

GLOTEC LatAm, Panama

14th March 2012

Panama

The Role of LPG in Natural Disasters

Nikos Xydas
WLPGA Technical Director
nxydas@worldlpgas.com



WORLD LP GAS ASSOCIATION
WWW.WORLDPGAS.COM

Particular thanks, for sharing with me information and materials, on recent natural disasters to:

- Mr. Makoto Arahata, Japan LP Gas Association
- Mr. Nobuo Kojima, Director for LP Gas Industry, Director for LP Gas Industry, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry, Japan
- Mr. Jun Matsuzawa, Chairman Japan LP Gas Association
- Mr. Greg Walker and Mr. Steve Wayne, PERC
- Mr. Jorge Montt, GASCO GLP S.A, Chile
- Mr. Neil Ormrod, ITO Europe Ltd and ITO KOKI Co Ltd



Natural Disasters are a Reality

- **Earthquakes**
- **Tsunamis**
- **Hurricanes, Tornadoes**
- **Floods**
- **Landslides & Mudslides**

- **Also**

- **Severe Thunderstorms/ Lightning**
- **Winter Storms / Ice Storms**
- **Large Scale Fires / Wild Fires**



Natural Disasters are a Reality

Earthquakes, Tsunamis, Hurricanes, Floods



Natural Disasters are a Reality

Earthquakes, Tsunamis, Hurricanes, Floods



Natural Disasters are a Reality

Earthquakes, Tsunamis, Hurricanes, Floods



Natural Disasters are a Reality

Earthquakes, Tsunamis, Hurricanes, Floods



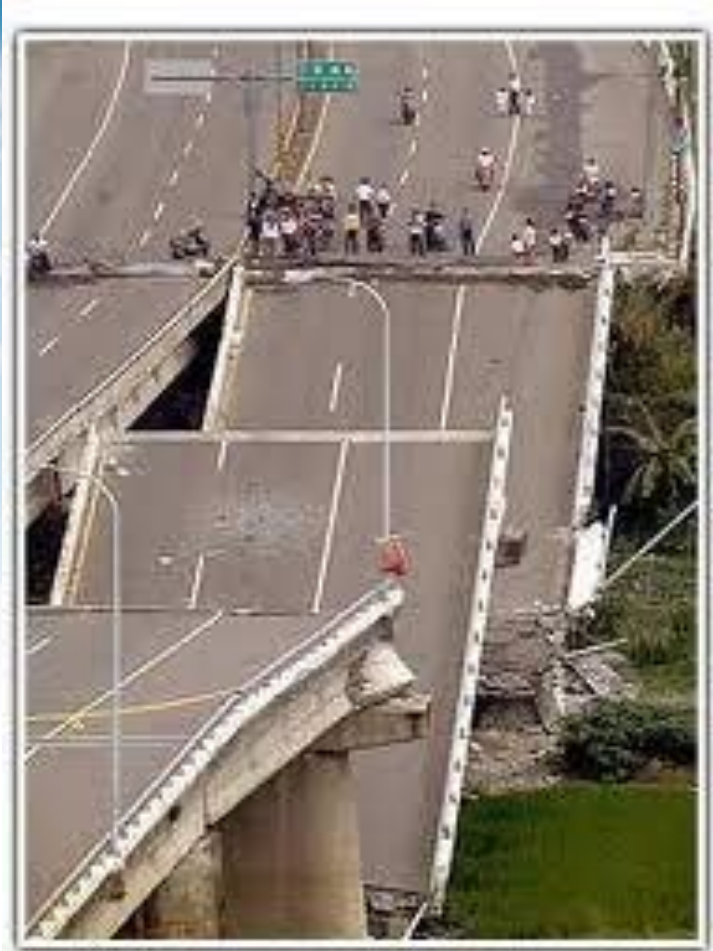
Natural Disasters are a Reality

Earthquakes, Tsunamis, Hurricanes, Floods



Natural Disasters are a Reality

Earthquakes, Tsunamis, Hurricanes, Floods



WORLD LP GAS ASSOCIATION
WWW.WORLDPGAS.COM

Natural Disasters are a Reality

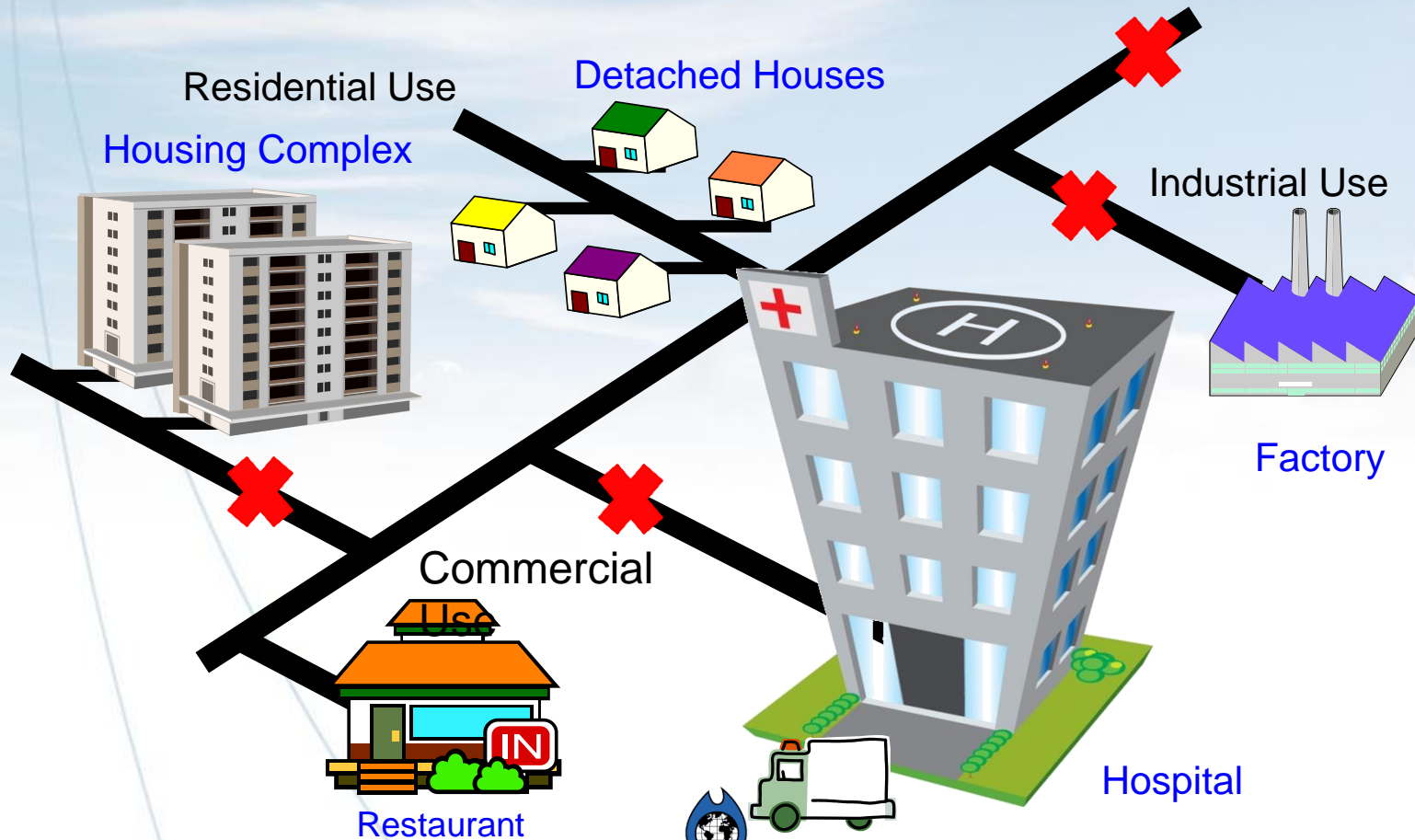
Earthquakes, Tsunamis, Hurricanes, Floods



Natural Disasters are a Reality

Some key issues / problems just after a natural disaster

- Power / Energy supplies from centralized distribution networks are interrupted / lost
- Natural Gas networks get damaged



Natural Disasters are a Reality

Some Key Issues Problems just after the event

- **Power/energy to immediately activate recovery actions is not well available**
- **Power /energy at key emergency centers/facilities, hospitals etc. is lost**
- **Basic cooking, hot water, heating needs become difficult to satisfy (assembly/evacuation centers need energy to prepare food, cleaning and for heating)**
- **Emergency transport activities / logistics including taxis and private cars to transport people and deliver relief materials are compromised**

and always

- **Every hour counts in the urgency of the recovery activities to save people**



The contribution of LPG in recent natural disasters

LPG Cylinders and Equipment where energy is needed

LPG stock/cylinders and equipment were easily moved to the affected areas/locations



The contribution of LPG in recent natural disasters

LPG Cylinders and Equipment for cooking

LPG equipment were immediately deployed in assembly and evacuation centers to provide cooking



The contribution of LPG in recent natural disasters

LPG Cylinders and Equipment for power generation and for light

Light in hospitals and electricity with mobile generators



The contribution of LPG in recent natural disasters

Mobile Skid mounted Bulk installations

Skid mounted mobile bulk installations were moved quickly where they were needed



The contribution of LPG in recent natural disasters

LPG-Air (Propane-Air) mobile systems as Natural Gas replacement

LPG-Air (Propane-Air) systems were employed where Natural Gas supplies were down



LPG



The contribution of LPG in recent natural disasters

LPG-Air (Propane-Air) mobile systems as Natural Gas replacement



ITO KOKI CO.,LTD.

**2008
Technical
Grand Prize
by Japan Gas
Association**



WORLD LP GAS ASSOCIATION
WWW.WORLDPGAS.COM



The contribution of LPG in recent natural disasters

LPG-Autogas, a reliable fuel

LPG fueled or LPG dual fuelled taxis, private cars and utility vehicles kept running to transport people and deliver relief materials, when gasoline and diesel supplies were no more available



The contribution of LPG in recent natural disasters

Some quotations

- **“LPG has proven itself as a reliable and easily distributed, recovery energy source”**
- **“Thanks to the “magical” property of LPG, which allows users to have an energy stock, along with the fast response of the industry, LPG supply was almost uninterrupted.”**
- **“Up to 100 days it took Natural Gas to re-establish normal supply, 23 kms of pipeline were rebuilt, in the meantime 1.000 clients switched from NG to LPG”**
- **“Infrastructure: The high quality of LPG industry infrastructure suffered no major damage.**
- **“LPG as a source of energy was the first basic service to be available for all chileans after the disaster”.**
- **“LPG is one of the best energies in emergency situations because of its portability, flexibility and storing properties”.**



The contribution of LPG in recent natural disasters

Some quotations

- “During initial response period, **LPG stock was utilized for providing food and heating to those affected, thus saving their lives**”.
- “Amidst continued power blackouts, the local women’s fire-fighting volunteer group used **LPG at assembly hall to provide soup kitchen for 3 days immediately after the earthquake**, supporting 40 local households, especially elderly members of the community”.
- “Local survivors from the tsunami traveled across a mountain to evacuate at a community revitalization center, providing a soup kitchen immediately after the quake, using the center’s LPG cooking facilities that escaped damage. A total of 1,200 servings was provided for four days”.



Natural Disasters are a Reality

The advantages of LPG

- **LPG is a decentralized, off grid energy source - centralized energy distribution networks are more prone to failure during natural disasters**
- **LPG can be moved easily to the areas/locations where needed**
- **It supports easily first/basic needs of the affected population**
- **It supports well emergency/recovery backup activities and systems**
 - **Cooking appliances, facilities, with cylinders of bulk**
 - **Mobile LPG-Air systems to replace damaged natural gas networks/sources in vital buildings/uses (hospitals, top priority facilities, also industry)**
 - **Mobile heating and power systems (combined heat/power systems mCHP)**
 - **Mobile power electric generators**
- **As automotive fuel on autogas vehicles or dual fuelled autogas vehicles, it allows to keep them running when other vehicles stop**



Natural Disasters are a Reality

Be better prepared, give more room to LPG

Promote the use of highly efficient and safe LPG equipment

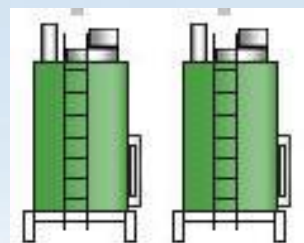


省エネ給湯器
eco-yo-yo



全センサー搭載
SI センサーコンロ

Promote fuel switching to LPG
(reducing at the same time CO2 emissions).



Promote use of Gas Heat Pumps (GHP) for heating / cooling to smooth out electrical load and decrease CO2 emissions.



GHP X AIR
GHP エア

Promote Fuel Cell (ENE-FARM) and Gas Co-Generation (ECO-WILL) for residential use.



家庭用燃料電池
ENE-FARM
ENE-FARM



エコウィル
ECO-WILL



Natural Disasters are a Reality

Be better prepared, give more room to LPG

Prepare disaster - bulk systems in advance at public evacuation shelters.



Prepare autonomous operation of co-generation systems, develop batteries which can operate during blackouts.



Promote the use of LPG as automotive fuel, more introduction of LPG vehicles to minimize the risk during disaster,



Natural Disasters are a Reality

Be better prepared, give more room to LPG

Promote LPG Hybrid Systems utilizing renewable energies more efficiently and stably with LPG high performance applications.

Residential fuel cells



Photovoltaic

Energy efficient gas water heater



Solar heat system



Natural Disasters are a Reality

Conclusions, Lessons Learnt

- **LPG has a significant position as a disaster-resilient distributable energy.**
- **Facilitates quick initial emergency response** in vital functions as effective lifeline, hence needs to be further established as an energy source
- The introduction of LPG is important as a **main or backup source in critical/vital public facilities** and services as hospitals, schools etc..
- **LPG infrastructure, supply/distribution points to be further enhanced** to make effective use of its role/advantages in natural disasters.
- **LPG stock in cylinders and bulk must be developed/kept**, easily movable to the areas that may need them. Consumers to keep adequate cylinders/bulk stock.
- **Stock of cooking/heating LPG appliances** must be adequate/ready for release in emergencies
- **Mobile skid mounted disaster bulk and cylinder systems** to be available/ready for release to vital locations, evacuation shelters, industry etc.



Natural Disasters are a Reality

Conclusions, Lessons Learnt

- **LPG-based applications/technologies** (LPG generators, LPG fuel cells, GHP etc.) **to be further promoted**, to mitigate electricity and natural gas supply issues in emergencies.
- **Mobile units** of the above to be available **ready for release** to affected areas
- **Autogas and dual fuelled vehicles** to be further promoted, fuel diversification
- **Energy policies** to be reviewed for LPG to play a more important role



Natural Disasters are a Reality

Conclusions, Lessons Learnt



Japan just commemorated one year of the tragic events

Natural Disasters Do Happen

LPG can play a Major Role in Recovery Activities



WORLD LP GAS ASSOCIATION
WWW.WORLDPGAS.COM

Thank you



WORLD LP GAS ASSOCIATION
WWW.WORLDPGAS.COM

Please do not forget The next World LP Gas Forum

Mark it in your Agenda Now
Our Silver Anniversary Forum

11th September – 13th September 2012
Nusa Dua, Bali, Indonesia


BALI 2012

**25th WORLD
LP GAS FORUM**
CONFERENCE & EXHIBITION

11-13 September 2012
International Convention Centre
Westin Resort
Nusa Dua
Bali
Indonesia

**SAVE
THE DATE!**

www.wlpgas2012.com


WORLD LP GAS ASSOCIATION
WWW.WORLDLP.GAS.COM