



A (VERY) SHORT INTRODUCTION TO SMART METER SECURITY

Máirtín O'Sullivan

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SMART METERS

/DEFINITION AND INTERESTING FACTS

“Smart Meters are electronic measurement devices used by utilities to communicate information for billing customers and operating their electric systems”



In 2008/2009 smart meter trials for **both electric and gas metering** started in Ireland.

The first production smart meters are intended to be deployed in 2015, with **installation in all homes and businesses completed by 2019.**

Sources: http://www.aeic.org/meter_service/smartmetersfinal032511.pdf
<http://www.cer.ie/GetAttachment.aspx?id=bba188f2-d9f4-48b9-9e1e-8482d35dd871>

Image Sources: <http://www.ecomagination.com/portfolio/smart-meters>

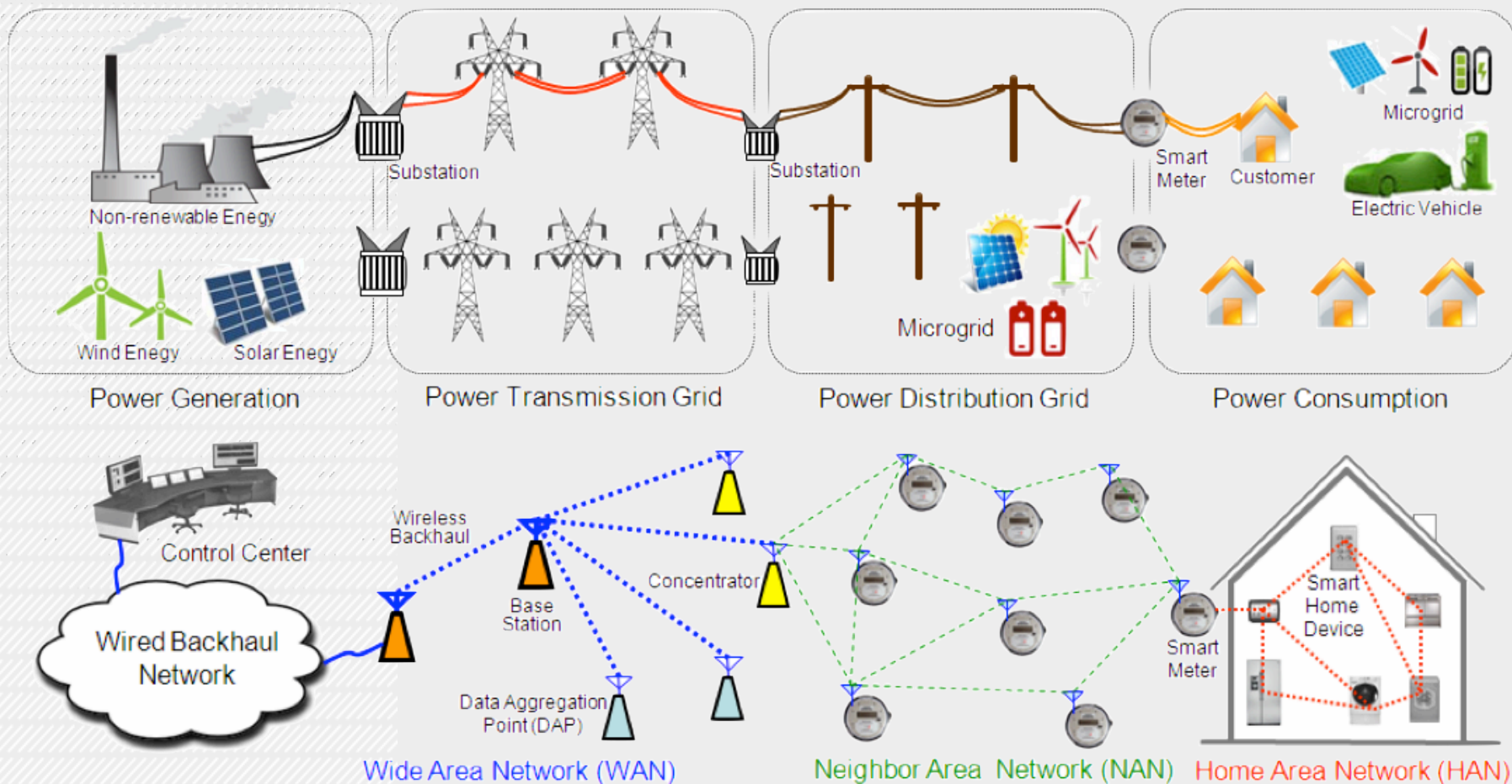
SMART METER **/NETWORK TYPES**

AUTOMATED METER READING (AMR)

ADVANCED METER INFRASTRUCTURE (AMI)

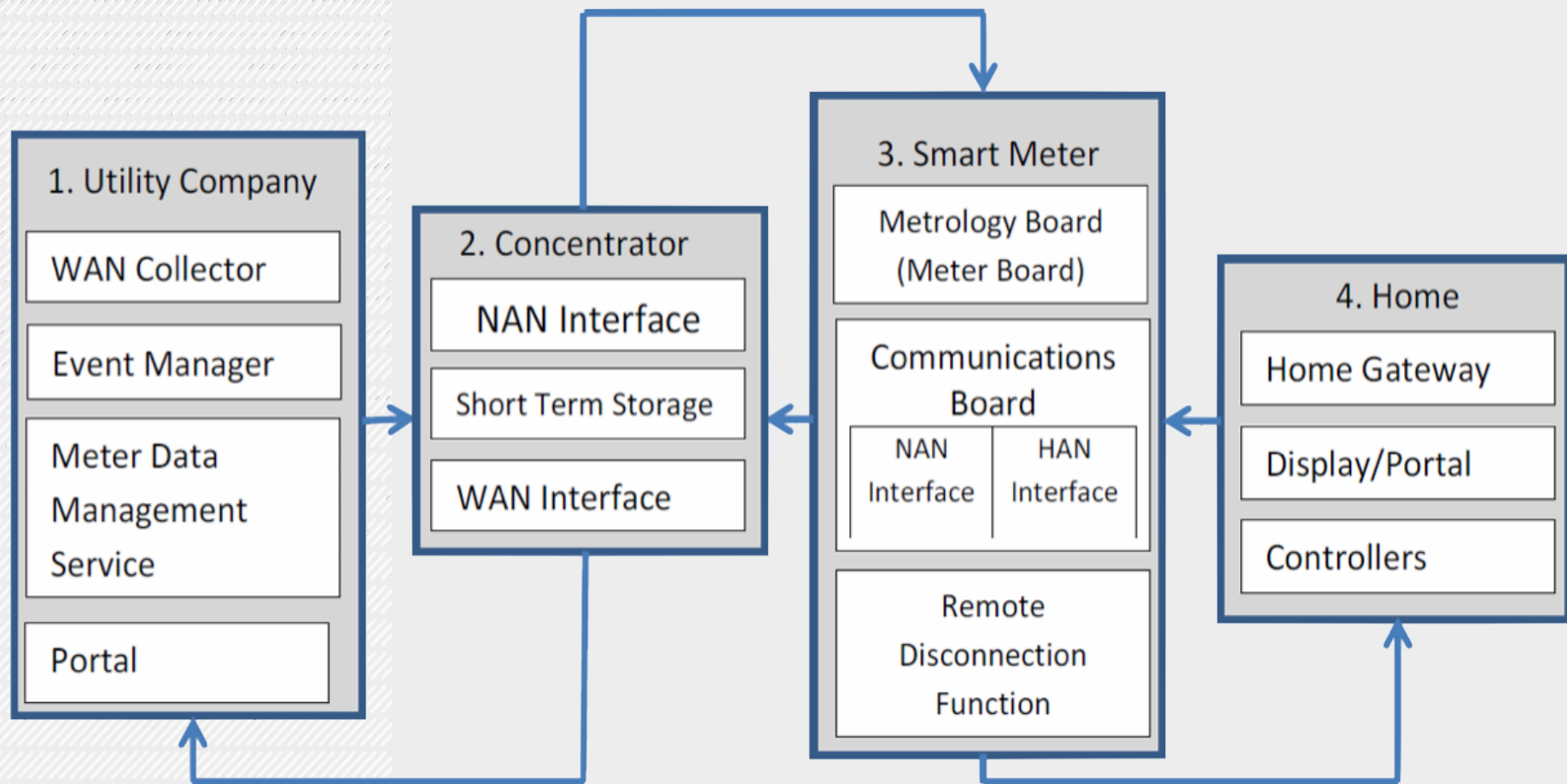
SMART GRID

ADVANCED METER INFRASTRUCTURE /NETWORK OVERVIEW



Source: http://booksite.elsevier.com/9780124158443/downloads/Chapter_05_Smart_Grid_Comm_Networks.ppt

ADVANCED METER INFRASTRUCTURE /COMPONENT OVERVIEW



Source: <http://arxiv.org/ftp/arxiv/papers/1206/1206.3880.pdf>

SMART METER **/PRIVACY CONCERNS**

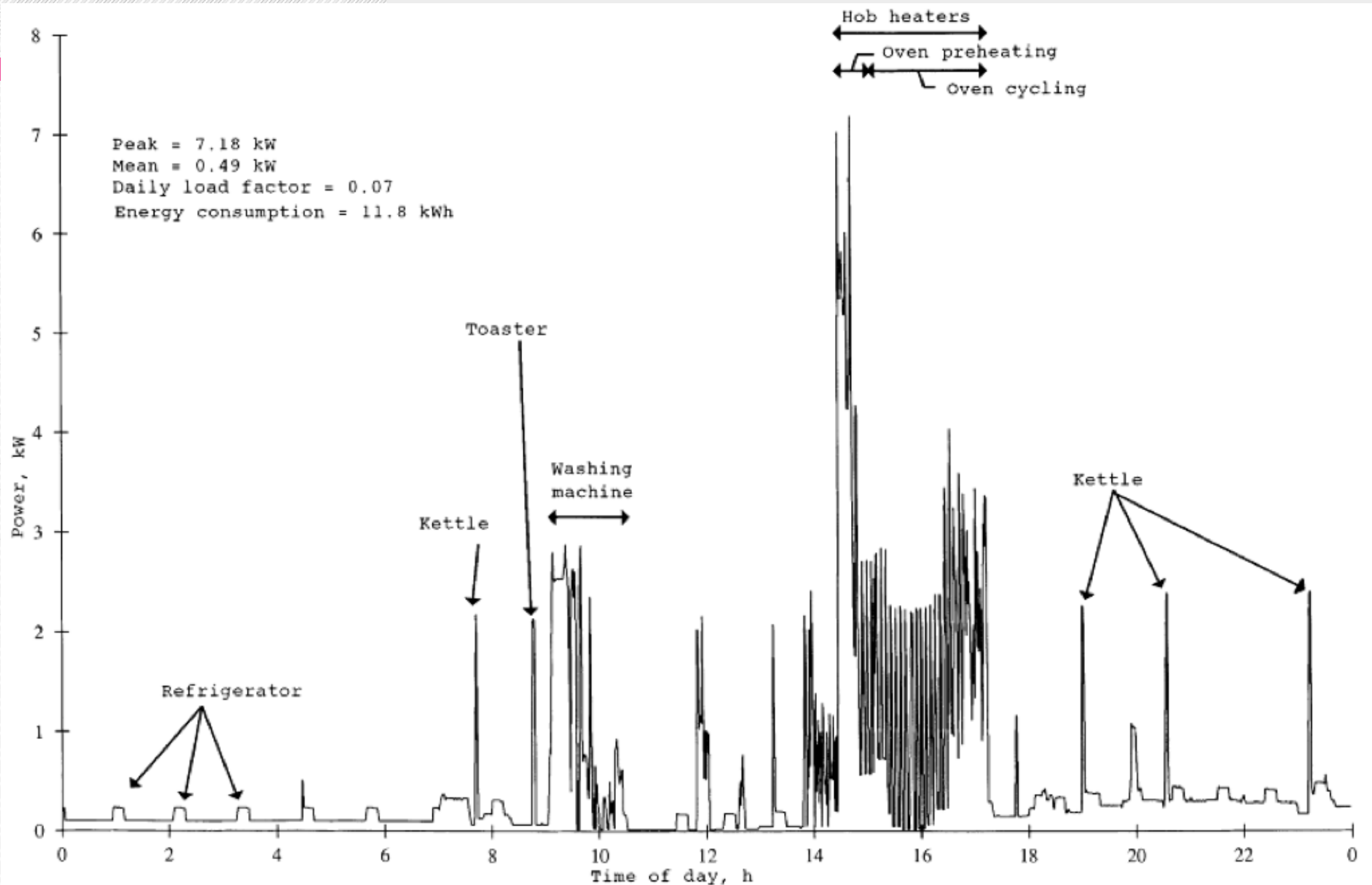
FREQUENCY OF METER READINGS

LEVEL OF ENERGY USAGE

ACCESS TO METER DATA

DEVICES CONNECTED TO THE HAN

Source: Applied Cyber Security and The Smart Grid - Eric D. Knapp, Raj Samani



Source: *Applied Cyber Security and The Smart Grid* - Eric D. Knapp, Raj Samani

SMART METER **/ATTACK MOTIVES**

MANIPULATION OF SERVICE

THEFT OF INFORMATION

DENIAL OF SERVICE

Source: Applied Cyber Security and The Smart Grid - Eric D. Knapp, Raj Samani

SMART METER /THREATS – PHYSICAL DEVICES

DEVICE RECONFIGURATION

DEVICE MEMORY/BUS ACCESS

DEVICE FIRMWARE MANIPULATION

UNAUTHORISED HAN ACCESS



Source: AMI Penetration Test Plan *<http://www.smartgrid.epri.com/doc/AMI-Penetration-Test-Plan-1-0-RC3.pdf>

Image Sources: <http://www.ecomagination.com/portfolio/smart-meters>

<http://www.siliconrepublic.com/clean-tech/item/21820-smart-metering-trial-result>

SMART METER

/THREATS – COMMUNICATION NETWORKS

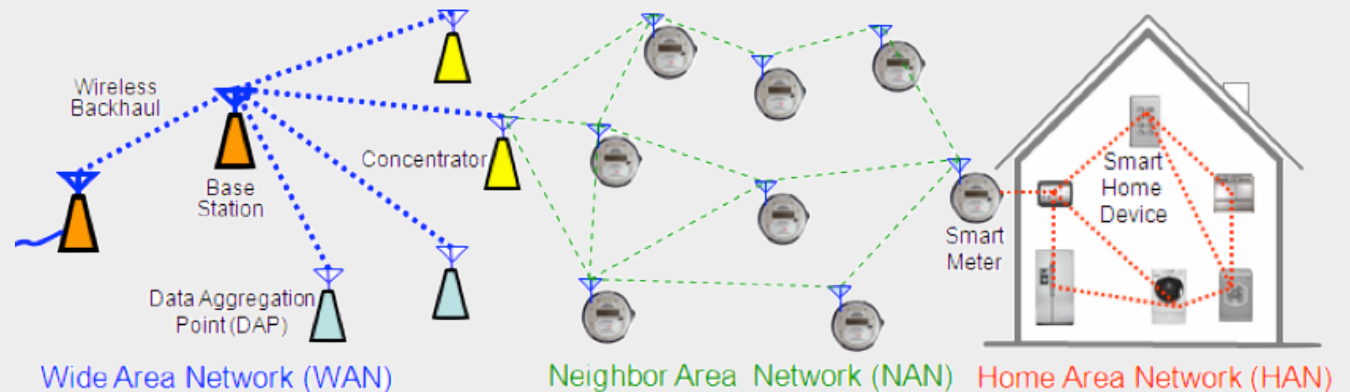
SNIFFING SENSITIVE INFO

MASQUERADE

REPLAY ATTACKS

REPUDIATION

DENIAL OF SERVICE



Source: Cryptographic Key Management for Smart Power (<http://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=1001&context=cctech>)

Image Source: http://booksite.elsevier.com/9780124158443/downloads/Chapter_05_Smart_Grid_Comm_Networks.ppt

THANKS



mairtin@mairtinossullivan.com



[@_mairtin_](https://twitter.com/_mairtin_)



mairtin.blogspot.ie