Sustainable Transportation Research at UVa

A Presentation to the Governors Energy Conference

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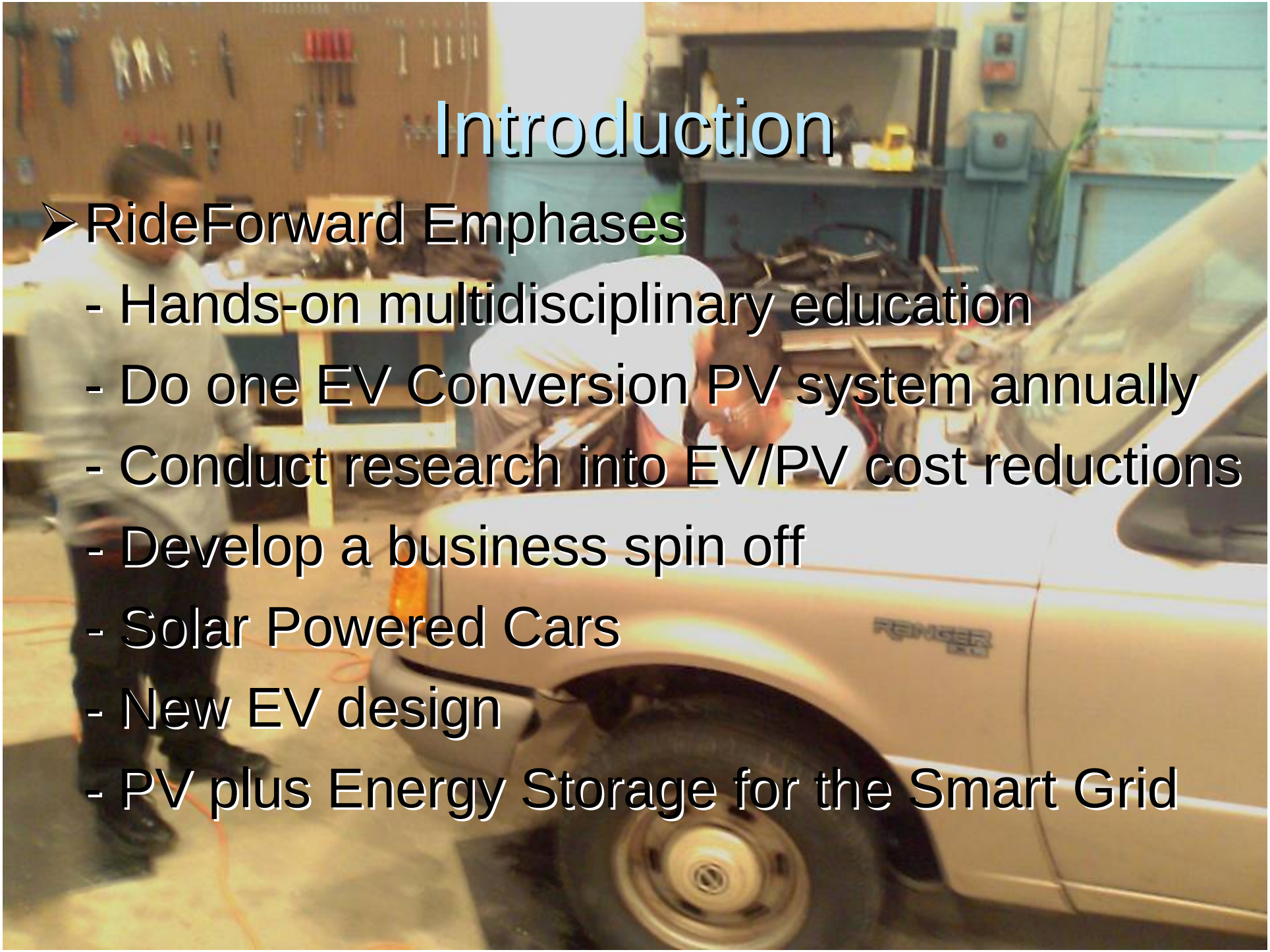
Introduction

- What is sustainable transportation
  - electric vehicles
  - powered by alternative energy

Introduction

- Why is this important
  - balance of trade
  - national security
  - reduce greenhouse gas emissions
  - reduce air pollutants
  - strengthen the smart grid
  - reduce operating costs
  - hedge against fuel price increases

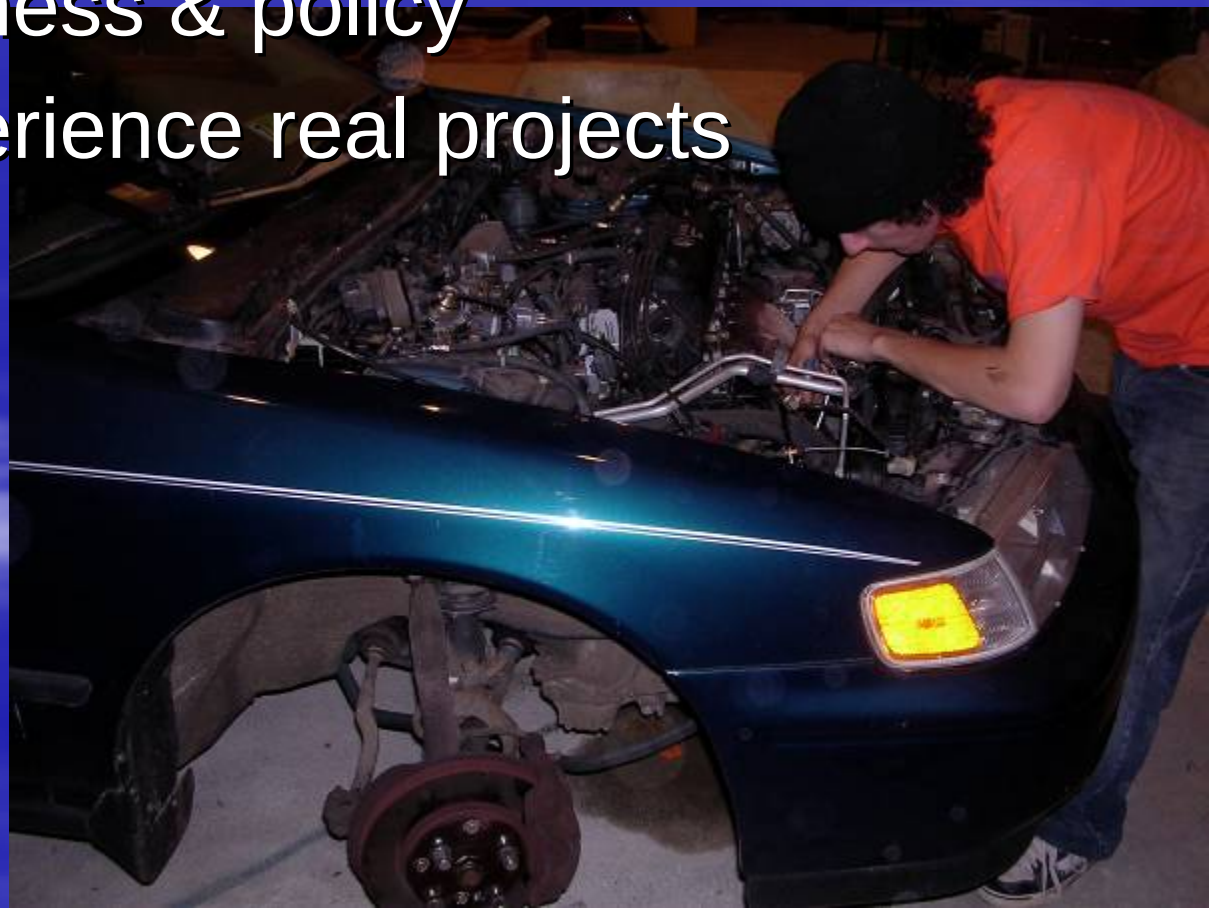


Introduction

- RideForward Emphases
  - Hands-on multidisciplinary education
  - Do one EV Conversion PV system annually
  - Conduct research into EV/PV cost reductions
  - Develop a business spin off
  - Solar Powered Cars
  - New EV design
  - PV plus Energy Storage for the Smart Grid

Multi Disciplinary Hands On

- Includes all engineering disciplines
- Includes business & policy
- Students experience real projects

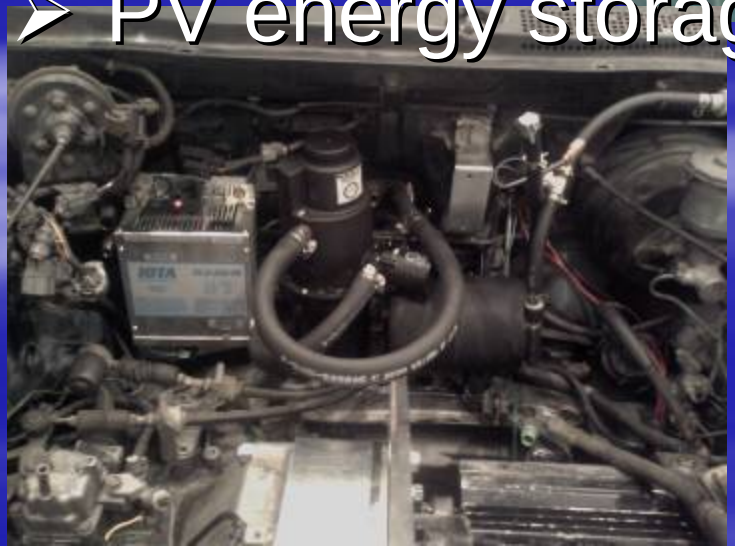


Conversions

- Annual conversion project
- Each project has a different challenge

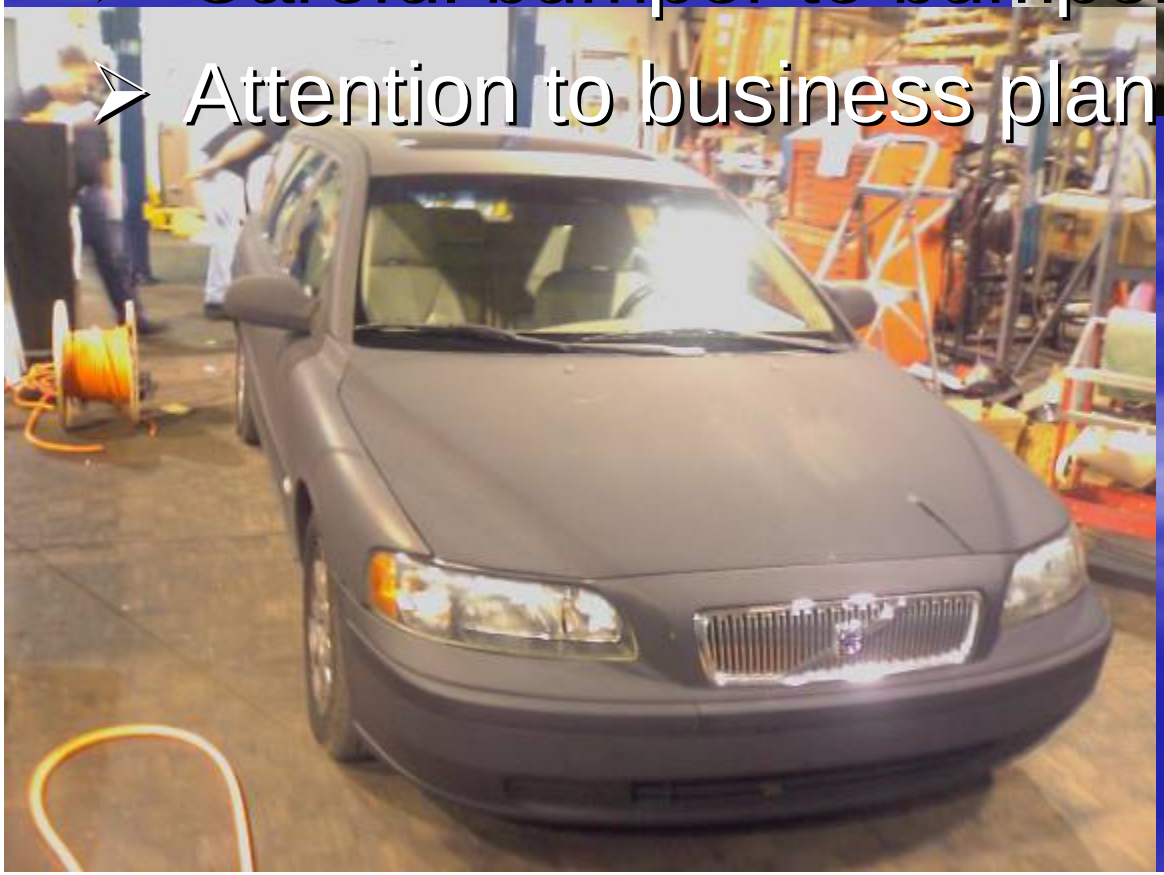
Cost Reduction Research

- EV drive line: motor/controller
- EV energy storage
- EV auxiliaries
- PV inverter, charge controller
- PV energy storage



Conversion Business Spin Off

- Focus on EV drive line optimization
- Careful bumper to bumper design
- Attention to business plan



Solar Powered Cars

- EV & PV together
- Focus on design optimization
- Focus on material & component development

New EV Design

- New EV Design
  - Very light
  - Very aerodynamic
  - Can produce startling results

Smart Grid Applications

- Distributed Generation
- Distributed Storage
- Design optimization

RideForward Summary

- Multidisciplinary hands-on learning
- Yearly conversions
- Viable business (2 – 3 years)
- Solar Race Car team
- New EV Design (3 – 5 years)
- Distributed energy generation & storage