



## **The importance of the IEA to the Swiss Federal Office of Energy's research, development and deployment activities: General aspects of the IEA**



IEA Networking Day, Fribourg/FR, 25 Sept 2015 - Gunter Siddiqi, Deputy Head Energy Research SFOE  
Swiss Member\* of Renewable Energy Working Party, Working Party for Fossil Fuels;  
Geothermal, Greenhouse Gas, and Gas and Oil Technology Implementing Agreements

\*Thanks are due to the Alternates Stefan Nowak (REWP), Stephan Renz (WPFF), Rudolf Minder (Geothermal), Peter Jansohn (Paul Scherrer Institute / GHG) and Christian Minnig (swisstopo / GOT) & all the colleagues working in various annexes of the Implementing Agreements.



# The International Energy Agency IEA

## Key figures:

founded in 1974 within the framework of the OECD in response to the oil crisis of 1973/74

- 16 founding member countries, among them Switzerland
- today 29 member countries plus the EU (observer)
- Executive Director: Fatih Birol

Mission: The IEA is an autonomous organization which works to ensure reliable, affordable and clean energy for its 29 member countries and beyond.

The IEA has four main areas of focus: energy security, economic development, environmental awareness and engagement worldwide.





# Interfaces with the IEA managed via a committee structure

Focus today!

Energy Advisors (ENAD)

Committee on Energy Research and Technology deals with the Energy Technology Network (CERT, FPCC, EUWP, WPFF, REWP, Experts' Group on R&D Priority Setting & Evaluation, Renewable Industry Advisory Board)

Coal Industry Advisory Board (CIAB)

Working Party on Energy Efficiency (EEWP)

Forum for participants in IEA Energy Technology Initiatives (ETIs)

Industry Advisory Board (IAB)

International Low-Carbon Energy Technology Platform

Standing Group on Emergency Questions (SEQ)

Partner Countries in Energy Security (SEQNMC)

Standing Group for Global Energy Dialogue (SGD)

Standing Group on Long-Term Co-operation (SLT)

Standing Group on the Oil Market (SOM)



# The Swiss Federal Office of Energy's international energy (research) policy and the IEA

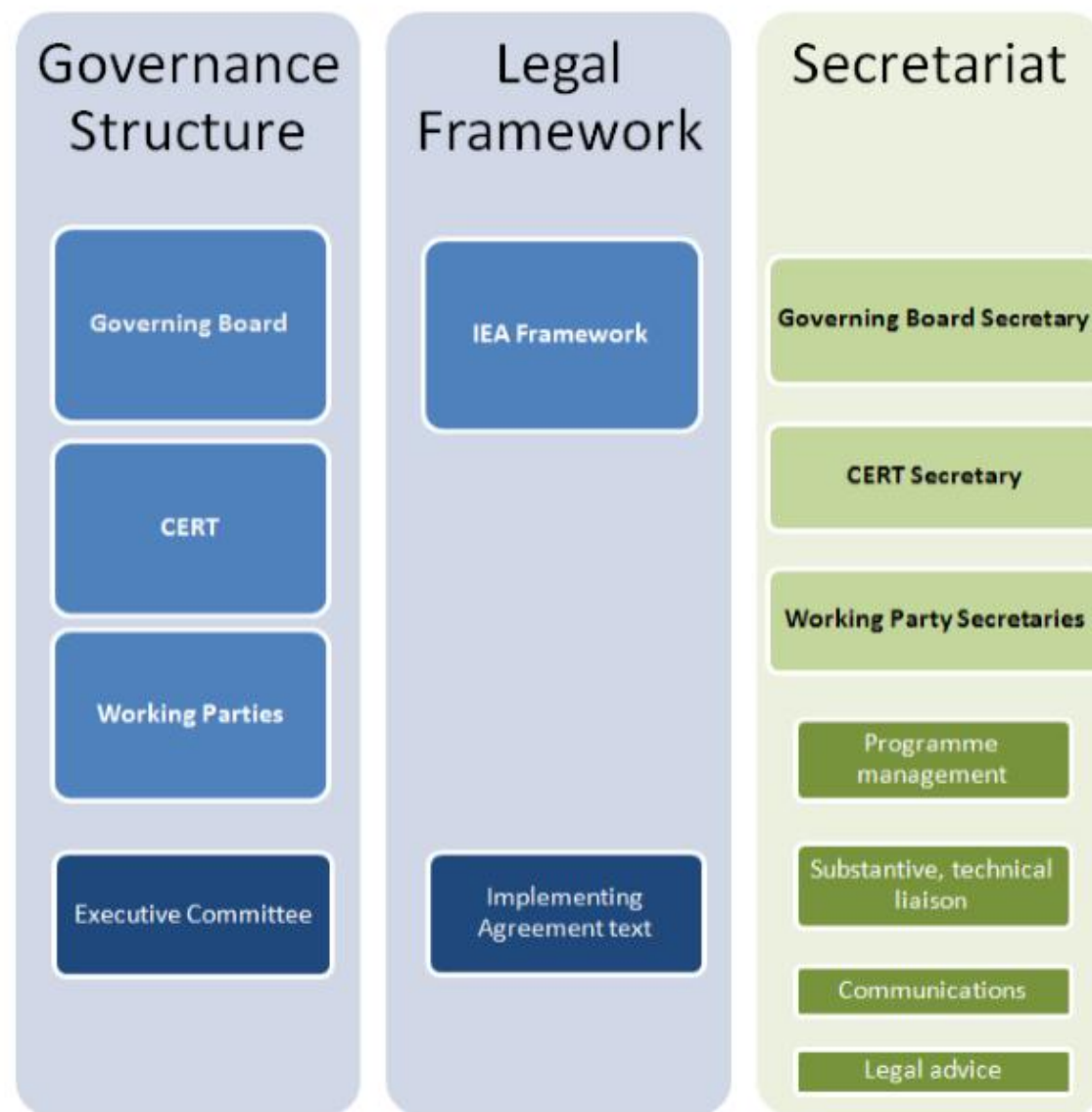
The Swiss Federal Office of Energy engages in energy research relevant to the Swiss Federal Department of the Environment, Transport, Energy and Communication (DETC).

Results have an impact on the work programs and goals of the Swiss Federal Office of Energy

- need to be policy-relevant results (and *not* policy-prescriptive)
- and may cover the entire spectrum from fundamental to market-oriented research development, as well as piloting and demonstration of energy technology
- Key are the Implementing Agreements (IA)

Switzerland is campaigning in favor of a global energy policy that is co-determined to a significant extent by multilateral bodies such as the International Energy Agency (IEA)

# Elements of IA governance



Slide courtesy of the IEA Secretariat (Gillian Balitrand and Jane Berrington)



# Governance Structure

## ■ Governing Board (GB)

- Renders decision on creation of new IAs

## ■ Committee on Energy Research and Technology (CERT)

- Primary responsibility for IA oversight
- Renders decisions on requests for extension
- Reviews *cross-cutting* issues relative to all IAs

## ■ Working parties

- Review IA requests for extension and makes a recommendation to the CERT
- Discusses *technology* issues relative to their IAs

# IEA R&D Strategy

**Committee on R&D created by Governing Board in 1975**

**CERT established in 1992**

- "body of adequate status to be responsible for energy R&D"

## Terms of Reference

- Develop and implement a strategy for energy R&D;
- Collaborate with SLT on coordination between energy R&D strategy and Programme for Long-Term Cooperation;
- Periodically review national energy R&D programmes;
- Promote collaboration on energy R&D; and
- Report to GB in conjunction with the SLT (at least 1x year)

# Relationship between Energy Technology and Energy Policy

## ■ Technology R&D supports policy:

- Focus development efforts on areas with the highest potential contribution priority policy objectives
- Provide key information on technology impact to enable successful policy development and implementation

## ■ Policy supports Technology R&D:

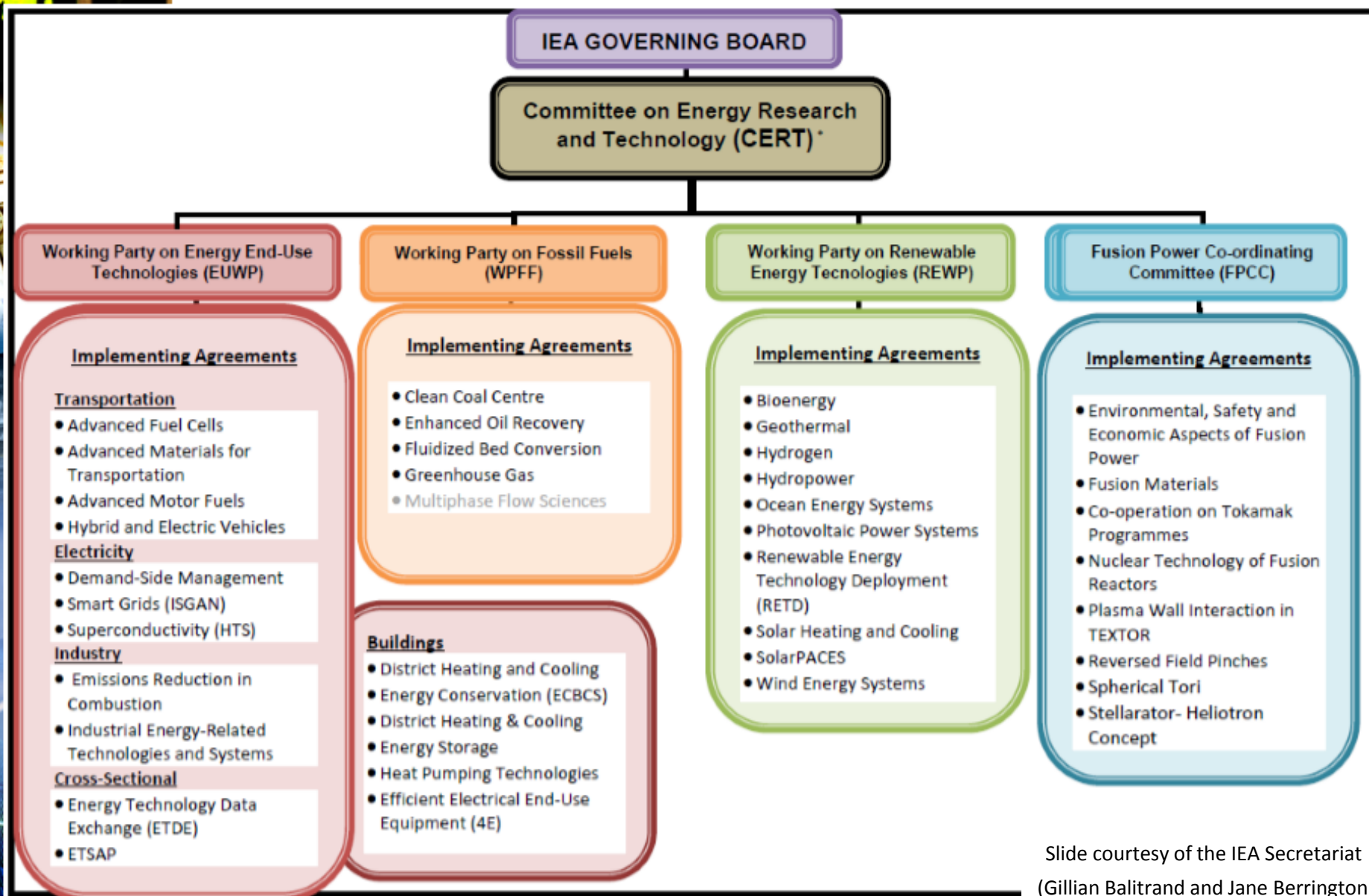
- Channel resources to achieve R&D objectives
- Address non-technical barriers to technology deployment

## ■ Communication between policy and technical experts is key

- Science can highlight policy opportunities and risks
- Policy direction must prioritise R&D efforts



# Relationship between IAs and IEA



Slide courtesy of the IEA Secretariat  
(Gillian Balitrand and Jane Berrington)



# Implementing Agreements (IAs)

## ■ Mechanism to share resources and advance technologies in pace with priorities

- 80 IAs have been established - 41 operating today
  - ◆ 1975 the first six IAs focused on coal
  - ◆ 2014 focus on renewables (32%) , energy efficiency in the buildings sector (16%), fossil fuels (13%) and transport (11%)

## ■ More than 1,400 topics examined

- ◆ Inventions, pilot plants and demonstration projects, to databases, models, operational manuals and input to energy device standards

## ■ Cover a wide portfolio

- ◆ Efficient end-use (buildings, electricity, industry, transport)
- ◆ Fossil fuels (coal, CCS, oil/gas)
- ◆ Fusion (physics, materials, technologies, socio-economic issues)
- ◆ Renewables and hydrogen

## ■ More than 6,000 experts from 48 countries, 58 businesses, and four IGOs



# 20 Implementing Agreements with SFOE participation

*Advanced Fuel Cells*

*Advanced Motor Fuels*

**Bioenergy**

*Demand Side Management*

*Energy Efficient End-Use Equipment*

*Emissions Reduction in Combustion*

**Energy in Buildings and Communities**

*Energy Technology Systems Analysis Program*

*Gas and Oil Technologies*

*Geothermal Energy Research and Technology*

**Greenhouse Gas**

**Heat Pumping Technologies**

*High-Temperature Super Conductivity on the Electric Power Sector*

**Hybrid and Electric Vehicles**

**Hydrogen**

*International Smart Grid Action Network*

**Photovoltaic Power Systems**

*Solar Heating and Cooling Systems*

**Solar-PACES**

*Wind Energy Systems*

**Delegate**

*Oberholzer*

*Hermle*

**Hermle**

*Bareit*

*Moser*

*Hermle*

**Eckmanns**

*Siddiqi*

*Siddiqi*

**Siddiqi**

*Pulfer (Renz)*

*Moser*

*Pulfer (Muntwyler)*

**Oberholzer**

*Moser*

*Oberholzer (Nowak)*

*Eckmanns*

*Oberholzer (Meier)*

*Maus*



# Other Implementing Agreements of the IEA

*Delegate*

## ***Implementing Agreements***

*Advanced Materials for Transportation*

*Climate Technology Initiative*

*District Heating and Cooling*

*Energy Storage*

*Enhanced Oil Recovery*

*Fluidized Bed Conversion*

*Hydropower*

*Industrial Technologies and Systems*

*under discussion*

*Ocean*

*Renewables Energy Technology Deployment*

*under discussion*

## ***Implementing Agreements related to nuclear energy***

*Environment, Safety & Economy*

*Fusion Materials*

*CH: SBFI*

*Nuclear Technology Fusion Reactors*

*Plasma Wall Interaction*

*Reversed Field Pinches*

*Spherical Tori*

*Stellarator-Heliotron*

*Tokamaks*





# Policy relevant output of an Implementing Agreement



IEA Greenhouse Gas R&D  
Programme

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/ [2015-04 Criteria of Fault Geomechanical Stability](#)

## 2015-04 Criteria of Fault Geomechanical Stability

### Background to the study

The storage of CO<sub>2</sub> in geological reservoirs requires relatively permeable conditions bounded by very low permeable layers. Reservoirs can be bounded by faults that can act as seals if, for example, an impermeable formation is juxtaposed against it. The presence of faults in virtually all geological formations is a key consideration as their stability is crucial for the integrity of storage sites. Fault stability is affected by multiple factors including fault structure, material properties, geochemical reactions between CO<sub>2</sub> and fault gouges and pore pressure changes. Injection operation and

### Key messages:

- Faults typically consist of two sub-structures: a fault core; and a wider fault damage zone. Faults in low porosity rocks tend to have a fine-grained fault core whereas faults in coarse-grained, high porosity rocks, usually have low porosity deformation bands that can develop into high permeable slip surfaces.
- Fault zone permeability increases with increasing fluid pressure but permeability varies both across and along faults. Hydraulic properties also vary between the damage zone and the core where gouge material is concentrated. This concentration of fine grained minerals also reduces the mechanical strength of faults.
- Mechanical failure or reactivation occurs either when shear stress exceeds normal strength or when hydraulic fracturing is induced.



ExCo Members

[Click here for Executive Committee information.](#)



# Impacts of IEA RDD&D work

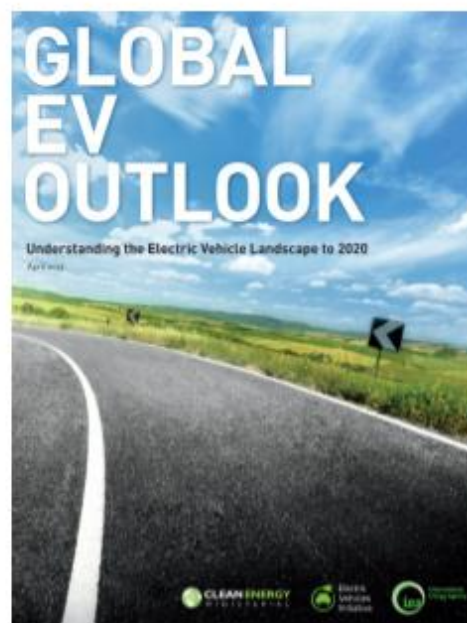
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*Delegates at COP 17 discussing carbon capture and storage thanks to input from the GHG Implementing Agreement (Durban, South Africa).*



*CTI PFAN is an alliance of private-sector companies experienced in providing investment and financial advisory services to climate-friendly projects*



*The Electric Vehicles Initiative (EVI) is an IEA supported initiative launched in 2010 under the Clean Energy Ministerial, a high-level dialogue among energy ministers from the world's major economies. EVI currently includes 15 member governments from Africa, Asia, Europe, and North America, as well as participation from the HEV Implementing Agreement*



It's a bargain!

<i>Member fees Implementing Agreements</i>	<i>250'000 CHF</i>
<i>Annexes</i>	<i>350'000 CHF</i>
<i>Operating Agents, Chair/Vice-Chair</i>	<i>200'000 CHF</i>
 <i>Own cost SFOE (Human resources, travel)</i>	 <i>350'000 CHF</i>
 <b><i>TOTAL</i></b>	 <b><i>1'150'000 CHF</i></b>



**Thanks for your attention!**



For more information on  
CERT – ask Rolf Schmitz  
EUWP – ask Michael Moser  
REWP & WPFF – ask Gunter Siddiqi