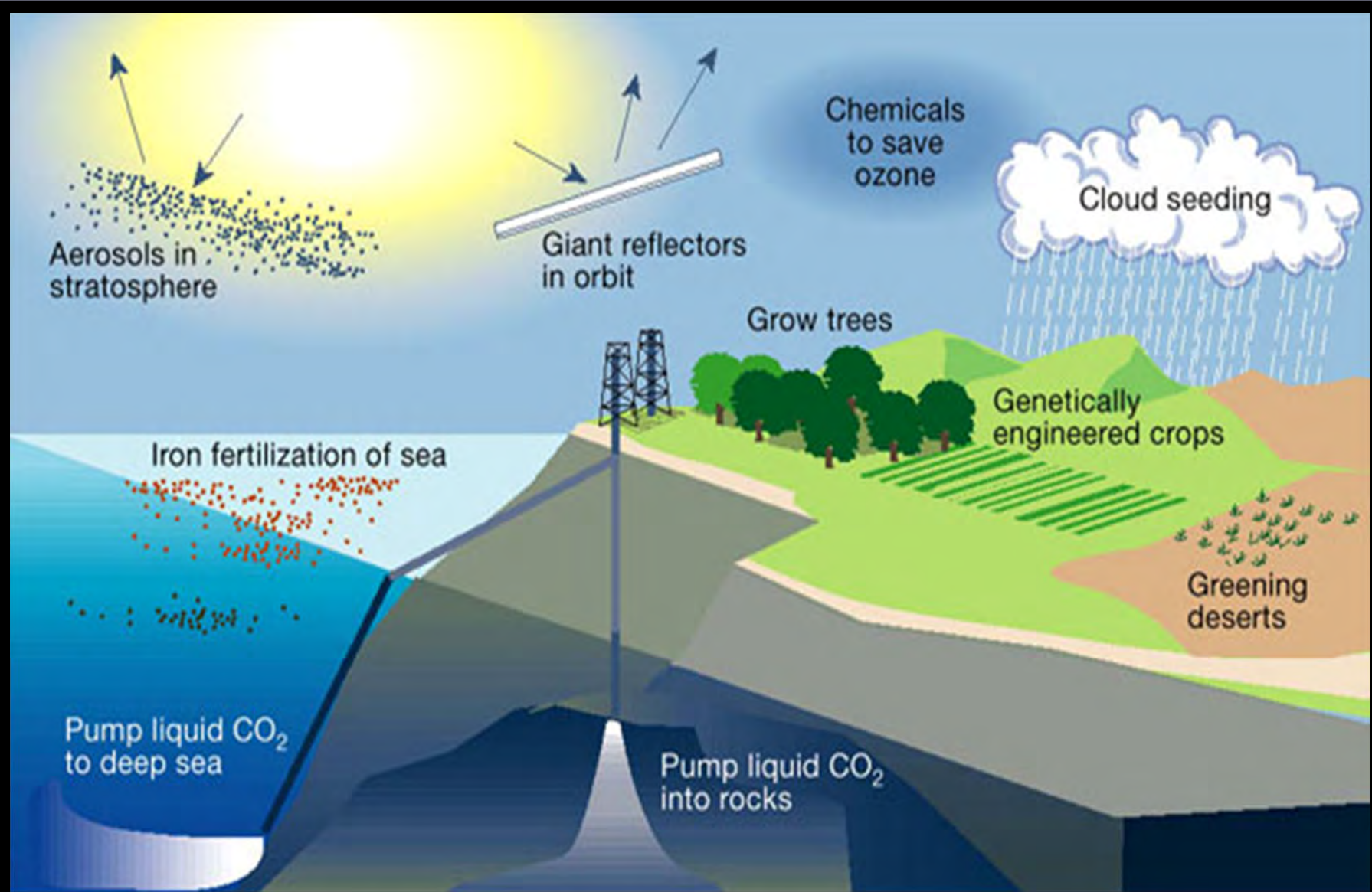


What is geoengineering?

Geoengineering is the deliberate modification of Earth's atmospheric or biogeochemical systems on a large scale.



Schematic representation of various climate-engineering proposals (courtesy B. Matthews).



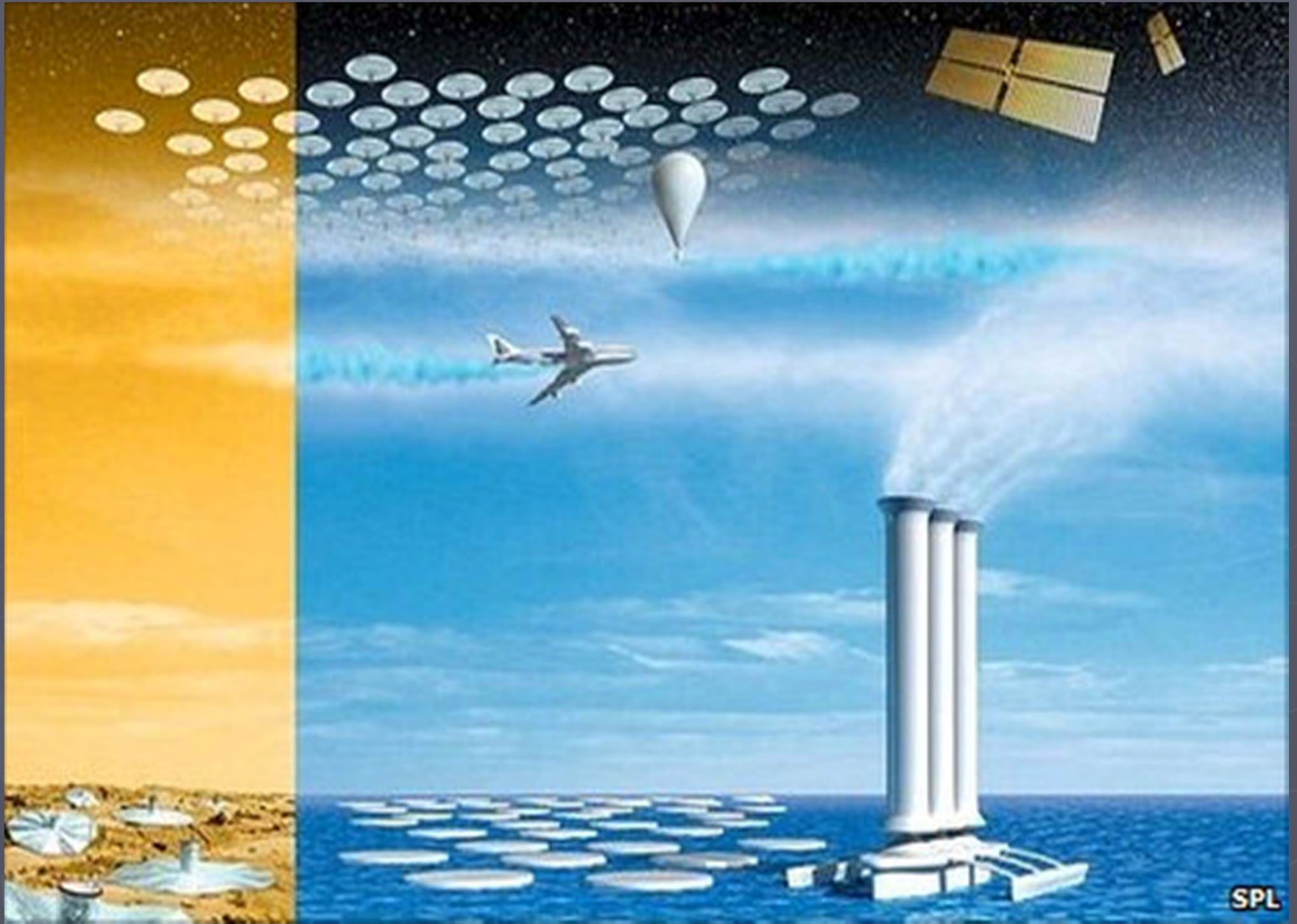




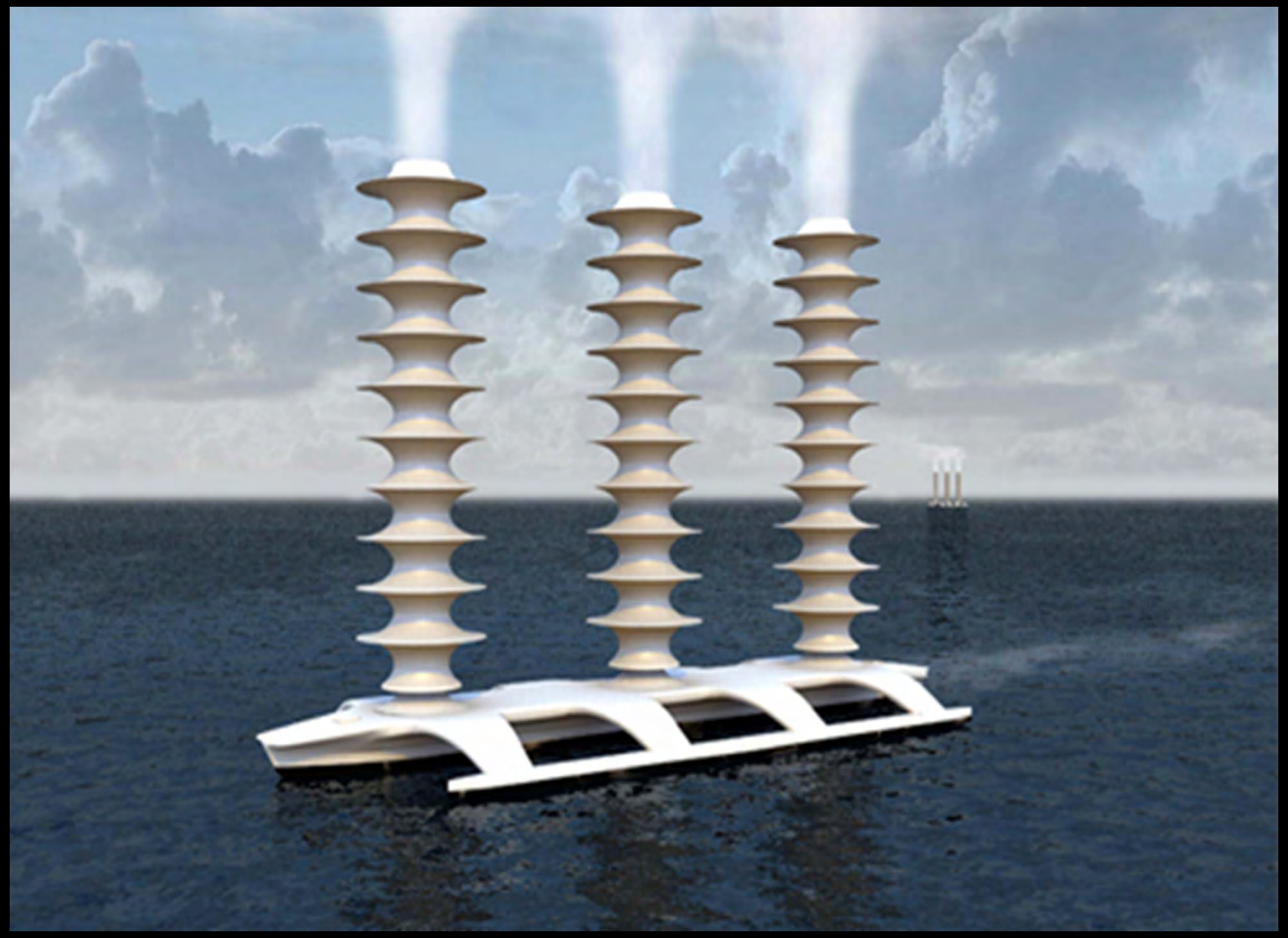
Paul Crutzen, Nobel
Prize in 1995



Mount Pinatubo
1991



SPL



D. Keith, "Engineering the Planet"

"Humans transform their environment"

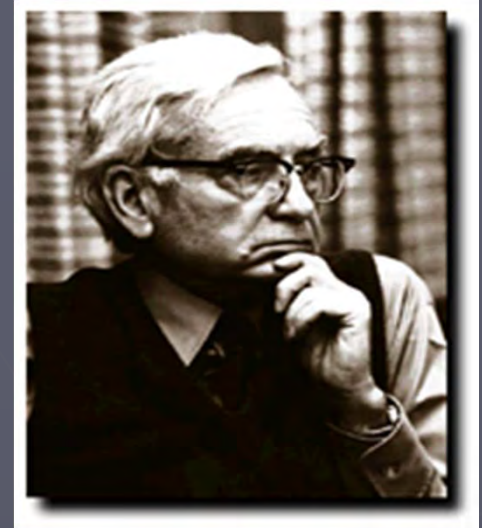
Tech fix: "an expedient solution that uses additional technology to counteract unwanted effects without eliminating their root cause."

Should we engineering the planet?

- ▶ SRM is potentially cheap
- ▶ What is the ultimate objective of climate change policy?
 - Human welfare?
 - Duty to protect natural systems?

Temporary reduction of solar radiation

Alvin Weinberg



Weinberg characterizes a technological fix as the solution to a problem that results from reframing a social problem as a technological one. The major benefit of doing so is simplification: it reduces seemingly insurmountable social problems to manageable levels.

Benefits

1. Technological problems are much simpler than social problems; they are easier to define and identify solutions.
2. Technological problems do not have to deal with the complexity and unpredictability of human behavior.
3. They provide policy makers with more options.
4. They can buy time until the problem can be dealt with on a deeper level.

Keith's Conclusion

“Active planetary management may be an inevitable step in the evolution of a technological society, but I urge caution. We would be wise to practice working before we try to run, to learn to minimize impacts before we try our hand at planetary engineering.”

Ethics and Intentional Climate Change

Dale Jemieson



Source of Worries

- ▶ Lack of familiarity with the technology
- ▶ Scale and magnitude of proposals
- ▶ Wrong to interfere with natural processes

Is it immoral to manipulate the earth's natural systems?



La France • Prométhée et l'aigle-vautour.

The Doctrine of Double Effect

An agent is responsible for consequences they intend to bring about but not for unintended consequences.

Jamieson: the doctrine of double effect breaks down when it comes to geoengineering.

Dale Jamieson: Under what conditions, if any, would geoengineering be justified?

1. "The project is technically feasible;
2. its consequences can be predicted reliably;
3. it would produce states that are socio-economically and preferable to the; alternatives;
4. implementing the project would not seriously and systematically violate any important, well-founded ethical principles or considerations."

1. Is The project technically feasible? YES

2. Can the consequences be reliably predicted?

Reasons for skepticism

Pervasiveness of unintended effects

Tendency of experts to be over confident

Complexity of the climate system

3. Would it produce states that are socio-economically and preferable to the alternatives?

Maybe

If we cannot answer 2 then we cannot answer 3.

4. Would implementing the project not seriously and systematically violate any important, well-founded ethical principles or considerations?

Procedural justice

Irreversible environmental change

Learning to live with nature

Jamison's Conclusions

- ▶ Money invested in one area of research is not available for research in other areas
- ▶ Initiating research on [geoengineering] involves investing in a particular approach to the problem of global warming.
- ▶ Researching a technology risks inappropriately developing it.

Robock's 20 Reason

- ▶ Continued ocean acidification
- ▶ Rapid warming if deployment stops
- ▶ Undermining emissions mitigation
- ▶ Commercial control of technology
- ▶ Military use of the technology
- ▶ Who controls the thermostat
- ▶ Questions of moral authority
- ▶ Unexpected consequences