Demand Side Management

Does South Africa need a paradigm shift?

Viv Cohen
Paradigm shift

The duck-rabbit illusion

Thomas Kuhn
Why a paradigm shift?

- Considering all the events that led to the power crisis
- And in recognizing South Africa’s typical knee-jerk reactions
- A new way of thinking through this challenge may be necessary
- Possibly – a clean sheet type of approach may be indicated
- A paradigm shift could change obsolete existing perceptions
Demand Side Management

- Eskom administering implementation of DSM initiatives
- DSM includes two fundamental parameters
  - Energy efficiency
  - Maximum Demand Control
- Both are related to the efficient USE of electricity
Energy efficiency

- Relates directly to the saving of power (WATTS)

  - Examples are

    - energy efficient compact fluorescent lamps
    - high efficiency motors

- Motivates users to consume less electrical power
Efficient USE of energy

- Relates more to Load Management
- Load Management addresses three related parameters
  - Load Shifting
  - Peak Clipping
  - Valley Filling
Typical load profile
Power crisis conferences

- SAIEE hosted two successful conferences in Feb. 2008
- Questions regarding Load Profile control not fully answered
- Follow-up breakfast talk presented by Andrew Etzinger
- Introduced his talk with “Six Tough Questions”
Six “Tough questions”

1. How will the Power Conservation Programme (PCP) be implemented?

2. Is there a role for utility driven DSM after introduction of the Power Conservation Programme?

3. Is there a role for load shifting programmes given that energy efficiency is a priority?

4. How do we entrench a savings culture in South Africa?

5. How do we best capture opportunities presented for business development & job creation?

6. What policy and regulatory changes are required to improve effectiveness of DSM?
One critical question

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Eskom’s Load Profile

- A comment made during the presentation was that –
  - Eskom’s Load Profile is “Relatively flat”

- This then begs the further question:

  “Relative to what ??”

- Opportunities exist for improving both utilization and economics
Electricity Regulation Act 2006

• New Regulations recently published

• Includes ambitious requirements for remote control by licensees

• It covers water heaters, HVAC, swimming pool drives & heat

• Methods may include smart metering and ripple control systems

• Effective date is only January 01, 2012
Ripple control systems

- Ripple control systems have been used by larger utilities
- Ripple control systems used to shed geyser loads
- Used by large utilities as tool for bulk load profile control
- Ripple control systems require skills & good management
- Group load shedding is not “democratic”
A democratic alternative

- It is unfortunate that only limited recognition has been given to unobtrusive, proven devices available for over 3 decades
- These passive devices democratically achieve load shifting without requiring any backbone infrastructure!
- Control is automatic without any intervention or maintenance
Older technologies revisited

• Possible to control peak loads in each residence
• Automatic control without any management system
• Peaking loads are used for control purposes
• Load shedding (geyser, heating) is under control of user
• Typical peaking load is cooker or “stove”
Load Control Devices

Load control Relay

LCR

ECU

Energy Control Unit
LCR and ECU

- Objective and function is the same
- Both include "Controlling" & "Controlled circuits"
- ECU is electronically operated with high accuracy
- LCR is thermally operated with longer time constant
- ECU / LCR cost ratio approximately 2 : 1
Energy efficiency

• **LCR & ECU** not intended to save energy costs

• **Primary function is to control peak demand**

• **Consumer still enjoys several advantages**
  - Maximum Demand savings (if applicable)
  - Additional geyser and floor heating without upgrade
  - Geyser only shed for short peak load periods
Benefits to utility

- Utility does not lose sale of power
- Load usage delayed to individual off peak period
- Cost benefit through reduction of Maximum Demand
- Low cost load profile control for utility
Window of opportunity

- Times of crisis create windows of opportunity
- Daylight saving and time zones can also improve load profile
- Either or both could be implemented much sooner than 2012
- WG’s, committee meetings, referenda etc. could be avoided through declaration of a National emergency in this time of need
- These could be achieved at minimal cost by avoiding all red tape
Load profile control using time zones

Even Namibia has introduced a winter time zone!!
Answer to the 3rd “Tough Question”

“Is there a role for load shifting programmes given that energy efficiency is a priority?”

The answer to that question is easy

and is an unqualified YES
A paradigm shift in fundamental thinking

- Implement additional low cost Load Profiling before 2012
- Do not restrict load profile control solely to utilities
- Improve consumer relationships with democratic load control
- Recognize proven individual consumer load control devices
- Use the window of opportunity to introduce daylight saving
- Seriously consider the introduction of a 2nd time zone in SA
Opportunity in adversity

It may be difficult to break away from long standing deeply entrenched pre-conceptions

To all South Africans, Government, Eskom & consumers in the interest of actually seeing some rapid results

Our opportunity in adversity has arrived!!