



## **Niche Early Markets: Portable Fuel Cells and the 'Long Tail'**

**Dr. Jonathan Butler**  
**Senior Market Analyst - Asia**  
**Fuel Cell Today**





## Portable Fuel Cells

- Any fuel cell unit designed to be moved



Consumer electronics



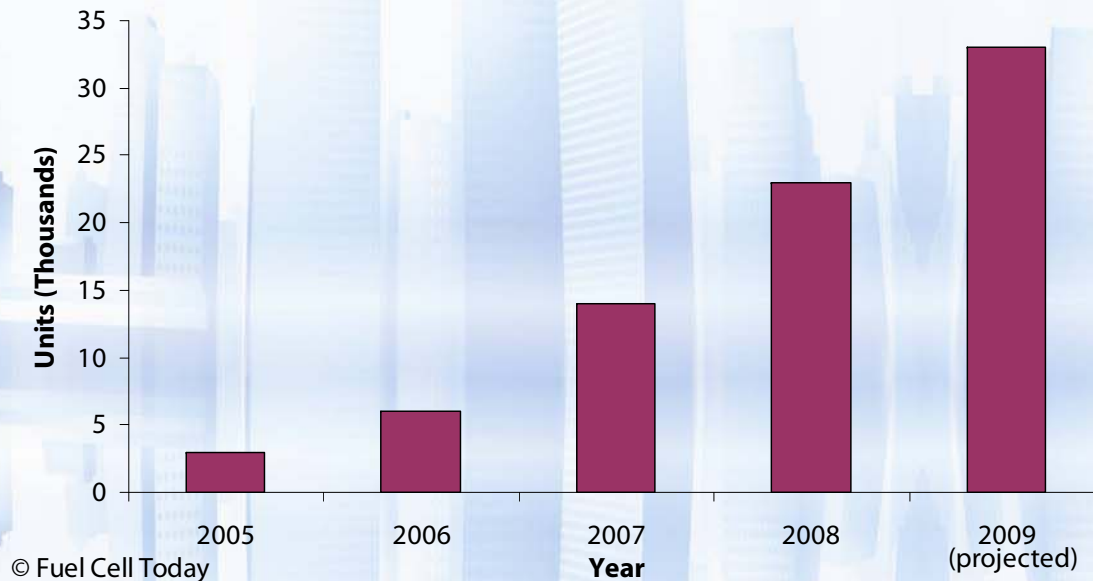
Educational Military



- Genuinely **commercial** markets



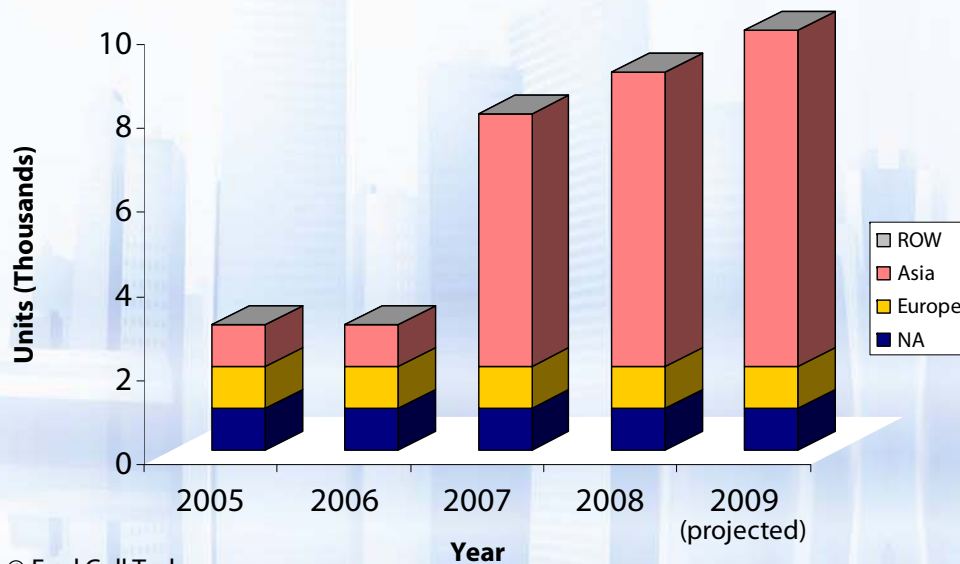
## State of the portable sector



	Integrated Fuel Cell	External Fuel Cell Charger
<b>Mobile Phone</b>	<b>Motorola</b> <b>Toshiba</b>	<b>Lilliputian</b> <b>Horizon</b> <b>MTI Micro</b>  <b>Panasonic</b> <b>Sony</b> <b>Toshiba</b>
<b>Laptop</b>	<b>PolyFuel</b> <b>Samsung</b>	<b>CMR Fuel Cells</b> <b>Horizon</b> <b>Nan Ya*</b>  <b>Panasonic</b>
<b>Other CE</b>	<b>Coretronic*</b>	<b>Syspotek*</b>

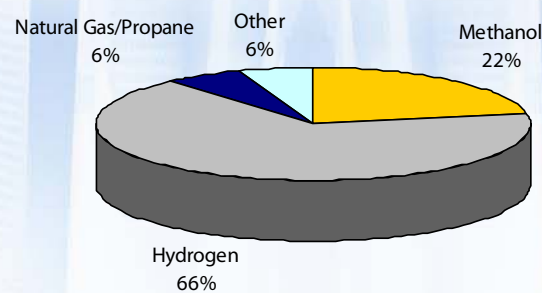
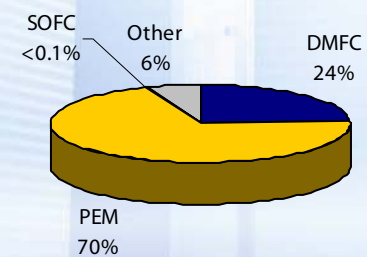


## Current Developments (2008)



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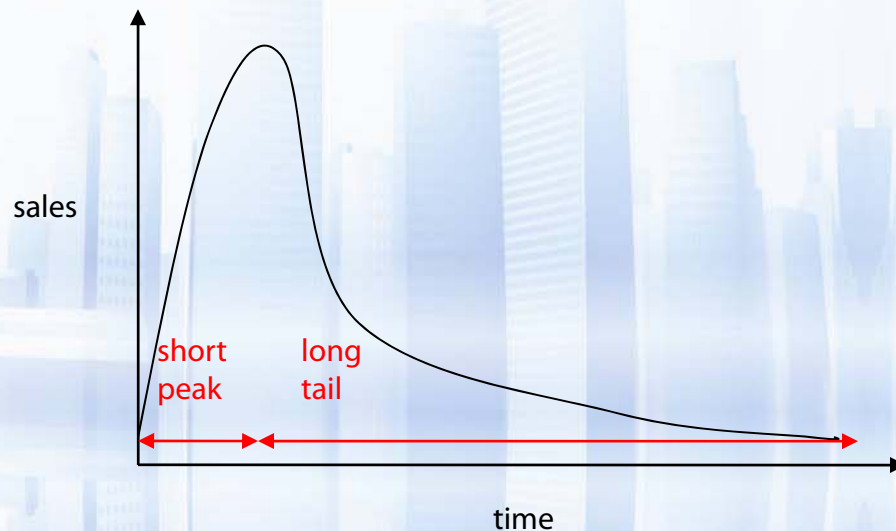


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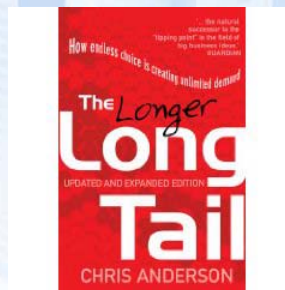
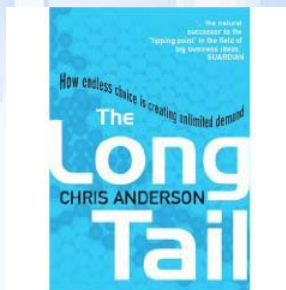
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## The 'long tail' (Anderson, 2006)

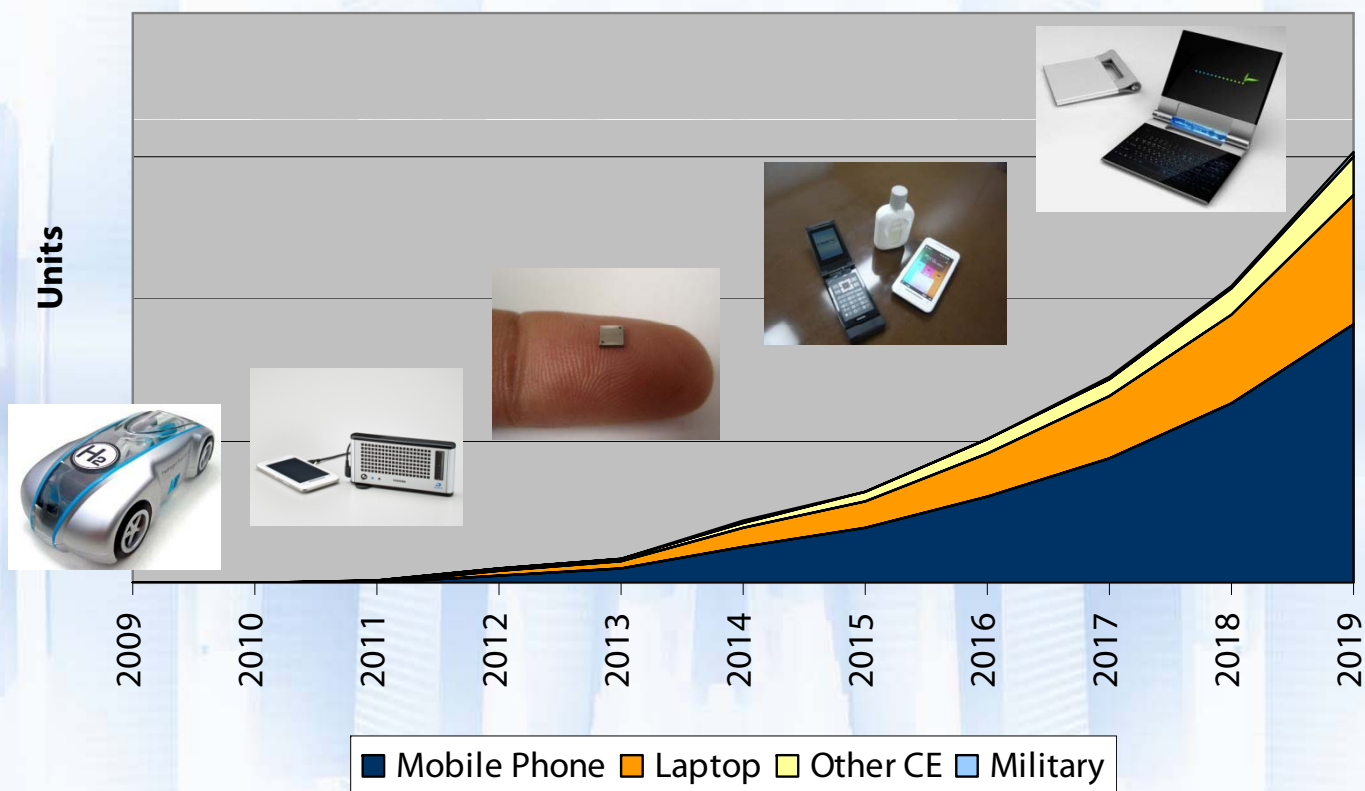


- 'Endless choice creates unlimited demand'
- Relevant to online retailing of specialised products, e.g. music, books, films, collectibles
- Turns the 80:20 rule on its head
- In other words handfuls of niche products add up to a large overall market – a long tail of demand





## Unit shipments 2009-19

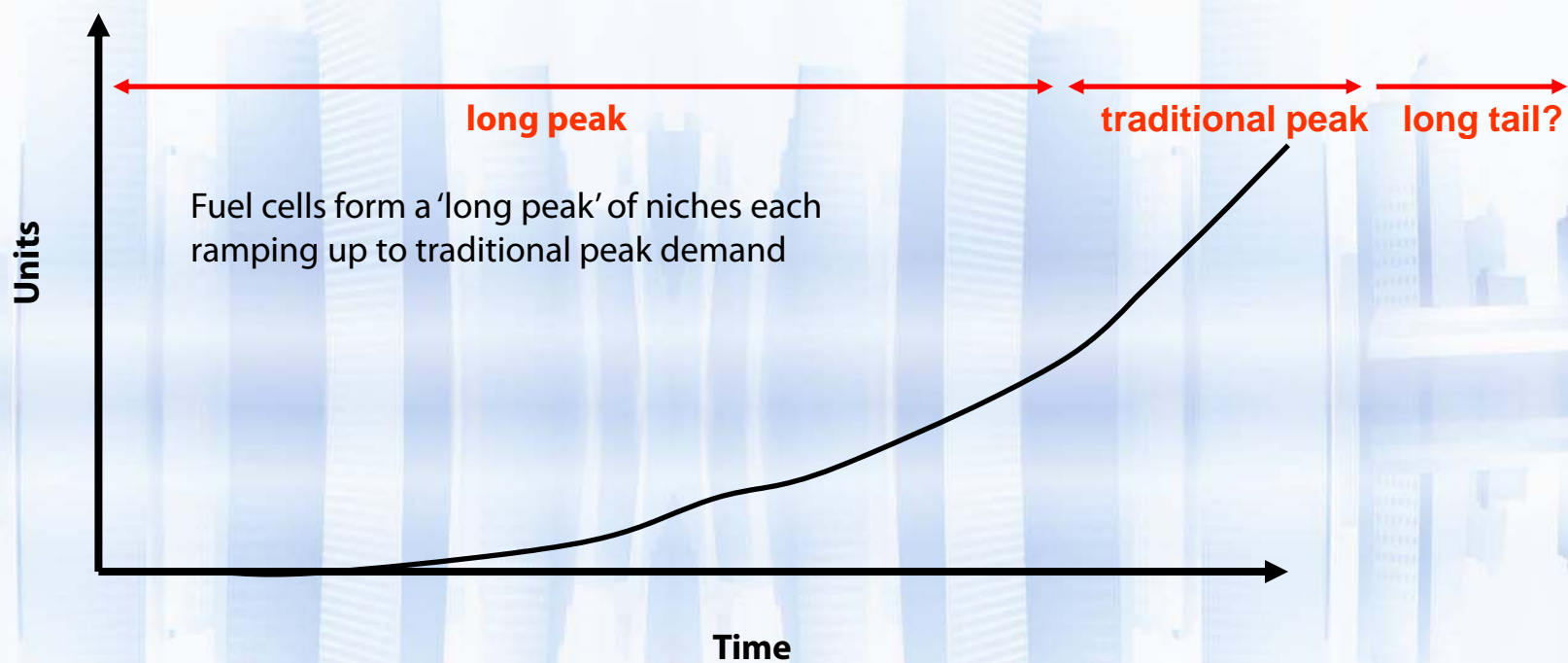


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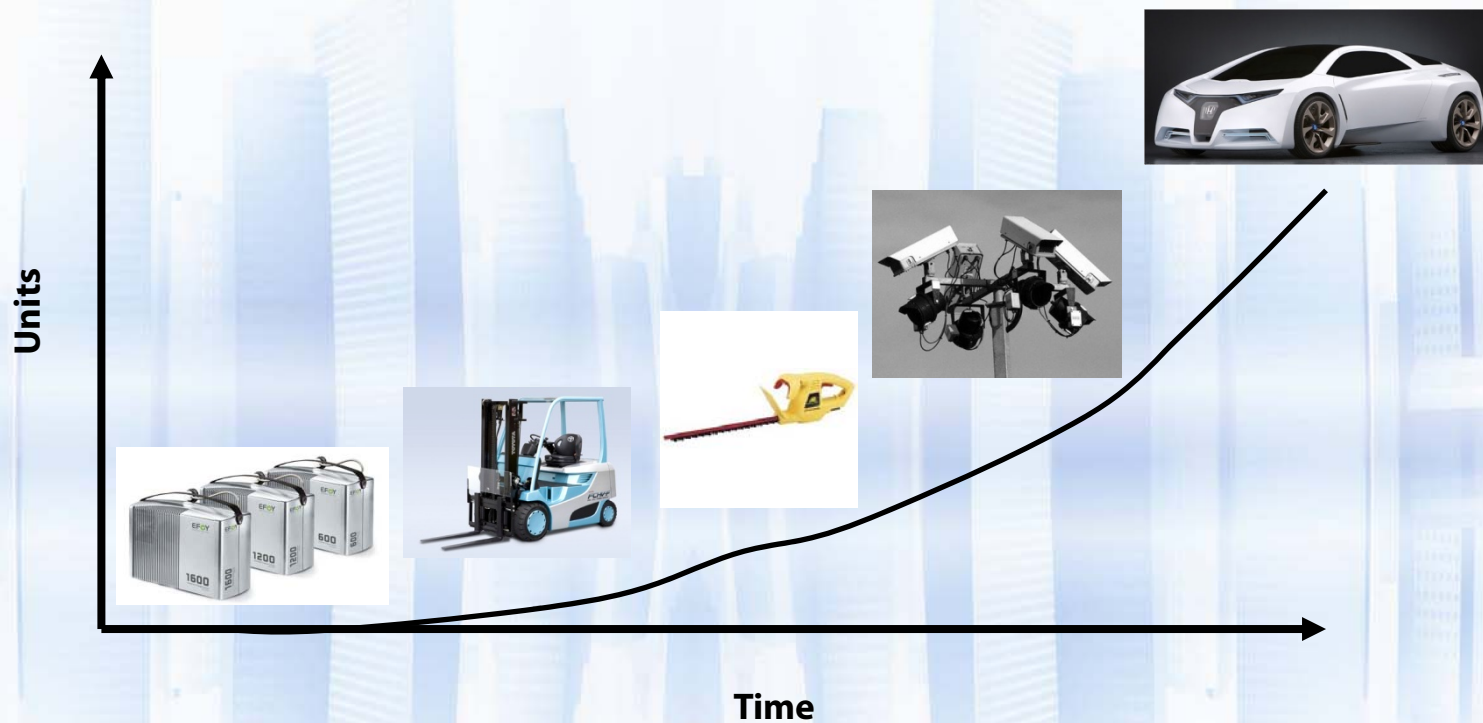


## The 'long peak'





## The 'long peak' – the fuel cell industry?



**Relatively small niches add up to large overall demand, with consequences for the supply chain, manufacturing, unit price and eventual mass market demand**



## Price

- Lowering the unit price at the start of the long peak stimulates demand
- Toshiba selling the Dynario for £200 (\$320) with methanol cartridges around £4 (\$6) each
- Self-fulfilling prophecy of lower price, higher demand, further reduction in unit price?
- Associated development of supply chain and mass manufacturing
- Proxy in the adoption of Li-B over NiMH batteries in 1990s





## Outlook

- **Commercial roll-out of DMFC battery chargers** by various OEMs, scaling up in power to be capable of powering more devices
- **Volume orders for a niche application:** such as remote monitoring, lighting and projection.
- **Further development of the supply chain:** stack manufacturers are moving away from being systems integrators and towards being pure-play stack manufacturers
- **Release of integrated DMFC consumer electronics items:** building on the success and consumer acceptance of external chargers
- **Further consolidation of the industry**

**= ramping up of the long peak**



**Thank you!**

**Dr. Jonathan Butler**

**Senior Market Analyst, Asia**

**[jonathanbutler@fuelcelltoday.com](mailto:jonathanbutler@fuelcelltoday.com)**

**[www.fuelcelltoday.com](http://www.fuelcelltoday.com)**