Opening Addresses

US-Japan Workshop on Fusion Power Plants and Related
Advanced Technologies with
participation of EU January 11-13, 2005 at Tokyo, JAPAN

Jan. 11
M. Kikuchi, JAERI
US-Japan Reactor workshop is a long-standing activity
(From my memory)

2nd 1990(UCLA,Oct. 15-17): ARIES-I, SSTR, CFAR
3rd 1992(JAERI,Mar. 9-11): ARIES-II/IV, SSTR-2, ST(TARTRs)
4th 1993(UCLA, Sep. 17): in conjunction with IAEA-TCM
5th 1995(Kyoto U., Mar. 13-16): STARLITE, SEAFP, FFHR, Pulsar, IDLT

?th 1999(Kyoto U., Mar. 24-26): CREST, ARIES-ST, DREAM, FFHR
?th 2001(U. Tokyo, ARIES-AT, A-SSTR2, CREST, FFHR, ESE
?th 2002(UCSD, Apr. 6-7): FFHR, Laser, ESE
?th 2005(JAERI/UT, Jan. 11-13): FFHR, ARIES-CH, VECTOR
Other Frameworks


[2] IAEA framework: IAEA technical meeting on 1st generation of fusion power plants

Note: IEA FPCC recommends coordination among various frameworks
Roadmap to Fusion DEMO

JA, US, EU road map is similar targeting power production early 2030

FY 2005 2010 2015 2020 2025 2030 2035

ITER program

Construction

Basic performance phase

Performance extension phase

Test of breeding blanket

Satellite Tokamaks And other devices

JT-60 and JET

Fusion technology development

Development of breeding blanket

Fusion material development (inc. IFMIF)

Achieve Q=20, 400s
Achieve Q~5 steady-state operation
Proof of principle of breeding blanket

Coordination of DEMO physics and tech. R&D

EDA/R&D

Conditioin

Coordination of DEMO physics and tech. R&D

Decision of construction

Grid connection

-3-
DEMO requirement
Fusion must be economically competitive to enter energy market

Prediction of world energy prospect for a case with
Assumptions:
Improving rate of energy efficiency
; -1.3%/year (E/GDP)
Cost of large scale solar power (2030 to 2100)
; electricity 5 to 2 cent/kWh, hydrogen 33 to 22$/barrel
Cost of fusion power (2030 to 2100)
; electricity 30to 3 cent/kWh, hydrogen 110 to 19$/barrel

From Dr. Itoh of nihon energy keizai kennkyuusho
4. Comparison with Fission Core

- Reactor vessel of A-BWR
- Reactor vessel of MONJYU
- ARIES-RS

Dimensions:
- A-BWR: 24.5 m (height), 19.0 m (diameter)
- MONJYU: 26 m (height), 21 m (diameter)
- ARIES-RS: 21 m (height), 14 m (diameter)
Remarks

1. Significant progress has been made in these 15 year on fusion reactor design interacting with experiments.

2. Next 15 years are critically important to identify DEMO to be constructed after ITER.

3. I hope successful workshop!