

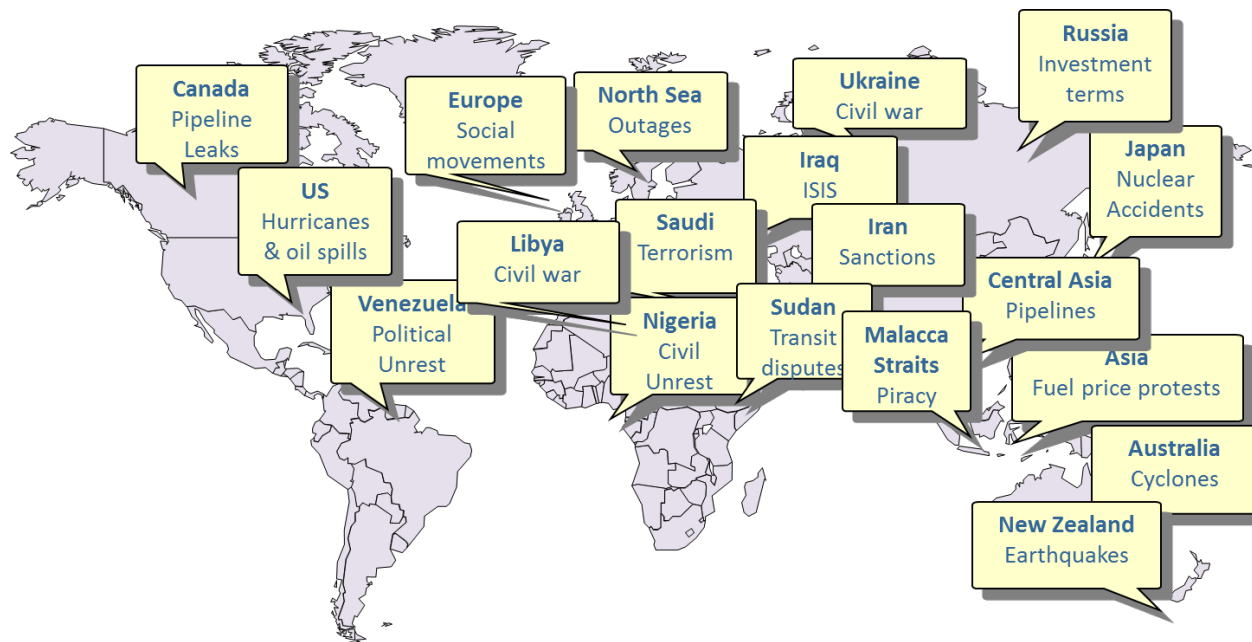
# Energy sector resilience

## Emergency response measures



# Energy security as urgent as ever

- **Countries must prepare for all forms of risk**
  - 3 IEA collective actions with 1 in response to weather-related (hurricanes Katrina & Rita in 2005)





# Energy security relies on markets

- **Market balances supply & demand smoothly**
- **Sufficient interconnections**
- **Diversity of supply (countries & fuels)**
- **Robust infrastructure for seasonal fluctuations (ports, pipelines, storage)**
- **Appropriate government regulations (e.g. public service obligations)**

# What can we do to increase resilience?

- **Flexible & efficient policies**
- **Communication, information**
- **Dialogue with partners**
- **Emergency Response Reviews**
  - Regular reviews of member & partner country emergency preparedness policies / procedures
- **Exercises**
- **Robust data**



# Real-life experience is priceless!

- **Gulf of Mexico, two similar sets of events:**
  - 2005 Hurricanes Katrina & Rita
  - 2008 Hurricanes Gustav & Ike
- **Similar effect, different market conditions**
  - IEA Collective Action in 2005, no action in 2008
- **Significant difference to consider:**
  - Better preparation based on experience -> faster expected recovery

# Brief overview of IEA emergency policy

## ■ Key tools for oil security:

- Increase supply: oil stocks (90 days)
- Decrease demand: demand restraint / management measures
  - Short-term can lead to long-term behavioral changes & fuel efficiencies (car-pooling, smart truck logistics etc.)

## ■ Gas and electricity security

- Different IEA remit (identify / share best practice)
- Monitoring, policy recommendations



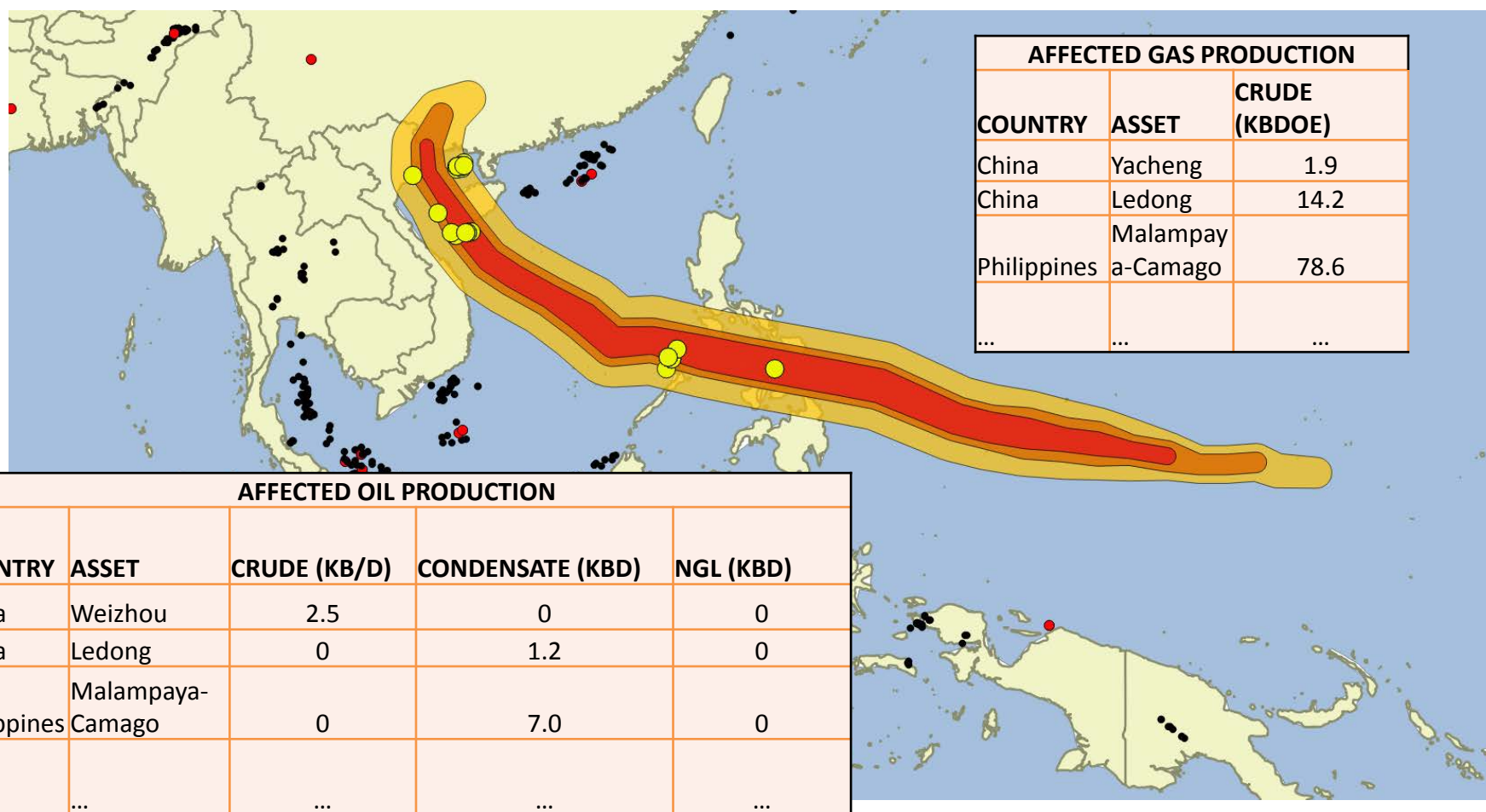
# Tools for resilience under development

- **Geospatial energy infrastructure disruption analysis**
  - Scrape weather/earthquake data
  - Combine with energy data
  - Perform spatial queries
- **Real-time alerts**





# Example of spatial analysis

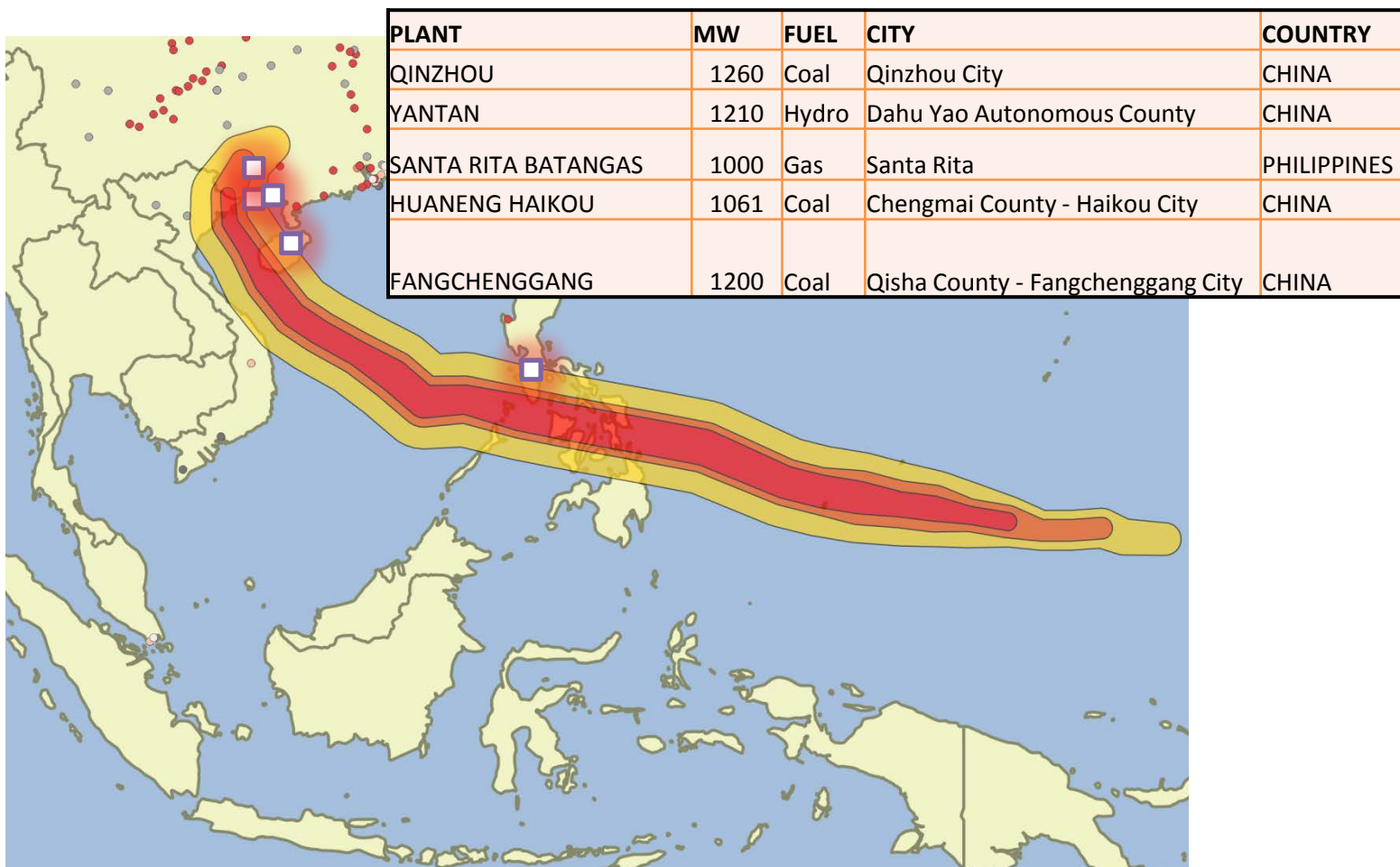




# Example of spatial analysis

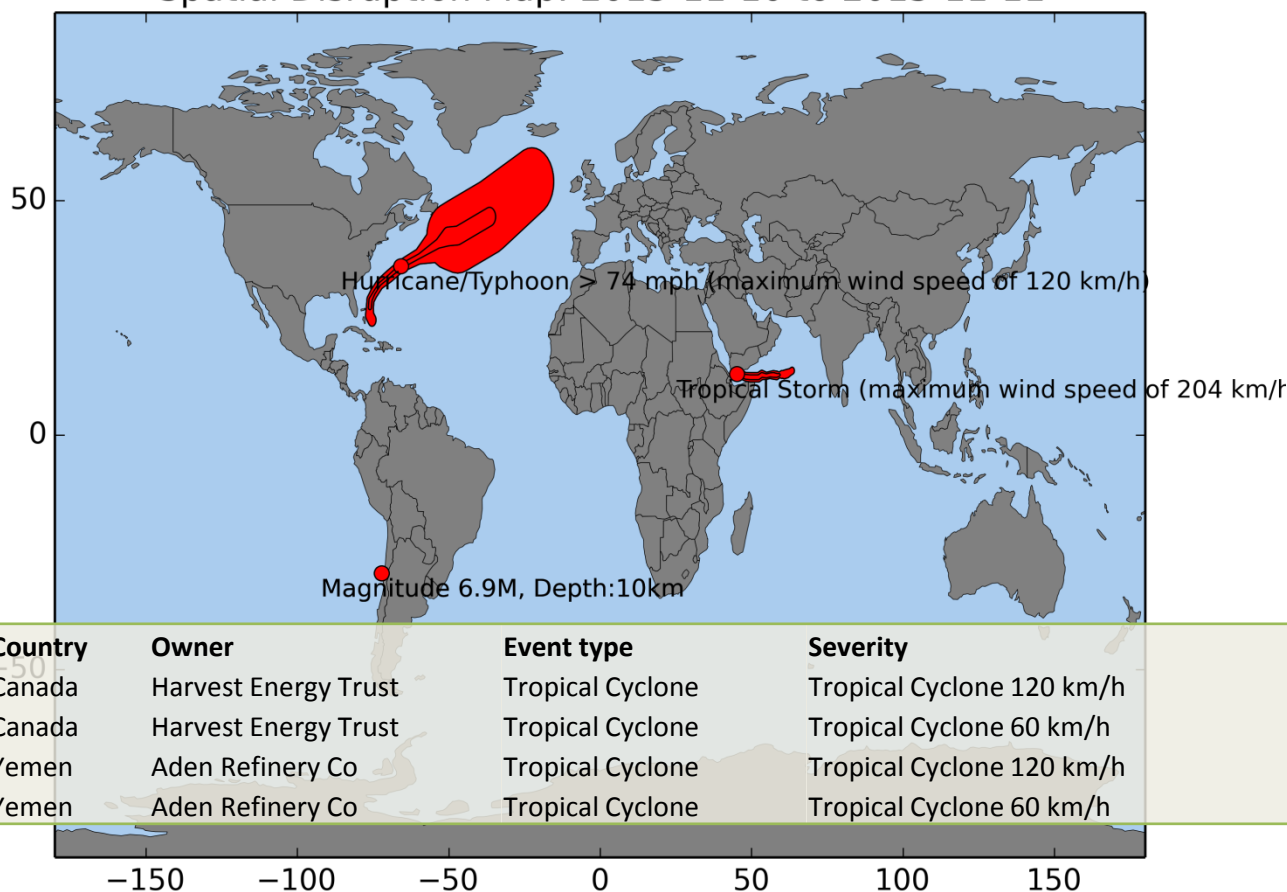
## Legend

- BFG
- COAL
- CWM
- GAS
- LNG
- OIL
- UR
- WAT
- WSTH



# Example of a recent alert

Spatial Disruption Map: 2015-11-10 to 2015-11-11



Asset	Country	Owner	Event type	Severity	Date
Come By Chance	Canada	Harvest Energy Trust	Tropical Cyclone	Tropical Cyclone 120 km/h	11-11-2015
Come By Chance	Canada	Harvest Energy Trust	Tropical Cyclone	Tropical Cyclone 60 km/h	11-11-2015
Aden	Yemen	Aden Refinery Co	Tropical Cyclone	Tropical Cyclone 120 km/h	10-11-2015
Aden	Yemen	Aden Refinery Co	Tropical Cyclone	Tropical Cyclone 60 km/h	10-11-2015

# Way forward

## Red alert for Tropical Cyclone HAIYAN-13

2013-06-11

Category 5 (catastrophic damage)

Maximum sustained winds: 315 km

[GDACS weblink for further information](#)



## Infrastructure at risk\*

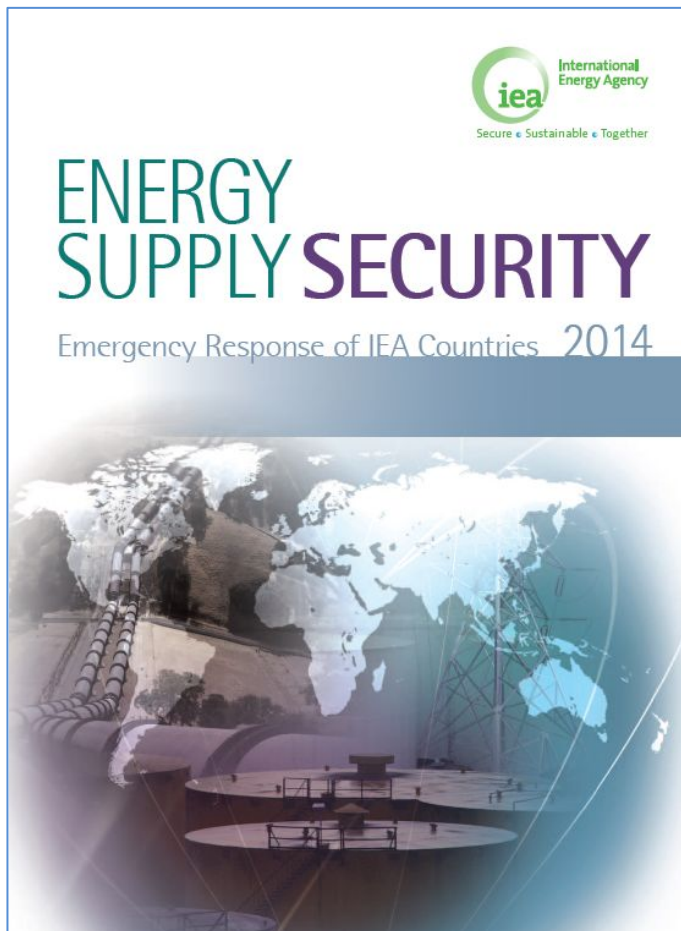
	Units	Severe	Moderate	Low	Total
<b>Oil production</b>	kbd (2014 production)	18	36	-	55
China		2	36	-	38
Philippines		17	0	-	17
Vietnam		-	0	-	0
<b>Refining</b>	kbd (ACD capacity)	40	643	-	683
China		40	360	-	400
Philippines			153	-	153
Vietnam			130	-	130
<b>Crude oil export ports</b>	kbd (2014 exports)	11	5	-	16
China		-	3	-	3
Philippines		11	1	-	12
Vietnam		-	2	-	2
<b>Crude oil import ports</b>	kbd (2014 imports)	-	550	-	550
China		-	398	-	398
Philippines		-	82	-	82
Vietnam		-	71	-	71
<b>Gas production</b>	bcmy (2014 production)	5	2	-	7
China		3	2	-	6
Philippines		1	-	-	1
<b>Liquifaction plant</b>	bcmy (2014 exports)	-	-	-	-
<b>Regasification plant</b>	bcmy (capacity)	-	-	-	-



# Conclusions

- **Energy security as urgent as ever**
- **Threats to energy security from many sources**
- **Efficient, transparent markets crucial for flexibility**
- **Government policies must complement efficient markets**
- **IEA helping members & partners to be ready**

# 2014 publication



Available for download at:  
<http://www.iea.org/topics/energysecurity/>

600 pages describing the emergency response policies for oil and gas of IEA and key partner countries.

Pdf files for whole publication and individual chapters.