Energy & Infrastructure Future

Overview

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Energy &Infrastructure Future Group

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Energy & Infrastructure Future Group

6330
Energy & Infrastructure Future
Rush Robinett

6337
Solar Technologies
Jeff Nelson

6335
Solar Systems Department
Charlie Hanley

6333
Wind Energy Technology
Jose Zayas

6331
Geothermal Research
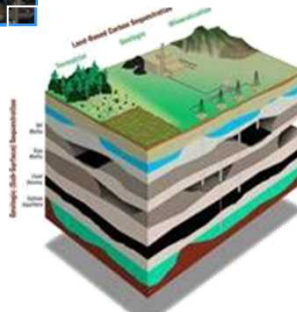**Douglas Blankenship**

6336
Energy Infrastructure & DER
John Boyes

6332
Energy Systems Analysis
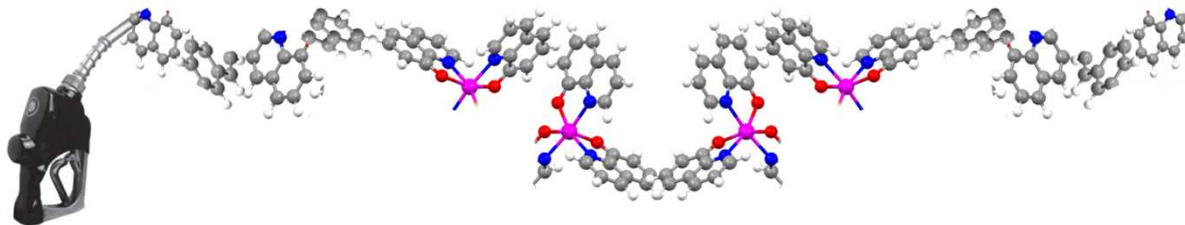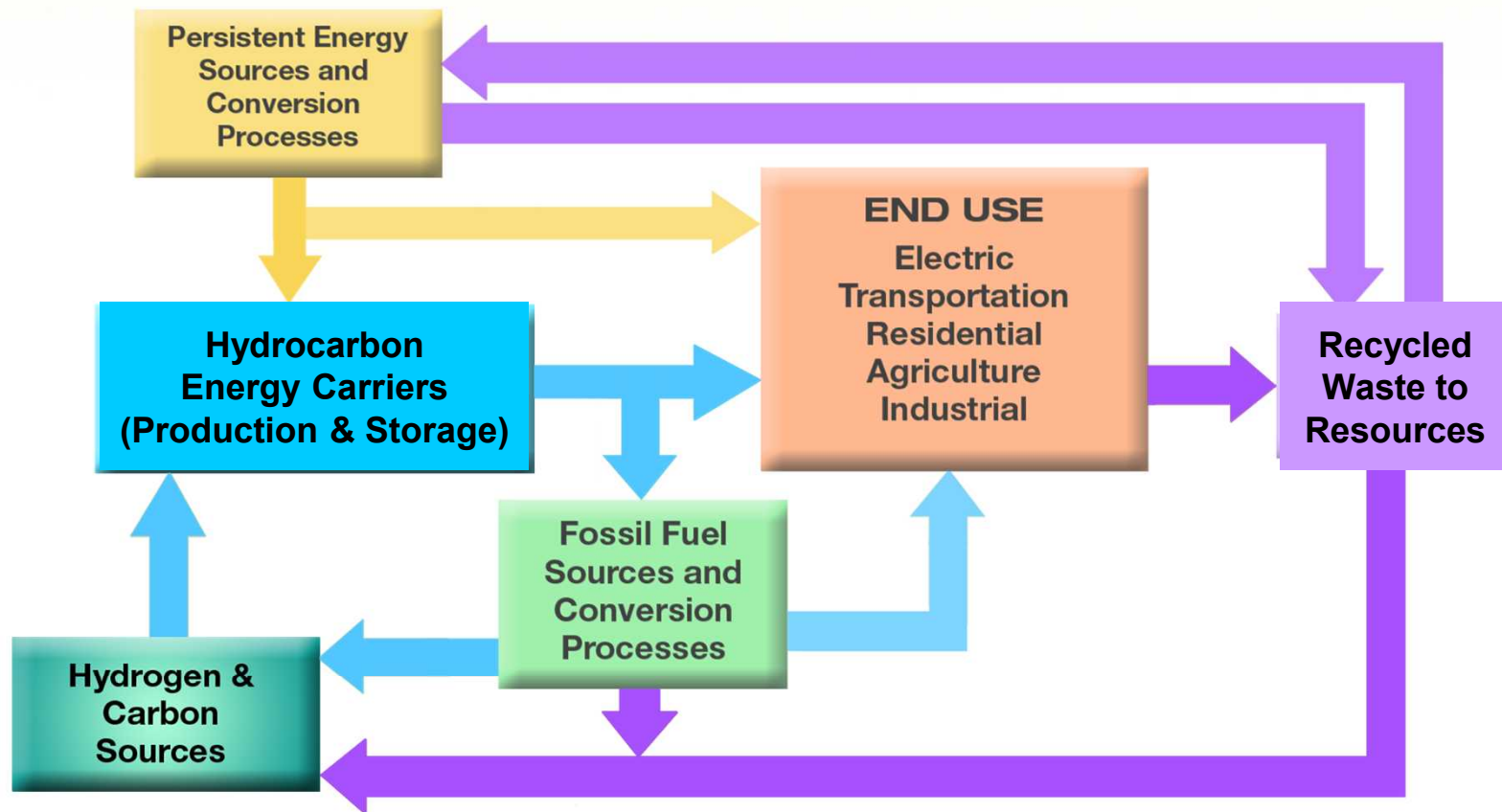**Juan Torres**

6338
Fuels & Energy Transitions
Ellen Stechel

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Elements of Energy Surety

Energy System is:

	If it:
Safe	Safely supplies energy to end user
Secure	Maintains power in a malevolent environment
Reliable	Maintains power when and where needed
Sustainable	It can be maintained indefinitely
Cost Effective	Produces energy at lowest predictable cost

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A Flexible, Adaptive Energy Infrastructure, with a Hydrocarbon "Core" Offers a Path Forward
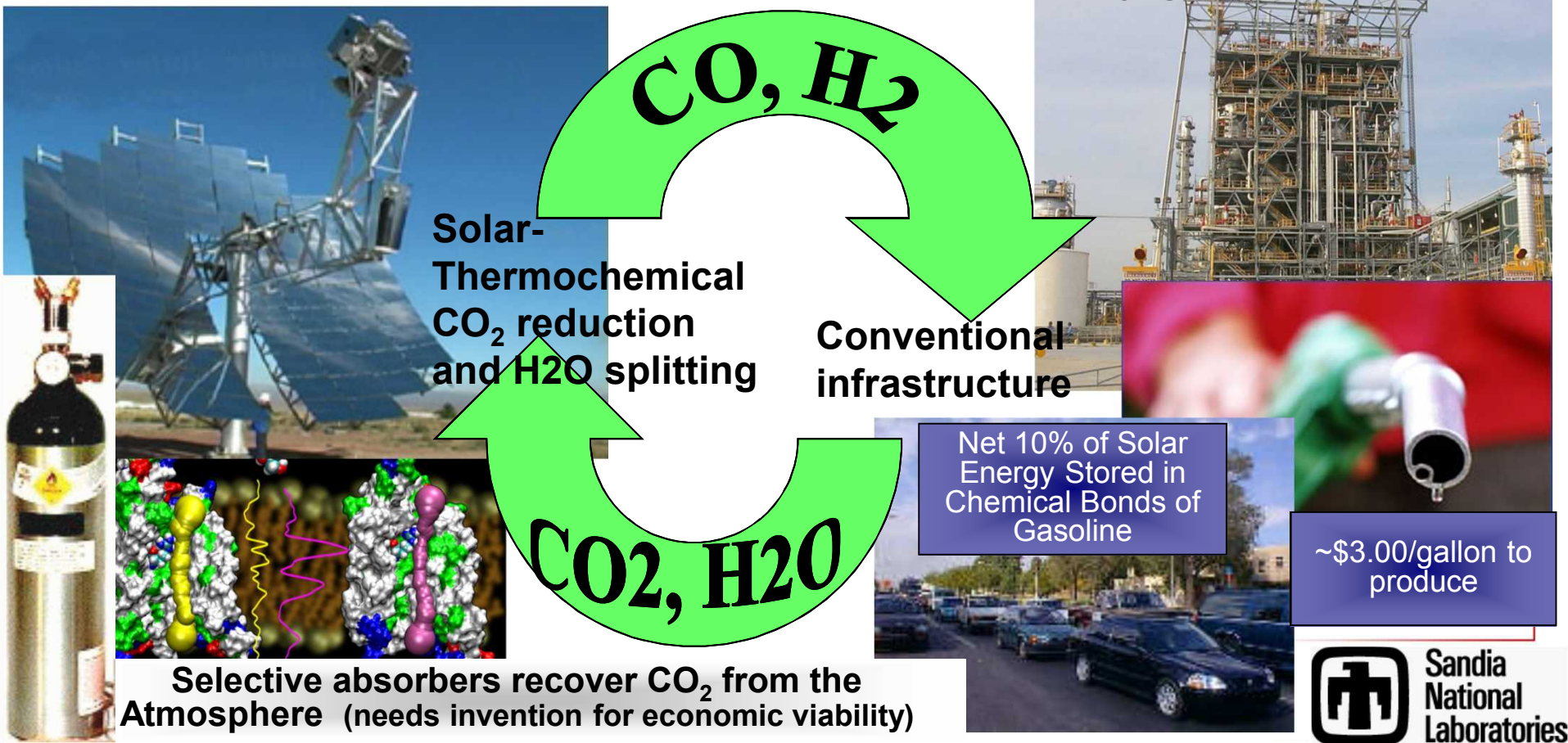
"S2P: Sunshine to Petrol"
Carbon-Neutral Renewable Gasoline

Proof of Concept demonstrated for **Splitting CO2** & **H2O** with a **Solar** driven Chemical "**Heat Engine**"
Chemical synthesis of **Gasoline** from the Solar Products and **Conventional Chemistries**.

Conventional Chemistries from Syngas to Gasoline

CO, H₂

Solar-Thermochemical CO_2 reduction and H2O splitting

Conventional infrastructure

CO2, H2O

Net 10% of Solar Energy Stored in Chemical Bonds of Gasoline

~$3.00/gallon to produce

Selective absorbers recover CO_2 from the Atmosphere (needs invention for economic viability)

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Mesa del Sol
An Application of Renewables in a New Sustainable Community

- A strategic partnership between Sandia and Mesa del Sol to:
  – **Demonstrate new technologies and methodologies in a "real community."**
  – **Focus on evolving energy and resource production, distribution, and consumption.**
  – **Meet sustainability objectives through renewable energy, its efficiency, and resilience.**

Facilities
- *Energy and Resource Showcase*
  - *Technology Demonstration Home*
  - *Town Center Site*
  - *100MW Concentrated Solar Power Plant*
  - *Education Portal for Sustainability*

Technology Areas
- ❖ Renewable energy technologies
- ❖ Fuel cells
- ❖ "Smart" power components
- ❖ Cognitive energy agents
- ❖ Control system technology
- ❖ Microgrid technology
- ❖ Security and resilience
- ❖ Trending, optimization, and reliability

Iberdrola Visit

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