

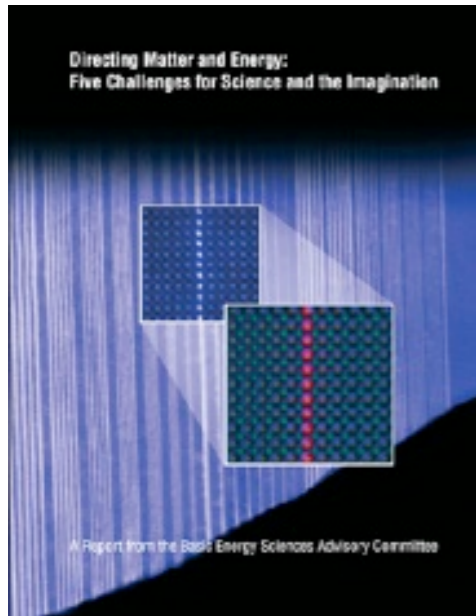
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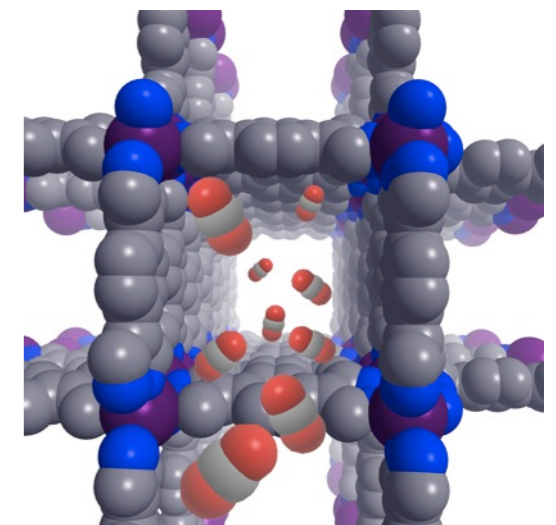
Energy Frontiers Research Center (EFRC): Carbon Capture



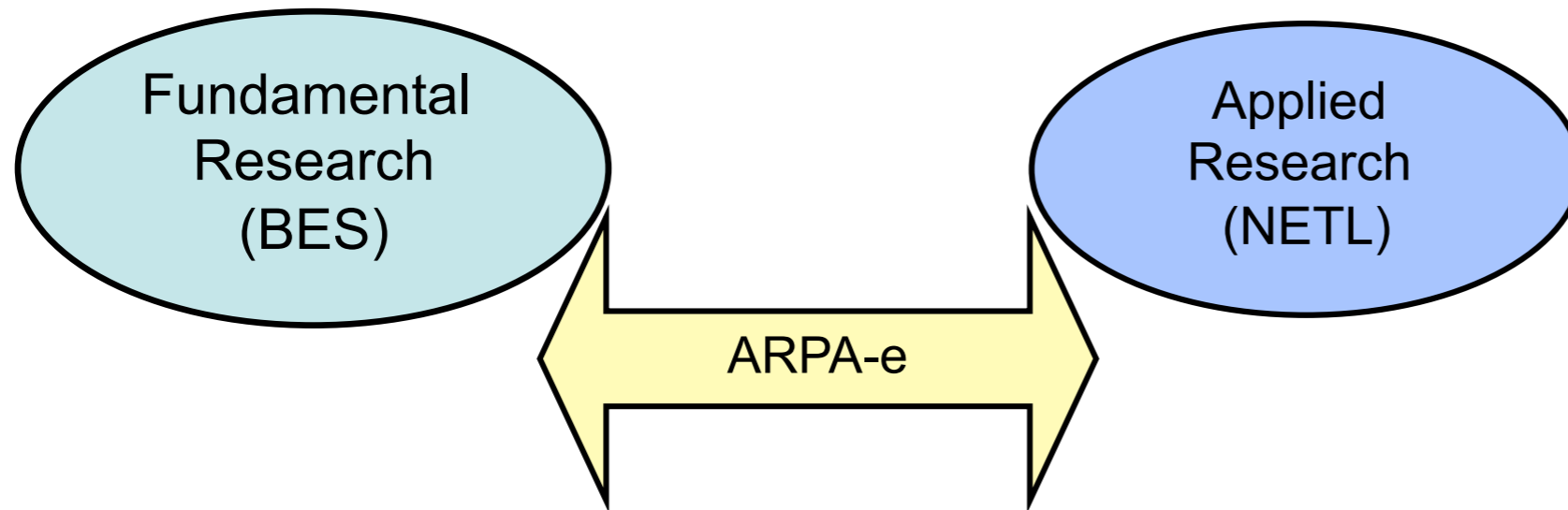
In the coming Control Age, scientists will be able to **design** and **create** entirely new **materials** and processes with **desired properties and outcomes**. With such capabilities, we should find solutions to some of the most vexing problems that civilization now faces, **including energy**, in all of its aspects, and **changing global climate patterns**.

EFRC - Carbon Capture

Capture of CO₂ from gas mixtures requires the molecular control offered by nanoscience to **tailor-make** those materials exhibiting **exactly the right** adsorption and diffusion selectivity to enable an economic separation process. Characterization methods and computational tools will be developed to guide and support this quest.



EFRC & other DoE programs



- ARPA-e
 - IMPULS (Carbon Capture)
 - LBNL (with EPRI and WildCat)
 - Texas A&M
- NETL
 - Collaborative program

EFRC spin-offs

- BES
 - Nano-porous materials Genome (Minnesota)
- ARPA-e
 - MOVE (methane storage)
 - Texas A&M (with GM and RTI)
 - Ford (LBNL and BASF)

70+ Researchers now working on Carbon Capture related to these programs

Some thoughts ...

There is no carbon capture Energy Hub (...but we are trying to create one in EPFL-Valais)

- (-) Fundamental research and applications are too much separated:
 - Funding by different parts of DoE that have very different cultures
 - Fundamental science and application are done by very different groups that do not talk to each other

- (+) As there is no Energy Hub regular funding continues

Public funding of non-academic partners

- (-) DoE requires a 20% cost share; we need someone to pay this
- (+) Allows start-ups/industry to develop something which is too risky/too early for venture capital
- (-) Allows start-ups/industry to develop something

Single principal investigators (PI) versus large multiPI programs

- (+) The problems in Energy are so difficult that a single PI cannot make progress; we need “big” science
- (-) Scientists do not like to get told what to do ...