

# The Realities of Disaster Recovery: How the Japan Data Center Council is Successfully Operating in the Aftermath of the Earthquake

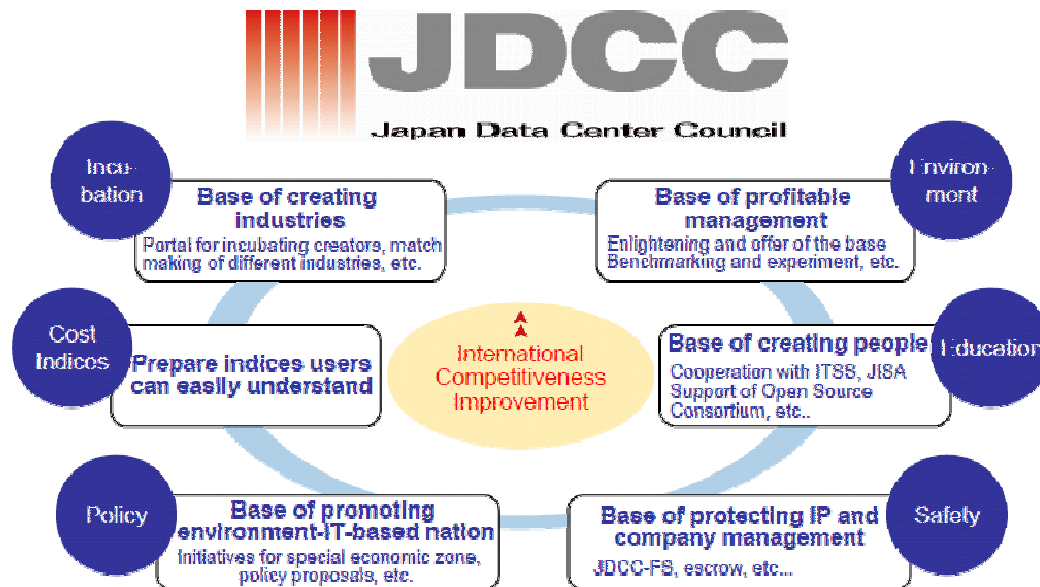
June 30, 2011

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## Agenda

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- JDCC Introduction
- 3.11 Disaster Overview
- Indirect Effects of 3.11
- What Really Happened to Japanese Data Center Industry
- What's Next?
- Lessons Learned
- Future JDCC Action
- Q&A



- Established in Dec. 2008
- 134 Corporate & Academic Members
- Working closely with METI, TGG, GIPC, ASPIC etc..

## 3.1 1 Disaster Overview

## 3 Major Elements of Disaster

- 1) Earthquake
- 2) Tsunami
- 3) Nuke Trouble

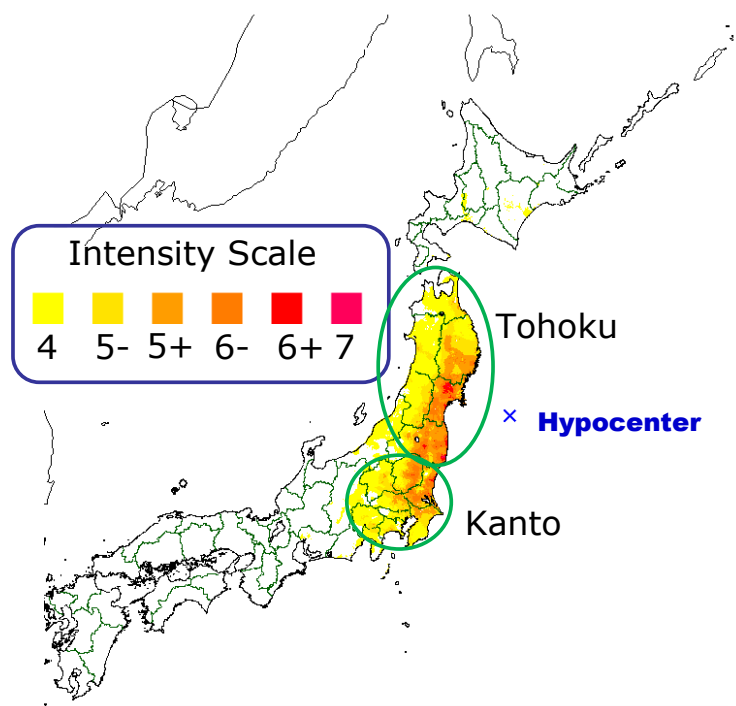


## ■ Earthquake

Mainly Affected;

- Tohoku Region
- Kanto Region

**Intensity Differs  
by Regions**



Source: The Meteorological Agency

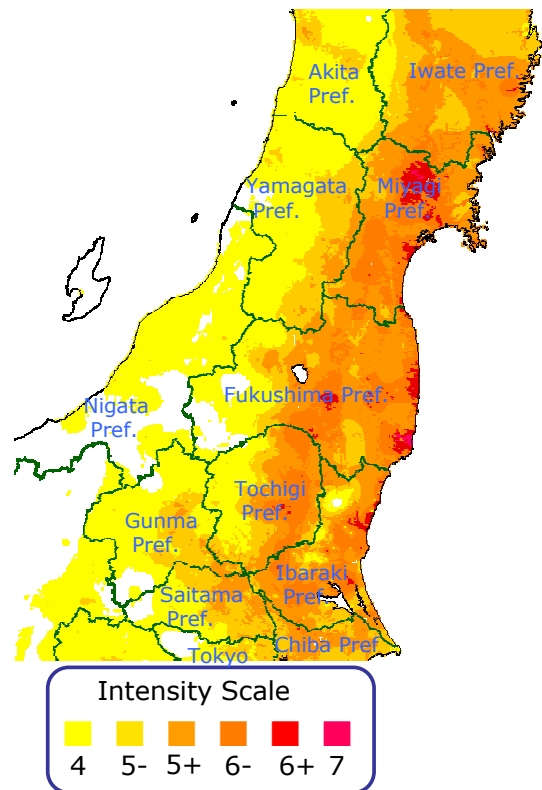
## ■ Earthquake

Source: The Meteorological Agency

Pref. with High Intensity  
(5+ to 7)

- Iwate
- Miyagi (Sendai)
- Fukushima
- Ibaraki

Pacific Ocean Side with  
High Intensity

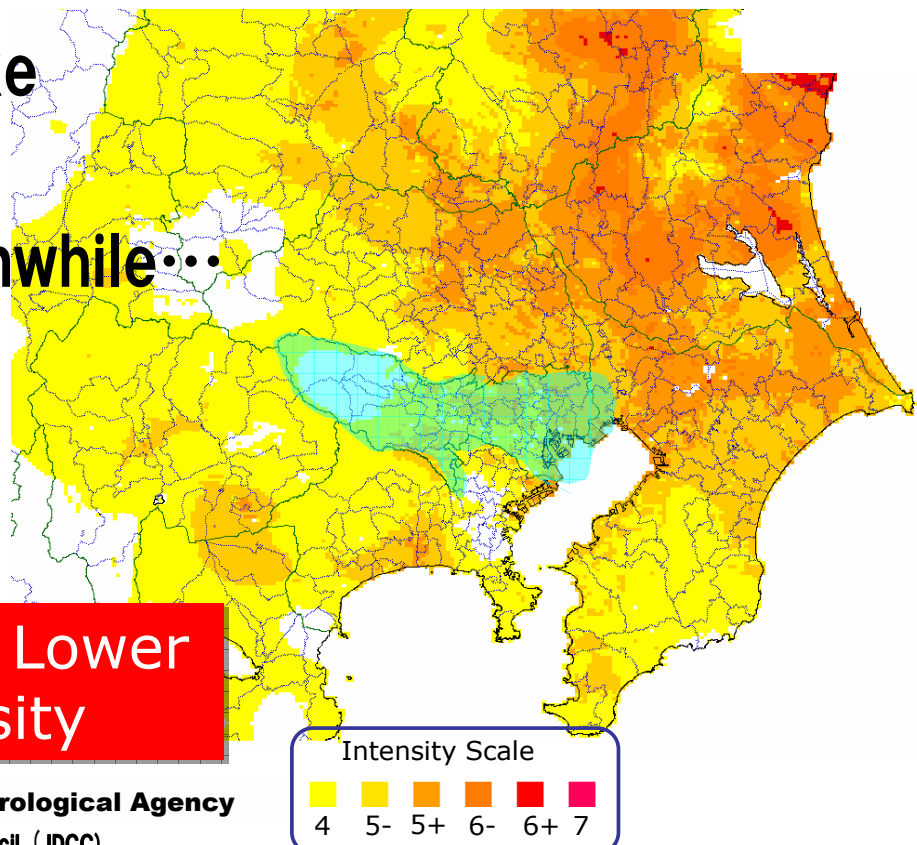


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## ■ Earthquake

Tokyo meanwhile...  
(5- to 5+)

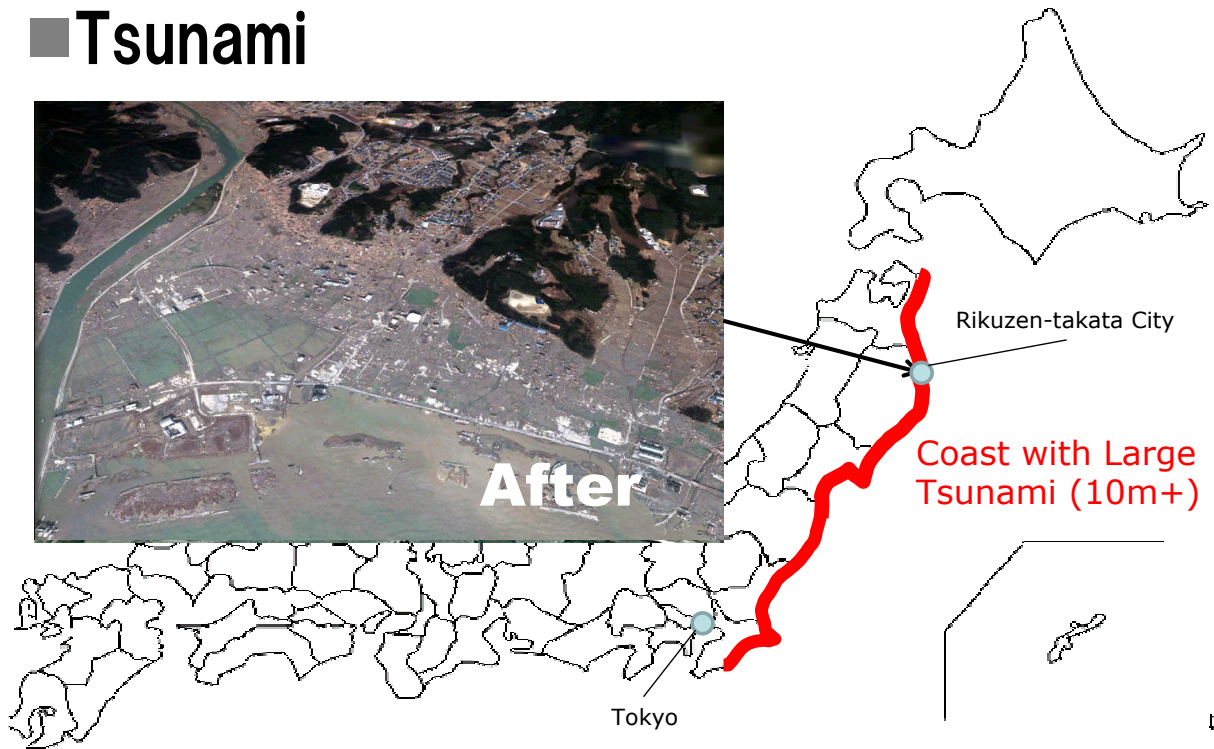
Relatively Lower  
Intensity



Source: The Meteorological Agency

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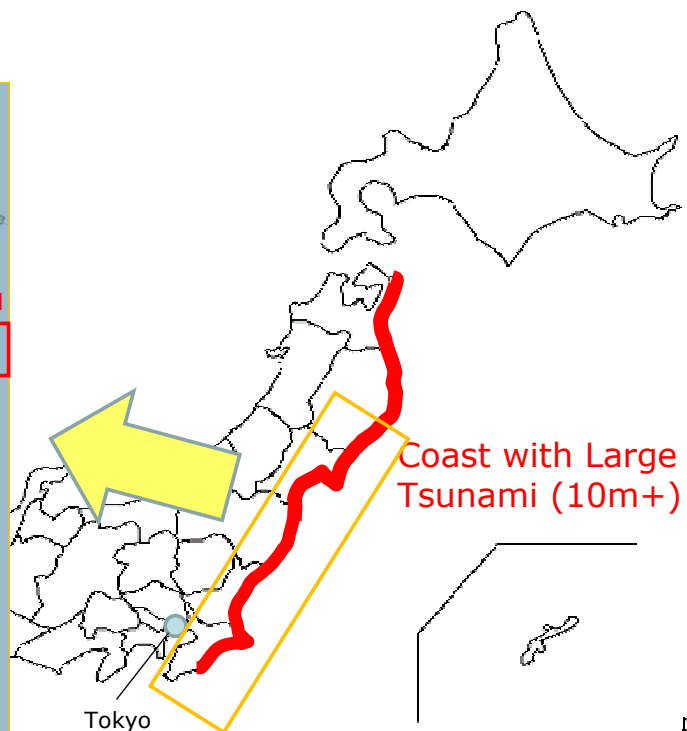
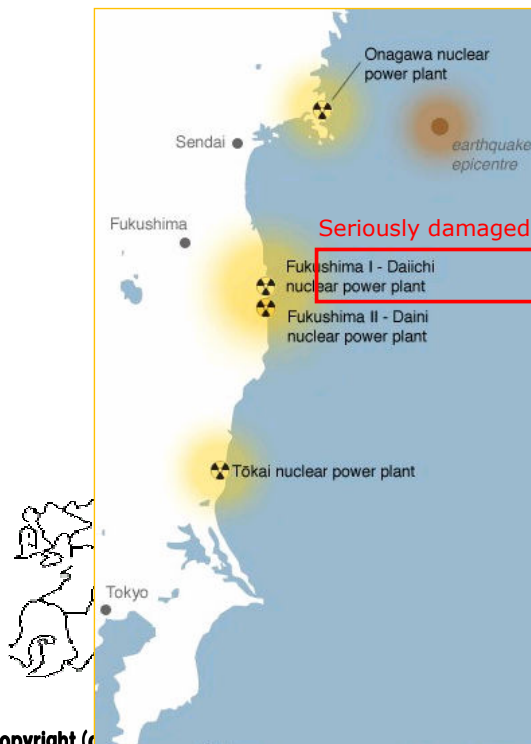
## Tsunami



Source: Port and Airport Research Institute

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## Nuke Trouble



Source: Greenpeace

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# Indirect **Effects** of 3.11 Disaster

## Indirect Effects of Earthquake

### ■ Electric Power Shortage

- **Nuclear & Thermal Power Plants Stopped**
- **Great Portion of Power Generation Capacity Lost**
- **Rolling Blackouts (3/11-3/15)**
  - ・ Only for Pre-planned **areas**
  - ・ Stable so far, **Pumped-up hydro activated**

## ■ Temporary Shortage of Various Products

- Tohoku Region: many factories damaged
- Logistic Stopped or Delayed
- Products were Assigned according to Priority
  - ・ Temporary Heavy Shortage in:
    - Fuels
    - Power Cables
    - Products with Semi-Conductors inc. Servers



# What Really Happened to Japanese Data Center Industry?

## ■ Reported DC Damages

Surprisingly...

**No Critical Damages**  
reported so far

Common minor damage reported:

- Non critical cracks on painted wall surface

## Why No Critical Damages in DCs?

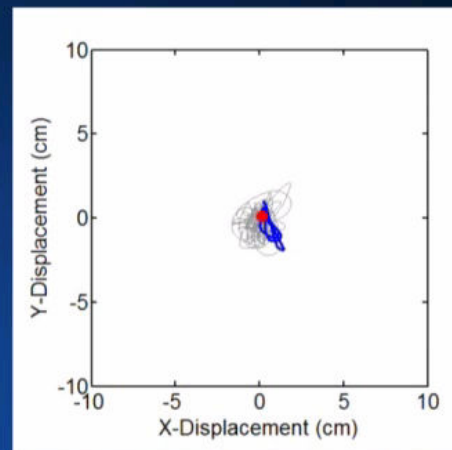


## ■ Earthquake-proof Building

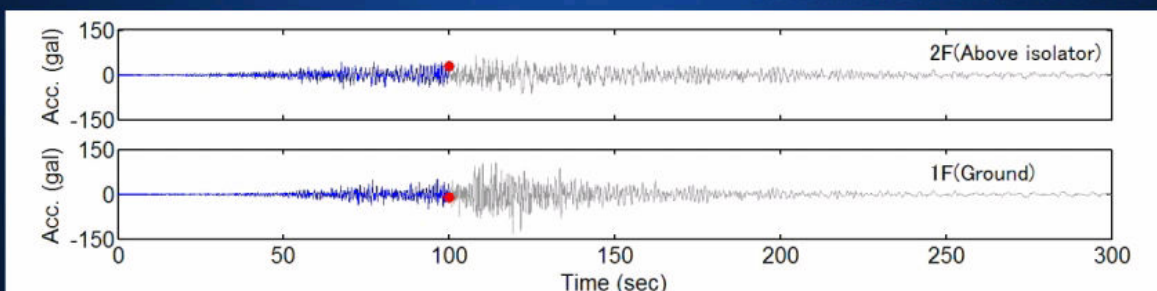
- Stringent building code Required by Law
- DCs are Designed to be “Above the Law”
- Earthquake Proof Technology
- M&Es/Racks are firmly bolted to Building



Motion video of the isolator



Locus of the horizontal deformation of the isolator

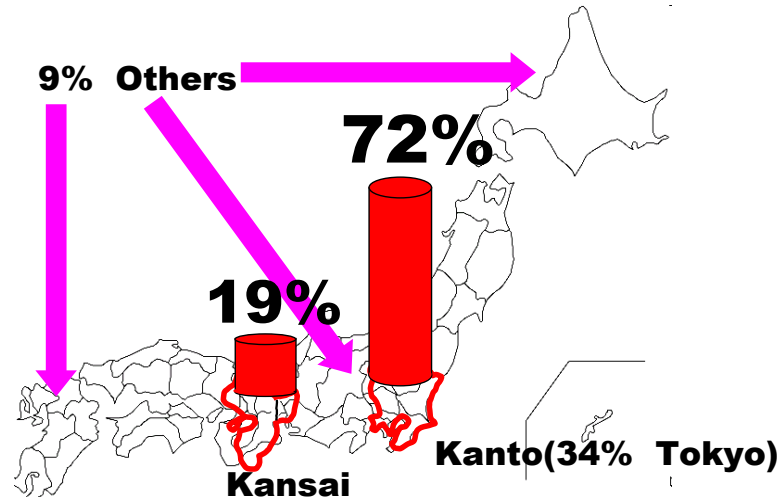


Acceleration waves on the second floor and on the ground

**Source: Shimizu corporation**

## ■ DC-concentrated Regions

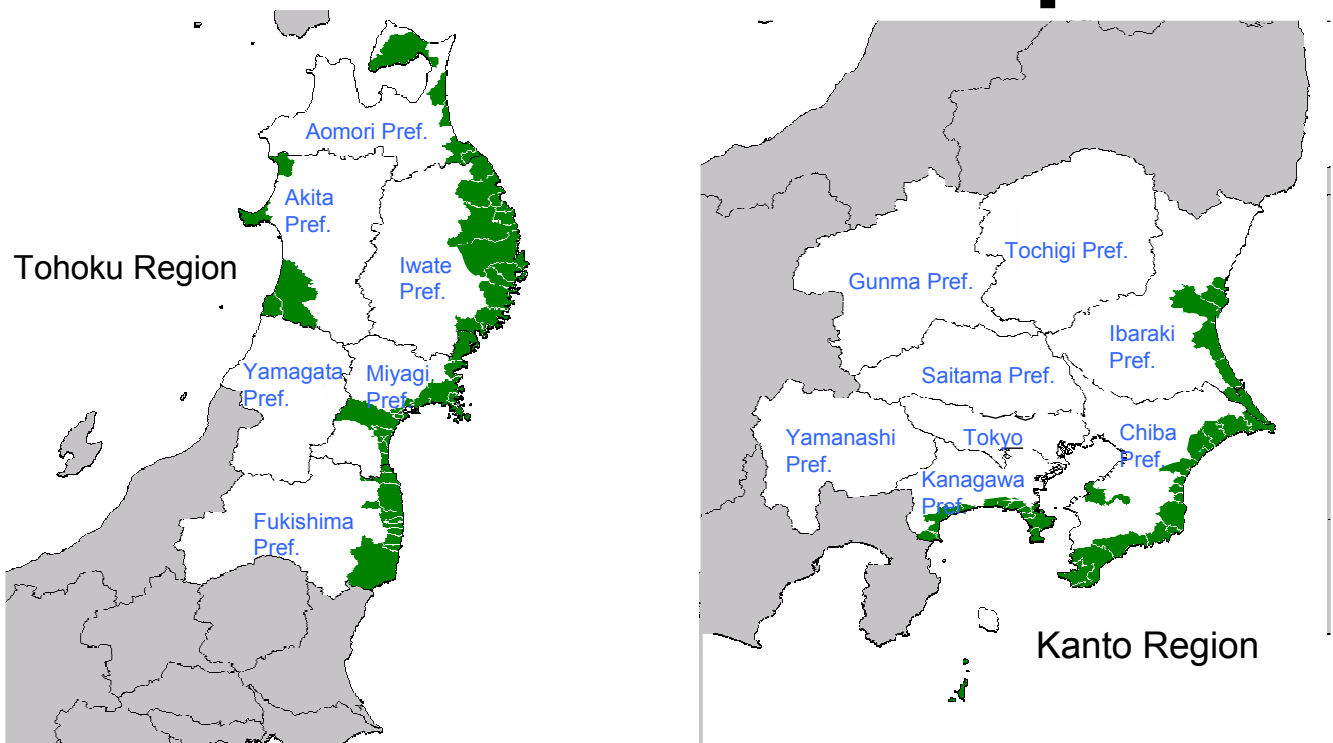
- JP DCs are mainly located in Kanto & Kansai regions
- No major commercial DCs in Tohoku Regions
- Predicted dangers in Tohoku, with coastline risk



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Source: Data Center Complete Guide 2009 | 19

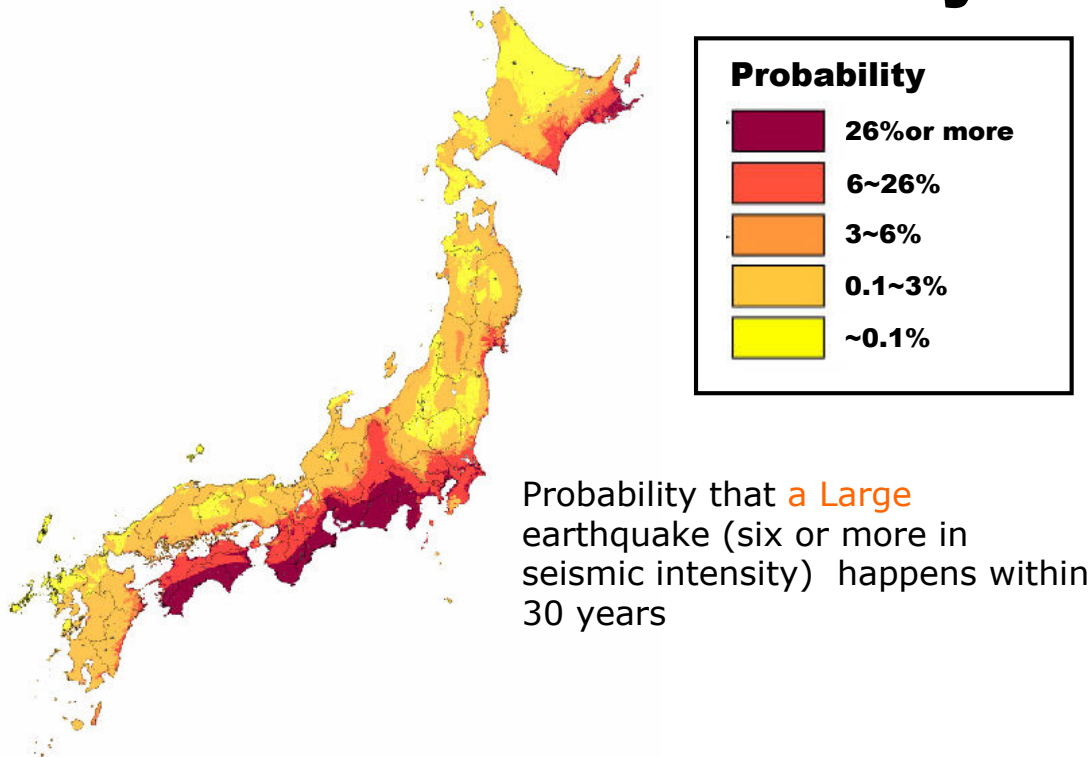
## Tsunami Hazard Map



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Source: The Geospatial Information Authority of Japan

# Large Earthquake Probability Map



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Source: J-SHIS

## What Really Happened to Japanese Data Center Industry

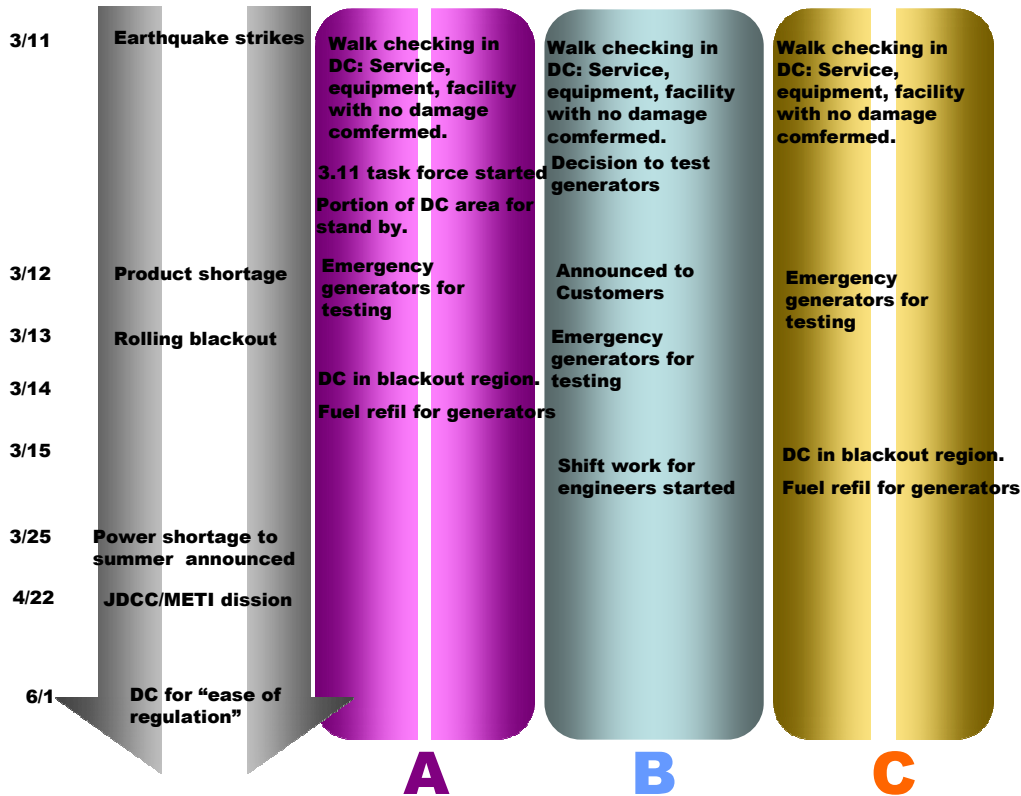
### ■ Generators/UPS Worked

### ■ Readiness

- Regular Drill
- Own fire-fighting organization
- Education and Licensing
- Live with Earthquake



# What Really Happened to Japanese Data Center Industry



# What Really Happened to Japanese Data Center Industry

## JDCC' s Action for Power Shortage

# What Really Happened to Japanese Data Center Industry

## ■ Electric Power Shortage for Summer

- Original Pre-announcement from Gov.
  - Compulsory Power Usage Limitation by law (a.k.a Chapter27)
  - Premises with 500kW or above use **MUST** cut daytime power use by 15% compared to that of last year
  - Heavy fines for Violators (\$12,500 per hour of violation)

===Unique circumstances for DCs in general:===

- More Power Usage than Last Year, especially for Young DCs
  - Many Companies moved servers to DCs after 3.11
  - Too much **risk** for daily use of Emergency Generators
- Many DCs already optimized cooling and maximized **for** efficiency

DCs “physically” cannot follow the original plan from gov.  
⇒ JDCC stood up for seeking solution

# What Really Happened to Japanese Data Center Industry

## ■ Electric Power Shortage **in** Summer

- **Showed** all technically possible ways of power saving with associated risks to Gov.
- **Showed** how DCs actually contribute power saving in macroscopic view to Gov.
- **Showed** power breakdown data & analysis to Gov., showing there is not much room for saving.
- Published “**Power Saving Manual**”, distributed free for DCs to encourage every possible power saving we can.

Finally DCs are designated for “Easing of Regulation”

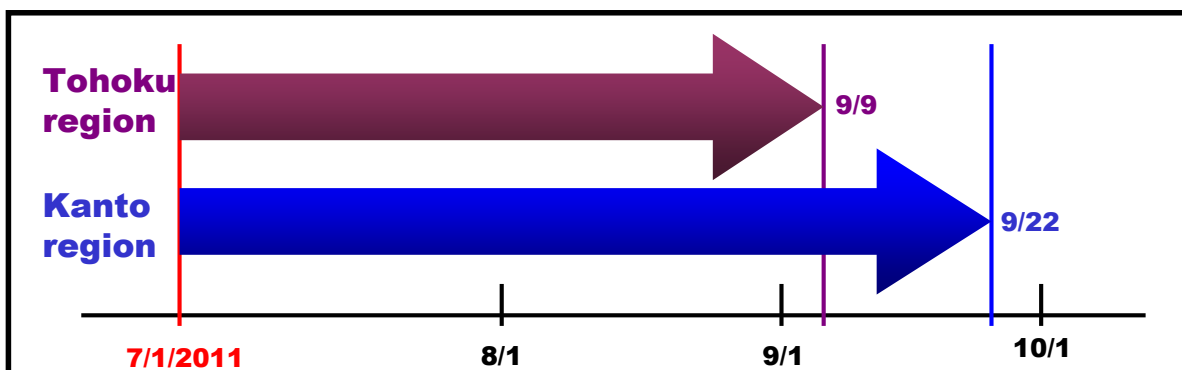
DCs are obliged to save 0%, 5%, 10% or 15% depending on  
“Last year’s rate of change in power usage”  
(Flatter the better for DCs)

# What's Next?

## What's Next?

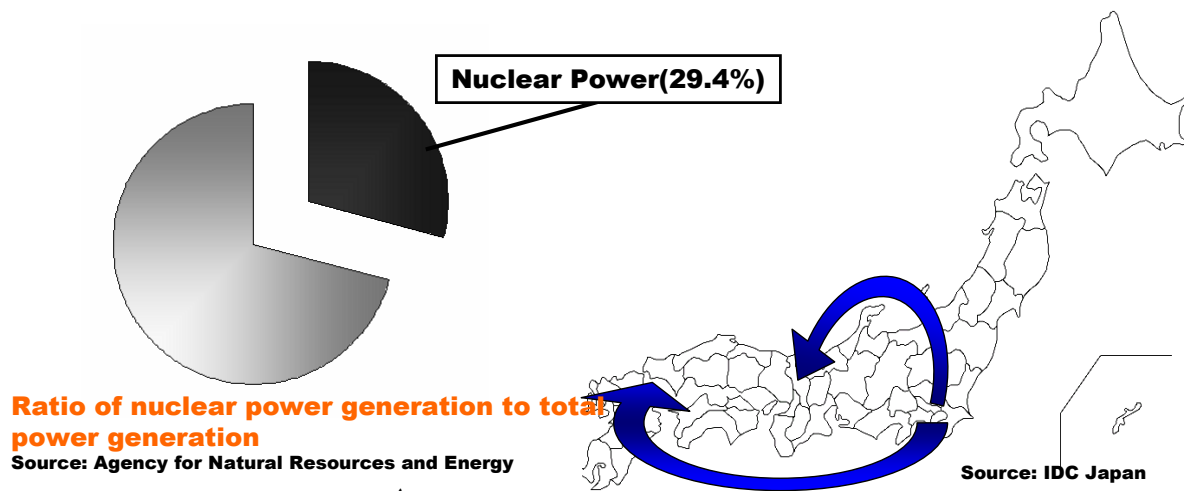
### ■ Electric Power Saving Order from Government in Effect

- So called “Chapter 27” will be in effect on July 1
- The regulation will be in effect through this summer
- If fails, pre-planned blackout happens again for some regions
- DCs are all on alert this summer with efforts on power saving



## ■ Possibility of Long-term Power Shortage

- If power generation capacity cannot recover **by** next summer, “Chapter 27” will be in effect **again next year again**
- It depends on **restarting** nationwide nuke power plant
- To minimize risks, de-concentration of DCs **accelerating**



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## ■ Redesigning of BCP/DRP

- Most companies had certain level of BCP/DRP
- However, many “Unexpected” & “**Underestimate**” existed
- Redesigning of BCP/DRP with lessons **learned** from 3.11

# Lessons Learned

## Unexpected & Underestimated

## Lessons Learned

### ■ Communication Difficulties; tools worked and not worked

#### ● Tools worked

- **SNS:** Twitter, Facebook, etc.  
("spreader of rumors" as a byproduct)
- **Web:** Message Board
- **Satellite Phone**

#### ● Tools NOT worked

- **Fixed line Tel:** Saturation / Call Limitation / Line Cut
- **Mobile Phone:** Saturation / Call Limitation / Antenna Trouble
- **SMS:** Long Delivery Delay
- **Email:** Long Delivery Delay



## ■ Transportation:

- NOT worked

- ・ Train: Stopped
- ・ Bus/Car: Heavy Traffic, Highway Closed

Many Unable to  
Go Home or Office



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## ■ Goods

- Needed but difficult to obtain

- ・ Fuels for generator: “Priority” of Priority contract problem  
Logistic Delay due to traffic
- ・ Power Cable: Priority given for Tohoku region
- ・ Servers: (Made in JP) Factories damaged

- Needed but unexpected

- ・ Accommodation: People unable to go home  
(Many customers visited DCs)

## ■ Other Unexpected & Underestimated

- Announcement to DC customers / Countermeasure to inquiries
  - ・ What/When/How/Who
- Action to avoid heavy workload to facility engineers
- Communication upon emergency
- Cooperation needs with Western DCs
- Fuel refill securement
- Procedure to cope with for long-term power shortage
- Countermeasure to possible power price hike
- Action guideline for nuke trouble / radiation
- General reinforcement of BCP as a whole

# Future JDCC Action

## ■ JDCC's Next Action

- More detailed survey planned after this summer on “3.11 effects for DCs”
- Wish to share with overseas
- Please tell me for “Things you want to know more”

# Wrap Up

- No Critical Damage for DCs so far
- Compulsory Power Usage Limitation (Chapter 27) in Effect
- DCs are **given** “Easing of Regulation”
- JDCC “Power Saving Manual”
- BCP/DRP not Enough
  - Many unexpected and **underestimated**
  - Acceleration of De-concentration of DCs (to western JP)

Hoping what we experienced from 3.11 would be  
in any way useful to DC operators in  
the US where they face earthquake risks like us

# Thank You

For listening,  
For helping Japan for recovery,  
& For all your thoughts and **prayers** for Japan

About JDCC: <http://www.jdcc.or.jp/english/index.html>

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