Mid-Long Term Planning for Decommissioning of Fukushima Daiichi Plant Site and Nuclear Energy Policy

October 6, 2011

Tatsujiro Suzuki
Vice Chairman, Japan Atomic Energy Commission
tatsujiro.suzuki@cao.go.jp

Note: The views expressed here are of my own and do not necessarily reflect those of the JAEC nor the government.

Japan Atomic Energy Commission (JAEC)

○The Role of Japan Atomic Energy Commission

The Japan Atomic Energy Commission is set up in the Cabinet Office and has five commissioners. Its mission is *to conduct planning, deliberations, and decision-making regarding basic policy for research, development, and utilization of nuclear energy, including the formulation of the Framework for Nuclear Energy Policy except matters related to nuclear safety*. When the JAEC deems it necessary as a part of its assigned mandate, *JAEC can recommend and demand reports of the head of relevant administrative organization through the Prime Minister*.

Members: 5 (appointed by the Prime Minister with the consent of the House of Representatives and House of Councilors)

Chairman
Dr. Shunsuke KONDO

Vice Chairman
Dr. Tatsujiro SUZUKI

Commissioner
Ms. Etsuko AKIBA

Commissioner
Dr. Mie OBA

Commissioner
Dr. Akira OMOTO

JAEC set up an Advisory Committee on Mid-Long Term Measures for Fukushima Site (Aug. 2011)

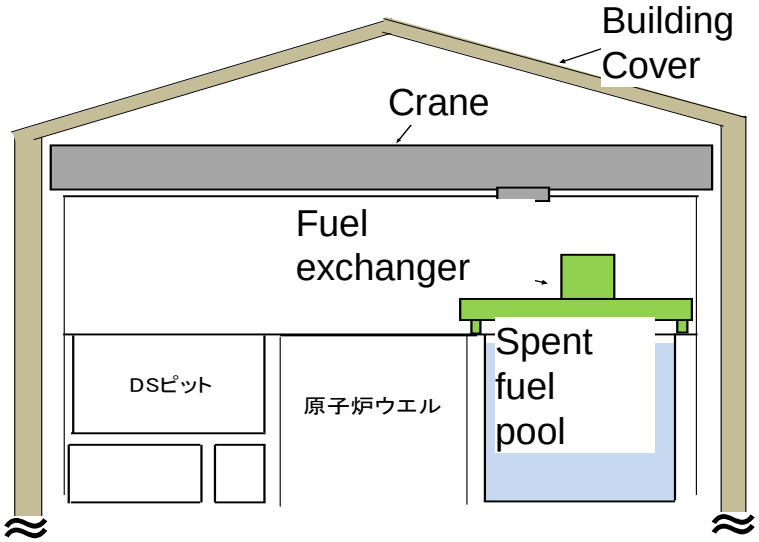
- Tokyo Electric Power Co. is primarily responsible for implementation of mid-long term decommissioning of the Fukushima Dai-ichi Site. The task will require extraordinary efforts as the scale and difficulties of the task are unprecedented
- However, it is also government responsibility to assist such efforts by providing comprehensive “road map” for such long term efforts as well as providing R&D assistance.
- Therefore, JAEC set up an Advisory Committee (Chair: Prof. Hajime Yamana) on Mid-Long Term Measures for Decommissioning of Fukushima Dai-ichi site to provide such “road map” and identify key issues to be addressed.

Removal of SF from SF pool

SF remain covered by water during and after the accident: sipping analysis suggests that SF is mostly intact, though some might be damaged by falling objects due to hydrogen explosion

1. Remove rubbles by crane

2. Install refueling machine & overhead crane



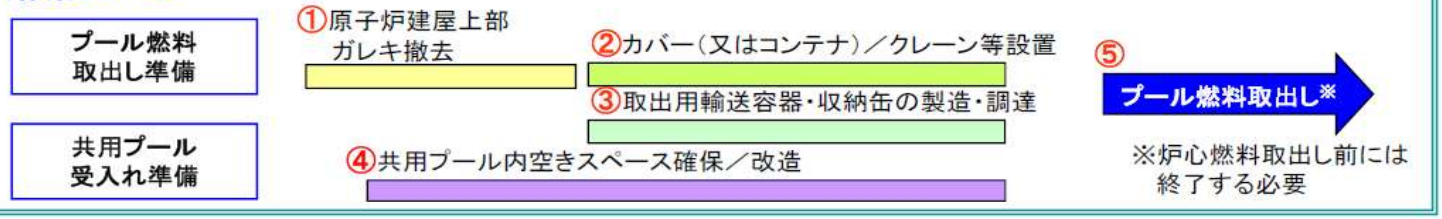
3. SF transfer by cask

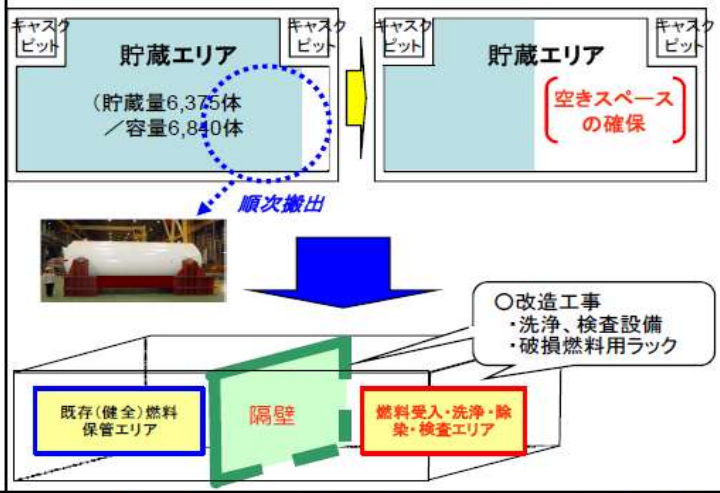
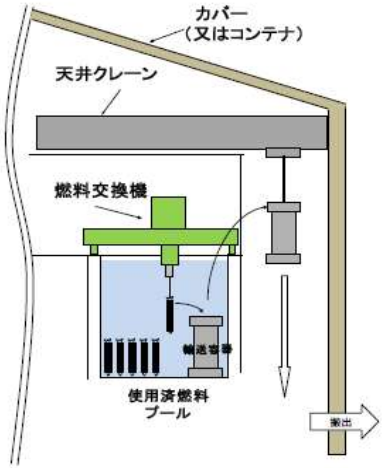
Tentative Image of Removing Spent Fuel from Pool

プール内燃料取出しまでの作業イメージ（2／2）

（技術開発計画検討用）

＜作業フロー＞



作業	④ 共用プール内空きスペース確保／改造	⑤ プール燃料取出し
イメージ	＜現在＞ 	
内容	共用プール内に既貯蔵中の燃料を順次搬出し、空きスペースを確保。その上で、受入れに必要な隔壁、洗浄・検査設備、破損燃料用ラック等を設置。	燃料の健全性を確認（外観確認、荷重試験等）し、破損燃料は収納缶に収納した上で輸送容器に装荷し、搬出。
技術開発における留意点と課題	・塩分付着燃料及び漏えい燃料の洗浄／除染／検査方法の検討	－

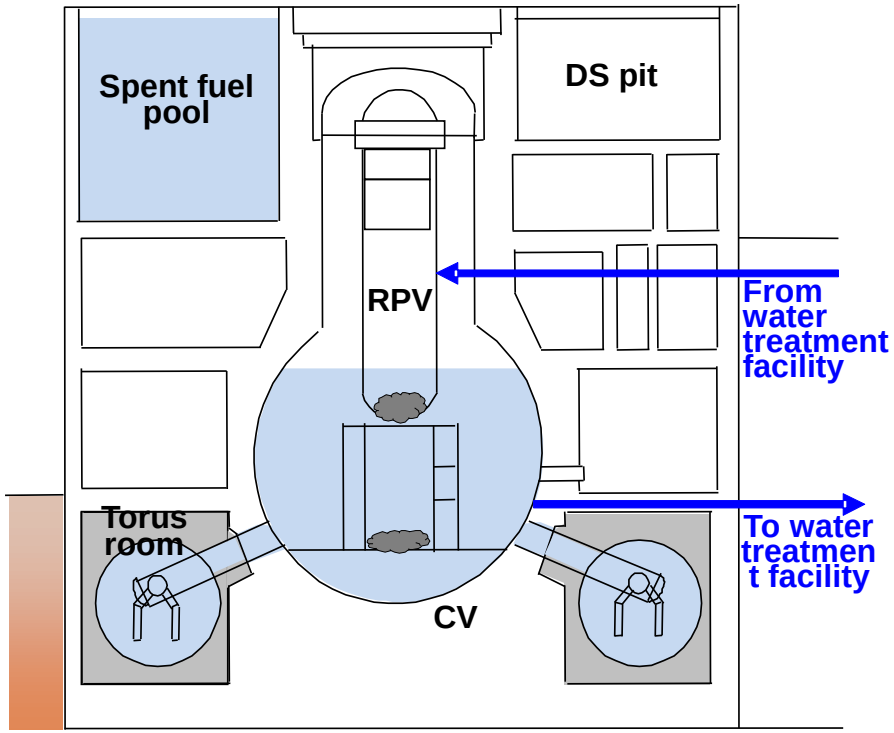
Removal of core debris

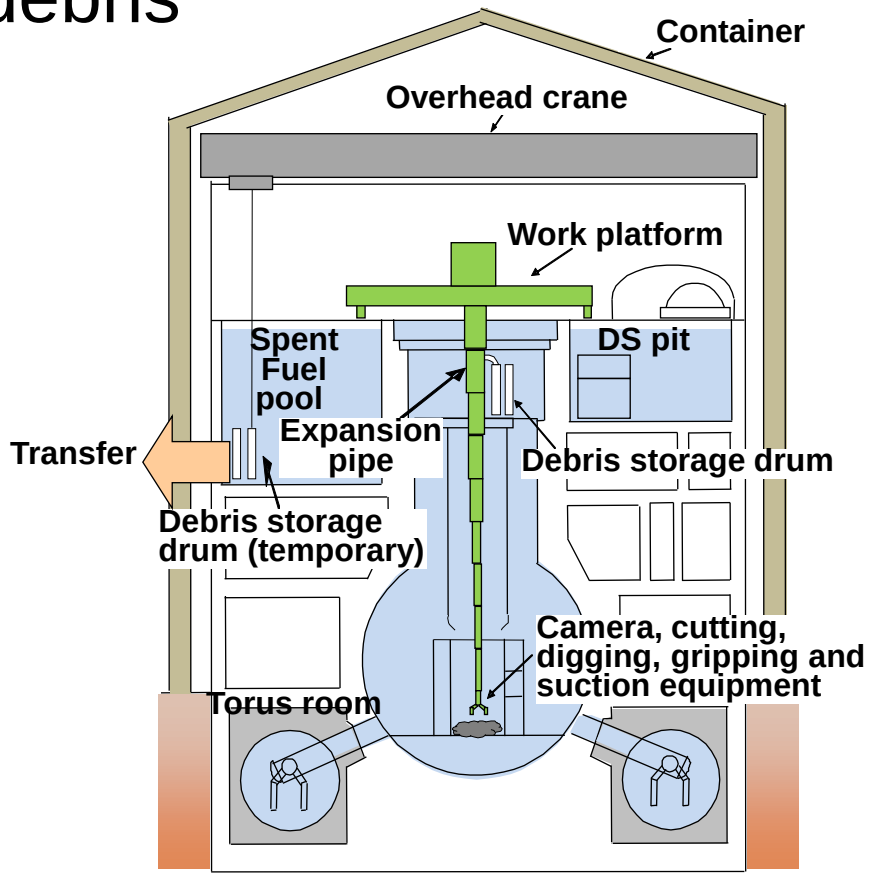
Decontamination (to reduce exposure)

→ Plugging the leaky holes

→ Flooding the containment

→ Removal of core debris



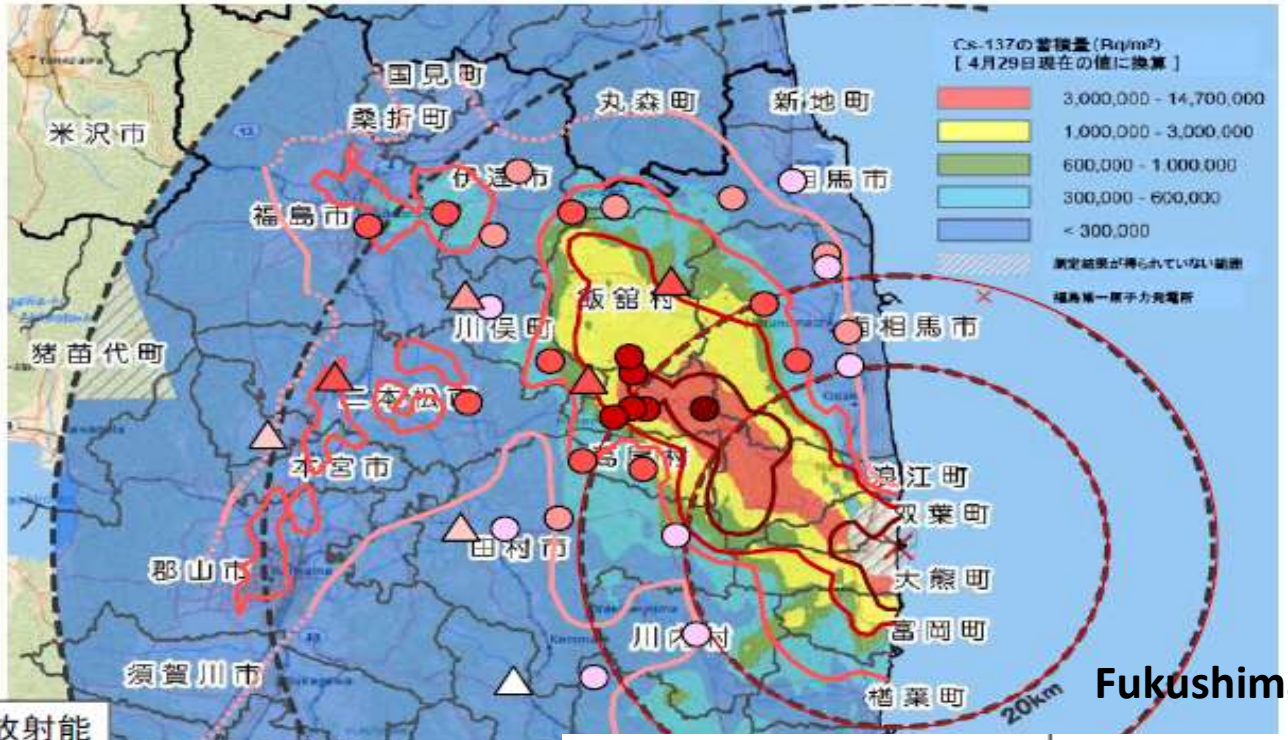


Major Issues Being Discussed

- Securing Safety and Security
- Collection of available technologies/knowhow
- Effective R&D plan and quick adaptation of new technologies
  - Need for advanced robot and remote control technologies
- Institutional Arrangement and Cost Sharing Scheme
  - Project management of complex, long-term tasks
  - Transparency and cost management
- Human resource development

Contamination Map by MEXT and DOE
(as of May 6, 2011)

5月6日公表文科省・米国DOE航空機モニタリング結果との重ね合わせ



Cs137放射能濃度

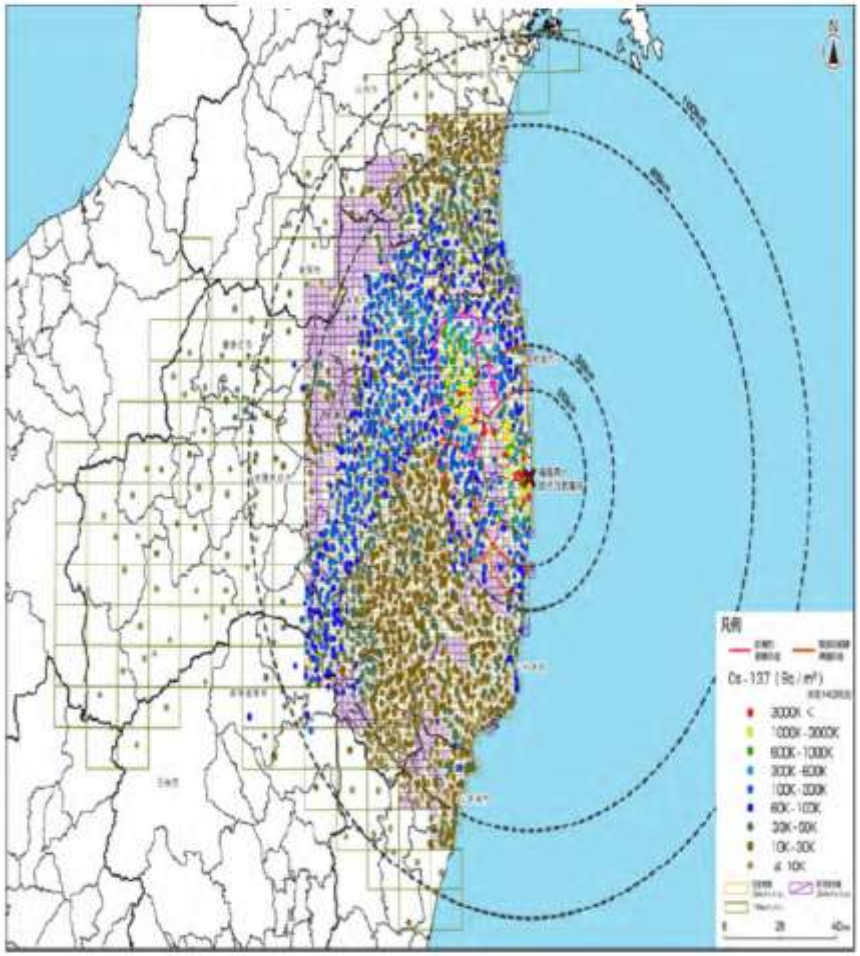
- 5000 kBq/m²以上
- 1480 kBq/m²以上
- 555 kBq/m²以上
- 185 kBq/m²以上
- 37 kBq/m²以上
- 37 kBq/m²以下

汚染レベル	今回の事故(注)	チェルノブイリ事故
555～1,480 kBq/m²の汚染地域	約 700 km²	約 7,200 km²
1,480 kBq/m²以上の汚染地域	約 600 km²	約 3,100 km²

Fukushima **Chernobyl**

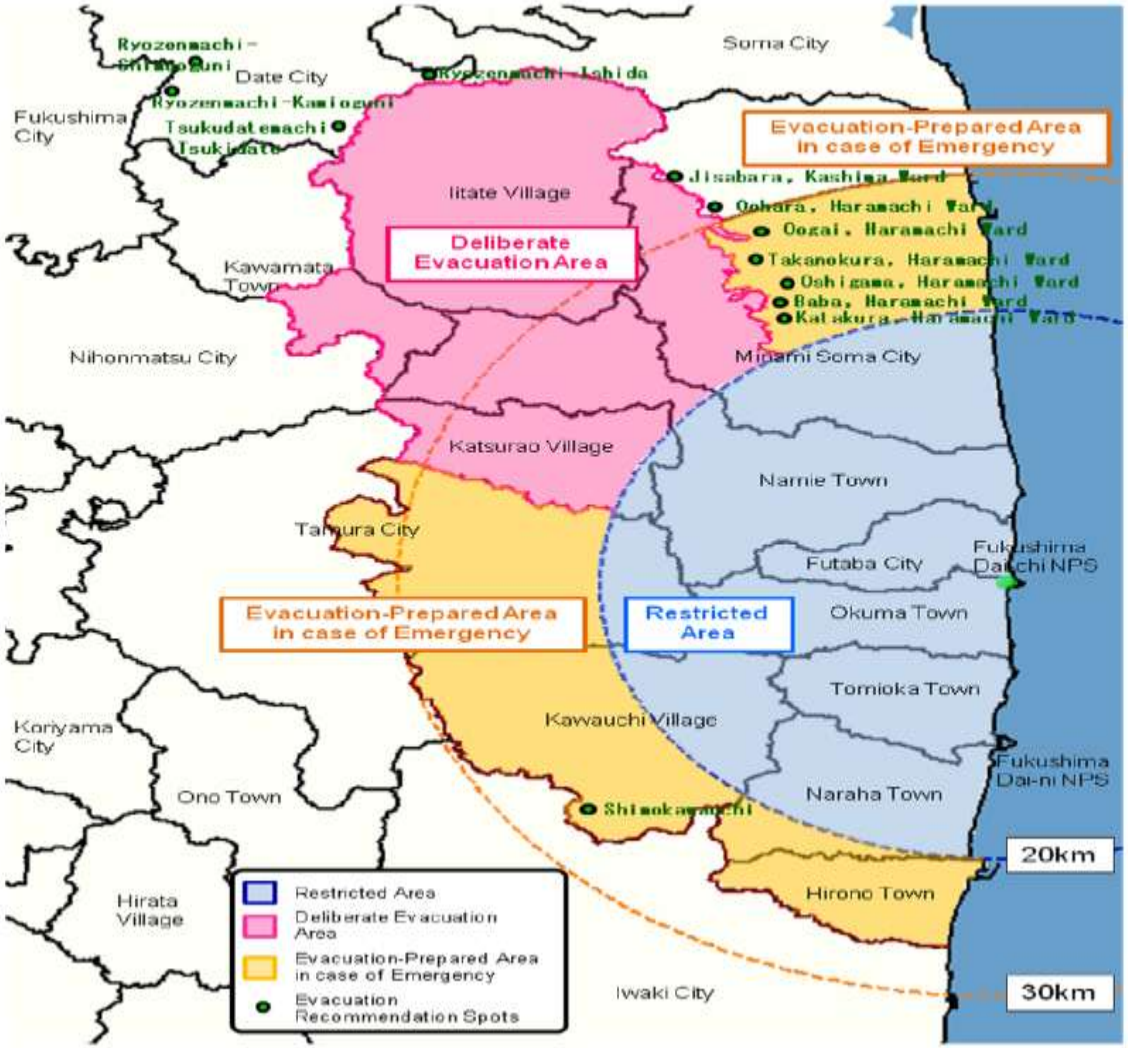
Source: T. Kawada, "Current Status of Soil Contamination and how to respond," Presentation at JapanAtomic Energy Commission Meeting, May 24, 2011
http://www.aec.go.jp/jicst/NC/iinkai/teirei/siryo2011/siryo16/siryo2.pdf

Soil Concentration Map of Cs-137



Air Dose Rate Map
(As of August 11, 2011)

Resricted Area, Deliberate Evacuation Area, Evacuation-Prepared Area in case of Emergency And Evacuation Recommendation Spots (As of August 3, 2011)



Short Term Energy Policy Issues : More nuclear plants may face shutdown

All nuclear plants may face shutdown by May 2012

- Out of all 54 units: (as of Sept.30, 2011)
  - 14 units are shutdown due to the Earthquake
  - 29 units are shutdown due to maintenance etc.
  - 11 units are now operating, but 4 more units will be shutdown due to maintenance by early next year.
  - All nuclear plants could be shutdown by May, 2012.
- The governor of Fukui said it will not approve the re-startup of nuclear reactors without new safety requirements. (May 20, 2011, Asahi)
- The governor of Hokkaido approved to restart the operation of Tomari #3. (Aug. 17, 2011)

Declining production of nuclear power

Capacity Factor

Nuclear Power Gen. (100MKwh

Source: Nikkei Shimbun, Aug. 23, 2011

New Energy Policy: Three Philosophies (July 29, 2011) by Energy and Environment Min. Council

(1) Three principles toward new best energy mix (*reducing dependency on nuclear power*, strategic approach for energy security, *complete reevaluation of nuclear energy policy*)

(2) Three principles toward new energy system (realization of distributed energy system, international contribution, multi-eyed approach)

(3) Three principles toward national consensus (*national debate in order to overcome "pro-" "anti-" conflict*, strategy based on objective data, dialogue with various sectors of the public).

（４）原子力 Nuclear Power Policy
高い安全性の確保と原発への依存度低減への挑戦: Securing High Standard of Safety and Reducing Dependence on Nuclear Power

ミッション Mission

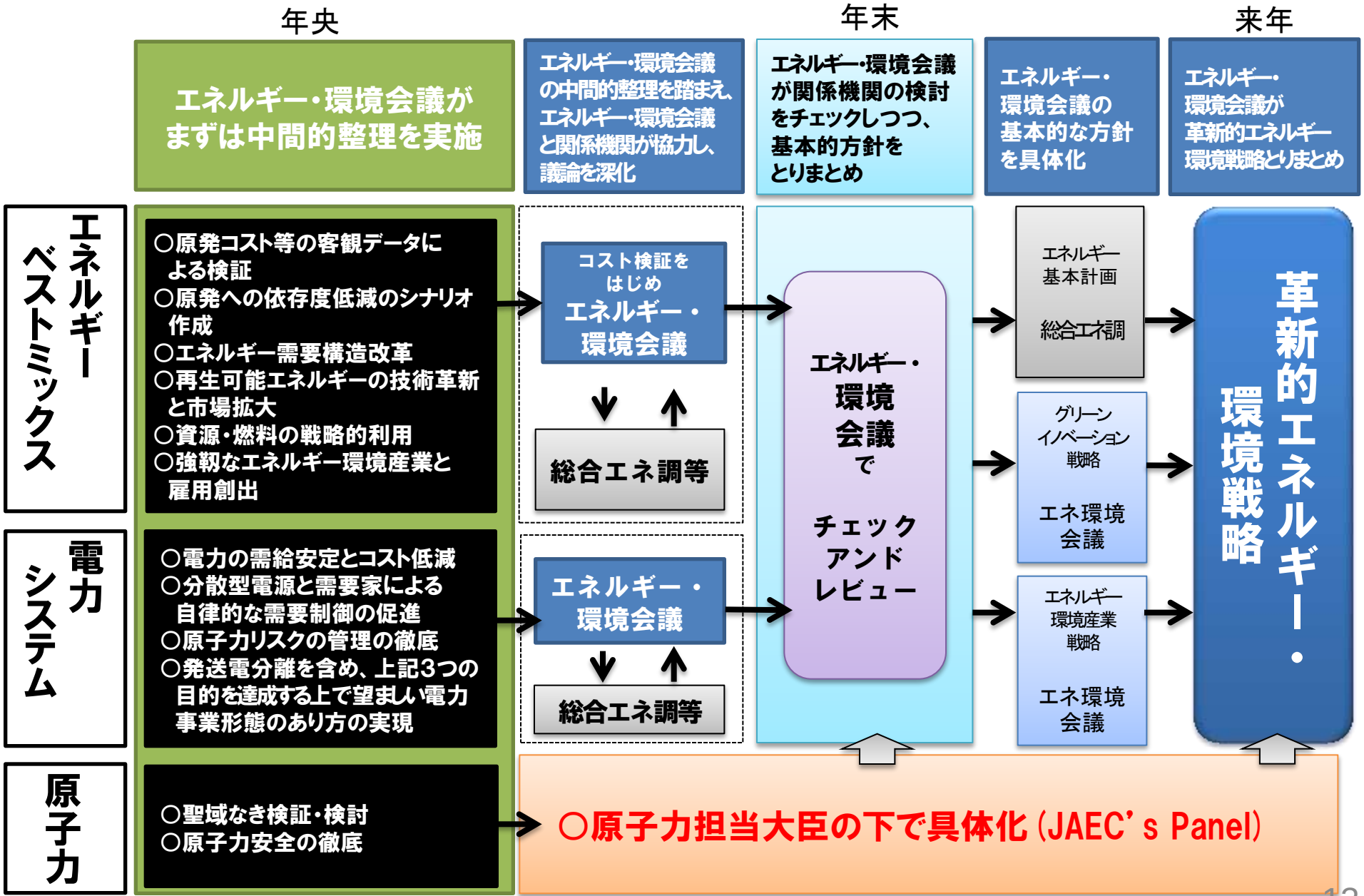
- **聖域なき検証・検討**: No “sacred area” (taboo)
- **原子力安全の徹底**: Assuring Safety
- **原発への依存度低減に関する国民的議論を踏まえた対応**: National Discussion on reducing dependence on nuclear energy

優先課題 Issues

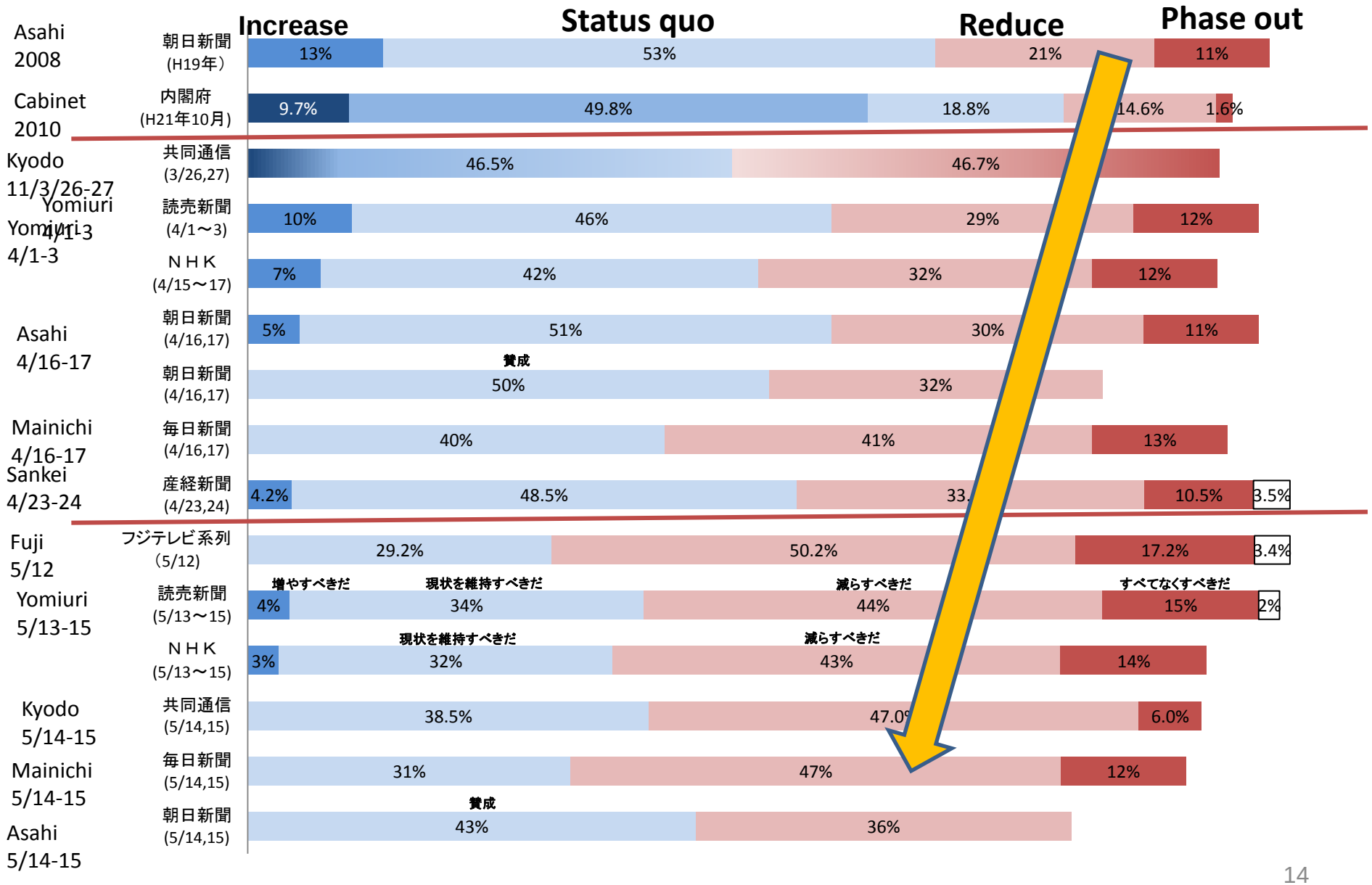
短期 Short	中期 Mid	長期 Long
○より高い安全性のもとでの活用と原発への依存度低減に関する国民的議論を踏まえた対応の決定 Utilization of existing nuclear power plants with enhanced safety National discussion on reducing dependence on nuclear energy	○原発への依存度低減に関する国民的議論を踏まえた対応 Appropriate measures to the results based on national discussion on reducing dependence on nuclear energy	○原発への依存度低減に関する国民的議論を踏まえた対応

6．革新的エネルギー・環境戦略の実現に向けて

－年央の「中間的な整理」を踏まえた検討体制（案）－



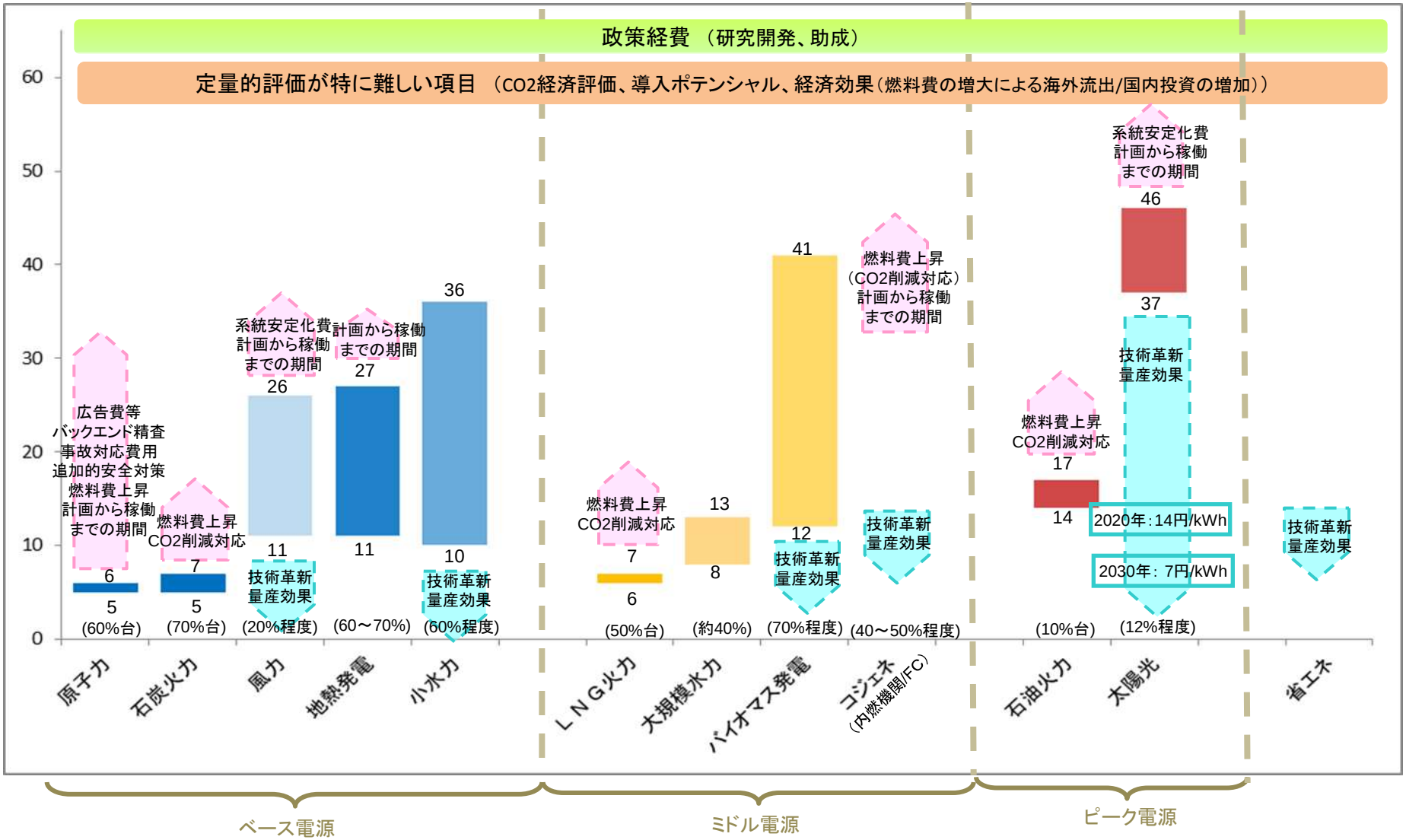
Public Opinion Shifting to “reduce” and “phase out”



５．発電コスト試算比較（今後の方向性）

〔円/kWh〕

※（ ）内は設備利用率



【出典】 ○大規模水力、石油火力、LNG火力、石炭火力、原子力：【単価】【設備利用率】総合資源エネルギー調査会電気事業分科会コスト等検討委員会（平成16年１月）
○地熱：【単価】地熱発電に関する研究会（平成21年６月）
○風力：【単価】「新エネルギー等導入加速化支援対策費補助金（平成21年度）」における実績値をもとに一定条件の元に試算
○小水力：【単価】「新エネルギー等導入加速化支援対策費補助金（平成21年度）」における実績値をもとに一定条件の元に試算
○バイオマス：【単価】NEDOバイオマスエネルギー導入支援データベースより試算、【設備利用率】単価試算前提を資源エネルギー庁より聴取。
○太陽光：【単価】「住宅用太陽光発電導入支援対策費補助金（平成21年度）」における実績値をもとに一定条件の元に試算、【2020年、2030年単価】NEDO「太陽光発電ロードマップ（PV2030＋）」（2009年６月）
（以上、「発電コストをめぐる現状と課題について」（平成23年３月10日　第１回　総合資源エネルギー調査会電気事業分科会　発電コスト等試算ワーキンググループ資料（資源エネルギー庁電力・ガス事業部））を参考に作成）

JAEC's Activities for Nuclear Energy Policy

- Restarted the deliberation process for new Framework for Nuclear Energy Policy (Sept. 27, 2011)
  - It was suspended after the 3/11 Fukushima accident
  - Members of the Committee have been changed slightly to reflect changing circumstances after the accident
  - Major issues: Safety, Cost, Nuclear Power and Fuel Cycle Options, Waste Management, International Perspectives, R&D planning, etc.
- Established Sub-Committee on Evaluation of Nuclear Power and Fuel Cycle Technology options
  - 7 expert members (Chair: Tatsujiro Suzuki)
  - Identify options and criteria for evaluations
  - Identify key differences of cost estimates/evaluations over different options
  - Submit key findings to the JAEC (as necessary)