Q&A

WA Electric Vehicle Trial
Australia's First Electric Vehicle Fleet Trial
WHAT IS THE WA ELECTRIC VEHICLE TRIAL?

- **What is the purpose of the WA Electric Vehicle Trial?**
  - Provide a public demonstration of the operating characteristics and environmental benefits of electric vehicles;
  - Provide local industrial development opportunities in a range of areas, as well as gain technology transfer into WA universities for what will be a major new industry;
  - Provide an opportunity for trial participants to assess the suitability of electric vehicles for their specific operational requirements.
  - Identify and assess the technical, regulatory, policy and planning issues with the introduction of electric vehicles in Perth; and

- **How will the WA Electric Vehicle Trial work?**
  - At least ten specially converted electric vehicles (developed in consultation with the University of WA) to be purchased and operated by fleet participants, in order to track and collect usage data;
  - Up to ten state of the art fast-recharge bays to be installed around Perth for use by fleet participants (to be provided under a separate ARC Linkage grant funded project conducted by a consortium led by UWA and including the Department of Transport, Murdoch University, Gull and CO2 Smart); and
  - A comprehensive multi-year UWA led research project to be conducted, aimed at providing the insights needed to enable the wider introduction of electric vehicles.

- **Who is participating in the WA Electric Vehicle Trial? What do they hope to take from the trial?**
  - **Telstra** is one of the largest fleet operators in Australia and has always acted where possible to reduce the environmental impact of this fleet. The step towards electric vehicles could provide an additional opportunity to make further improvements and Telstra are keen to explore and support the trial for this purpose.
  - **Water Corporation** is a significant fleet operator in Western Australia and as such has always had a fleet policy that encourages efficiency and lower emissions. Water Corporation has used its fleet as a test centre for new fleet technologies in the past and welcomes the chance to show leadership in the promising technology of electric vehicles.
  - Through the **City of Perth**'s strategic planning process the community's expectation became obvious that the Capital City should lead in environmental and climate solutions, one aspect of which is access and mobility. A number of programs are in place already in the City's parking portfolio including energy reduction initiatives, carbon sequestration in trees, and sustainable energy sources to reduce carbon emissions.
  - The most recent example is the construction of a 1050 bay car park in Elder Street which will incorporate smart energy consumption management, solar harvesting and the provision for recharging of electric vehicles.
  - The opportunity to be involved with the UWA consortium has been taken up with enthusiasm by the City and we look forward to being an active participant in the ongoing development of alternative mobility for people which has minimal environmental consequences.
• The City of Swan is pleased to be associated with the Electric Vehicle Trial Program. It will provide valuable insight into the infrastructure and logistical requirements as well as highlighting the future benefits of Electric Vehicles. The EV program forms part of the City’s strong commitment to supporting environmental improvement and long term environmental sustainability for our community. The City of Swan is the largest local authority in Metropolitan Perth. It presents a unique opportunity to research the very limits of electric vehicles in terms of range and performance.

• The recharging and services required by electric vehicles on the main road network are of particular interest to Main Roads WA. The trial will allow an opportunity to reflect on the requirements that may need to be planned for in the future. Main Roads WA also takes seriously the issue of emissions from their own vehicle fleet.

• The RAC is Western Australia’s peak motoring body and will be a key player in educating its members and the wider motoring community about evolving vehicle technology from the internal combustion engine to electric drives. As the RAC did 100 years ago with the introduction of vehicles, the RAC can play a crucial role on behalf of members by advocating for government policy and the infrastructure required to facilitate the introduction of electric vehicles. The introduction of electric vehicles also has the potential to significantly impact the services and products offered by the RAC and it is imperative that the organisation is at the forefront of EV development to ensure it can adapt its business to accommodate the new technology and continue to serve and inform its membership in the years to come.

• The West Australian is an important media outlet in WA as well as a key publisher of automobile news and information to the wider community. The West Australian will play a key role in shaping public perceptions of sustainable transport options including electric vehicles. The West Australian looks forward to reporting the experiences of the trial as well as finding direct ways to reduce further the environmental impact of our business.

• The Department of Environment and Conservation has the lead responsibility for protecting and conserving the State’s environment on behalf of the people of Western Australia. One of the Department’s key objectives is to support the development and implementation of strategies to reduce greenhouse gas emissions. The Department of Environment and Conservation is supportive of initiatives such as this trial of converted electric vehicles to keep Western Australia at the forefront of developments in the field of alternative transport options and to develop the capability within Western Australia to pursue favourable low emission transport options in the future.

• The Department of Transport works to provide safe, accessible, sustainable and efficient transport services that promote economic prosperity and enhance the lifestyle of all Western Australians. The Department’s Sustainable Transport Energy team has an interest in promoting the development and uptake of alternative fuels and vehicle technologies and has worked closely with the trial organisers in developing the trial concept.
- **LandCorp** is Western Australia’s Liberal/National government land development agency with urban and industrial development projects in the metropolitan and regional areas throughout the state. LandCorp integrates sustainability into its developments wherever possible for example Transit Orientated Developments in Cockburn Central and Mandurah. LandCorp is pleased to be involved in this trial as a demonstration of its commitment towards a more sustainable future for all West Australians.

- **How long does the WA Electric Vehicle Trial run?**
  - Two years, extendable for a further year if agreed by all participants.

- **Why does WA need to lead? Why not let others go first?**
  - Firstly, electric vehicle technology promises to be a major new industry, now is the time to fully explore what local industrial development opportunities may exist for WA - perhaps not as a centre for vehicle manufacturing, but certainly there is potential in areas such as engineering/design, battery and vehicle management software, recharge and support systems.
  - Secondly, while overseas/Eastern States trials could tell us something, WA will still needs to work through the actual WA infrastructure and (State) regulatory changes required with the wider adoption of electric vehicles.
  - Lastly, electric vehicles impact the entire automobile industry chain, from retailers, garages/service companies, lease and fleet management companies and more. The trial gives an opportunity for the WA industry to learn these impacts in a structured way first hand.

- **How much will the trial cost?**
  - The trial is possible due to the decision of the ten participants to purchase and operate a specially converted electric vehicle for $46,900. This is instead of purchasing an equivalent internal combustion vehicle for $20,000 or a hybrid for $30,000-$35,000. This is an incremental additional cost of as little as $11,900 per vehicle (versus hybrids). This means all the testing and data collection critical to the trial research can be done at same time vehicles are being used for regular transport purposes.
  - Further, each trial participant contributes $10,000 per year (plus a $7,000 start up fee) for cost of managing the trial (which includes vendor evaluation processes for vehicle conversion services and recharging infrastructure, project management, fleet management, training, administration, research support and communications,).
  - Federal ARC Linkage funding received for the fast charging network component is $229,000. The Department of Transport has contributed $20,000 in cash, to the ARC Linkage application (along with sponsors CO2 Smart and Gull).
  - Department of Transport (and other areas) contribute significant "in-kind" resources to the trial via advice and expertise.

- **When will the trial start?**
  - The trial begins with the conversion of a single vehicle, which will act as a prototype. Department of Transport have ordered the donor vehicle and completion ready for testing is scheduled for May 2010.
• The remaining nine vehicles will be delivered from August (phased delivery to all participants from August to September)
• The recharge network will be in place by August.
• Initial on-road testing by participants of prototype commences May 2010.
• The on-road trial remaining vehicles commences August 2010.

ELECTRIC VEHICLES - WHY THE FUSS?

• Why is there so much fuss about electric vehicles? What are the benefits?
  • Electric cars and electric motorbikes are zero emission vehicles, which mean they do not produce any pollutants when charged with electricity from renewable sources, such as solar, wind, tidal or geothermal energy. Transport as a sector contributes around 14% of Australia’s greenhouse gas emissions.
  • Electric cars are ideal for city traffic and commuting in metropolitan areas, even when charged with electricity generated from coal or gas, as the pollution is moved away from urban centres and can be more efficiently dealt with at the power generator.
  • Electric vehicles are almost silent (although a certain level of warning noise can be added for safety reasons) and will significantly reduce street noise levels.
  • Electric vehicles have significantly less service requirements (as most service costs in conventional cars are associated with combustion engines). This will result in lower maintenance costs.
  • Electric cars are significantly cheaper to run, as their electricity costs are only a fraction of the cost of petrol or diesel.
  • Electric vehicles will reduce the nation’s dependence on imported foreign oil, as electricity can be produced locally from traditional power stations and renewable energy sources.

• Are there industrial development opportunities for WA in electric vehicles?
  • We believe there are. Perhaps not in areas of mass market vehicle manufacturing, but possibly in areas of research, design/development, software such as battery management systems, recharge systems and aftermarket conversions. Already there are some promising commercial initiatives in WA.

WHAT ELECTRIC VEHICLES ARE BEING USED IN THE TRAIL?

• What electric vehicle will be used in the WA Electric Vehicle Trial?
  • A new Ford Focus sedan converted to electricity, via the removal of internal combustion engine and the placement of a battery pack and electric motor. The summary specification is as follows:
**Ford Focus CL Sedan - Specification Highlights**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford Focus CL Sedan</td>
<td>Manual</td>
</tr>
<tr>
<td>Removal of ICE and Accessories</td>
<td>Required</td>
</tr>
<tr>
<td>Re-sale of ICE And Acc.</td>
<td>Returned to required address</td>
</tr>
<tr>
<td>Option: Automatic transmission</td>
<td>incl. add. modificat.</td>
</tr>
<tr>
<td>Batteries: 45x160Ah, 22kWh, 94kW</td>
<td>Li-Ion-P range ~120km, top sp. 120km/h</td>
</tr>
<tr>
<td>Battery Management</td>
<td>incl. Master module</td>
</tr>
<tr>
<td>Drive motor: Netaign 9&quot; Impulse</td>
<td>30kW cont. up to 100kW peak</td>
</tr>
<tr>
<td>Drive Controller</td>
<td>Synkromotive 700A, 100kW</td>
</tr>
<tr>
<td>Range ~120km, top sp. 120km/h (1)</td>
<td></td>
</tr>
<tr>
<td>Brake assist</td>
<td>pump YT Stabletech VBS, 50W</td>
</tr>
<tr>
<td>Power steering</td>
<td>not required electric power steering</td>
</tr>
<tr>
<td>Air Conditioning and Heating</td>
<td>Rev. Cycle 10,000 BTU</td>
</tr>
<tr>
<td>DC-to-DC inverter</td>
<td>Iota 55A</td>
</tr>
<tr>
<td>Combined fast and slow charger</td>
<td></td>
</tr>
<tr>
<td>Charge cable 10A - 15A</td>
<td>2.2kW</td>
</tr>
<tr>
<td>Fast - incl. IE socket</td>
<td>4.3kW 3-phase</td>
</tr>
<tr>
<td>Level 1 recharge time</td>
<td>8 to 10 hours</td>
</tr>
<tr>
<td>Level 2 recharge time</td>
<td>4 to 5 hours</td>
</tr>
<tr>
<td>Black box monitoring</td>
<td>Mobile broadband, 3G wireless, GPS, charge status</td>
</tr>
<tr>
<td>Re-registration and Eng. Report</td>
<td></td>
</tr>
<tr>
<td>Option: Motor sound system</td>
<td>N/A - UWA development</td>
</tr>
<tr>
<td>Re-registration and Eng. Report</td>
<td>selectable engine sound</td>
</tr>
<tr>
<td>Re-registration and Eng. Report</td>
<td>Dept. of Transport</td>
</tr>
</tbody>
</table>

*(1) Range Note: The range target shall be calculated using as a proxy the driving pattern specified as per the Combined Averaged Cycle Test, as outlined in Australian Design Rule ADR 81/02*

- **What will be the range of the electric vehicle conversion?**
  - Combined city/country cycle =120km

- **What will be the performance of the electric vehicle conversion?**
  - The actual driving performance of the converted cars will be very similar to the petrol version.

- **How much "horsepower" and "torque" will the vehicle have?**
  - The converted cars will have 22kW (39 HP) of **continuous** electric motor power and 300Nm or torque. These values cannot be directly compared with the peak performance rating of petrol or diesel cars, as the electric peak performance will be a multiple of the continuous performance.

- **Will the electric vehicle conversion be licensed?**
  - Yes

- **Are the trial electric vehicles safe?**
  - Yes. To ensure safety a prototype vehicle will first be completed and thoroughly tested before completion of other vehicles. Agreed safety standards have been concluded with licensing authorities. The vehicle will have all the regular safety
equipment, such as ABS, airbags etc. (excluding stability control - which cannot be fitted due to system requiring integration with engine management).

- The voltages involved in these electric vehicles are significantly lower than the 240V mains power we use every day, and the entire traction circuit is both isolated and insulated such that under normal operating conditions it is not possible to get an electric shock from the vehicle.

**What is the cost of the electric vehicle conversion?**
- $46,900 which includes donor vehicle (Ford Focus), plus conversion costs (parts and labour), less sale of internal combustion engine (which is not required).

**Who will be doing the conversion work? Where will it be done?**
- The prototype will be completed in consultation with UWA and a selected conversion provider. The conversion provider will complete the vehicles. A vendor selection process has been completed and a potential conversion provider selected. Negotiations are continuing on a final agreement. Once the agreement is concluded the conversion provider will be announced. The work must be completed in WA, in consultation with UWA.

**Can anyone buy a trial electric vehicle?**
- The trial is restricted to fleet operators. Individuals interested may contact CO2 Smart Pty Ltd (via www.co2smart.com.au). Vehicles used in the trial may be available from resale at the conclusion of the trial.

**Why bother with a conversion of an existing fuel vehicle? Why not wait until a mass-produced electric vehicle is available?**
- A key goal of the trial is as follows: “Provide local industrial development opportunities in a range of areas, as well as gain technology transfer into universities for what will be a major new industry”. The best way this can be achieved is to complete the conversion work in WA, in cooperation with one of the leading research universities. This is the best way to achieve the initial technology transfer required.
- Secondly, there are currently no mass produced electric vehicles available in Australia. Some vehicles (such as the Mitsubishi iMiEV) may be available in late 2010 or early 2011 but these are likely to be very expensive and available initially in very small numbers. A major issue on the sale of electric vehicles is that industry and the recharge networks are not in place (in Australia), therefore the launch of electric vehicles may be delayed. We need to break out of this "chicken and egg" dilemma and start readying our cities and towns for electric vehicles today.

**Why are we converting a Ford Focus sedan and not another car?**
- A range of vehicles were considered, including all major brands. The Ford Focus was selected due to good weight, space (including sedan variant), price, resale opportunity of unused parts and good dealer support (we need a dealer who has depth and flexibility to support trial where needed).
RECHARGING DURING THE TRIAL

- **How will vehicles be charged during the WA Electric Vehicle Trial?**
  - The vehicles can be recharged using a regular household power outlet (slow charging) or via a fast charging stations (fast charge). Initially, 10 fast charge stations will be located around Perth for use of all trial participants. Participants can recharge via a regular power outlet at the office or home.

- **Where will the fast charge stations be located?**
  - Locations will be at convenient, public locations. Specific locations will be selected by ARC Linkage partners (Department of Transport, Gull, UWA, Murdoch and CO2 Smart), in consultation with fleet participants.

- **Who can use the recharging stations?**
  - The trial research involves users from two groups:
    1. Trial participants (10 fleet operators)
  - Why are members of the Australian Electric Vehicle Association participating?
    In the WA Electric Vehicle trial we are converting 10 cars to be placed in government and company fleets. This is a good number for the EV trial, as it will let us find out benefits and possibly also limitations and problems of EV usage in a daily work environment. However, to widen the base for the socio-economic part of the study we are including the up to 50 electric vehicles from private members of the AEVA Perth Branch.
    - Initially, only trial participants and members of the Australian Electric Vehicle Association will be able to use the recharging stations. If you are an individual or company with an EV, and are not a participant or member of AEVA but wish to use the recharge stations, please contact CO2 Smart Pty Ltd (via [www.co2smart.com.au](http://www.co2smart.com.au)).

- **How long do vehicles take to recharge?**
  - Slow charge (regular 240V power outlet) = 6-8 hours
  - Fast charge (special stations) = 3-4 hours

- **Can trial electric vehicles be charged via a standard 240V power outlet?**
  - Yes.

- **What is the capacity of the battery pack?**
  - We will be using 45 Lithium-Ion-Phosphate cells with 160Ah capacity each. This will give the battery pack a total capacity of 23kWh, which translates into a vehicle range of about 125km.

- **What voltage is generated?**
  - Each battery cell has a nominal voltage of 3.2V, which gives the battery pack a total of 144V.
• Can you get electrocuted? Seriously injured or killed?
  • Electrocution is a serious issue that needs to be avoided when a service person or repairer conducts work on an electric car. Electrocution can only happen if a person is exposed to both battery terminals at the same time (e.g. touching the battery pack terminals with two hands), which cannot happen during normal driving conditions. For additional protection, each car will be equipped with electronic safety switches, which disconnect the battery pack in case of a collision and during charging. In the engine and battery bay, all high voltage points are marked and their terminals are insulated to prevent touching.

• What recharging stations will be used during the trial?
  • A number of recharging station providers already exist, with extensive installations already in place in many overseas countries. The ARC Linkage trial partners, lead by UWA, are currently conducting a vendor evaluation process of all suitable recharging stations. This will result in a recommendation(s) for use in the trial.

ELECTRIC VEHICLES IN GENERAL

• What is the cost of electric vehicles versus internal combustion engine (ICE) cars? Aren’t they expensive?
  • New research confirms that electric vehicles are cheaper on a fully factored cost per km basis today (small and medium passenger cars), and will be much cheaper longer term.

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Small Passenger 2010</th>
<th>Medium Passenger 2010</th>
<th>Large Passenger 2010</th>
<th>Light Commercial 2010</th>
<th>Taxi 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE</td>
<td>$0.263</td>
<td>$0.264</td>
<td>$0.267</td>
<td>$0.356</td>
<td>$0.277</td>
</tr>
<tr>
<td>HEV</td>
<td>$0.299</td>
<td>$0.254</td>
<td>$0.318</td>
<td>$0.272</td>
<td>$0.380</td>
</tr>
<tr>
<td>PHEV</td>
<td>$0.297</td>
<td>$0.217</td>
<td>$0.313</td>
<td>$0.227</td>
<td>$0.469</td>
</tr>
<tr>
<td>EV</td>
<td>$0.260</td>
<td>$0.191</td>
<td>$0.270</td>
<td>$0.199</td>
<td>$0.416</td>
</tr>
</tbody>
</table>

**Source:** ARECOM

Table 8.5: Lifetime cost per kilometre for each engine configuration in 2010 and 2040

• Are hybrids a better solution that electric vehicles?
  • The current limitation of battery electric cars are their limited range in combination with large recharging times, however with new and improved battery technology, we will see longer driving ranges as well as shorter recharging times. Today’s hybrid cars have only a very small battery inside, which can drive the car for only 90 seconds! And, it is not possible to recharge a hybrid car’s battery from the grid (i.e. by plugging it in) – one has to burn petrol or diesel when driving the car with its combustion engine, in order to charge the battery. The next generation of hybrids will have somewhat larger batteries and offer the “plug-in” option of charging it from a power point; however, hybrids will always be significantly more expensive than either petrol/diesel cars or electric cars, since they contain two separate drive trains (combustion and electric). The future may rather belong to battery electric cars with small onboard diesel generators used as range extenders to recharge the battery pack during longer drives.
• Are hydrogen fuel cell vehicles a better solution than electric vehicles?
  • Hydrogen fuel cell cars have the advantage of a longer range and the convenience of quicker refill, compared to battery electric cars in their current form. But this advantage is likely to reduce with more advanced battery capacity and recharging techniques of future electric car generations. Much larger investments will also be required to develop and implement safe, clean and economic hydrogen production, storage, and distribution systems compared with those required for a roll out of electric vehicles.

• Are LPG or natural gas powered cars a better solution than electric vehicles?
  • Neither LPG nor natural gas vehicles can be zero emission, they still pollute the atmosphere. On the plus side, they can reduce the dependence on foreign oil imports.

• Do electric vehicles have any negatives? What are the risks?
  • In their current development stage, battery electric cars have two disadvantages: They have a limited range (usually 80-150km) and they require longer recharging times (typically 2-8 hours). However, these limitations will be overcome in newer electric car generations using more advanced battery and recharging technology. Even with today’s limitations, electric cars are ideal as commuter cars or a second family or — in the words of Ed Begley, Jr.: "The detractors of electric vehicles are right. Given their limited range, they can only meet the needs of 90 percent of the population."

• Can Lithium Ion batteries be recycled?
  • Lithium batteries can and should be recycled. They also do not contain any toxic substances.

• Is there a risk of a potential shortage of Lithium Ion?
  • A possible Lithium shortage has been called a myth. Only very small amounts of lithium are required for producing Li-ion batteries (about 3% cost factor) and there are abundant Lithium reserves worldwide. Just recently, Galaxy Resources opened a new Lithium mine in Ravensthorpe, Western Australia.

• Is there a risk of explosion in a Lithium-Ion battery?
  • Older style Lithium-Ion batteries had a very slow risk of explosion if overheated or when charged with excessively high voltage, while the risk of newer style battery packs is virtually zero. This is achieved by using a Battery-Management-System (BMS) with modules that monitor conditions for each individual battery cell, together with improved battery electrodes.

• Are Lithium Ion batteries toxic?
  • No

• Will batteries keep getting better? What is the trend?
There is continuous research going on in either improving Li-ion type batteries or using different battery materials altogether. We have seen a huge jump in battery technology through emerging markets for mobile phones and laptop computers. The automotive battery market is larger by several magnitudes and will definitely lift battery technology to another level.

What happens when you run out of charge on the highway or breakdown in an electric vehicle?
- This situation is similar to having a breakdown with a petrol car. A tow truck will be required to bring the car to the next service station or recharging station.

Will the trial provide for battery swapping?
- No, a battery swap facility will not be provided as part of the trial, due to the small number of vehicles participating and the high costs of providing such a facility. While some potential EV providers are proposing to include this as an option, the technical and economic viability of such a business model remains to be proven.

How fast can a battery be charged in the future?
- In the past, we required 10 hours for a full charge using standard Australian power outlets. Today, with the “Level 2” medium-fast charging stations, which will be installed as part of the UWA-led ARC Linkage Research project, we will achieve a full charging time of 3 hours. Future systems using same or similar battery technologies using the same or similar battery technologies will be able to do a full recharge in under one hour, while future advanced batteries may get in the order of 10min.
- It should be noted that these times are for full recharges from completely empty. Charging from half-full to three-quarters full is a much more realistic charging scenario - this will only require one quarter of the before-mentioned times, i.e. 45min. using our Level-2 charging stations.

Do you need special training to drive an electric vehicle?
- No, driving an EV is very similar to a petrol car. The most frequent comment we have received when letting people test drive the UWA REV car was that “this is not very different from driving a petrol car”.

Will electric vehicles simply overload the electricity grid?
- Not if managed well. Incentives to charge off-peak should ensure there is no "overload" of the electricity grid.

Where will people recharge? Home? Work? In a carpark?
- It is very hard to predict people's behaviour in this regard. This is why UWA, Murdoch University, CO2Smart, Gull Petroleum and the WA Department of Transport are currently conducting an ARC-funded research project on EV Charging Behaviour to collect ground data. The two main questions for which we are looking for answers are:
1) To which percentage do EV owners use public charging stations rather than charging at home? This will let us know how much recharging infrastructure will be required in the future for larger numbers of EVs. 
2) At what times do EV owners prefer to recharge their cars? This will have a significant impact on future power generation and grid structure requirements, as well as the possible need for smart metering and daytime-dependent electricity pricing to avoid excessive power using during peak hours.

**ELECTRIC VEHICLES - PROMOTION**

- **How do we plan to promote the take up of electric vehicles?**
  - We are fortunate to have The West and the RAC on board with the trial. A media/communications plan will be developed with the aim of increasing the profile of electric vehicles for consumers.

**WHO’S WHO?**

- **Who is the REV (Renewable Energy Vehicle) Project at UWA?**
  - The UWA Renewable Energy Vehicle Project (REV) hopes to “revolutionise personal transport” by building zero emission vehicles, powered by electricity from renewable sources, charged from any plug point and viable to both the performance and commercial markets. REV is tackling the problems created by rising fuel prices and vehicle pollution head-on. The REV team comprises Engineering staff and students from the University of Western Australia, fuelled by a passion for a sustainable future. REV provides a unique opportunity for students to learn and develop multi-disciplinary teamwork plus innovative, design, leadership, management, marketing, finance and practical skills. REV was re-started in 2008 by Professor Dr. Thomas Braunl (UWA Robotics & Automation, UWA Elec. & Comp. Eng.) and Dr. Kamy Cheng (UWA Mech. Eng.) after a precursor project had looked at hydrogen technologies (contact via [http://therevproject.com](http://therevproject.com)).

- **Who is CO2 Smart Pty?**
  - CO2 Smart is an integrated electric vehicle fleet management company, working with organizations to lower per km costs as well as remove vehicle related CO2 emissions. This includes correct vehicle selection, the required recharging network and organizational support. CO2 Smart Pty Ltd initiated the idea of the trial, recruited participants to join and has worked on the technical and legal structure of the trial over the last one and a half years. CO2 Smart Pty Ltd will be paid directly incurred costs only to manage the trial over the coming two years. Terry Mader is founder and CEO of CO2 Smart Pty Ltd (contact via [www.co2smart.com.au](http://www.co2smart.com.au) or 04 6666 3639).

- **Who is the Sustainable Transport Energy team at The Department of Transport?**
  - The Department of Transport works to provide safe, accessible, sustainable and efficient transport services that promote economic prosperity and enhance the lifestyle of all Western Australians. The Department’s Sustainable Transport Energy team has an interest in promoting the development and uptake of alternative fuels and vehicle technologies and has worked closely with the trial organisers in
developing the trial concept. Contact Luke O'Donoghue, Director Sustainable Transport Energy, Department of Transport (luke.odonoghue@transport.wa.gov.au).