Optical Disc & Long term Archiving for a sustainable society

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Panasonic Corporation
Dec, 2008

AGENDA

1. Data explosion & Energy

2. MIC and ITU activities

3. Hybrid Storage is the way

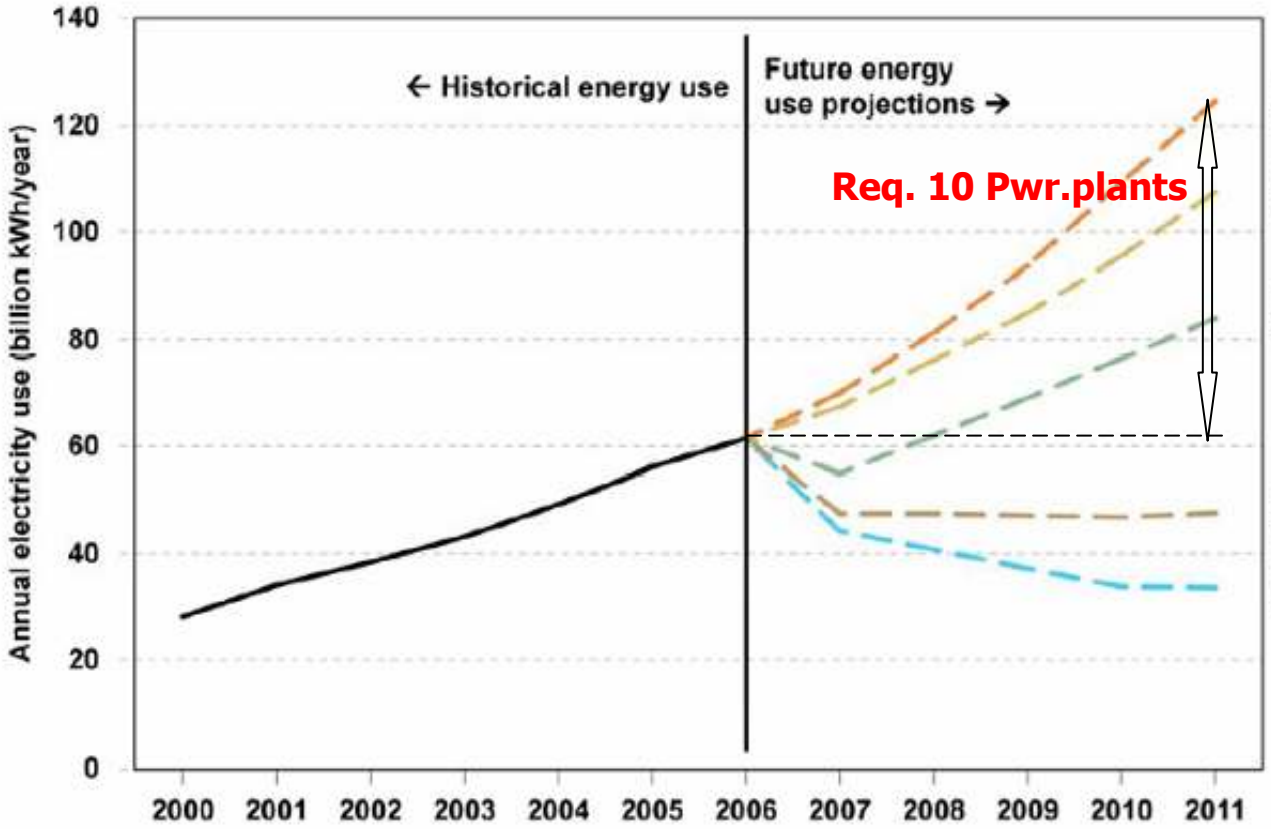
4. Why Optical based Archive

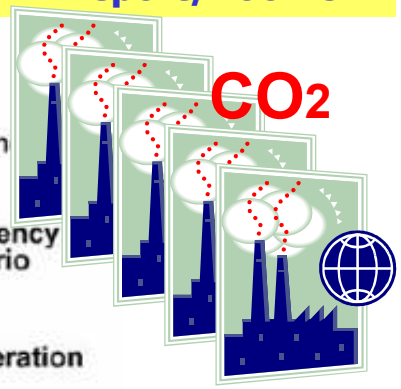
EPA reported to the US Congress

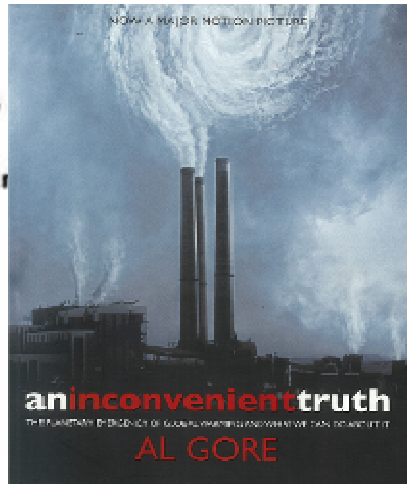
- The Power consumption in US data center alone:
- 61BKWh /2006, 100BKWh /2011 (double in 5 years)
- Require 10 Power plants for just data centers by 2011

Figure ES-1. Comparison of Projected Electricity Use, All Scenarios, 2007 to 2011

EPA report/2007.8.2

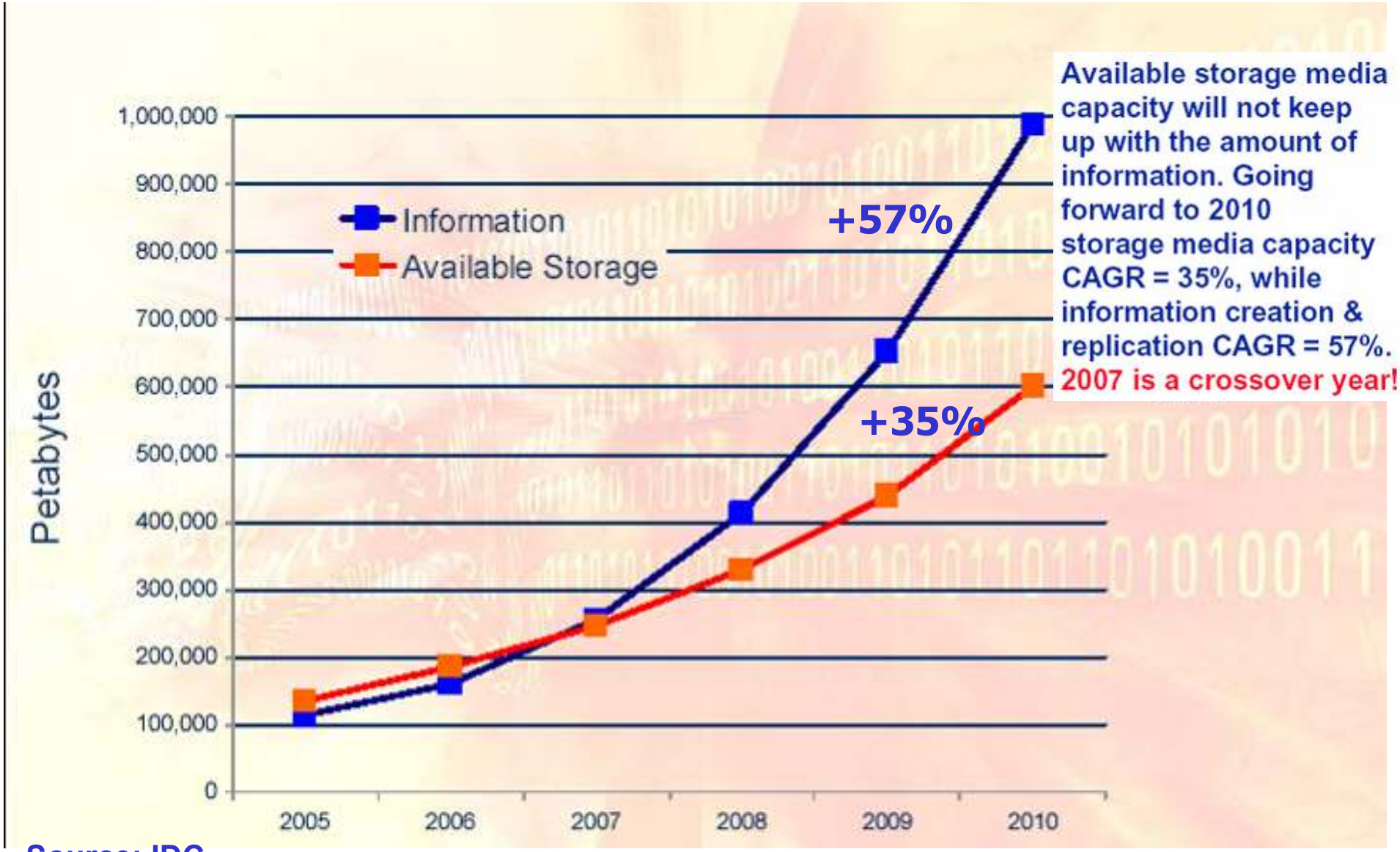






Source: U.S. Environmental Protection Agency STAR Program

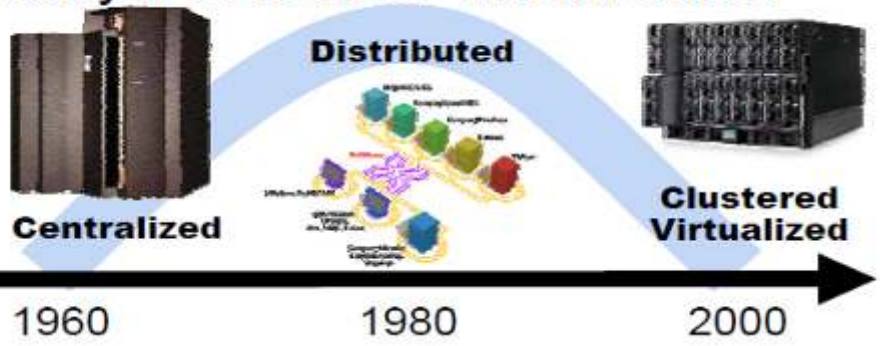
Information Explosion

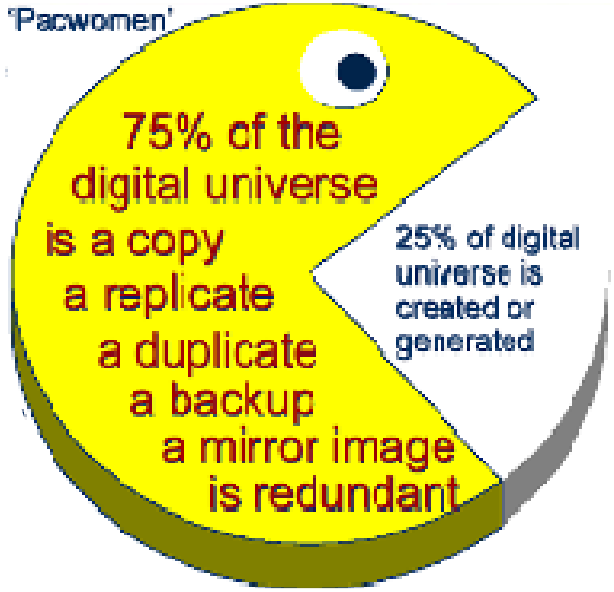


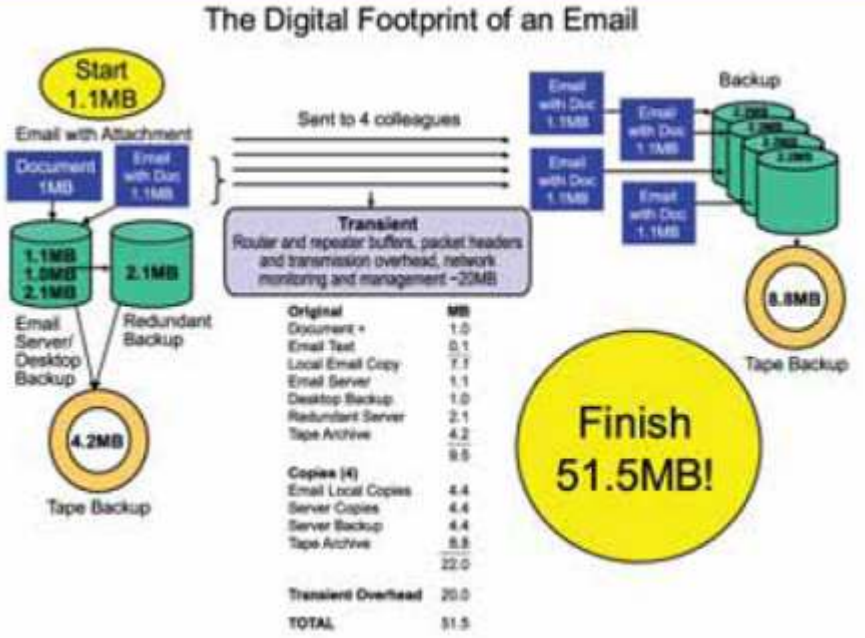
Source: IDC

The reasons for data explosion

- Pre 1990s — data was predominantly "structured" (i.e., within databases)
- Today and in the future — data is/will be essentially free form or "unstructured"







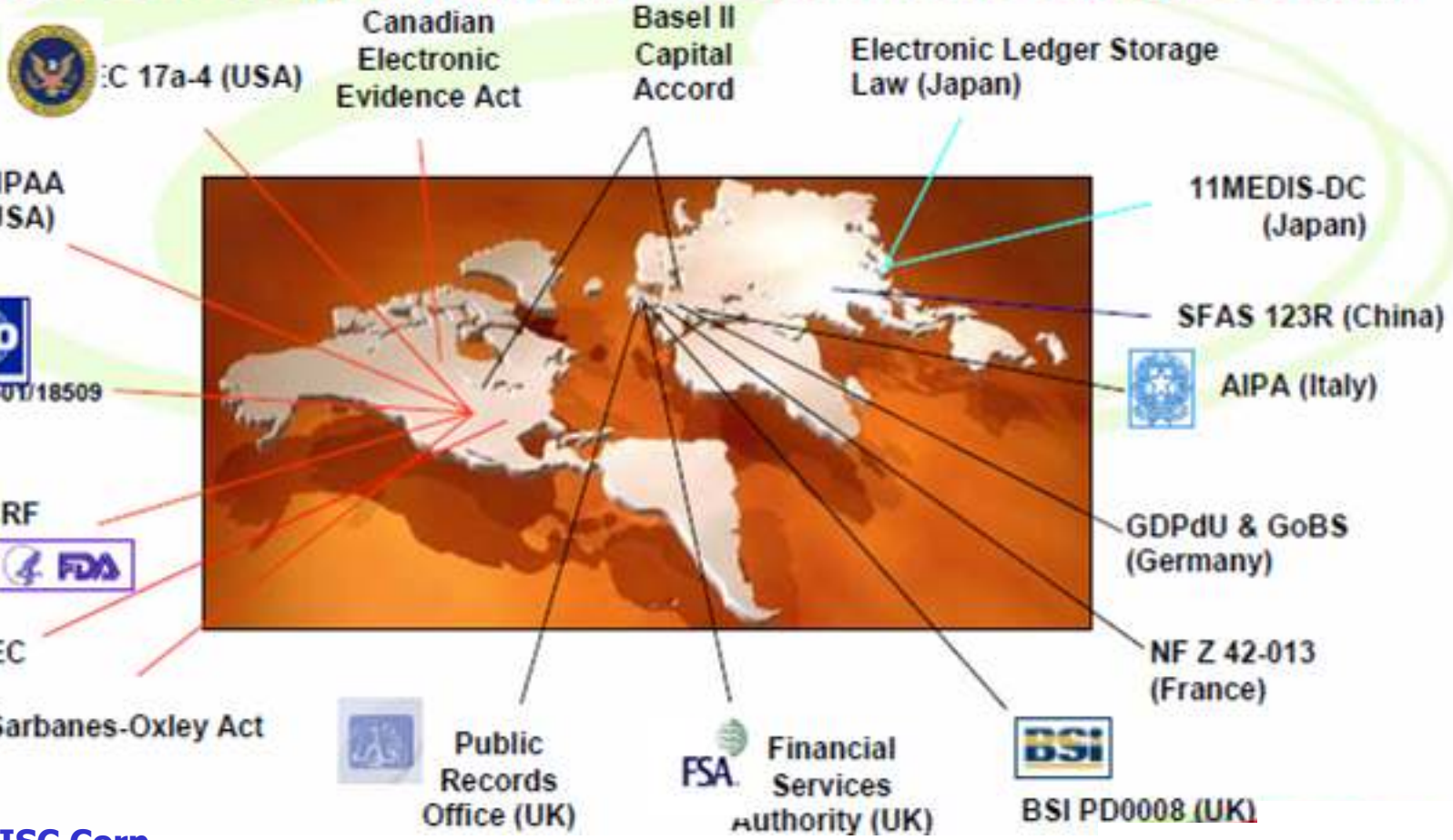
Source: IDC

Growing Archiving Importance by Regulation

Problem - Regulation Deluge

Because Terrorism, Corp.-scandal, SOx

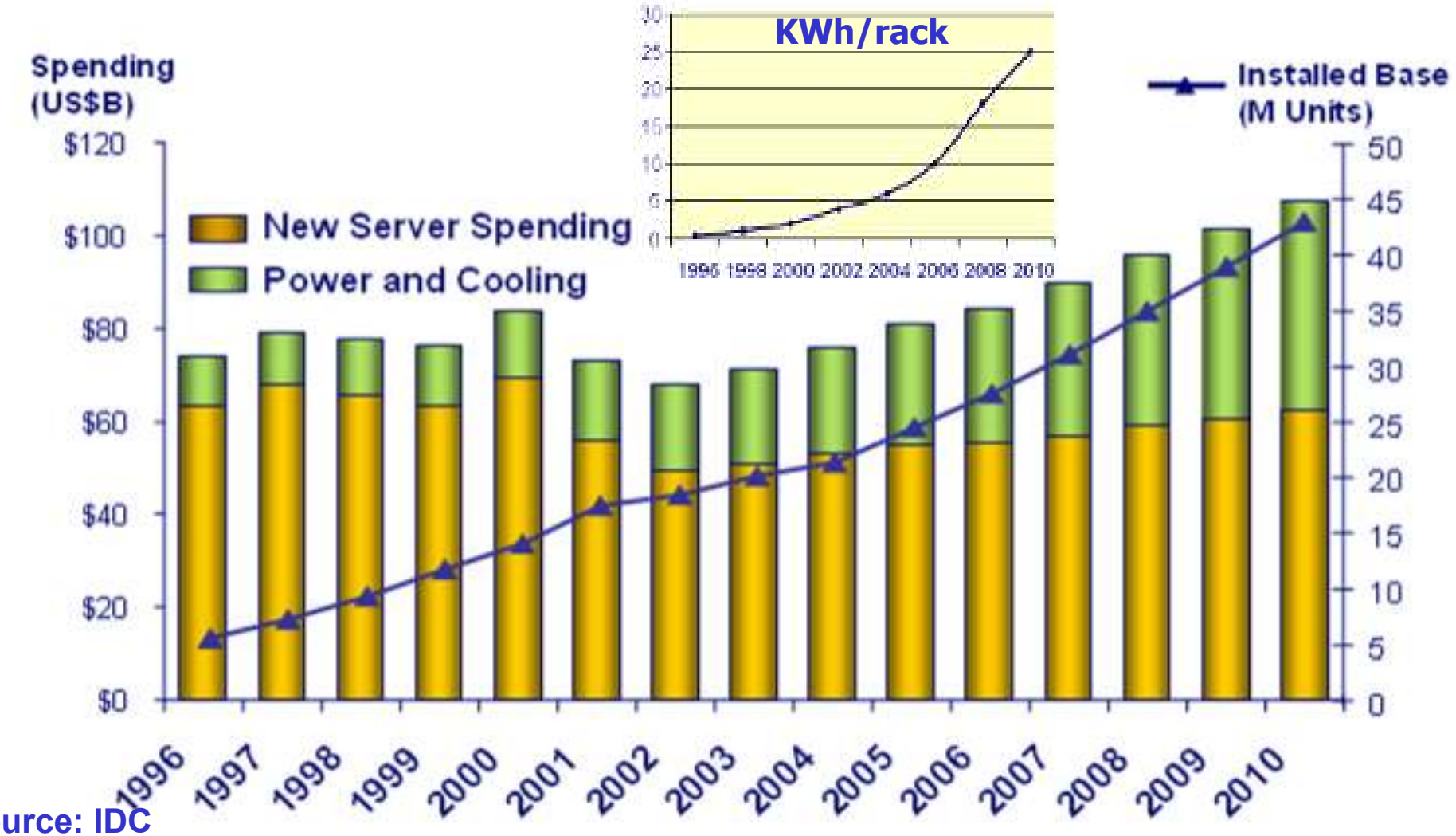
CEOs and CIOs are personally liable for continuous data protection!



Source: DISC Corp.

WW Server market: Impact of Power

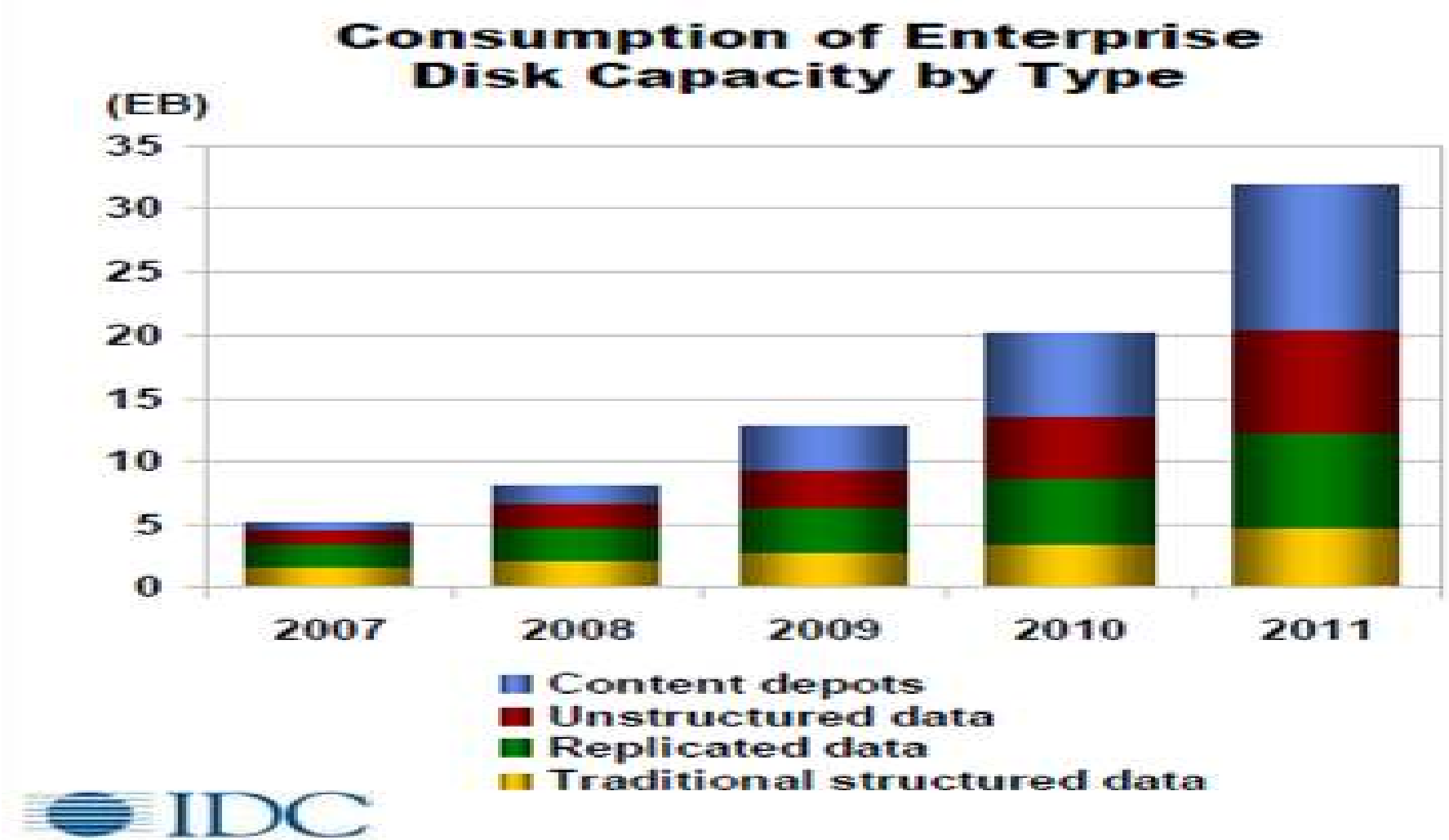
- Power & Cooling cost in 1996 is only 15% of total
- Power & Cooling cost in 2010 will be 40%



Source: IDC

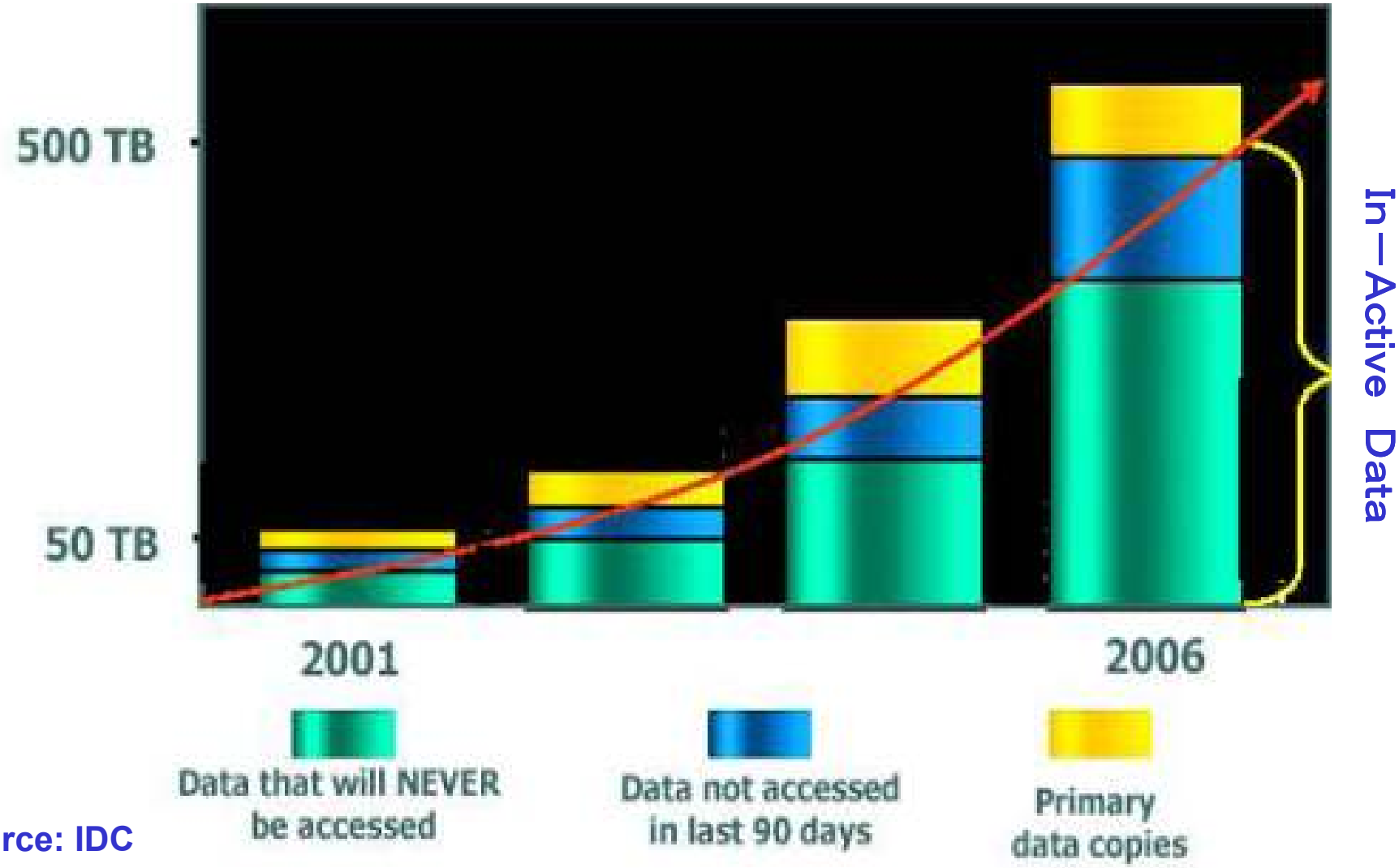
Information explosion & In-active data

- Disc Capacity rapidly growing
- Majority of data are FIX data (In-active data)



In-active data =sleeping data

80% of the entire data are in-active (sleeping) data among the exploding data storage capacity



Source: IDC

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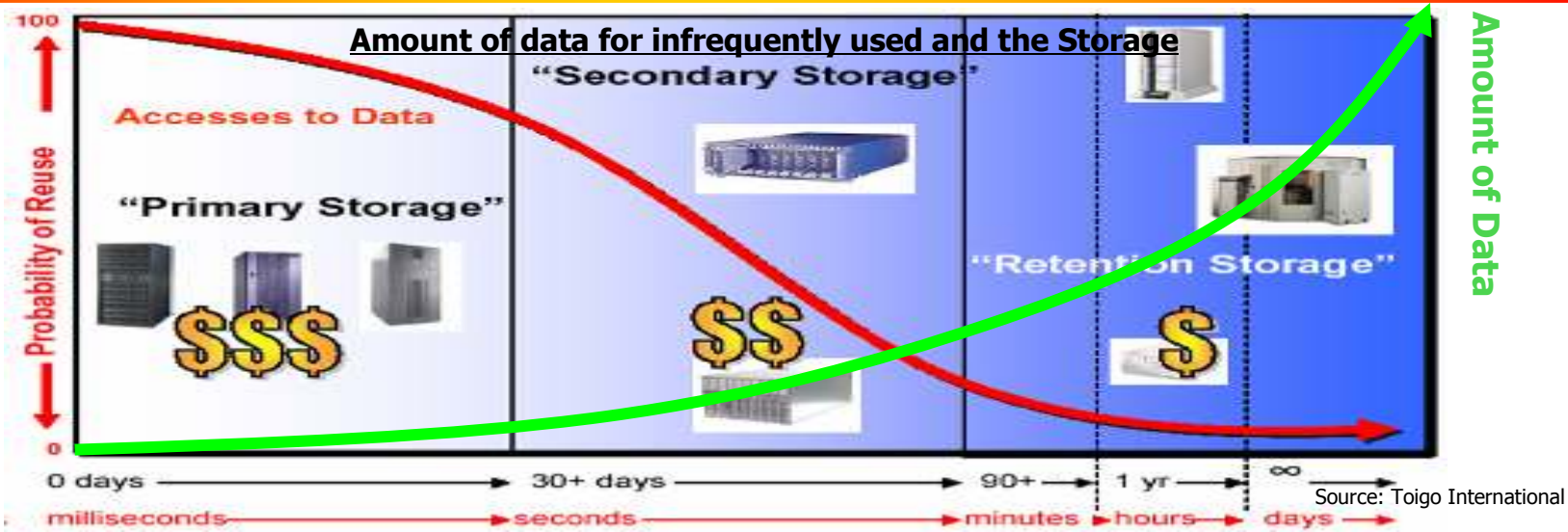
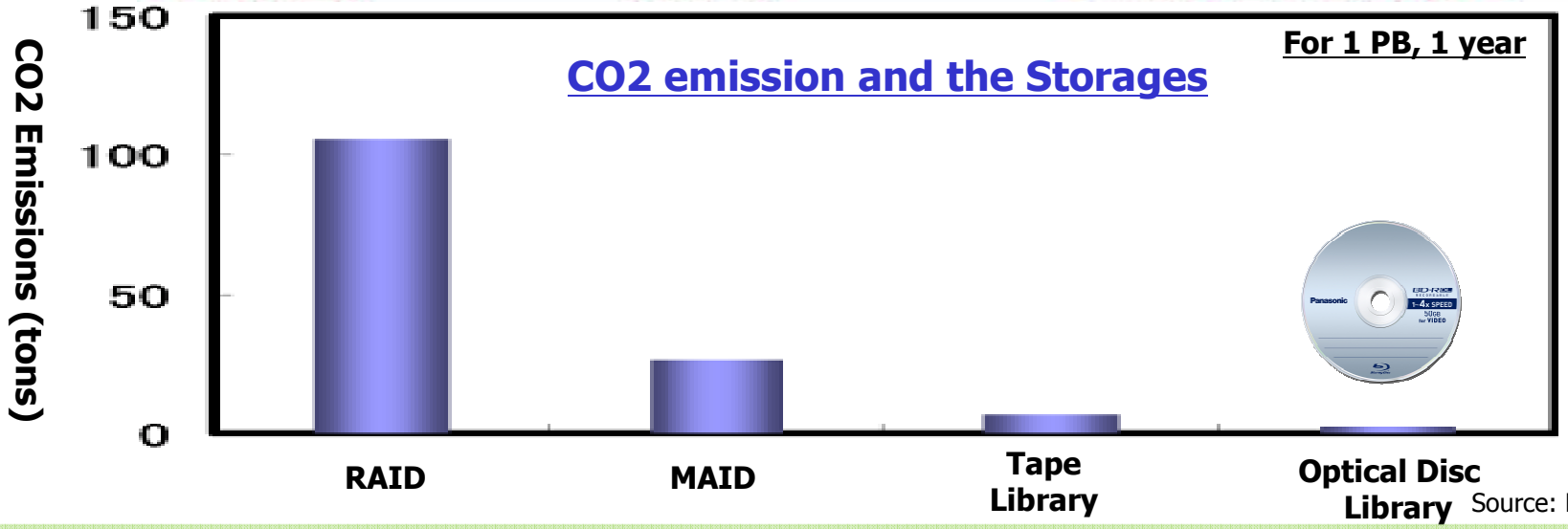
Japanese Gov. MIC report

2008. 4. 10



Source: Toigo International



Source: Panasonic

Promote low power (low CO_2) Storage devices, such as Optical Disc for inactive archive data

Source: Translated from Japanese Gov. MIC report 2008. 4. 10

WTSA-08 Johannesburg South Africa

the doc

ITU and Climate Change

ITU Activity for global warming problem

2008/Jan. Mar. Apr. May Jun. Jul. Oct.

Study Group of ICT policy to prevent global warming

Report 10/Apr

ITU symp 17~18/Jun. @ London

ITU TSAG 2~11/Jul. @ Geneva

ITU symp 15~16/Apr. @ Kyoto

ITU WTSA 21~30/Oct. @ Johannesburg

GIIC assembly 24~25/Apr @ Tokyo

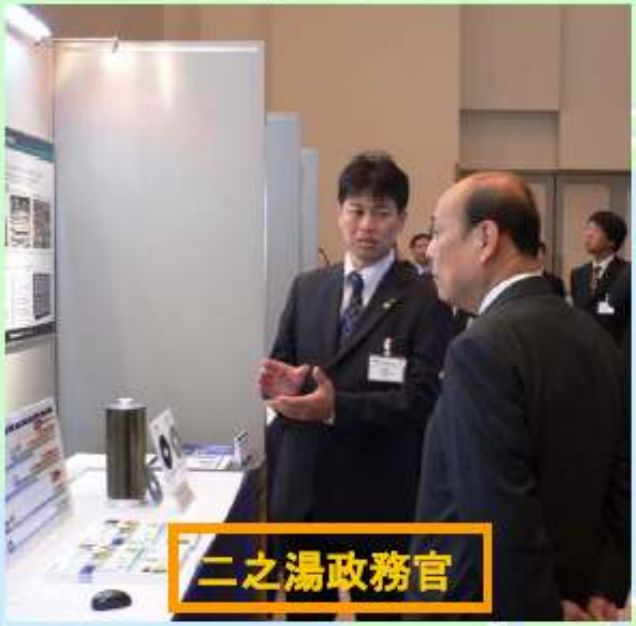
OECD ministerial meeting 17~18/Jun @ Seoul

Davos Forum 23~27/Jan. @ Davos

WEF working Level meeting 23~24/Apr. @Tokyo

G8 summit 7~9/Jul. @ Japan

ITU Symposium in Kyoto 2008/4/15-16


二之湯政務官


ITUジョンソン局長

ﾎﾞﾂﾜﾅ大学 Totev教授と岡田課長


大工大学大学院　平松教授

ITU/WTSA08 Symposium in Johannesburg

PanaNews

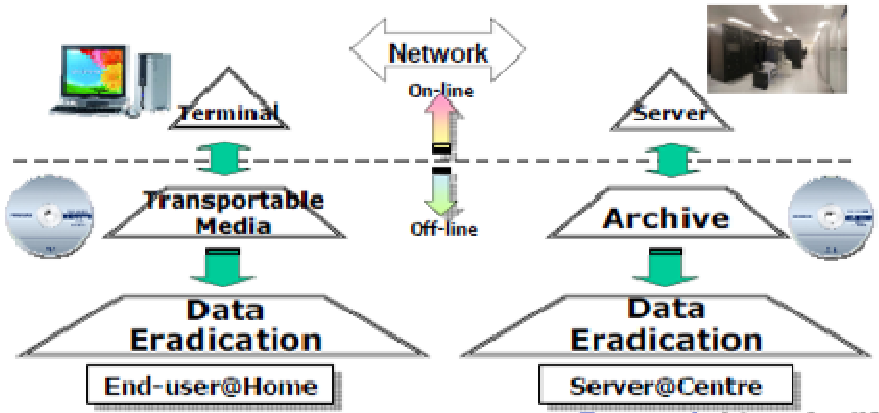
「ITU-T（国際通信連合）/WTSA-08 国際標準化シンポジュウム」で櫛木シニアフェローが講演

【発信：スタンダードコラボレーションセンター】

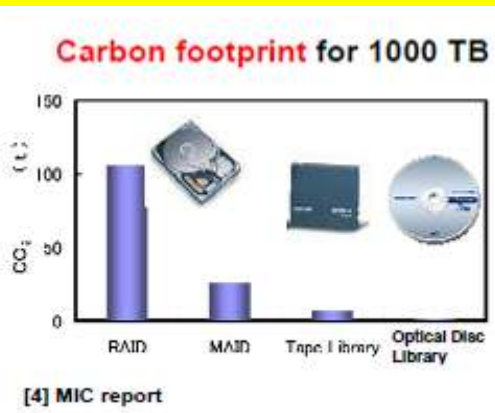
2008/10/20

ITU and Climate Change

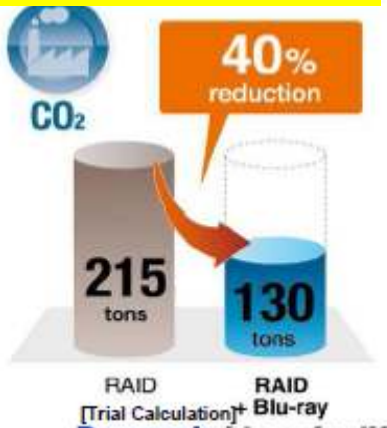
Multi-tier Storage save energy and reduce CO_2



Panasonic ideas for life



[4] MIC report



Panasonic ideas for life

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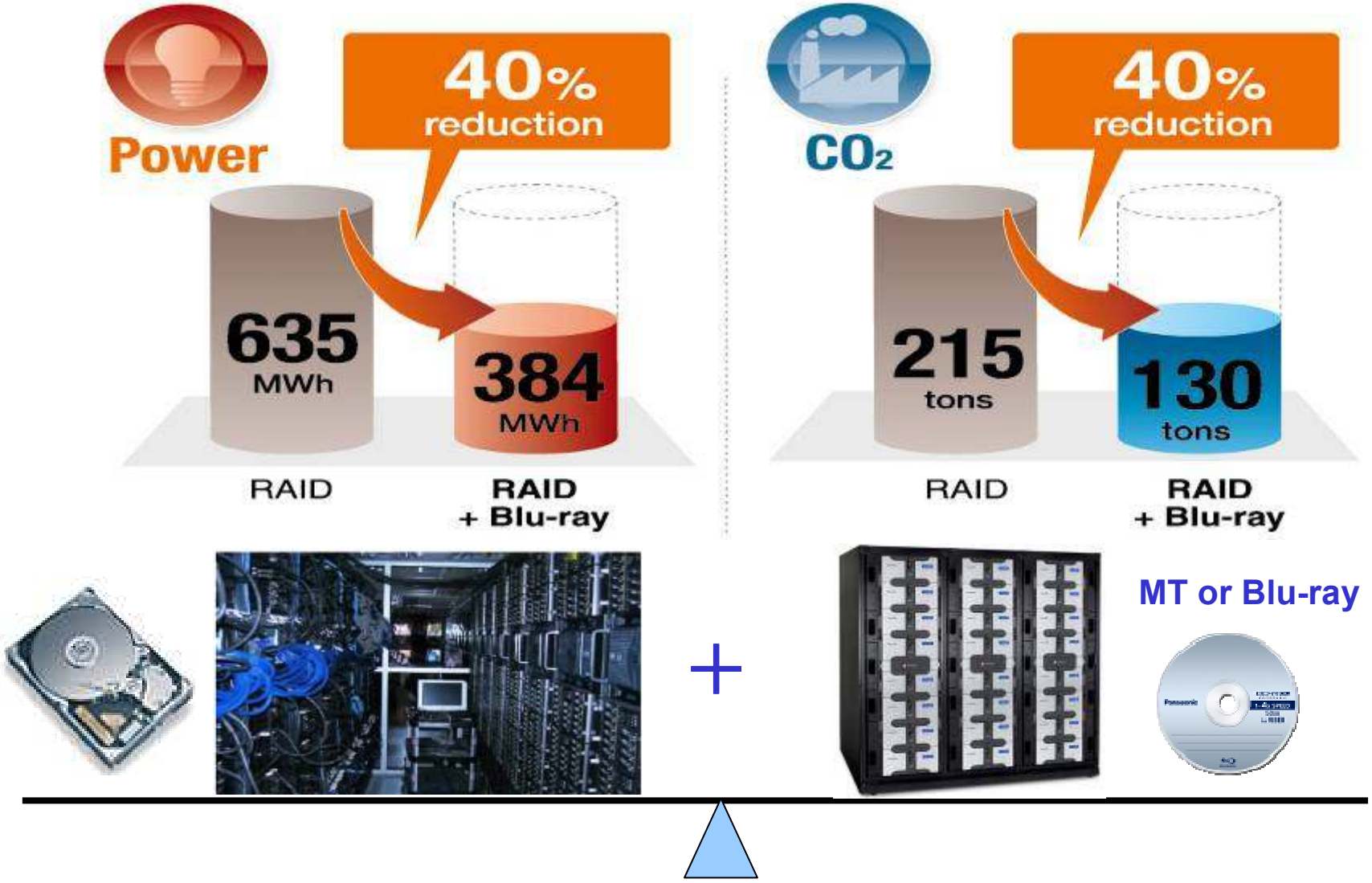
Hybrid is the way for sustainable society

- **Resource pressure & Global warming issues makes the trend toward "Hybrid"**

Hybrid VEHICLE **Engine +Motor**	
Hybrid Storage **RAID + Optical**	 +   *Tape Archive* *Optical Archive*

Hybrid Storage save energy & reduce CO_2

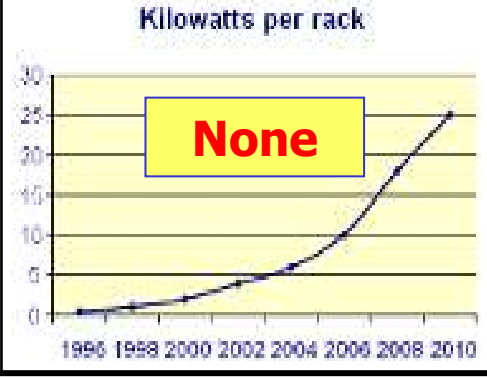
- **Case study ;**
  Case for 400TB archived by BD for 1 year out of Total Capacity 1,000TB



No Metric nor Criteria in IT industry

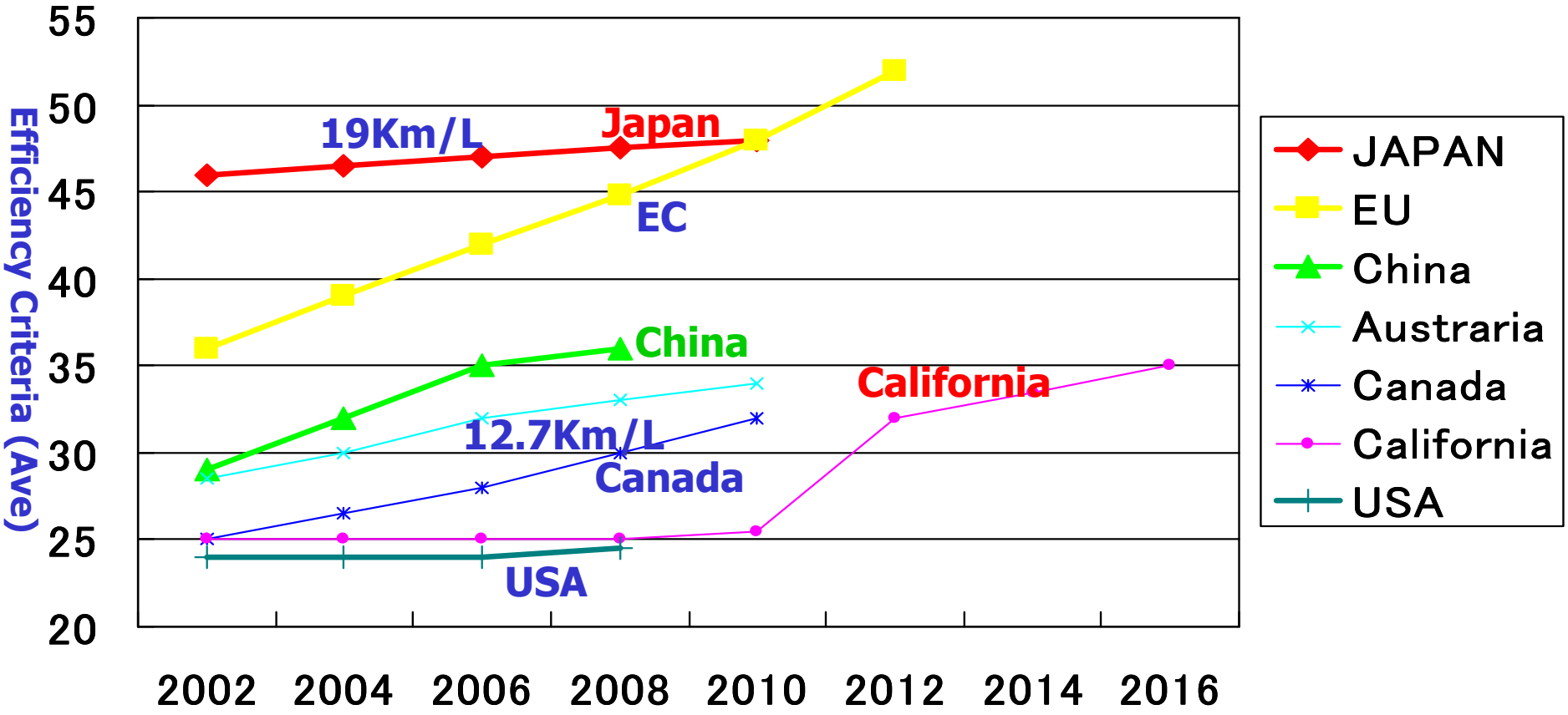
- Automotive industry has the Criteria [Km/Litter]
- Digital data has CFP, but NO Criteria in IT industry
- Metric & Criteria is the first step for the argument

CFP: Carbon foot-print

Industry	Metric	Criteria
	Km/L	Fuel efficiency 19 Km/L Case for Japan
		Power efficiency None (PB·yr/KW)

Metric & Criteria in Automotive Industry

- Metric & Criteria is the essential
- Criteria (High hurdle) helped to reduce CO2 and Competitiveness



Source：An Inconvenient Truth /Al Gore

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Why Optical based Archive (1)

① Longevity ② Data mining ③ T.C.O.

1,000 years

500 years

50 years

①Long archive life
②No power archive
③No air condition req.
④CO2 less
⑤None-contact read

10-15years
(Re-fresh)

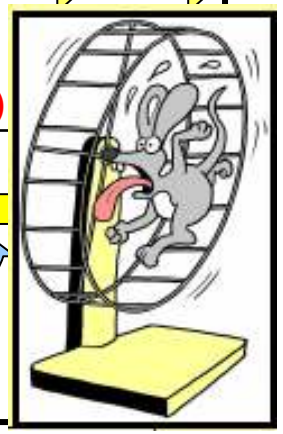
3-5years
(Re-place)

①Short life (mechanic)
②Powered Archive
③Air conditioning req.
④with CO2
⑤Contact write & read

Why Optical based Archive (2)

- Optical Media & Format are solid & stable (Physical and Logical)
- In case of RAID based Archive, you have to keep "RAT RACE"
- Because drive will fail by 3-5 yrs, and obsolete in every 5-7 Yrs

	2006-	2010-	2020-	2030-
	BD Media (UDF format, Major manufacturers)			
	BD Drive (major manufacturers)			
	(Drives & parts available over 30+ years, CE maker backed Format)			
	Tape Media			
	Tape Drives	$	$	$
		(Drive obsolescence every 7-10 years = rat race)		
	HDD Drives			
	$ $	$ $ $	$ $ $	$ $
		(Drive obsolescence every 5-7 years = rat race)		



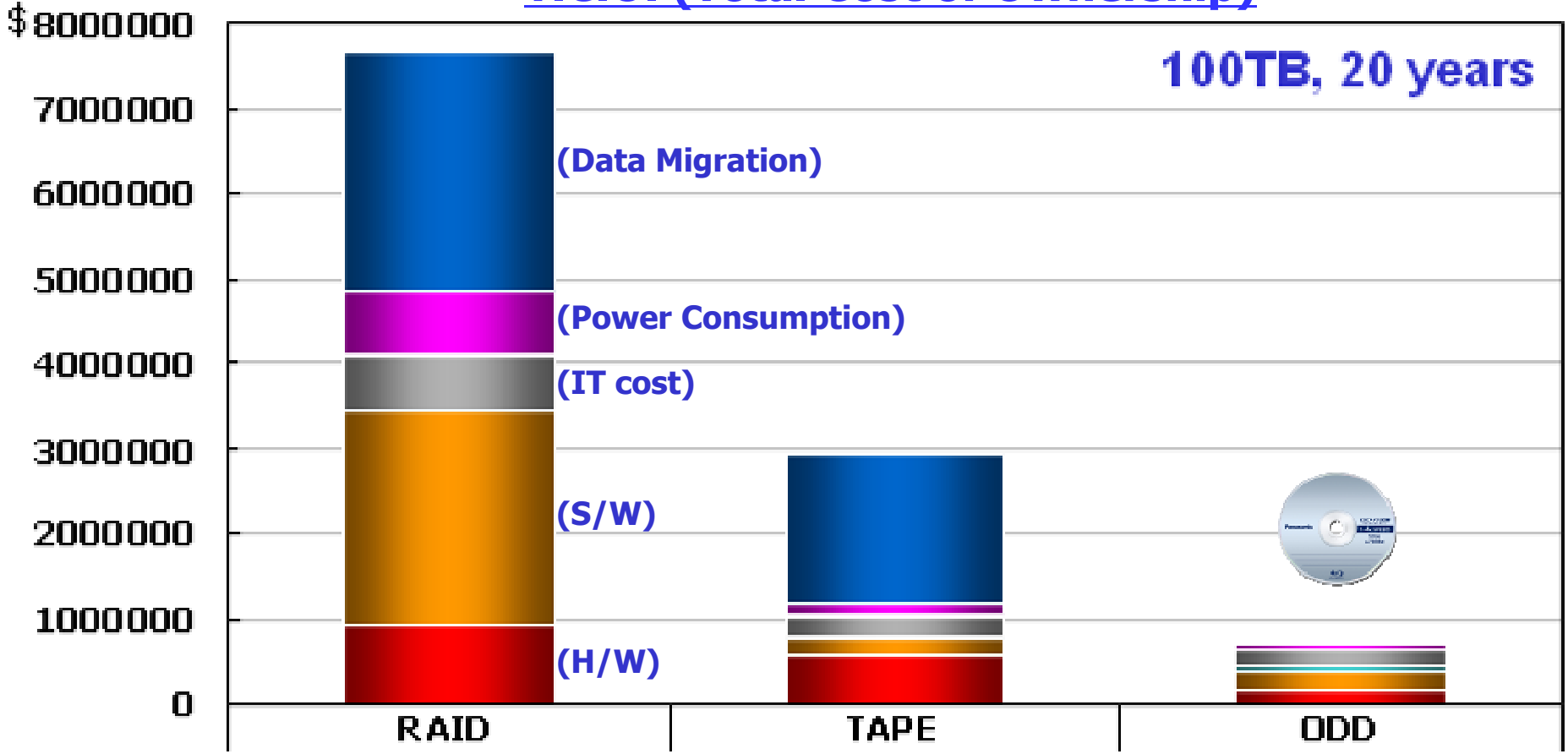
Replacing HDDs creates mountains of junk

Rolling hardware and replacing failed HDDs,
obsolete SANs and NAS units,
creates mountains of junk.

Why Optical based Archive (3a)

- Real cost for Archiving is Operational Cost, not for H/W alone
- You need $3M for 5 migration cycles in 20 years (H/W & S/W)
- You need closed to $1M for electricity in 20 Years for 100 TB

T.C.O. (Total Cost of Ownership)

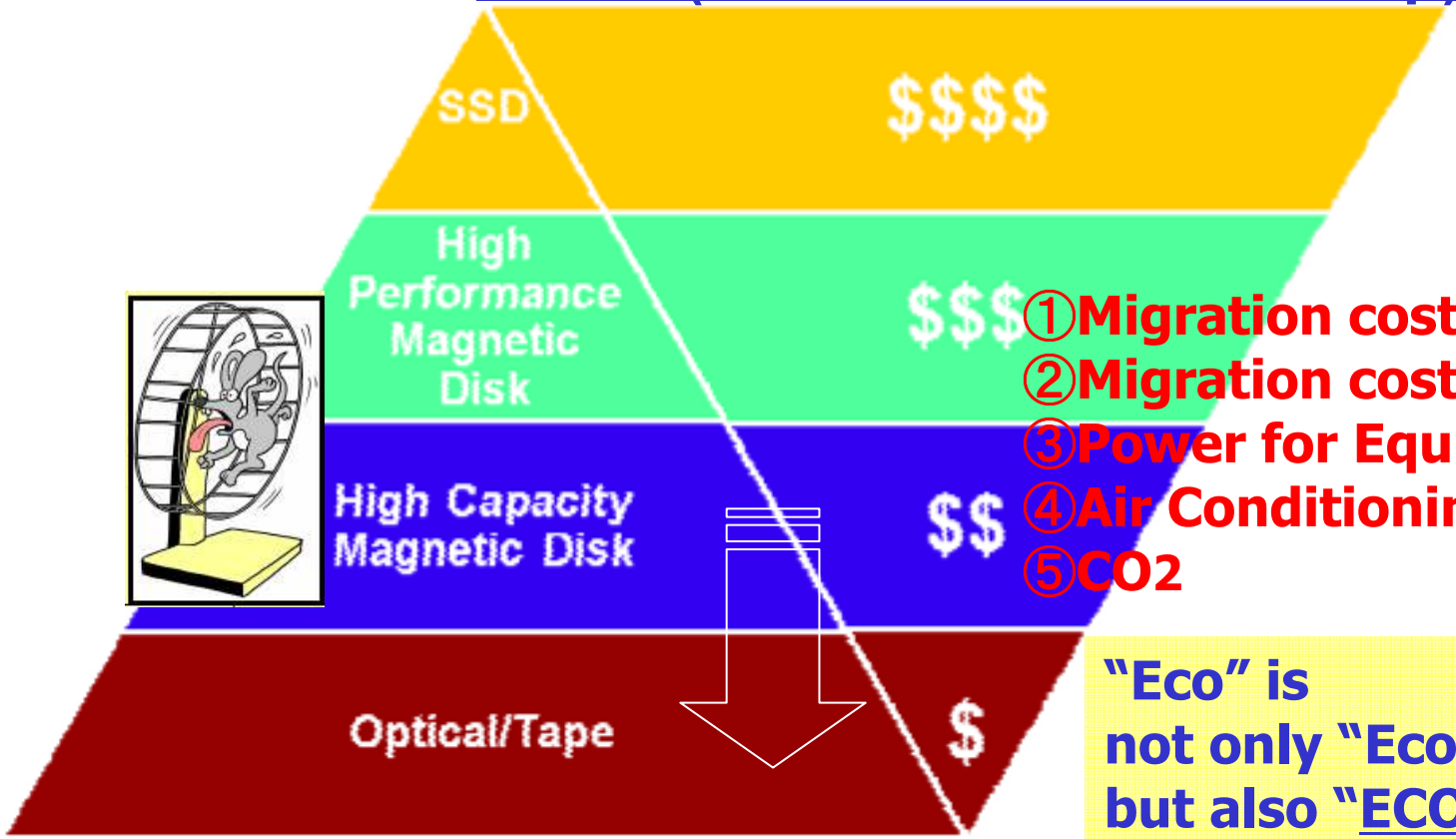


Source: Buckley's White Paper

Why Optical based Archive (3b)

- Real cost for Archiving is Operation Cost not for H/W
- Archive for 1,000TB requires 1000 person (Resource)
- Storage Operation cost in Wall St./NY : $300K/TB/Yr

T.C.O. (Total Cost of Ownership)



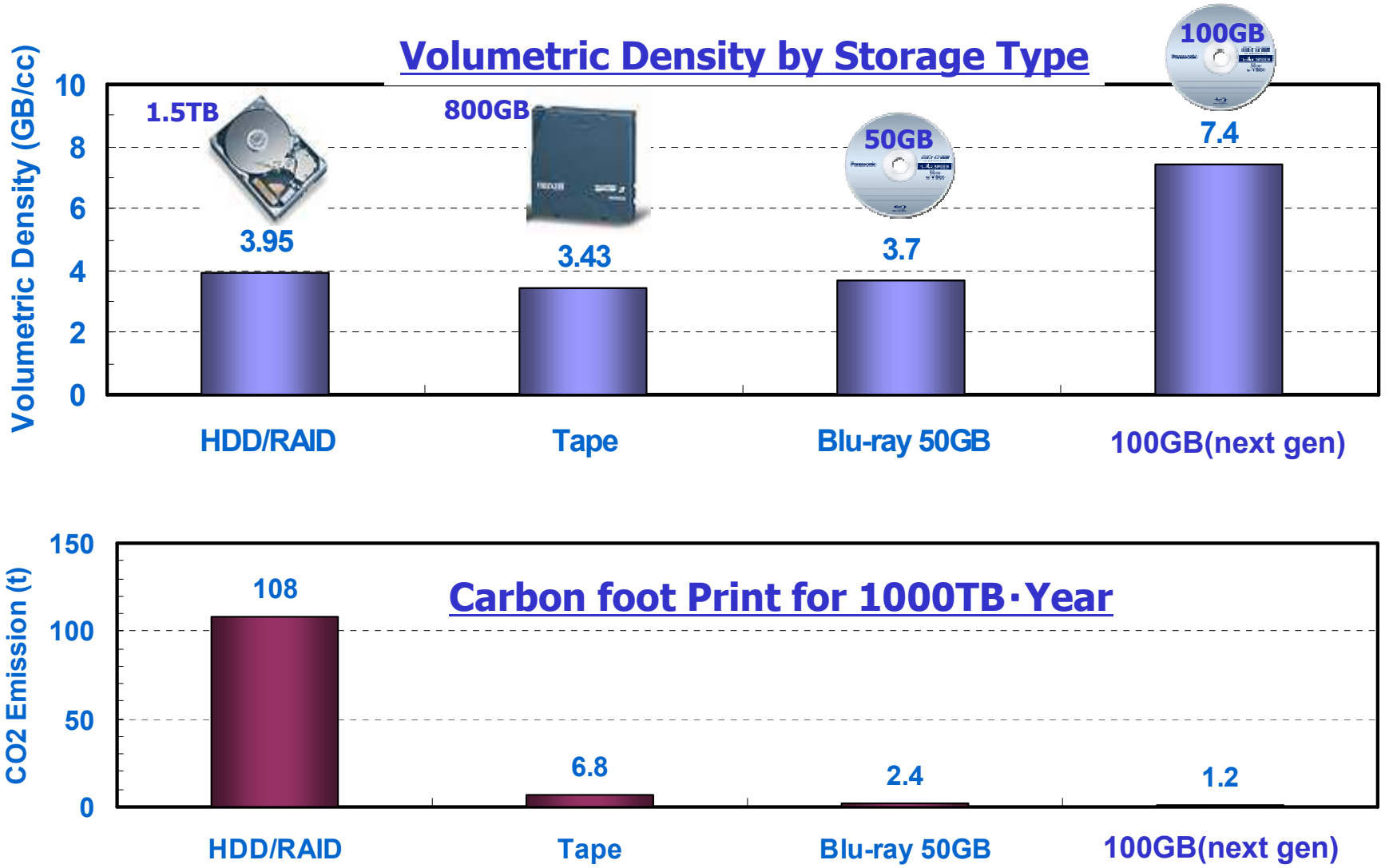
①Migration cost for H/W
②Migration cost for S/W
③Power for Equipments
④Air Conditioning required
⑤CO_2

"Eco" is
not only "Ecology"
but also "ECONOMY"

Source: IDC

Why Optical based Archive (4)

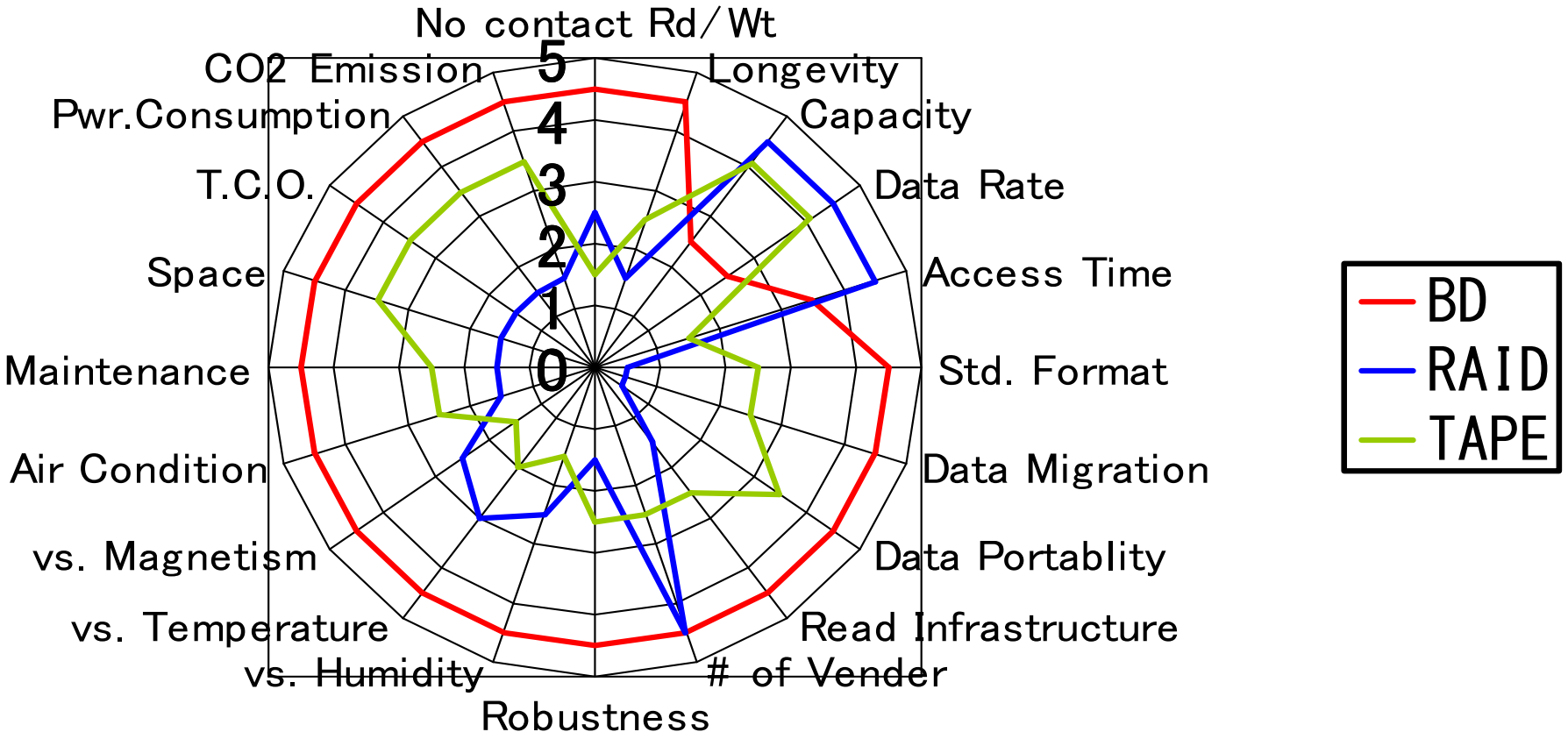
Optical advantage for Volumetric density & CO2 emission



Source： Panasonic

Why Optical based Archive (5)

BD has superior characteristics as an archive media



Source: Panasonic

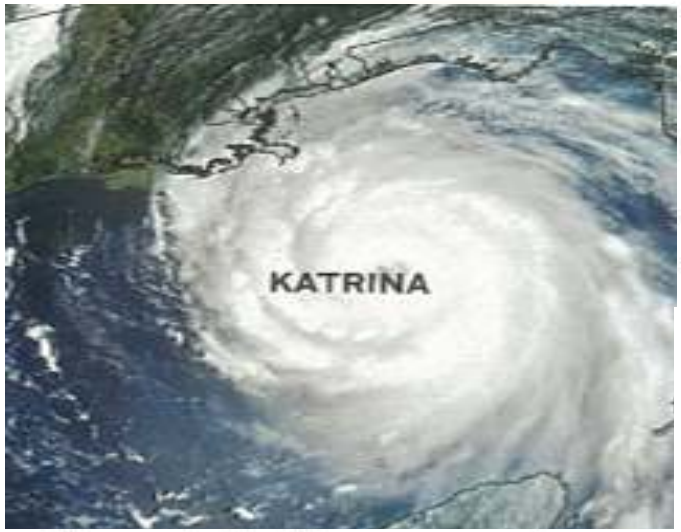
Why Optical based Archive (6)

 **Soft Archive** (migration)	 **Hard Archive** (Migration less)
Mechanical media (MTBF)	**Disc solid media** (No MTBF)
Short-Life (migration, drive obsolescence)	**Long-Life** (migration less)
Powered (24hr/365d) (Powered/CO_2 Archive)	**Power-less** (No Power Archive)
Air conditioning req. (with CO_2)	**No Air conditioning** (with out CO_2)
High T.C.O.	**Low T.C.O.**

Why Optical based Archive (7)

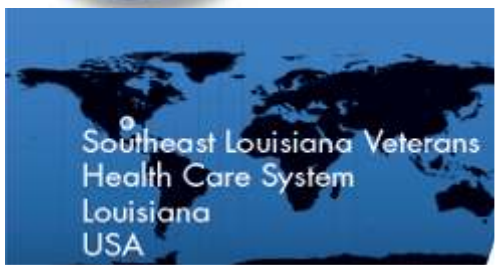
- Hurricane [Katrina] in Aug.2005, Data in VA hospital in Louisiana
- All medical records from hospital were destroyed or severely damaged
- 98% of the data in Optical disc recovered, data in HDD & Tape are dead after a month later in the high temperature & humidity mud & dirty water

Hospital's Data Survives Hurricane Katrina



The Southeast Louisiana Veterans Health Care System (formerly the VA Medical Center, New Orleans) and its outpatient clinics located throughout southeast Louisiana are committed to providing high-quality, compassionate, and safe health care to the more than 220,000 veterans who live in the 23-parish region they serve. The 354-bed acute care facility was affected by flooding following Hurricane Katrina in August 2005.

"The media had been exposed to extremely high temperatures and humidity from brackish standing water, they were covered in debris and dust for more than a month," said Allen. "We were able to recover all of the patient images off of the Plasmon libraries. We had just started to migrate to UDO™ (Ultra Density Optical) for an archive solution when the hurricane hit. We are now primarily using the Plasmon UDO Archive Appliance for its long-term recoverability."



Case of BD Archive Installation

National Institute for Fusion Science (NIFS) in Japan

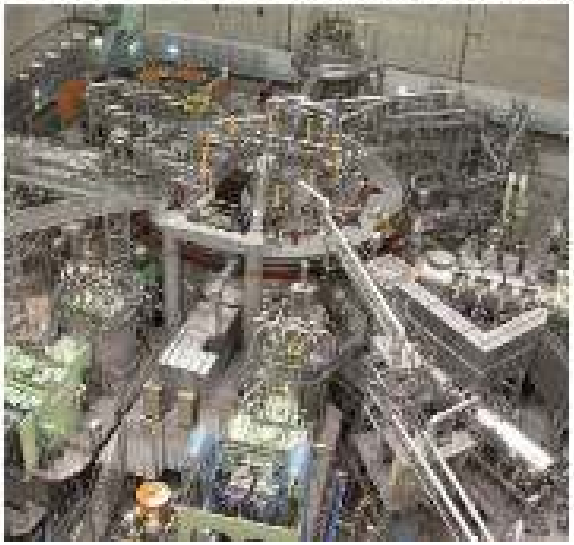
Blu-ray Discs are used to archive experimental data for fusion science.
The volume of experimental data is increasing 50% every year.

Points for Adopting BD

- Long term data preservation
- Future capacity expandability
- Low Power, Low CO_2.
- Total cost of ownership (TCO)

LHD Control Floor

Exp. Device Large Helical Device (LHD)



BD is the media with no power required for archiving
you can save Energy and reduce CO2 emission
and your operation cost drastically.
These are the differences with RAID/HDD
which require electricity 24Hr・365 days

contribute

Thank you
very much !