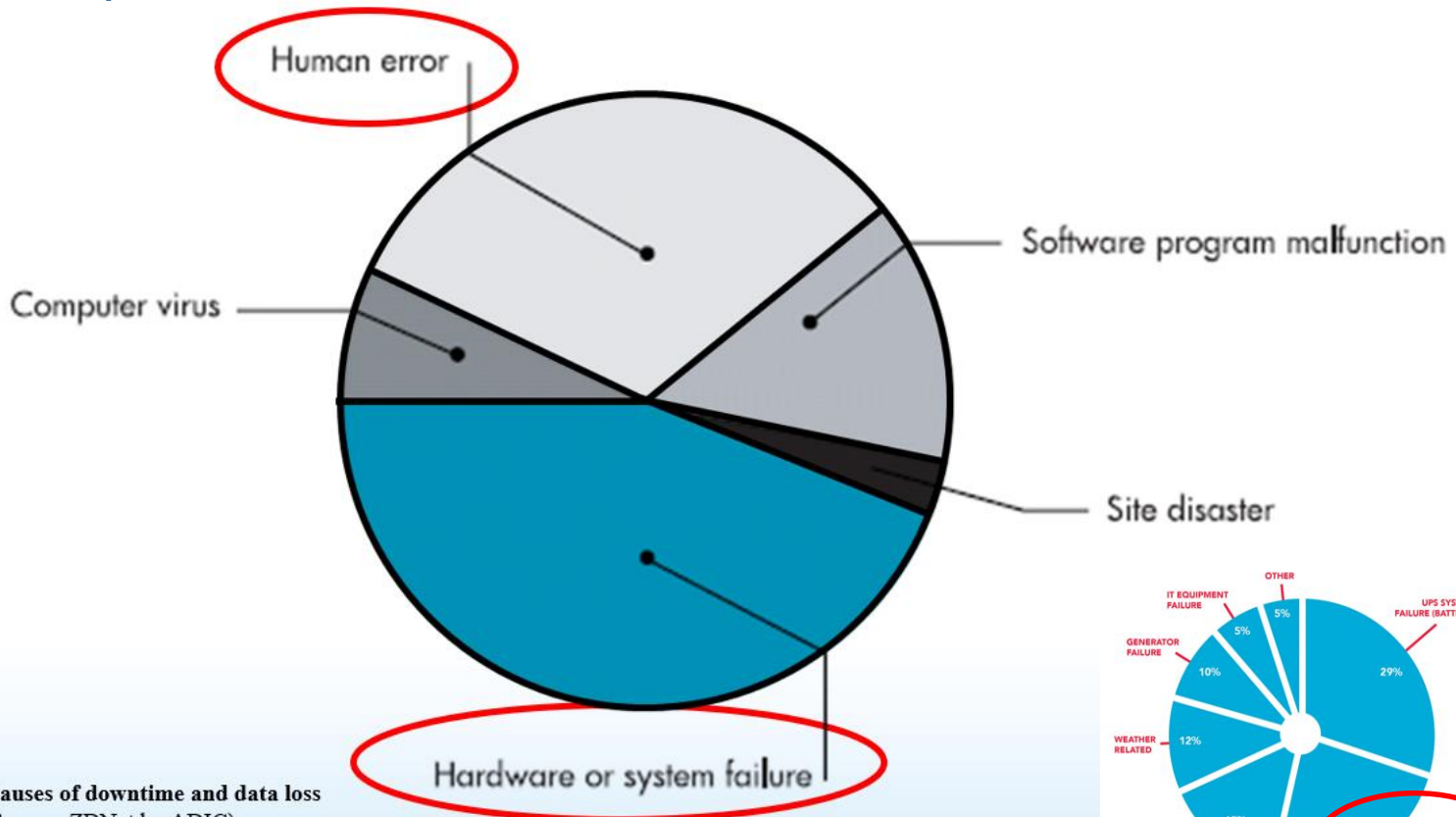
Choice between Availability and Green?

- Green and Hi-Availability for ICT often do not go very well together

- Data Center owners / operators need to carefully consider the right balance for both objectives
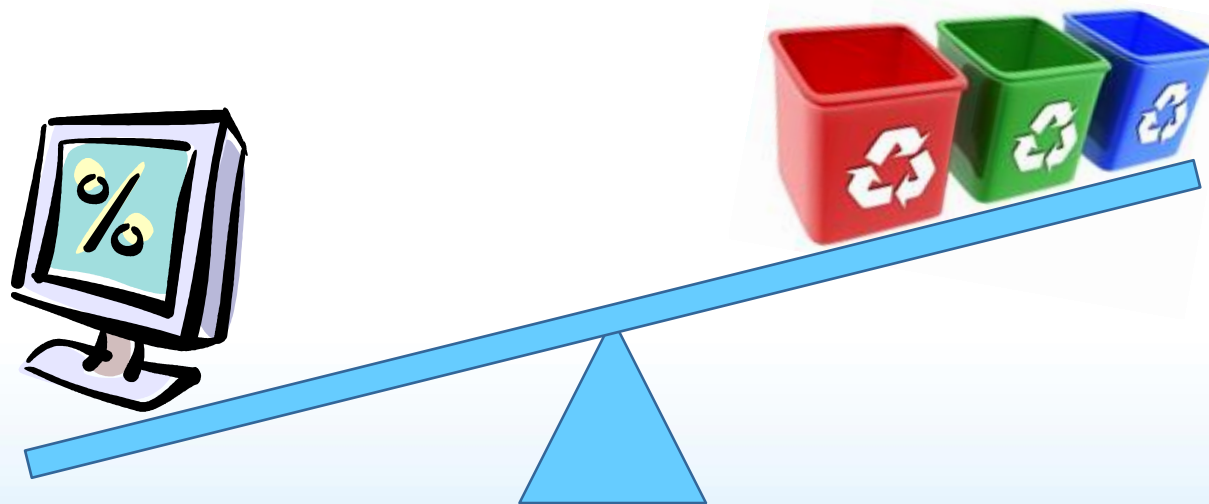
Data Center Downtime

- Different research indicate different results between 18 – 70% of downtime being caused by Design or Operations related issues

Human error

Software program malfunction

Computer virus

Site disaster

Hardware or system failure

Causes of downtime and data loss
(Source: ZDNet by ADIC)

OTHER

IT EQUIPMENT FAILURE 5%

5%

UPS SYSTEM FAILURE (BATTERY) 29%

GENERATOR FAILURE 10%

WEATHER RELATED 12%

15%

24% ACCIDENTAL / HUMAN ERROR

WATER, HEAT OR CRAC FAILURE
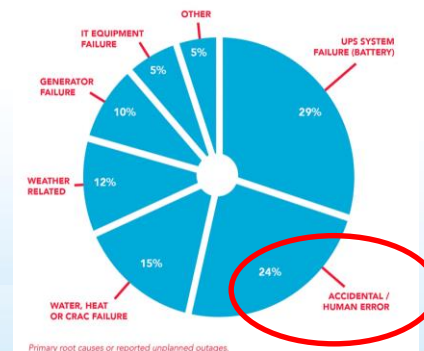
Primary root causes or reported unplanned outages.

Designing for Availability – Which Guideline or Standards to follow?

	Uptime®	TIA-942	BICSI-002	EN-50600
Origin	USA	USA	USA	Europe
Main scope of Topology Guideline or Standard	Electrical Mechanical	Electrical Mechanical Architectural Telecom Site location Safety Security Efficiency	Electrical Mechanical Architectural Telecom Site location Safety Security	Electrical Mechanical Architectural Telecom Site location Safety Security Efficiency
Type of Conformity	Tier (I-IV)	Rated (1 – 4)	Class (F0 – F4)	Class (1 – 4)
Detailed Spec public. avail.	No (high level guideline)	Yes (Standard document)	Yes (Standard document)	Yes (Standard document)

Designing for Availability – Which Guideline or Standards to follow?

	Uptime ®	TIA-942	BICSI-002	EN-50600
Type of organisation	$$ Commercial	Non-profit	Non-profit	Non-profit
Official Standard Development Organisation	No	Yes ANSI	Yes ANSI	Yes EN CENELEC
Certified data centres	Yes	Yes	No	No
Auditors	Uptime only	Multiple organisations	n/a	n/a

The Adoption of ANSI/TIA-942 Standard

- A global survey indicated that 78% of the respondents use the ANSI/TIA-942 as the standard of choice when designing and building their data centres

Standard	Percentage
Uptime Institute	13%
ANSI/TIA-942	78%
BICSI-002	3%
SS507	1%
ISO/IEC-24762	3%
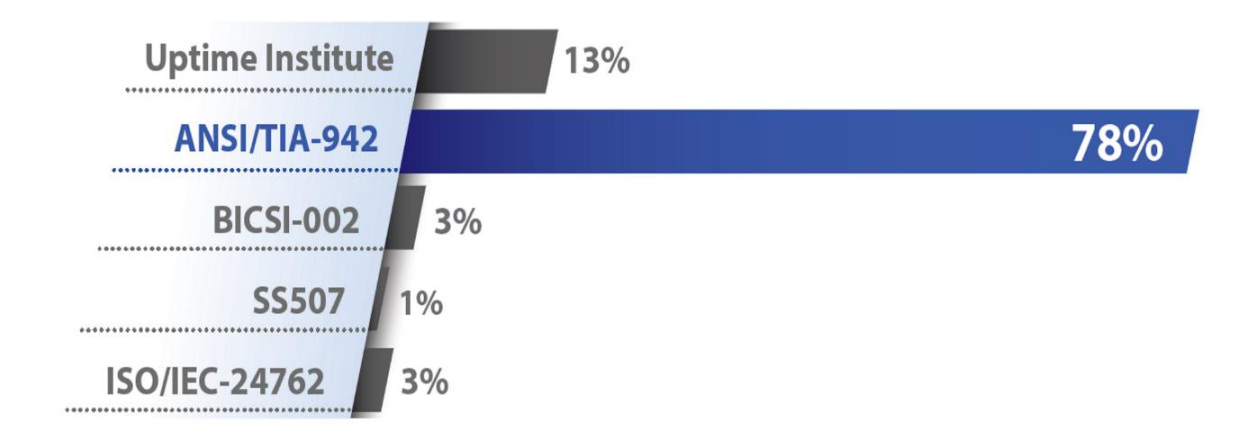
LinkedIn survey data centre professionals

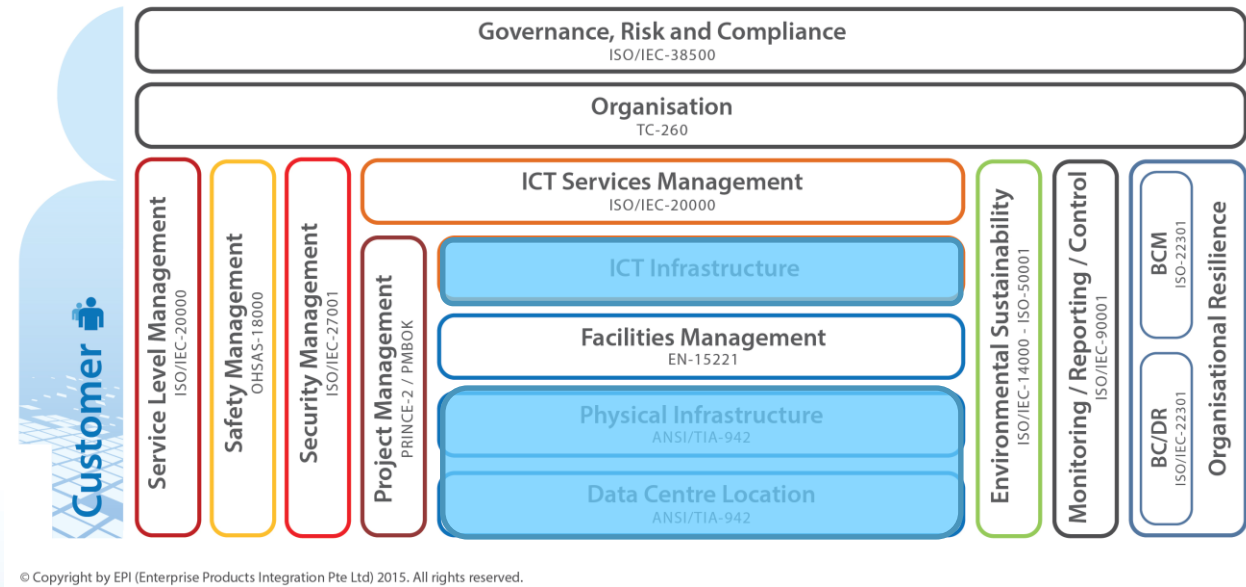# Latest version: ANSI/TIA-942-B (July 2017)

- The Rating levels are fully aligned with industry outcome based descriptions
  - No more difference between Tier and Rated at the outcome based level for Electrical and Mechanical

- Latest technology developments taken into consideration
  - New fire suppression systems, network technologies and architectures, power systems and mechanical systems

EPI Data Centre Framework©

Governance, Risk and Compliance
ISO/IEC-38500

Organisation
TC-260

Service Level Management
ISO/IEC-20000

Safety Management
OHSAS-18000

Security Management
ISO/IEC-27001

Project Management
PRINCE-2 / PMBOK

ICT Services Management
ISO/IEC-20000

ICT Infrastructure

Facilities Management
EN-15221

Physical Infrastructure
ANSI/TIA-942

Data Centre Location
ANSI/TIA-942

Environmental Sustainability
ISO/IEC-14000 - ISO-50001

Monitoring / Reporting / Control
ISO/IEC-90001

BCM
ISO-22301

BC/DR
ISO/IEC-22301

Organisational Resilience

Customer

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Airline Safety – a 5 Year Overview

- Airline accidents have dropped against an increase in number of flights

Description	2009	2014	Change %
# of flights (in Millions)	33.2 (2.5b)	38 (3.3b)	+15% (35%)
Total accidents	90	73	-19%
Fatal accidents	18	12	-33%

Source: IATA

- Pre- and inflight check lists are one of the reasons...

Issues Facing Today's DC Operations

- A large portion of data centre downtime is caused by maintenance and operational processes
  - Even a Rated-4 data centre with poor operational and maintenance processes can go down!
- Data centres often wonder
  - Which processes should we have?
  - To what level of detail should we go?
  - What are proper control mechanisms?
  - Controlled/automated and to what level?
- No or little integration between facilities, IT and business management could lead to serious risk

DCOS for Operational Excellence

Green Data Center Myth or Reality?

- ## The Conclusion…
  - Green and Hi-Availability are hard to match
  - New technologies and methodologies can assist in making data centers more Green
  - A Green Data Center does not exist (yet) as there is no world-wide standard
  - Unless….

Enhanced Energy Efficiency in Indian Data Centre Projects

The Future of Green

- ## The future is not clear yet
  - Many organizations work on variety of standards
  - It might take a while before official standards are defined and agreed

- ## The worst thing to do is 'to do nothing'

- ## Start now, start somewhere…

CII-IGBC – ECBC - the Strategy

- ## Start somewhere….
  - Senior members need to be driving the Green Initiative and set goals throughout the organization
  - Further enhance the ECBC to make it auditable and practical avoiding too much process and paper work creation, thereby making it acceptable
  - Integrate Availability from a Design perspective (TIA-942)
  - Integrate Operational effectiveness to enhance sustainability and availability (DCOS)
  - Make continuous improvement plans and define a process for work group contribution and incorporation of recommendations.

Green affects all parts of the Data Center

- Need to get support from BEE and CII to push this forward.

- Clear KPO/KPI's need to be set to drive human behavior/ adoption.

OR

Questions and Answers

Thank You

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