



Vandalism – A challenge to Smart Grid in Developing Economies

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INTRODUCTION

- Smart Grid
 - Aply done
 - Focus is Electricity infrastructure & Telecommunication infrastructure
 - Software support (Data Management)

VANDALISM DEFINED

- Comes from name of ancient tribe invaded Rome 455 AD
- *Wilful or malicious destruction, injury, disfigurement or defacement of any public or private property without the consent of the owner or persons having custody or control*

TYPES OF VANDALISM

- Can be described based on the motives
- Such as:
 - Acquisitive
 - Motive is to acquire money or property
 - Tactical
 - Done as a conscious tactic
 - Ideological
 - normally oriented towards a social or political cause

TYPES OF VANDALISM-contd

- **Vindictive**
 - involves damage to obtain revenge
- **Play**
 - is carried out in the context of a game
- **Malicious**
 - expression of rage or frustration against a symbolic item of property.

ACADEMIC PERSPECTIVE- Theories

- Manageable Space theory
 - stresses on the role of management to make sure residents learn to seek out responsibility and even exercise significant creativity in participating in their communities.
 - argues that architecture should respond to people and the design must be responsive to human presence

ACADEMIC PERSPECTIVE-

Theories- contd

- Defensible Space theory
 - established that crime rates in high-rise buildings, where a hallway, lifts, lobbies, fire escapes were isolated from the scrutiny of the public, vandalism was higher than in low-rise buildings where there was scrutiny
 - vandalism is high where three major components of territoriality, natural surveillance and image were not available
 - Territoriality is creating sense of ownership and control by people to mark out and defend their own ground.

ACADEMIC PERSPECTIVE-

Theories- contd

- **Design & Kinetic Management Theory**
 - based on the principle of “least effort”
 - argues that criminals and victims find the shortest route, spend least time and seek the easiest means to accomplish something

CONVERGING OF THEORIES

- Territory, (*people defending their own ground or targets*)
- People or owners need to seek out & exercise responsibility
- Natural surveillance- (hinges on architectural design allowing potential target areas to be open space)
- Recognizing the role of design in preventing or scaling down vandalism. (including physical)
- Diverting flow of likely offenders or restricting them to where they can be monitored.

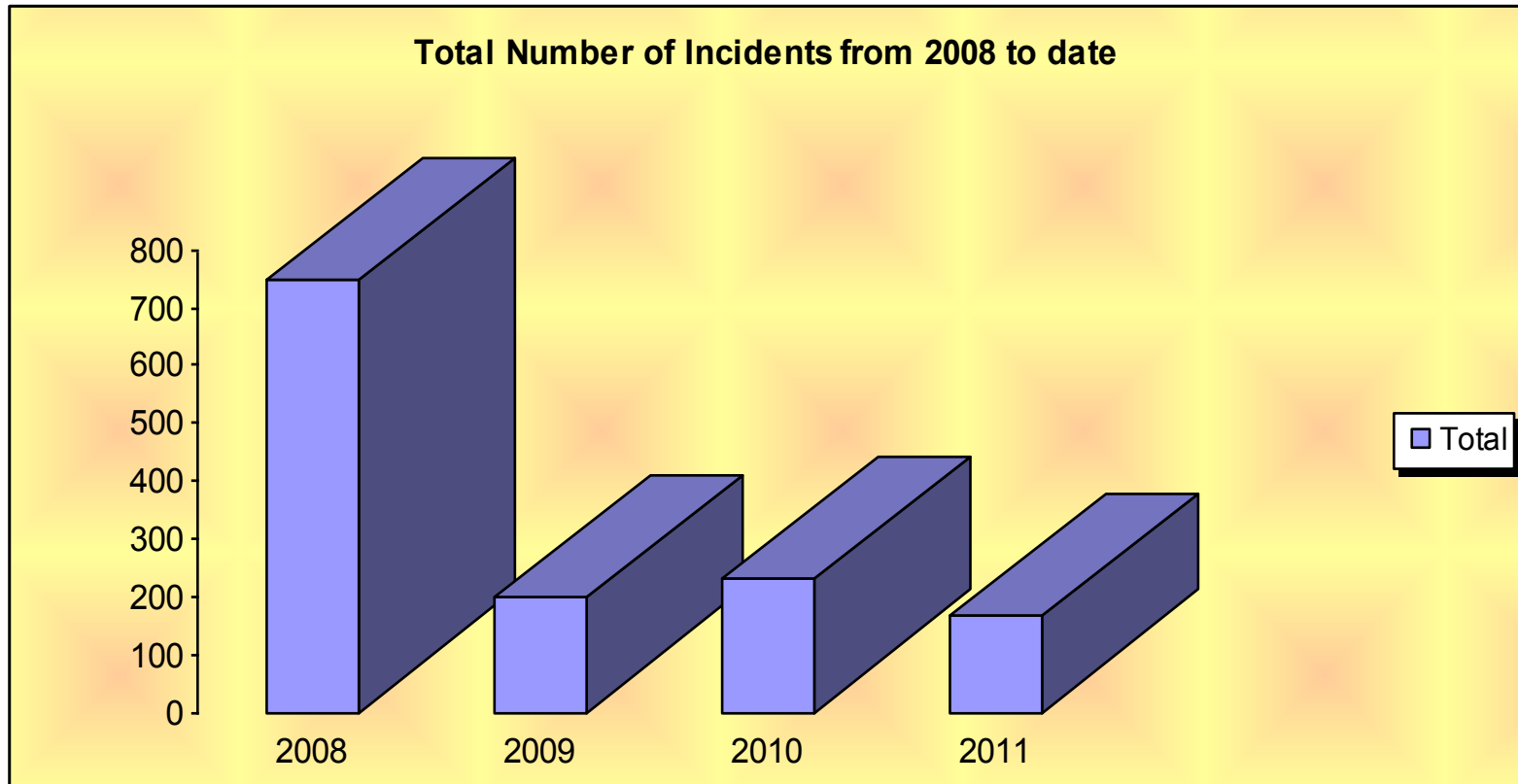
SITUATION IN DEVELOPING ECONOMIES

- Business Unit of the Power Holding Company of Nigeria, PHCN, said it spent over N20 million
- In Zimbabwe, ZESA is reported to have lost equipment worth US\$5 million to vandalism between January last year and February this 2011
 - cases of vandalism of electricity pylons also prejudiced the power utility to the tune of US\$400 000
- SADC acknowledges that the electricity infrastructure is vandalised and stolen from one SADC country and sold to another Country
- PIESA through WG has discusses issues of vandalism

MALAWI CASE –Telecom (MTL)

- Telecommunication
- Lost USD 721m in 2007 with 570 incidents
- Lost MKUSD 1.2 m in 2008 with 748 incidents
- Average cost/incident =USD 1,430

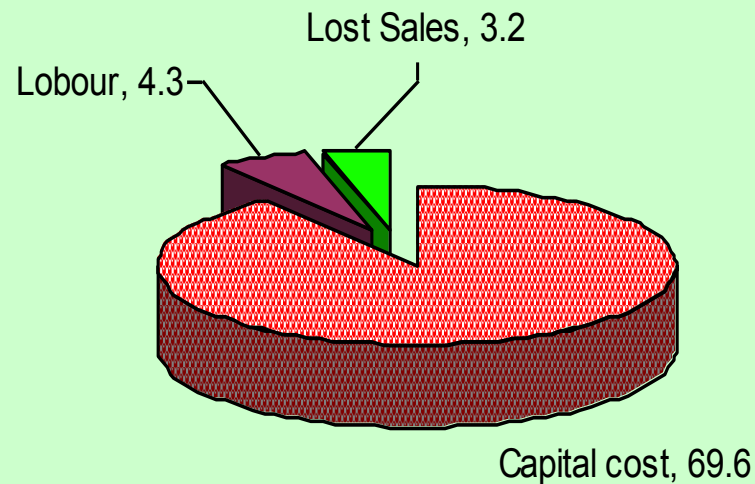
MALAWI CASE – Telecom industry (MTL)



Average of 300,000 USD lost annually

MALAWI CASE – Tx cost componets

Cost of Transfomer Vandalism (Mk million) - 2011



Capital cost Labour Lost Sales

Capital costs are major component

MALAWI CASE- impact

- 119,000 MK lost in tx vandalism in 2010
- 77,000 MK lost in tx vandalism in 2011
- Equivalent to 3770 connections lost
- Thus just close to 40% of last years performance
 - Thus distribution transformers costs only!!

WHY SO VULNERABLE?

- To access items that can easily be converted into cash.
- Item that are difficult to trace back once they enter the market are the most vulnerable.
- Perpetrators are organized and have fair knowledge of the industry.
- Apparent leniency on penalties meted out due to vandalism

SMART GRID CONSIDERATION

- **Territory/ Natural surveillance**
 - The vulnerable items should be
 - Located in places that are open to public scrutiny.
 - In places considered private or semi private
- **Responsibility**
 - Instilling responsibility in other stakeholders e.g
 - Community policing
 - Cross border corporation
 - Public awareness
 - Stiff deterrence measures for culprits
- **Physical Design**
 - This is essentially to achieve target hardening thus making the target very difficult to acquire e.g.
 - Very difficult to access
 - Very difficult to dismantle
 - Early Warning mechanism

CONCLUSION

- Vandalism is a challenge in developing economies
- Mostly done by organised gangs that sell vandalised items
- The impact of vandalism on Smart grid will be greater as it will be a combination of Telecom & Electrical equip.
 - Most crucial is the software and data management
- Utilities in developing countries need to balance between technical requirements and vandalism deterrent considerations in their smart grid designs.
- Natural Surveillance, Physical design and creating/instilling Responsibility are key considerations.

END OF PRESENTATION

- **THANK YOU FOR YOUR ATTENTION**