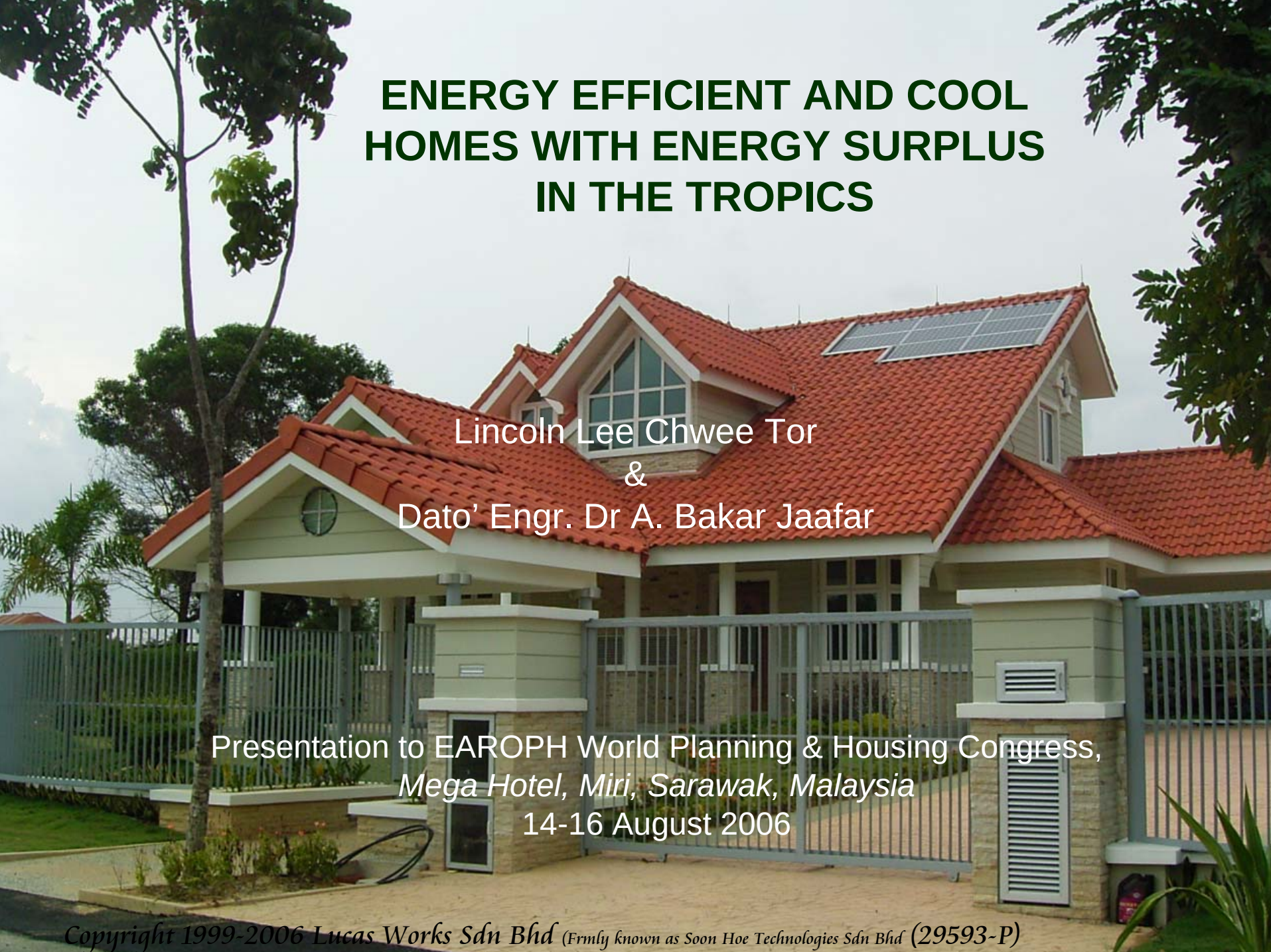

ENERGY EFFICIENT AND COOL HOMES WITH ENERGY SURPLUS IN THE TROPICS

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&
Dato' Engr. Dr A. Bakar Jaafar

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Mega Hotel, Miri, Sarawak, Malaysia
14-16 August 2006


Problem to fight against:
High energy wastage in
(1) Keeping modern homes cool during the day
(2) Cooling them down in the early evening
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SOLUTION:


Smart & Cool HOMES
Building Technology
Better HOMES Forever
2003/10/31

The Science & Technology of

Smart & Cool HOMES
Building Technology
Better HOMES Forever

Why "SMART" ?

- Cost efficient (construction cost, energy cost)
- Reduce (material use, labour content, time, waste, formwork)
- Reuse (Formwork)
- Recycle (Discarded tyres)
- Healthy living (No heat stress)
- Higher quality house (accurate & fine construction)
- Ideal for BIPV (faster ROI)

The Science & Technology of

Smart & Cool HOMES
Building Technology
Better HOMES Forever

Why "COOL" ?

- Built not to keep the heat in, but to absorb-cum-conduct the heat away

- Heat through the roof taken away by the *venturi*-action of cold air pushing heated air up through the space under the roof in parallel with insulated ceiling; no hot air trapped under the ceiling

- The heat captured in the walls would find its way to cooler points created by having to introduce waste-rubber tyres laid systematically in the works below ground, as "heat sinks": to absorb and to conduct the heat away, deeper into cooler grounds.

The Technology

+ Proprietary, owned by Lucas Works Sdn Bhd
+ Developed to improved the quality of houses and to meet current needs of house buyers (e.g. thermal comfort), developers, builders and contractors (e.g. labour shortage, lack of skilled workers etc)
+ Results—Higher quality, Resource efficient and sustainable buildings
+ Solution provider for the building industry

Our Focus

In developing the technology, our focus in on:

- Houses for housing development projects and for individuals
- Must not burden house buyers with additional cost
- Must not add extra maintenance/work for the house owner
- Must not cause problems like leakage, or give opportunities or new avenues for insects/vermins to breed
- Must not require more labor to build than current methods (i.e. RC brick mortar house)
- Should not require more material than current methods
- Must be of higher quality than the ordinary RC brick mortar house
- Renovation and extension can be done easily
- Method must be easily adopted by contractors/laborers
- House must be cool and energy efficient
- Must be environmental friendly

Features & Benefits I

- Thermal Comfort
- Energy Efficient
- Ideal for Grid-Connected PV
- Environmental Friendly
- Healthy Living
- Cost Efficient
- Industrial Building System
- Modular Coordination
- Accurate Construction
- Superior Wall Quality Finishing
- Flexibility in Design

Features & Benefits II

- Good Quality and Cost Control
- Speedy Construction
- Low Labour Content
- Clean Worksite
- Waterproof Slab
- Termite-proof Slab
- High Fire-rating & Non-combustible
- No toxic materials
- Long-lasting & low maintenance
- Excellent Acoustics

Thermal Comfort

- Achievable indoor air temperature of 25°C - 28 °C
- IAT of Smart & Cool HOMES ~ 6°-8°C lower than outside ambient air temperature, whereas RC Brick mortar house ~ 2°C- 4°C higher than OAT.
- Ground floor slab temperature lower by 6°C than conventional slab

Absorbs and transfer heat to the ground during the day

Heat Sink

RELEASE HEAT FASTER

STORE LESS HEAT

Bigger Surface Area

Less Thermal Mass

Works during the whole hot day

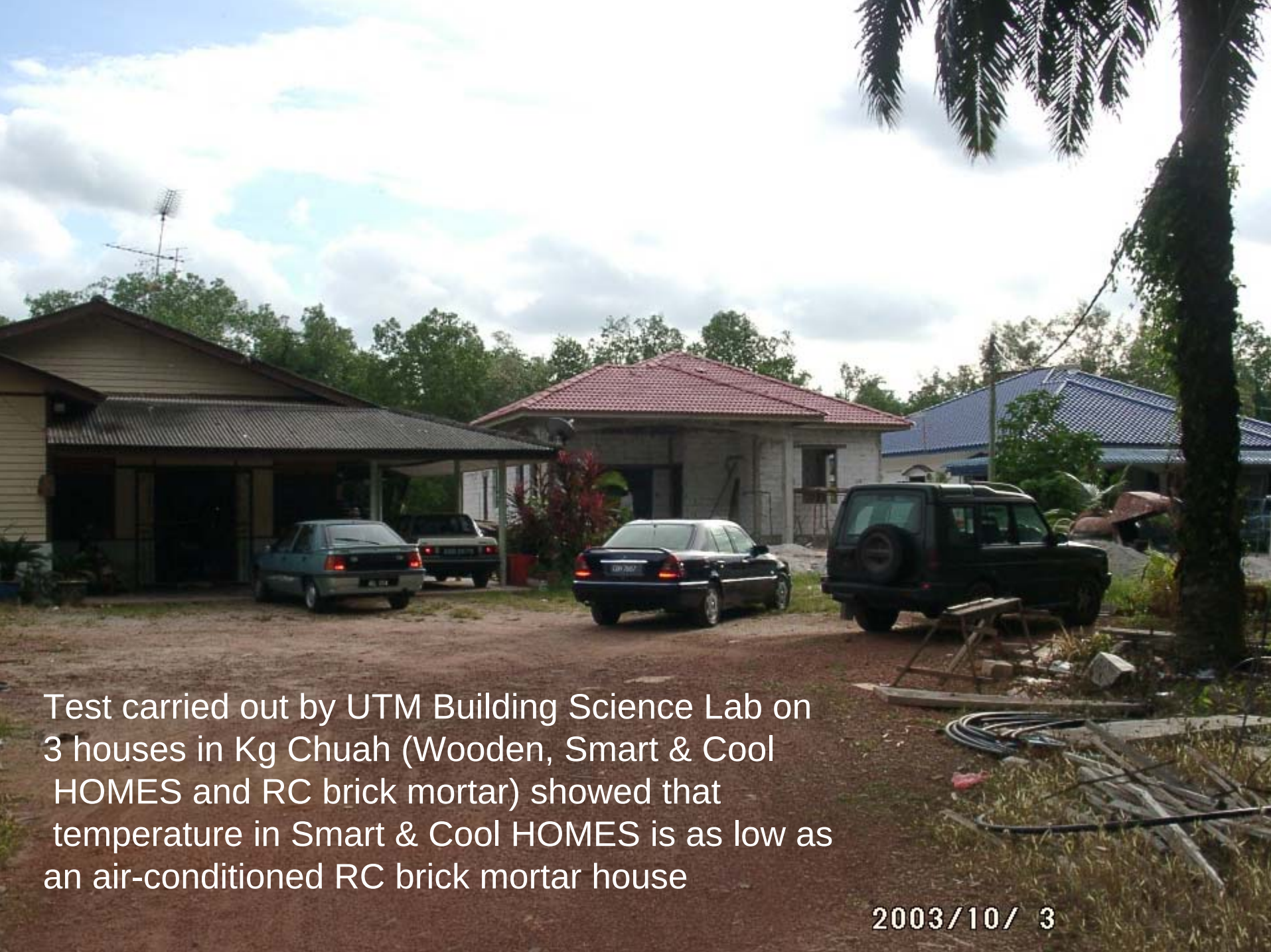
Venturi-Action Flow

Extract hot air from the attic during the early evening

Active ventilation by exhaust fan

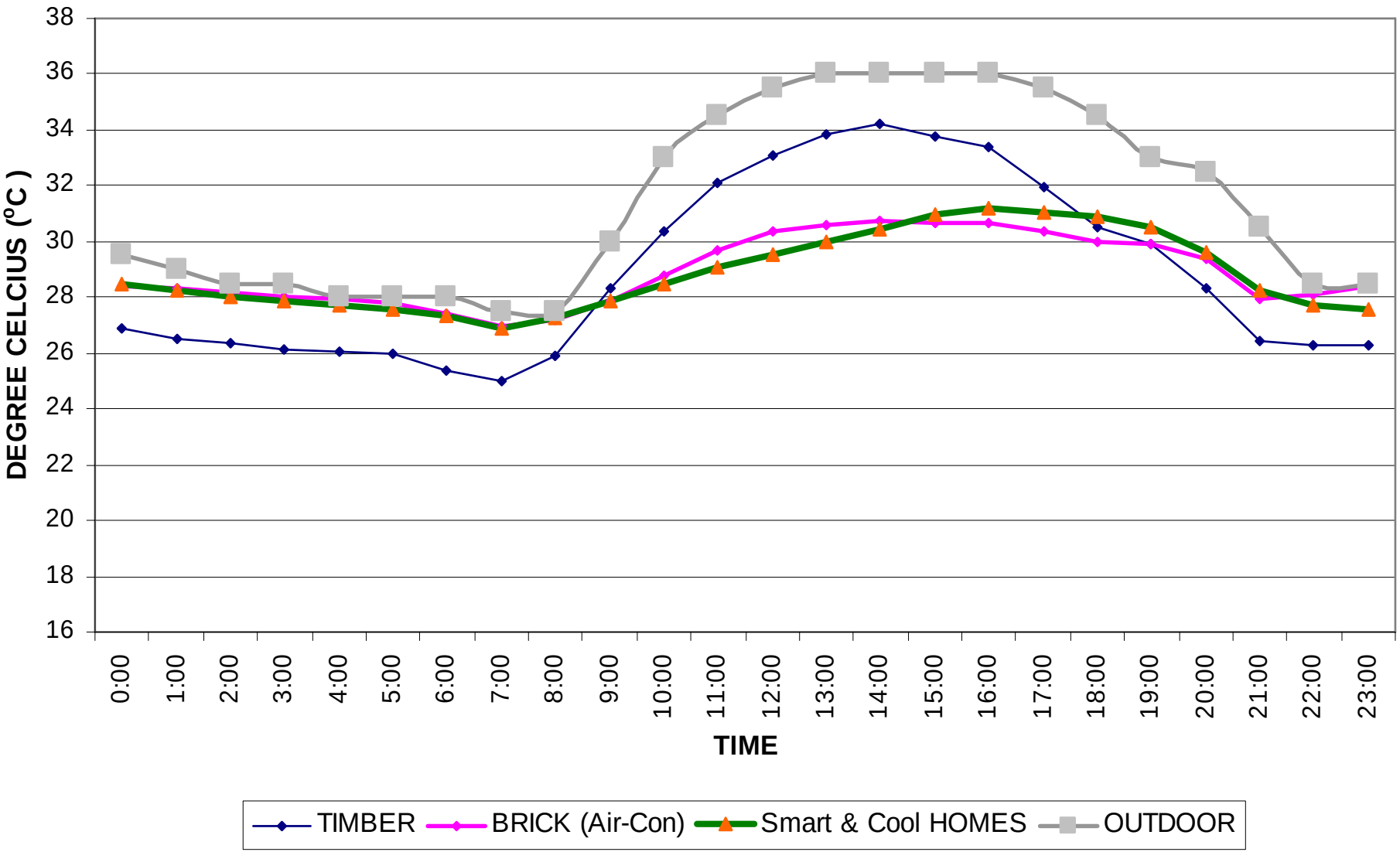
Open windows with fan on

Air change during early evening



Test carried out by UTM Building Science Lab on 3 houses in Kg Chuah (Wooden, Smart & Cool HOMES and RC brick mortar) showed that temperature in Smart & Cool HOMES is as low as an air-conditioned RC brick mortar house

AIR TEMPERATURE - KAMPONG CHUAH
(30 MAC 2004)
Tested by Building Science Lab, UTM, Skudai



Energy Efficient

- Low indoor-air temperature
  --> can live without air-con
  --> energy savings
- Even if air-con is used, air is cooled faster because the whole house doesn't retain heat (no need to cool the walls)
- Indoor cool air stays cool longer

Cool enough to live without air-con

Even if air-con is used, energy usage is very low. Savings as high as 80%

Ideal for Grid-Connected PV

- Lower electricity consumption by house means more electricity generated by PV can be fed back to the grid, giving the house owner higher income.
- The very significant saving in energy would in turn shorten the pay-back period of the high investment in the installation of the Photovoltaics system, from about 65 years to 20 years, even at the present tariff of the utility

Environmental Friendly

Creates cooler house and surroundings

A happy homeowner

When Mohd Noor Abdul Latif saved enough money to buy a house, his main concern was whether the purchase will be "suitable." He had heard enough stories about house buyers being disappointed with shoddy work and to put up with inconveniences in their "dream homes".

Not wanting to fall into the same boat, the architect sought the assistance of Lincoln Lee, who was promoting the home-grown "Smart & Cool Homes" building technology.

"I think it was the energy-efficient pitch that really got me interested. My thoughts were very long-term and that is why I made this bold decision," says Mohd Noor whose office is located just a few hundred metres away.

He bought a corner lot terrace in Ulu Klang last December for RM340,000. He then engaged contractors to demolish the house and rebuild it with the Smart & Cool Home technology.

"The whole house had to be demolished and rebuilt in three phases. Work is now nearing completion and my family and I are very eager to move in," he says.

With a different structure, the two-and-a-half storey house will have five-plus-one rooms, four bathrooms, a store, attic and roof garden. Its total built-up floor space will be 3,000sq ft.

"People might get the idea that this is a costly, sophisticated kind of concept which is only for those with money. But don't be misled. I have also given my input as an architect to enhance the aesthetics," Mohd Noor says.

"But in the long run, living in a conventional house will cost much more than an energy-efficient house, such as this. I think I have made a wise and prudent investment and my wish is for people with existing houses to retrofit and for developers to move into building energy efficient houses."

Coming on nicely: Mohd Noor Latif's house is not only energy-efficient but set to become pleasing to the eye.

The neighbourhood has not been the same since work on the Smart & Cool house started. Mohd Noor gets curious visitors very often, wanting to find out why his house is different and also "how come the interior is as cool as being in a cave".

An unassuming man, Mohd Noor is not only delighted but happy to preach the many benefits of opting for energy efficient homes and most of all, he says, "the atmosphere and comfort are so natural ... nothing can beat that". - *CF*


MEMBELI
EMAS
2005 3 8


Flexibility in Design
2005 4 4


2005 4 6


Waterproof & Termite-proof slab
2005 4 7


Industrial Building System
High Fire-rating material
2005 4 12


Accurate construction
2005 4 18

Modular Coordination


RUS PIPE
2005 5 1

Clean worksite
&
low labour content

Superior wall quality & finishing


Speedy Construction
RIS PIPE
4087713
MIRUL
PLUMBING
2576085
2005 12 20

Cost Efficient

Savings in:

(a) less Formwork used by 30% - 40

(b) less Material used (Concrete & Steel)

(c) less Plastering/Rendering needed

(d) Labour reduced by 60%

(e) not affected by weather

(f) less use of Tools & Machinery

(g) less Down Time

(h) less Wastage

(i) less piling or not necessary

"THE CHALLENGES OF A NATION GROWING UP"
by YAB Dato' Seri Abdullah bin Haji Ahmad Badawi, Prime Minister of Malaysia
@The Harvard Club of Malaysia, May 5, 2005

" …but as people, as individuals, …nor are we willing to let go of a few bad habits that we have become addicted to and that stand in the way of our objectives."

"Firstly, we are still addicted to cheap foreign labour, rather than … adopting high technology …?"

"THE CHALLENGES OF A NATION GROWING UP"
by YAB Dato' Seri Abdullah bin Haji Ahmad Badawi, Prime Minister of Malaysia
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"Secondly, we are addicted to subsidies rather than investing to become more ENERGY-EFFICIENT …"; the saving "can be better spent on schools, hospitals, and other facilities to benefit many more people, especially those in need."

THE CHALLENGES OF A NATION GROWING UP"
by YAB Dato' Seri Abdullah bin Haji Ahmad Badawi, Prime Minister of Malaysia
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"Thirdly, we are addicted to rent-seeking; we would rather go for "know-Who" than "KNOW-HOW" … by investing to become more competitive and "to add value in our products and services …"

Thank You!
Terima Kasih!

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