World Renewable Energy Situation

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SERT

SCHOOL OF RENEWABLE ENERGY TECHNOLOGY

NARESUAN UNIVERSITY

ENERGY CATEGORY

ECONOMIC ENERGY

1. **Non-renewable Energy**

   Conventional Energy or Commercial Energy

   - **Oil Coal Gas**

2. **Renewable Energy**

   Non-conventional Energy or Non-commercial Energy

   - **Solar Wind Hydro Geothermal Tidal Biogas Biomass**

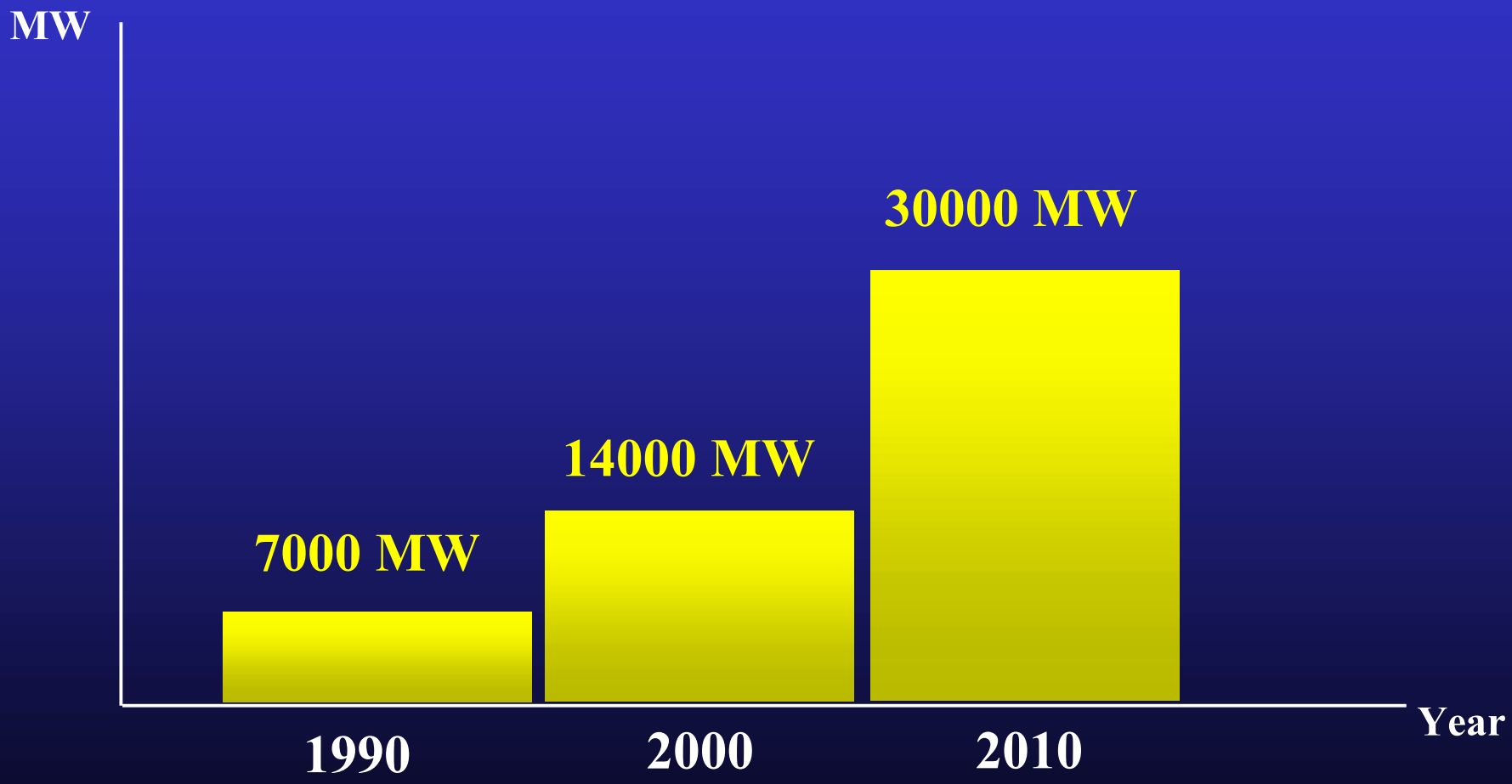
WHAT KIND ENERGY IN THE FUTURE ?

“ SUSTAINABLE ENERRGY ”

1. Environmental Friendy

2. Renewable Energy

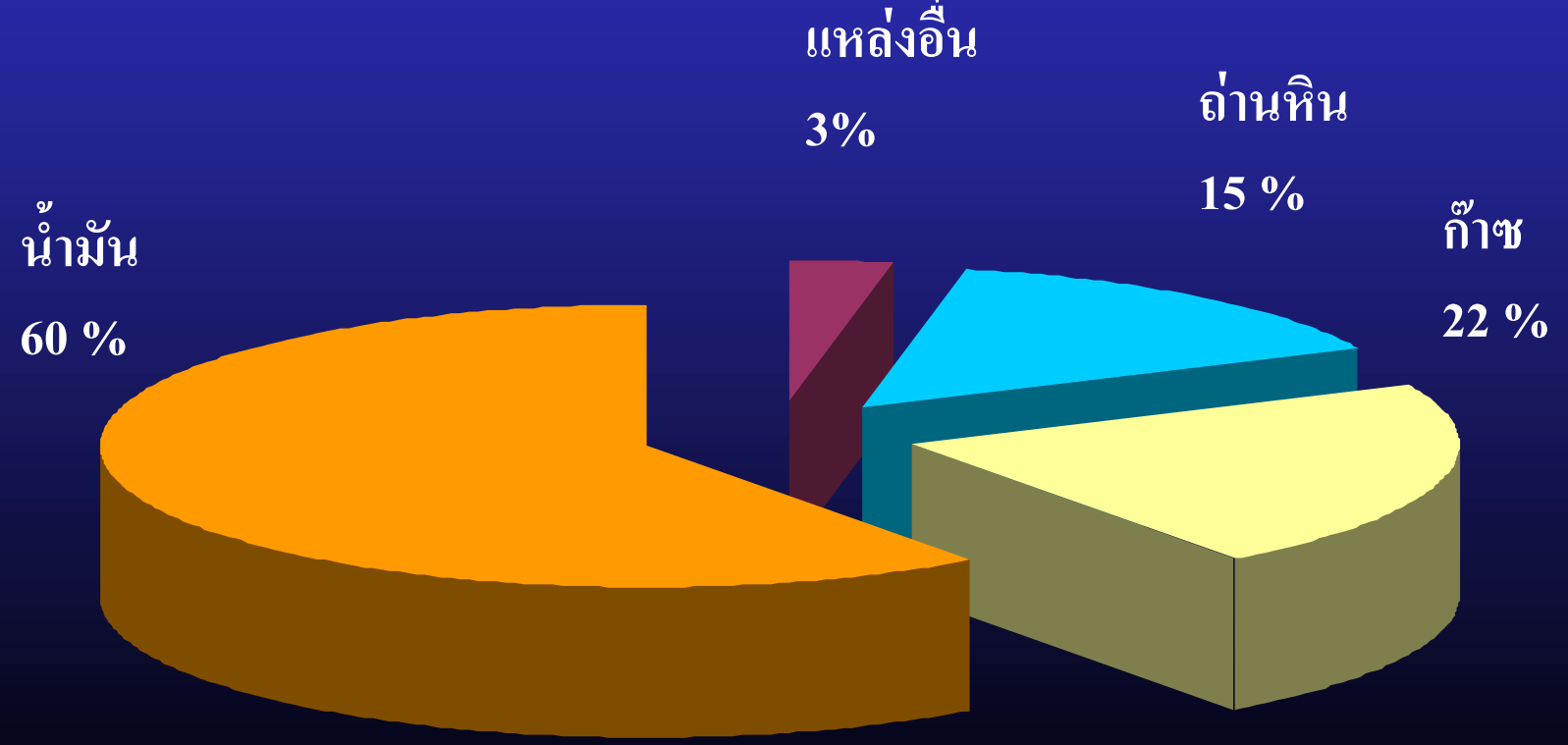
ความต้องการพลังงานไฟฟ้าสำรองของประเทศไทย



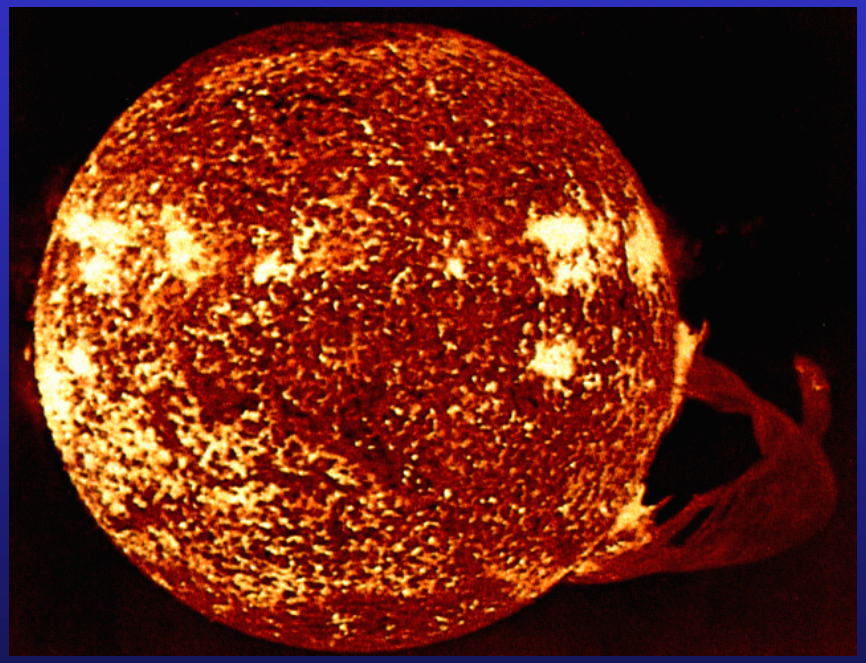
สถานการณ์พลังงานของประเทศไทย

เทียบเท่าน้ำมันดิบ : 70,000 ล้านลิตร / ปี

(200 ล้านลิตร / วัน)



SOLAR ENERGY SOURCE



Mass ***1. 99 X 10*** ^{30} ***Kg.***

Radius ***6. 96 X 10*** ^{8} ***M.***

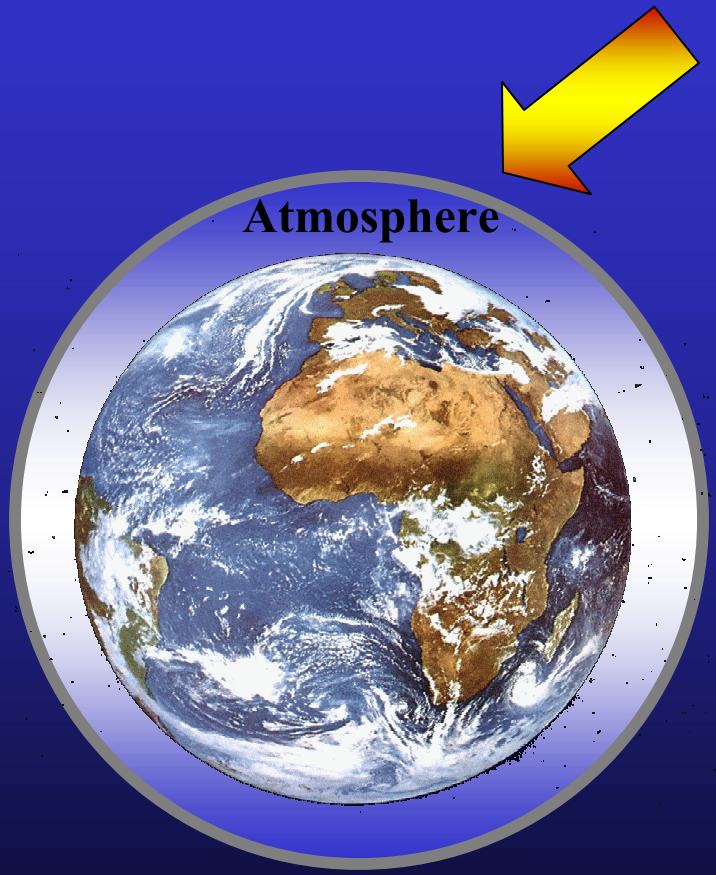
Surface Temperature ***6000 K.***

Radiation Rate ***3.92 x10*** ^{23} ***Kw.***

Distance From The Earth

150,000,000 Km.

SOLAR ENERGY TO THE EARTH



Extraterrestrail

Solar Energy *1, 353* W/m^2

Energy Receives Rate

***1.5 X 10 ^{18}* Kwh / Year Or *5.4 X 10 ^{24}* J**

World Energy *Consumption In 1970*

Was 2 X 10 ^{20} J

SOLAR ENERGY UTILIZATION

1. Solar Thermal

2. Photovoltaic (PV)

SOLAR THERMAL TECHNOLOGY

1. Low Temperature

(T < 100˚ C)

2. Medium Temperature

(100 - 300˚ C)

3. Higth Temperature

(T > 300˚ C)

LOW TEMP.

Solar Hot Water

Type : Vacuum Tube

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กองทุนเพื่อส่งเสริมการอนุรักษ์พลังงาน

SOLAR HOT WATER

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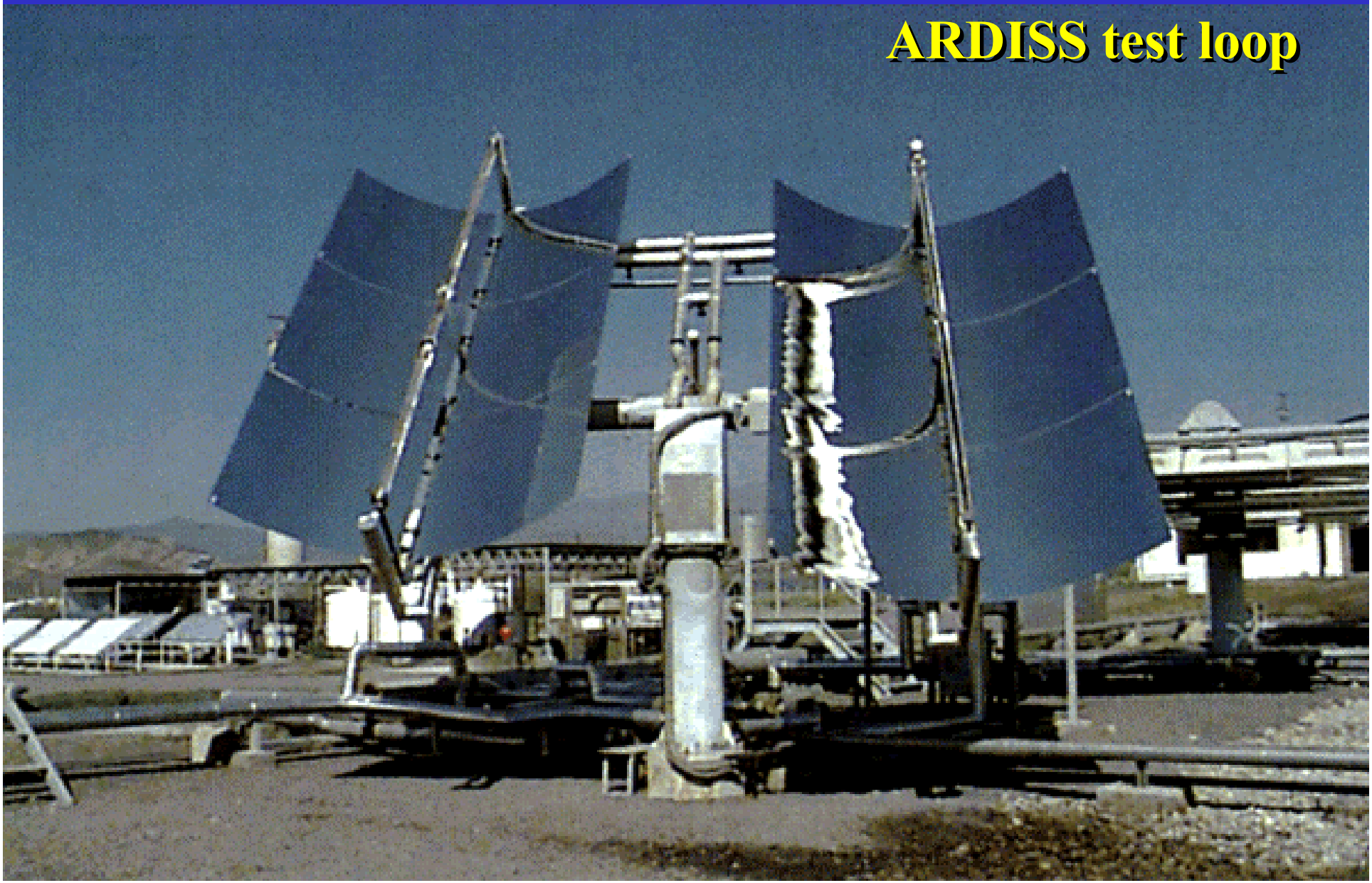
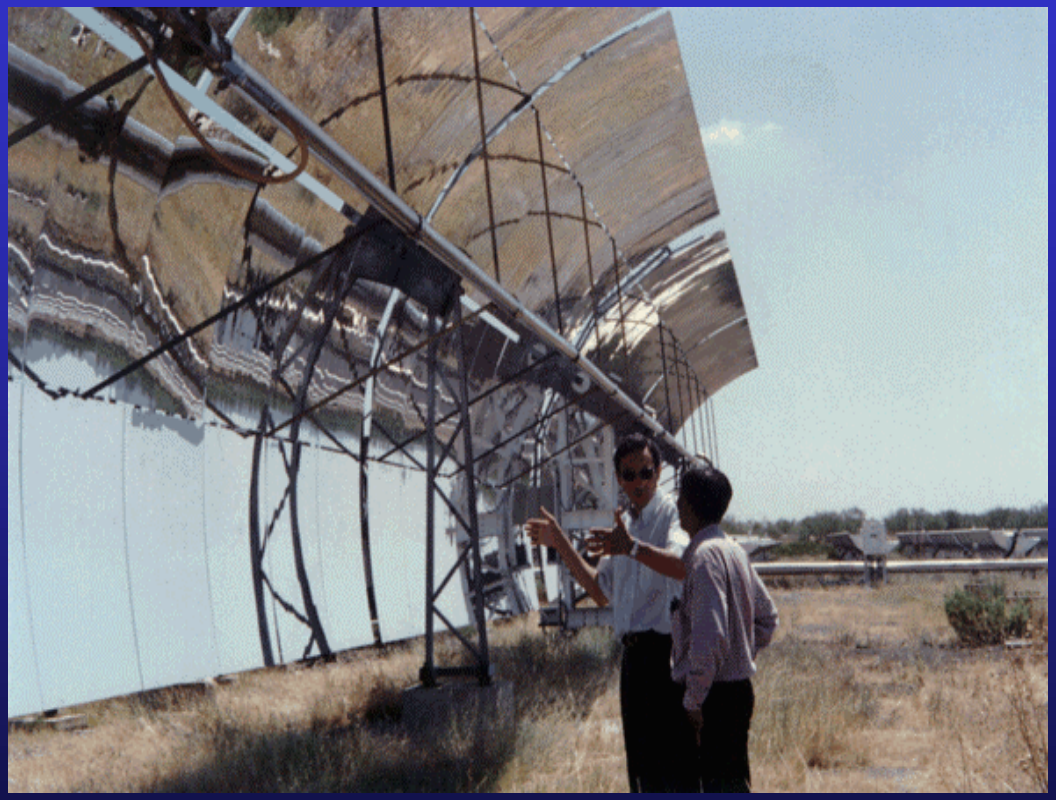
SOLAR DRYING

SOLAR DRYING

Medium Temperature Solar Collector



Parabolic Trough Concentrator (PTC)



Character

- **Concentrator (Focusing)**
- **Direct Radiation**
- **One Axes Tracking**

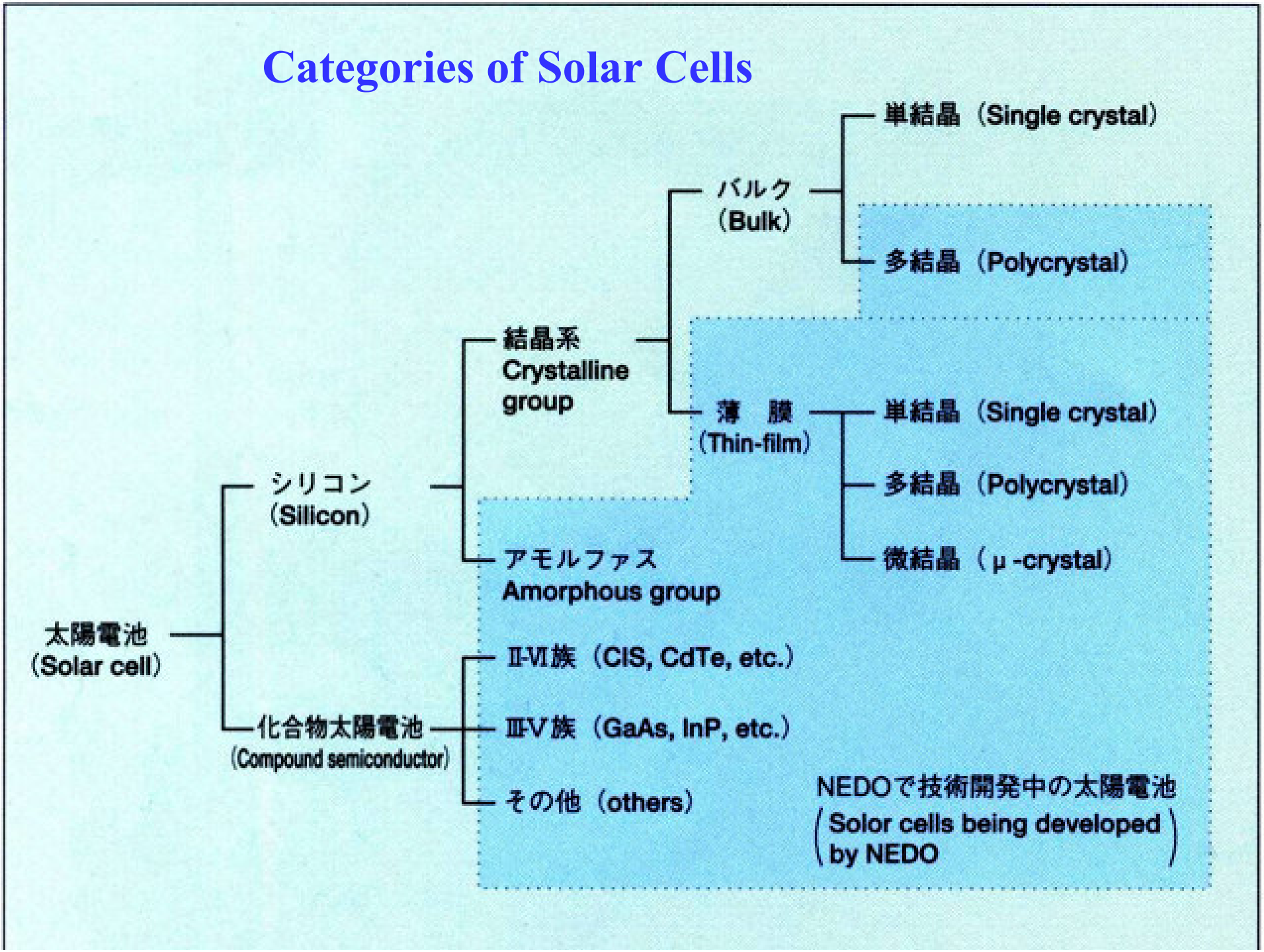
Parabolic Dish Charactor

- **Concentator**
- **Direct Radiation**
- **Two Axes Tracking**

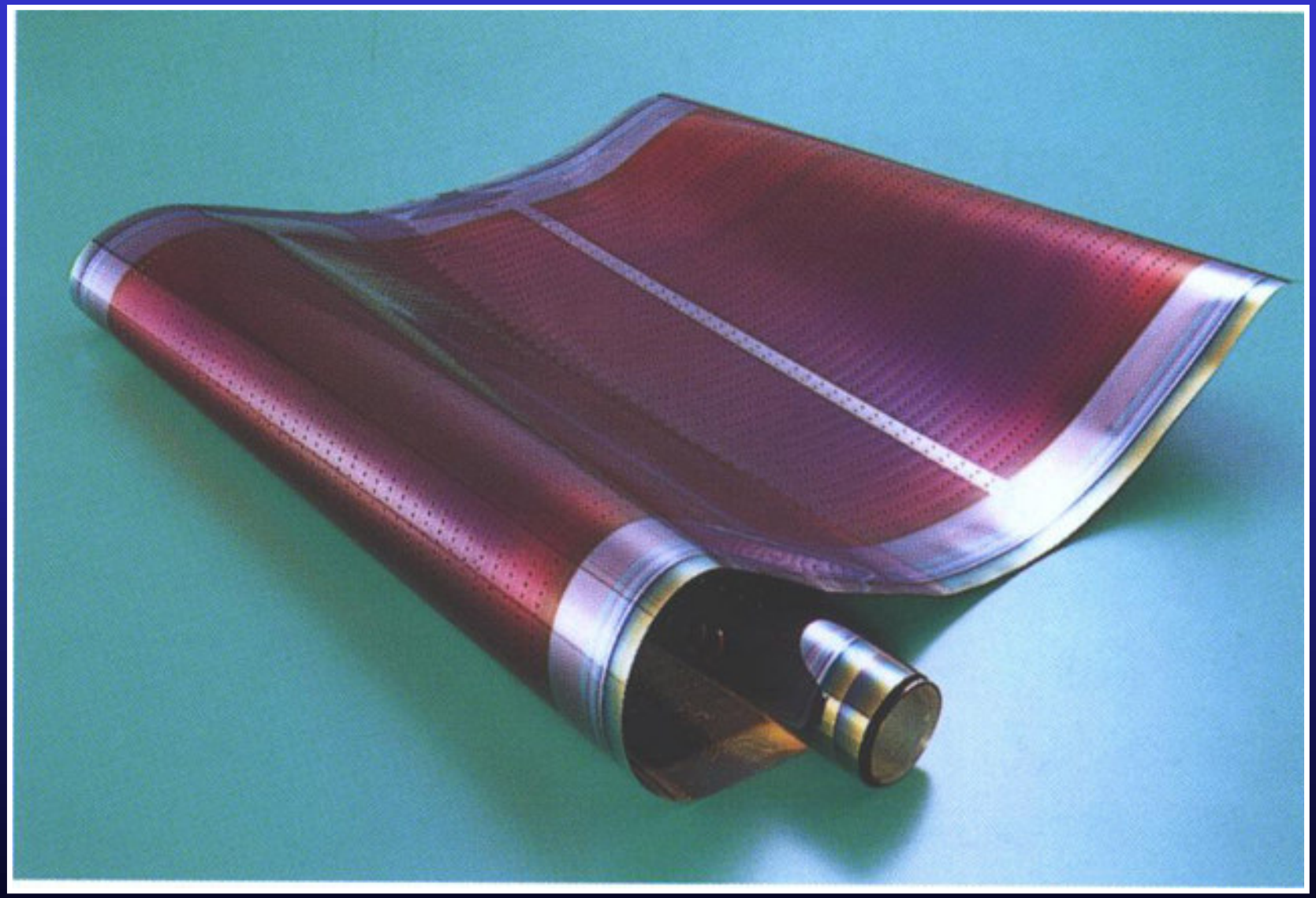
Aerial view of the Plataforma Solar de Almeria

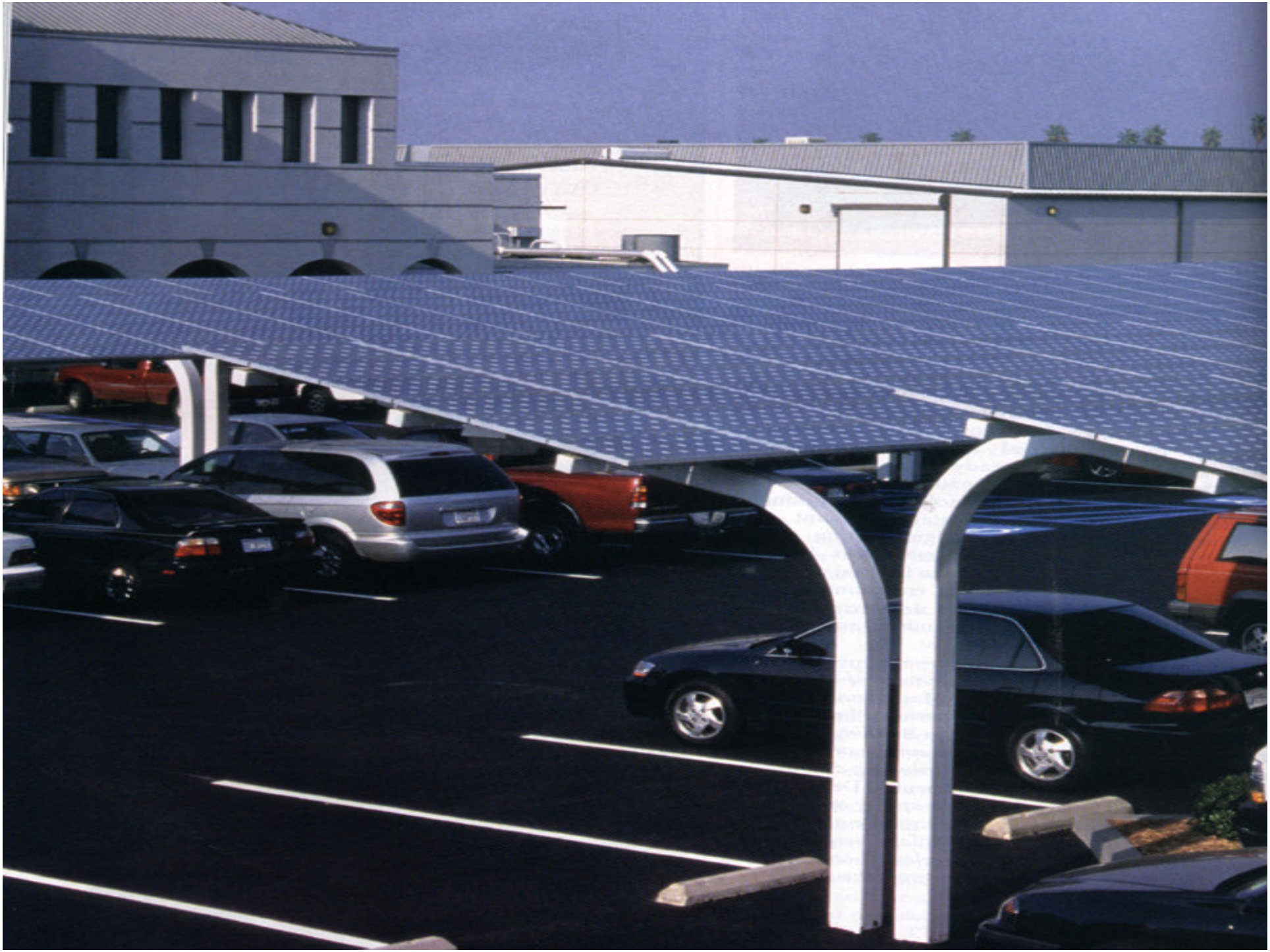
PHOTO VOLTAIC

Categories of Solar Cells



Amorphous Solar Cell (Fiexible) (80cm)





PV-ROOF INTEGRATED

建材一体型実証棟（高耐久性屋根パネル方式）

Demonstration of house roof-integrated PV module (high-durable roof panel system)

建材一体型太陽電池モジュールの開発では、個人住宅等の用途に対応出来る、太陽電池モジュールと

PV-POWER PLANT

高密度連系技術の研究（六甲新エネルギー実験センター）
Demonstrative research on multiple PV system-to-grid connection and control technologies [the Rokko New Energy Test Center]


GhK
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EU - MINI GRID

PV - PUMPING

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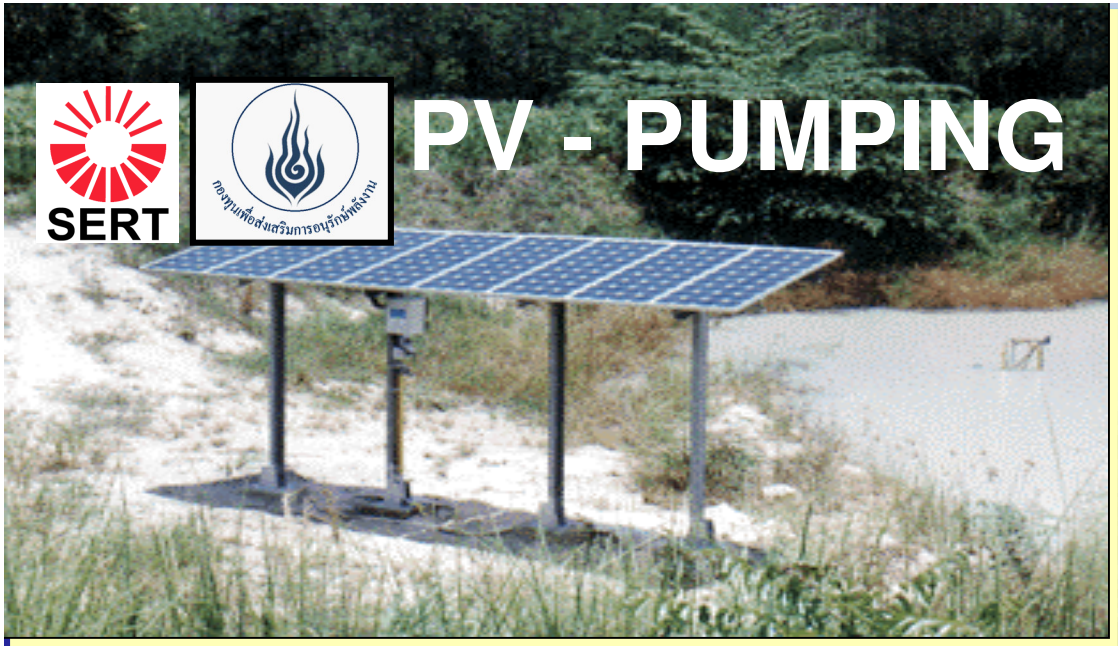
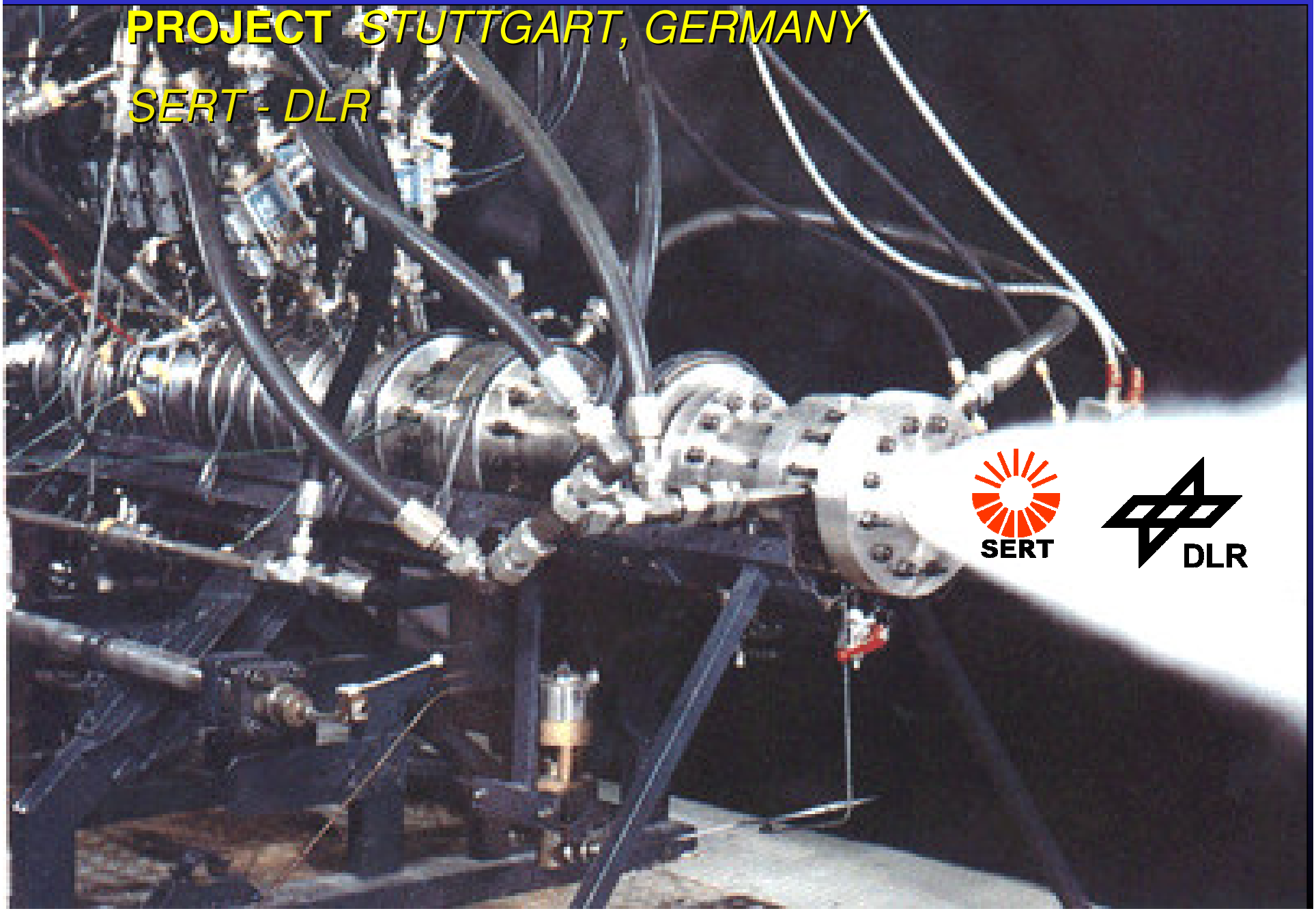


SOLAR HYDROGEN ENERGY DEVELOPMENT

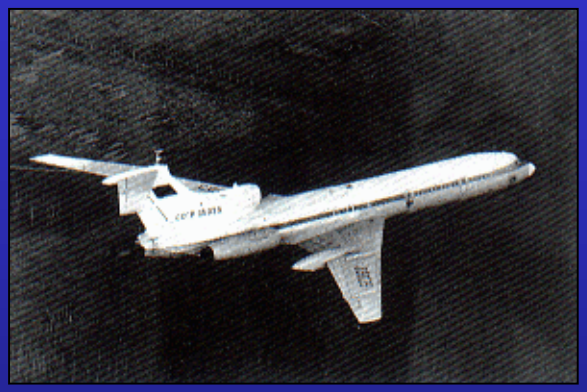
PROJECT *STUTTGART, GERMANY*

SERT - DLR

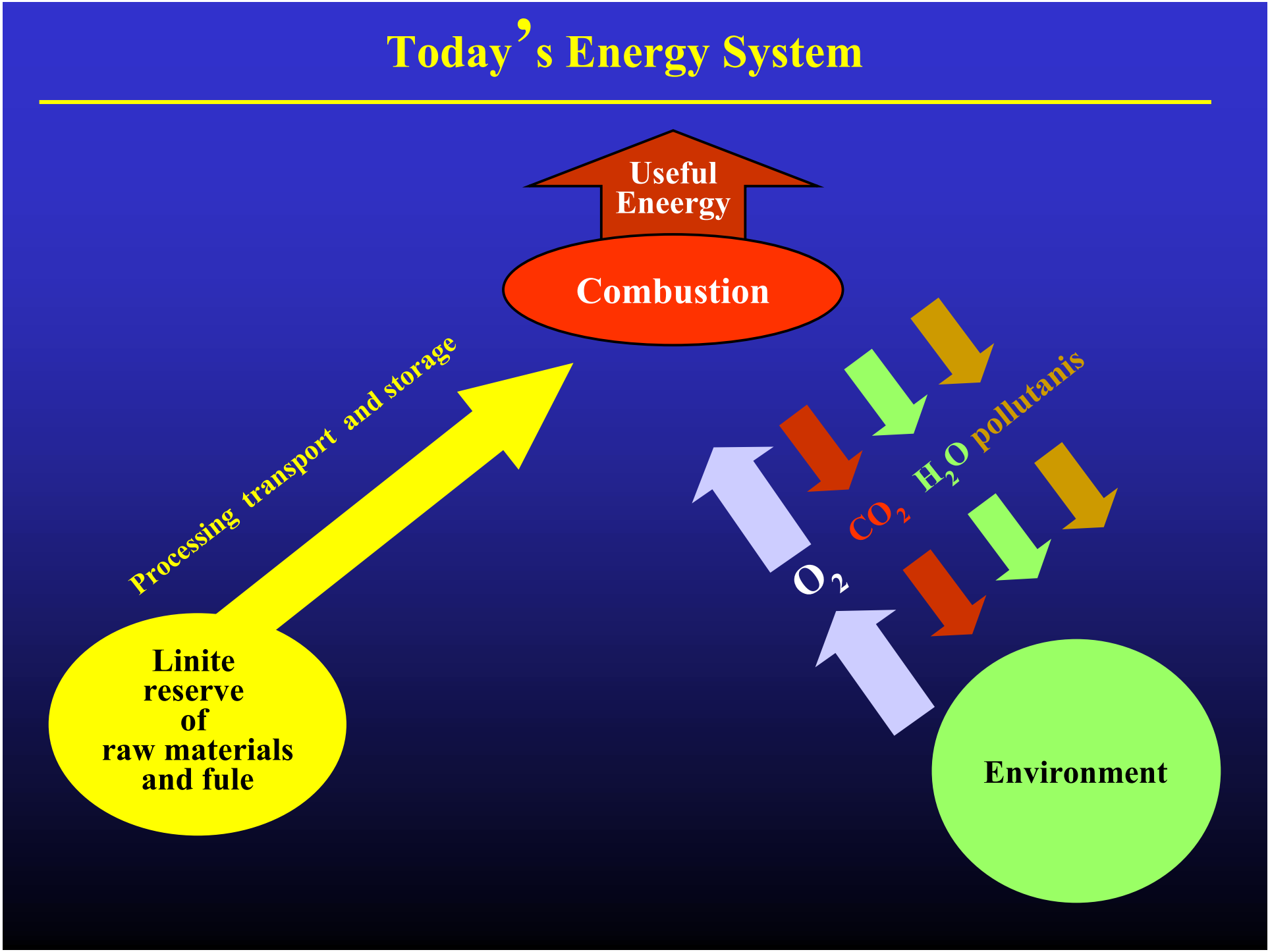


Hydrogen in Motor Vehicle : Liquid hydrogen Storage

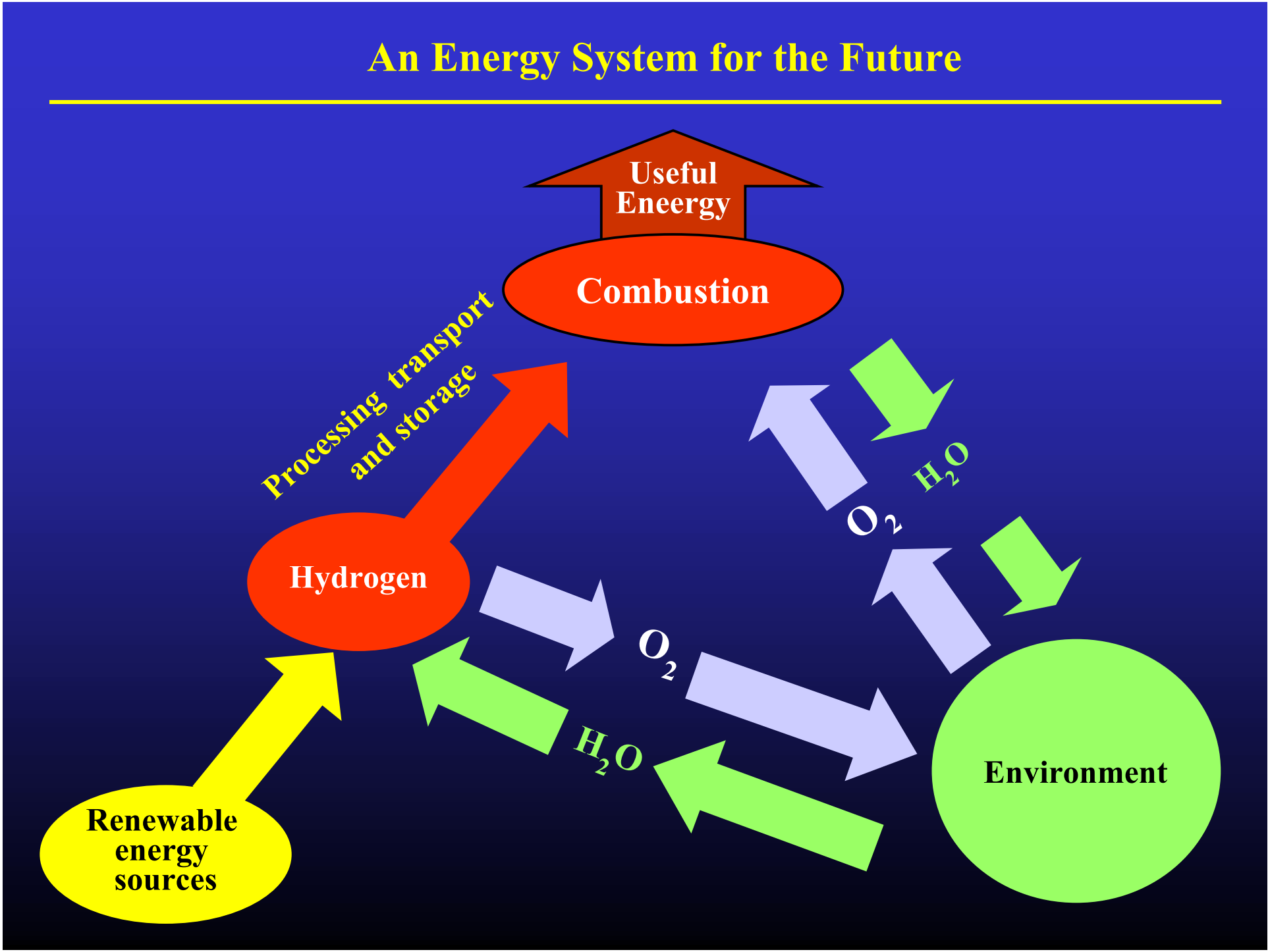
Hydrogen in Aviation

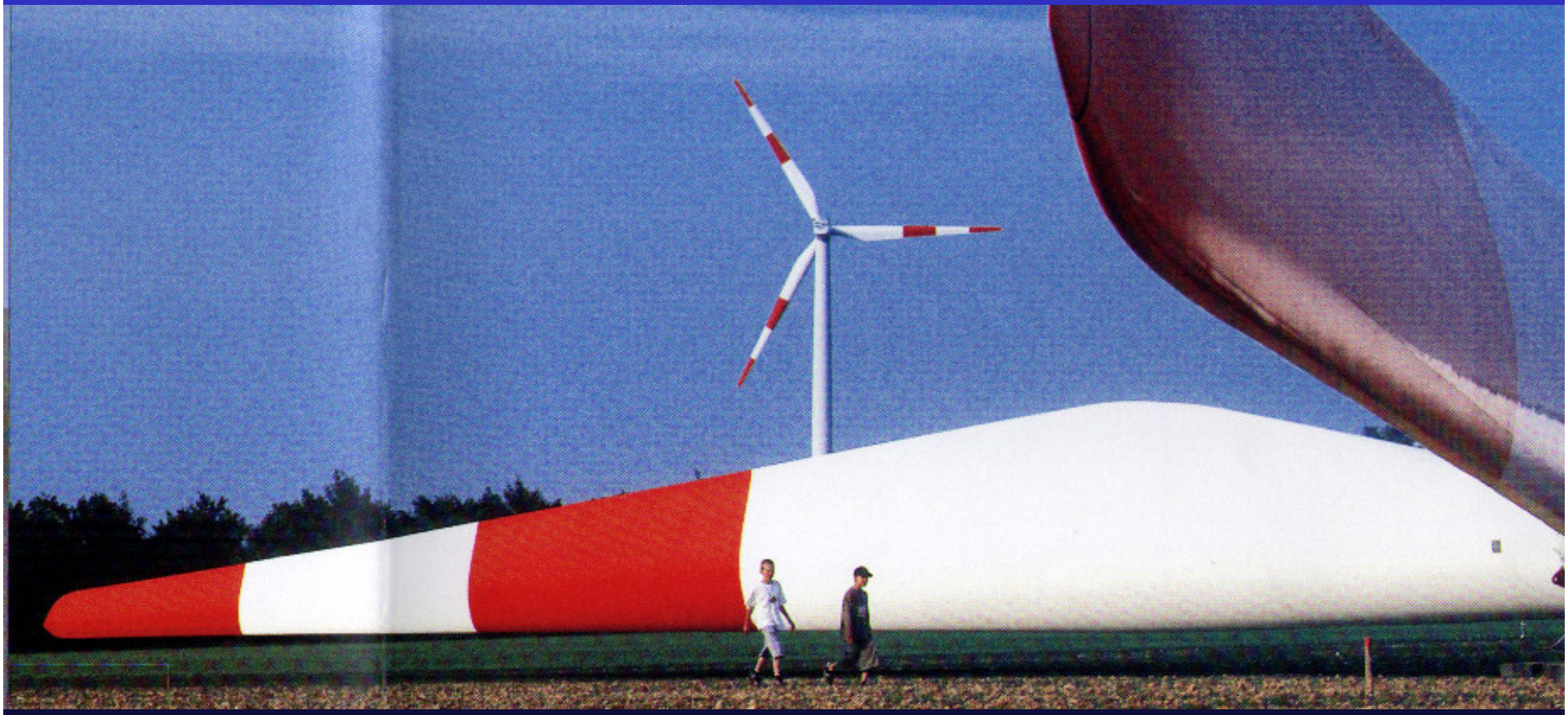


Today's Energy System

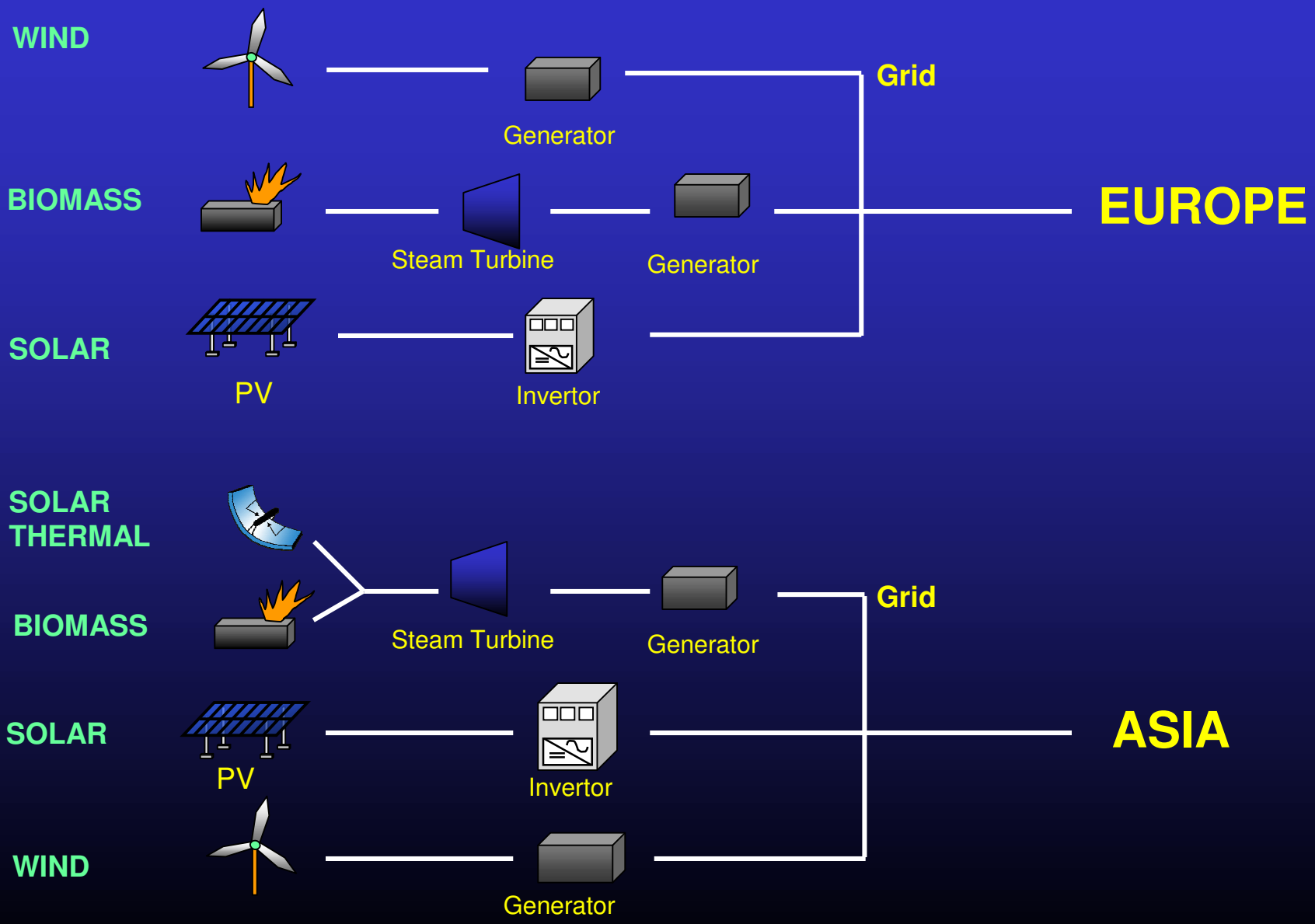


An Energy System for the Future

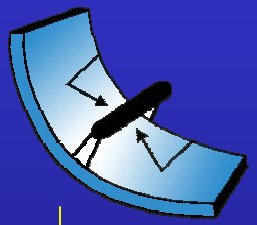




Main Renewable Energy Spectrum

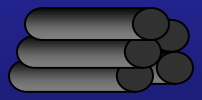


1 MW ONE TUMBOL ONE PRODUCT FOR 10 MB/Y



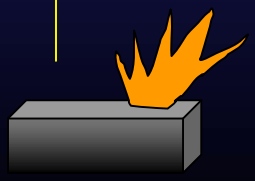
SOLAR THERMAL (30%)
700 ^{0}C 70 BAR

LINITE POWER PLANT
(70%)



SOLAR THERMAL (70%)
180 ^{0}C 15 BAR

BIOMASS
(30%)

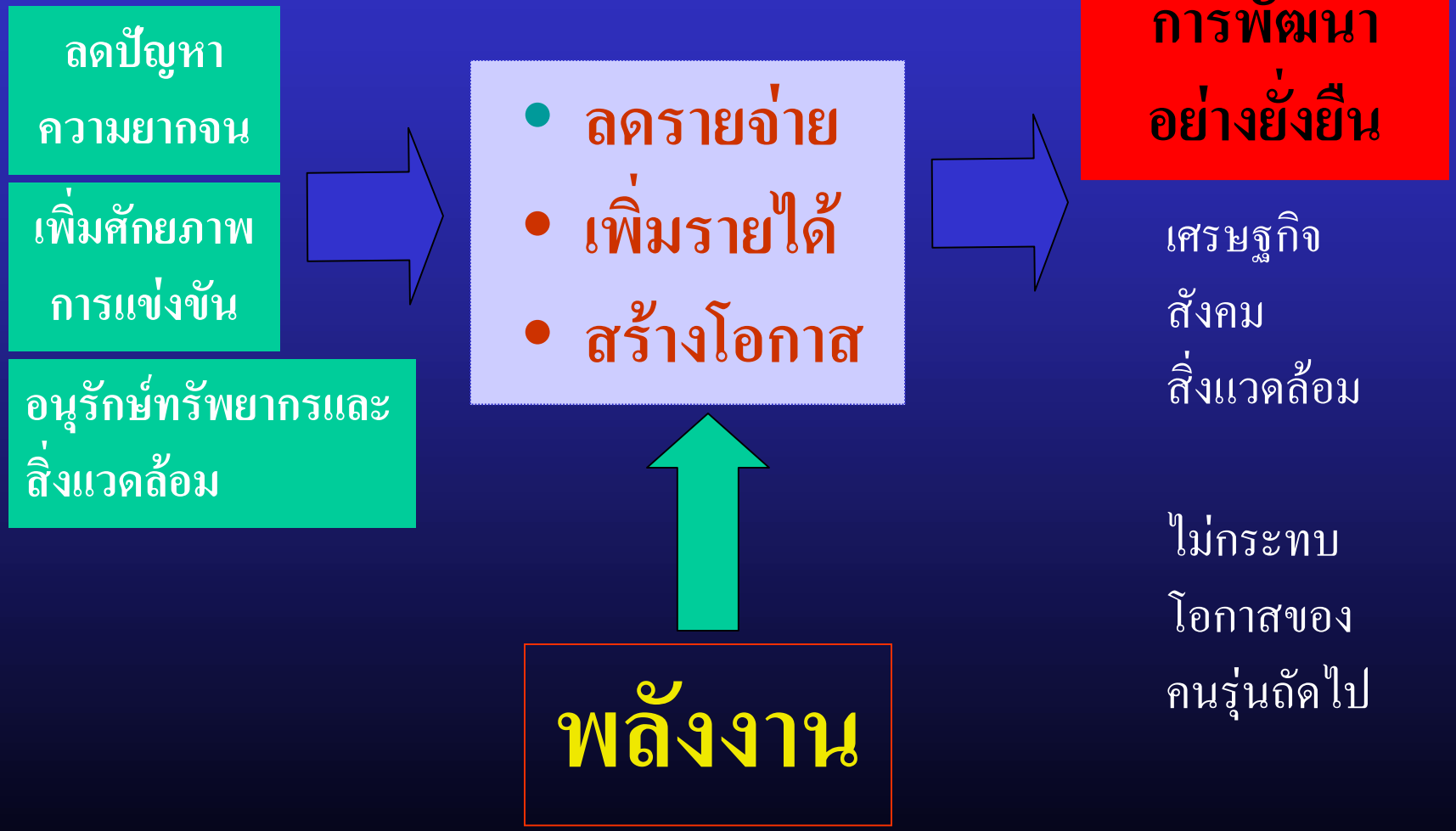


USA	20,000 MW
CHINA	20,000 MW
INDIA	20,000 MW

THAILAND

3,500 MW
35,000 MB/Y

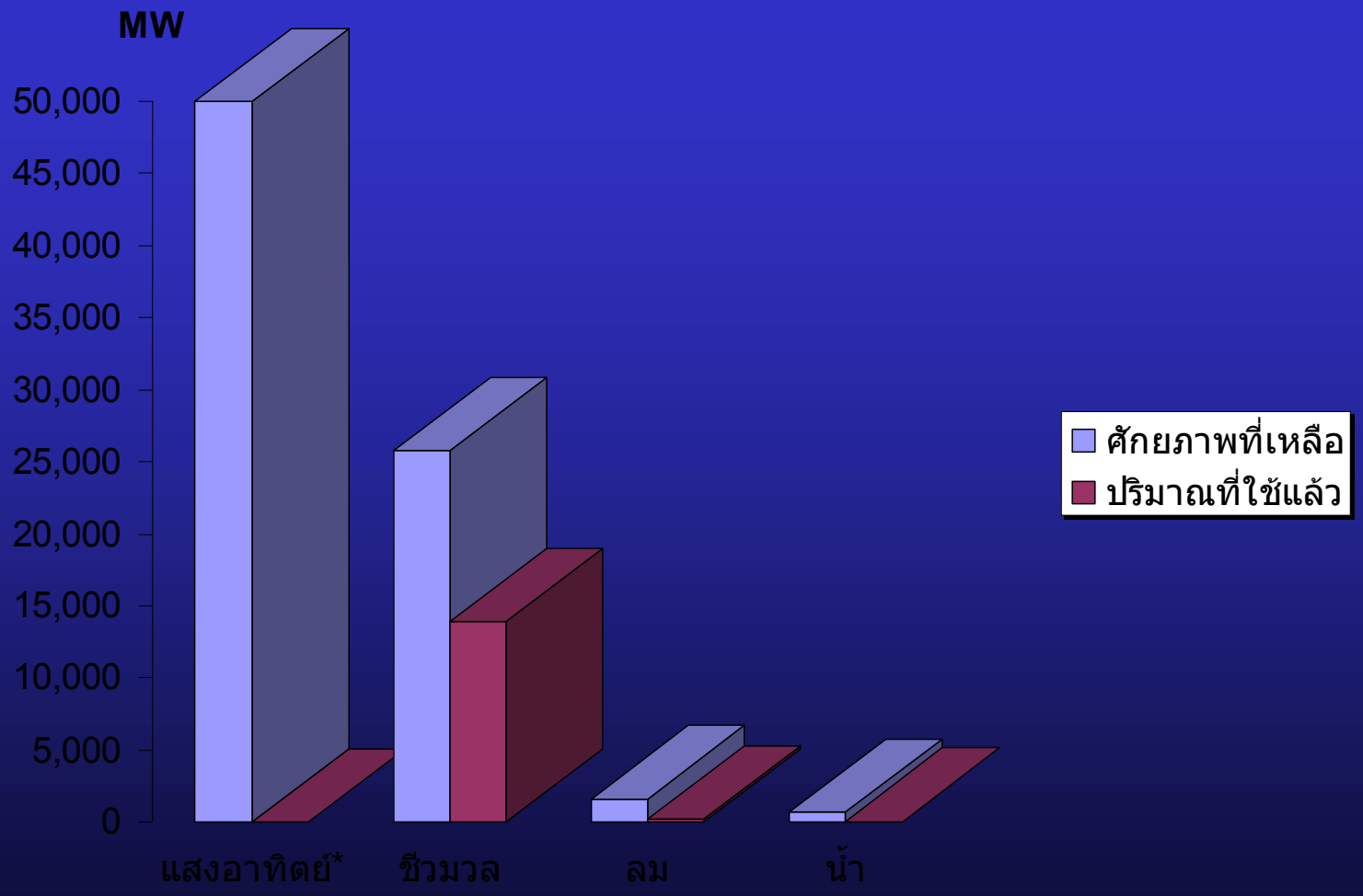
การพัฒนาพลังงานชุมชนเพื่อการพัฒนาอย่างยั่งยืน



ศักยภาพพลังงานแสงอาทิตย์

- Highest solar radiation during April and May, 20-24 MJ/m2-day
- Yearly average daily highest solar radiation : northeast and central, 19-20 MJ/m2-day
- 50.2% of area of the country, 18-19 MJ/m2-day
- Yearly average 18.2 MJ/m2-day

ศักยภาพของแหล่งพลังงาน



หมายเหตุ : แสงอาทิตย์คิดจาก 0.1 % ของพื้นที่ทั้งหมด