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OPTIMAL ENERGY

imagineering mobility





The Green machine – threats and opportunities

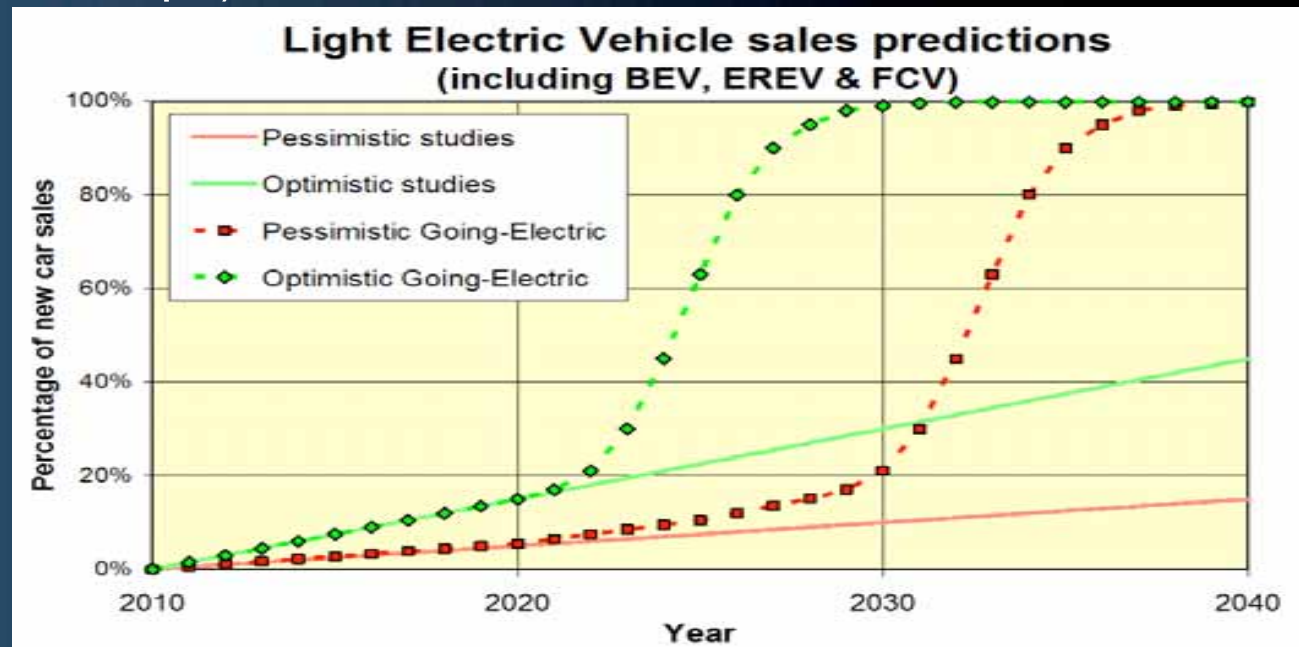
Why Electric Vehicles?



- Most energy and cost efficient way of transport
 - “well to wheel”, (WWF)
- Complete flexibility in terms of energy source
 - fossil, renewable, nuclear, etc
- Technology ready now
 - Joule, Tesla, Leaf, etc

Market Forecast

- By 2020, 10% to 25% of global car production will be electric vehicles. (Frost & Sullivan, Renault, Betterplace, etc)
 - i.e. **10 million or more electric vehicles produced in 2020**
- >50% of EU will be driving electric by 2030 (Association for Electric Vehicles in Europe)



- 75% of all light vehicle (passenger & commercial) km's traveled in the USA in 2040 will be electric (US Electrification Coalition)

This is the biggest and fastest change in the history of the automobile

South African Energy Usage

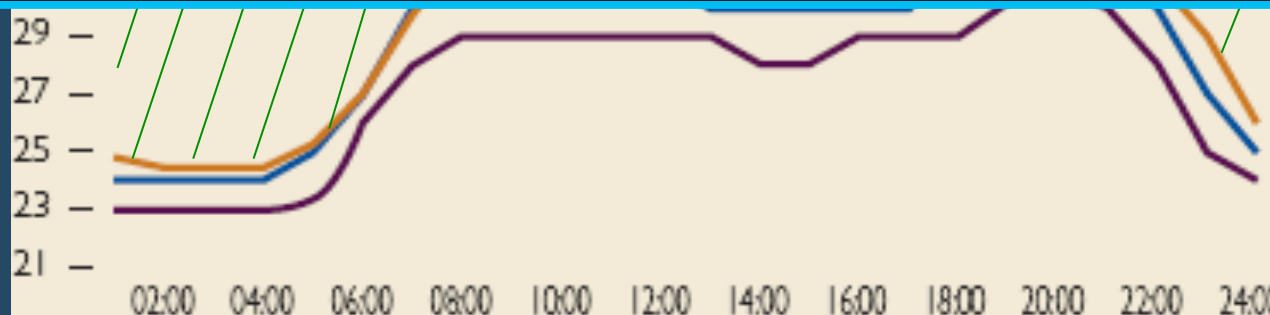


- SA has a peak electrical power problem, NOT a total electrical energy problem - there are not enough consumption and/or storage at night (off-peak)

MW in thousands

37 —

Switching ~8% of SA vehicle fleet to electric will meet national target of 10 000GWh energy saving



Darling Wind Farm can generate enough electricity (9GWh/y) for 4500 EV's to run 20 000km/y

- Enough electrical energy off-peak for 8m cars doing 20 000km/y – only 7m cars in SA!
- 10% of SA fleet as EV's, would save ~1700 million litres of fuel, for net energy saving of ~12 000GWh
- SA national target: 10 000GWh by 2013

Legislation & Incentives



USA:



- 1000 000 plug-ins by 2015,
- Advanced Technology Vehicles Manufacturing Loan Program (ATVMLP): \$25 billion in loans

UK:



- £5 000 subsidy
- London – free parking, license, registration & exemption from congestion charge

DENMARK:



180% tax on conventional cars, 0% tax on EV's

EUROPE:



- France – € 5000 rebate, France – One of world's first Auto focused Li-Ion battery plants
- Monaco – €6 000 rebate
- Spain – 1 million EV's by 2014
- Portugal – 20% of gov fleets, 1100 charging stns

JAPAN:



- Substantial rebate
- New subsidies for EV manufacturers
- Subsidised battery R&D
- Currently building the largest Li-Ion battery manufacturing plant in the world (Matsushita Battery Industrial Co.)

ISRAEL:



70% tax on conventional cars, 10% tax on EV's

CHINA: EV's one of four national 25 year projects, \$15bn government funding



SOUTH AFRICA:



- New Tax on Carbon Emissions
- Investment in Optimal Energy for the development & production of the Joule
- IDC, DST have launched battery initiatives
- SABS have included EV'S in committee
- IPAP2 to support SA EV

South African policy: IPAP2 (Industrial Policy Action Plan 2)



Commercialise South Africa's electric car

- Nature of the intervention: Provision of appropriate support to encourage local manufacture of EV's and related components, installation of infrastructure for such EVs, creation of testing facilities, provision of demand stimulation mechanisms and public education on the use and benefits of alternative energy source vehicles.
- Economic rationale: Direct and positive spillover effects of developing a local electric vehicle coupled with the creation of the broader regulatory environment for such vehicles.
- Outcomes: Creation of a legislative and regulatory environment to allow the operation of electric vehicles, relevant testing infrastructure for electric vehicles, local manufacturing for domestic and global markets, initiation of charging infrastructure and educational campaigns on electric vehicles.

Further Investment Opportunities



- Electric motor manufacturing
- Battery cell manufacturing
- Battery assembly and testing
- Power electronics at automotive prices (chargers, high power relays, high power fuses, HV connectors, HV cables)
- Electric compressor, peripheral components
- Battery handling equipment
- Automotive electronics (ECU's, displays)
- Charging infrastructure & equipment
- Battery financing
- EV testing & certification facilities for global OEM's

Threats



- EV industry displacing conventional industry - No
- Availability of electricity - No
- Ability to compete globally - No
- Big Oil - No
- Delays, indecision & bureaucracy - Yes

Joule Opportunities



- R7b export earnings annually
- ~10,000 sustainable jobs
- A new industry – training, skills, spin-offs, jobs, earnings
- Proving that South Africa is serious about climate change





Optimal Energy's Vision:

To establish and lead the electric vehicle industry in South Africa, and expand globally.

Thank You

