Power and Related Infrastructure

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Planning logistics:

After the Katrina hit Louisiana and the Gulf region, destructions of power and energy supplies imposed a sever impedance on almost all the efforts on the rescuing frontlines and following recovery. One of the unique features of Katrina aftermath is the prolonged lose of main grid power from several weeks to several months in all affected areas. Most of the liquid fuel based back-up power generation systems only last for few days at most. A continuous energy supply through, for example dedicated natural gas pipeline, may be a potential resolution to wind and flood damaged areas. These dedicated NG pipelines will need to be separated from the general residential and commercial pipelines which could be shut down to reduce fire hazardous.

This session will focus on the following subjects:

a. Main grid power
b. Effect of power and energy destruction to industries (gas & oil, petrochemical, chemical, etc.)
c. Effect of power and energy destruction to other infrastructure such as water, sewage, pump station, communication, sanitation, hospitals, etc) in the greater New Orleans area.
d. Potential solution of using Distributed Generation to mitigate part of the power-outage problems.
e. Continuous energy supplies during and after the storm including natural gas and other fuels
f. Applicability to natural or man-made disasters that could happen in other cities.

Discussion topics

<u>Infrastructure Destruction, Resilence and Survival</u>

1. How damaged were the existing power and energy infrastructure systems and what infrastructure functions were lost during and after the storm?

    - Main power grids
    - Natural gas pipelines
    - Others

2. How were the effects of power and energy destruction to local industries (gas & oil, petrochemical, chemical, etc.)

3. How were the effects of destruction and shut-down of local industries (gas & oil, petrochemical, chemical, etc.) to **national energy supplies**?

4. How were the effects of power and energy destruction to local industries (gas & oil, petrochemical, chemical, etc.)

5. How were the effects of power and energy destruction to other infrastructures such as water supply, sewage, pump station, communication (land phone, wireless phone, and cable internet), sanitation, hospitals, etc) in the greater New Orleans area.

6. What was the status of emergency power supply during the period immediately after the storm and during the phase of rescuing?

7. How resilient were the power and energy infrastructure systems? What infrastructure functions were lost during and after the storm?

8. What are the major lessons learned from Hurricane Katrina concerning power and energy infrastructure design and survival?

9. Are these lessons applicable to other regions susceptible to hurricanes?

Recovery

1. What new technologies are available to accelerate power and energy infrastructure reconstruction and to reduce the risk of a repeated flooding event?

2. What was the status of emergency power supply during the recovery phase?

3. Can "flood tolerance" in reconstruction substitute for "flood protection" in power and energy infrastructure design?

4. How can power and energy reconstruction be completed in a **timely** manner. What were the problems and obstacles impeding main power grid repair after the storm. How could these problems and obstacles be minimized in a future event less or more severe than Katrina?

5. Are there methods to accelerate power and energy infrastructure reconstruction using new technologies

Toward the Future

1. What new regulations and practices are needed to become flood-immunity? For example,
   (a) The power supply and generation systems, such as sub-station, transformers, back-up generators, are required to be placed above flood level or be protected from flood damage with water-proof walls.

   (b) The wireless communication tower shall have sufficient on-site backup power for a week or longer.

2. Could distributed generation (DG) be a potential solution to mitigate a large part of the problems when the main grid power is incapacitated? If yes, what should be done to make this happen?

   (a) How would fuel be supplied to the DG system continuously when road transportation is shut down and city NG gates are shut off to avoid fire hazardous?

   (b) Any change of regulations need to be made to accommodate DG installations?

3. What infrastructure is needed to protect the Louisiana ports and the nation's energy supply flowing from this region?

4. What emergency preparation plans for infrastructure should be developed to minimize the damage of future category 4 or 5 storms?

5. How important is the power and energy infrastructure be used to attract industry and business to the region?

6. How would the above discussions be applicable to other cities which could subject to similar scale of nature or man-made disasters.