Innovation, transformation, integration and energy efficiency

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What do all these things have in common?

Extreme energy efficiency redefines reality

Human Powered Vehicle: world record holding human powered vehicle – 137.9 km/h
http://gosporttimes.com/2015/09/20/crazy-fast-human-powered-vehicle-sets-new-world-speed-record/

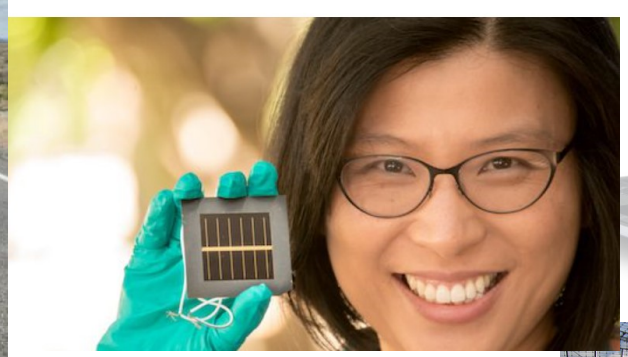
UNSW smashes solar cell record, predicts doubling in 12 months

By Sophie Vorrath on 2 December 2016

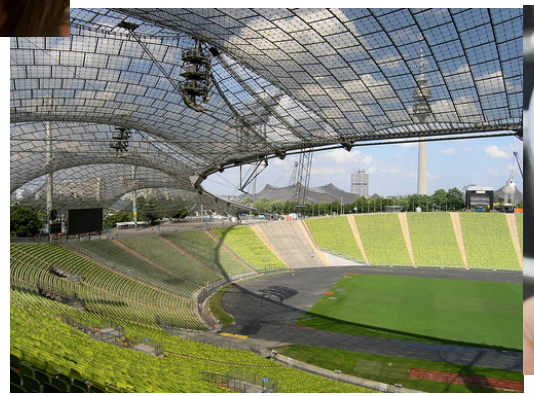
Print

Solar engineers at the University of New South Wales have scored the world's highest efficiency rating with the largest perovskite solar cells to date – a level of efficiency the team believes it can double within another 12 months.

In a presentation to the Asia-Pacific Solar Research Conference in Canberra on Friday, UNSW team leader and senior research fellow at the Australian Centre for Advanced Photovoltaics, Anita Ho-Baillie revealed her team had achieved 12.1 per cent efficiency for a 16 cm2 cell.



Tensile structures
http://www.tensilefabricstructure.com/kolkata/stadium-tensile-structure.html



Which is the odd one out? Why?

Only one of these is promoted for its energy efficiency

Energy efficiency is a means to ends – outcomes that matter to decision-makers, users and society

- The dimensions of implementation:
  - Practical/technical
  - Financial
  - Social/cultural
  - Motivational
- Energy Efficiency/Productivity thinking:
  - Services (and their perceived value and perceived risks of change)
  - Systems (tech, social, financial) see http://www.abc.net.au/news/2017-11-16/will-australia-be-the-lucky-country-in-tomorrows-economy/9153884
  - Incremental versus fundamentals
  - Obsessive detail, challenging assumptions
  - Synergies, 'piggy-backing'

Induction cooktops don't heat up – so insulated pots can be used to cut heat loss

Forces supporting EE/EP

- Supply side political mess and high project risk
- Climate policy; RE can’t do it alone
- RE (especially behind meter) drives energy literacy, desire to capture best value
- Finance options:
  - low interest rates,
  - improving finance sector literacy (thanks CEFC),
  - shift from large, long-lived investments by big players to many retail level decisions
- Controllable technologies combined with low cost monitoring, analysis, real-time feedback and control (eg IoT+VSDs+load management)
- Smarter packaging, volume production instead of bespoke design small scale manufacture
- Increasing recognition: can’t deliver economic, social and environmental outcomes without optimisation and efficiency

Forces working against EE/EP

- Supply side and economic policy group think:
  - Energy debate – almost no mention of demand side
  - Finkel recommendation 6.10 – 'energy efficiency is a job for governments….'
  - National Energy Guarantee – DR and EE must be built-in
- Government and policy failure to recognise scale of support for EE, 'hand holding' needed and scale of investment needed
- Need to find ways to create tangible value for EE/EP in energy markets – Matt Golden (https://www.openee.io/), my Finkel submission
- Perceptions about EE:
  - hair shirts, cutting back, 'greenies', hassles,
  - over-budget projects that don't deliver predicted outcomes, add risk to core business…….
  - Metrics and language: 'payback period', 'housing affordability' etc