



BATAN

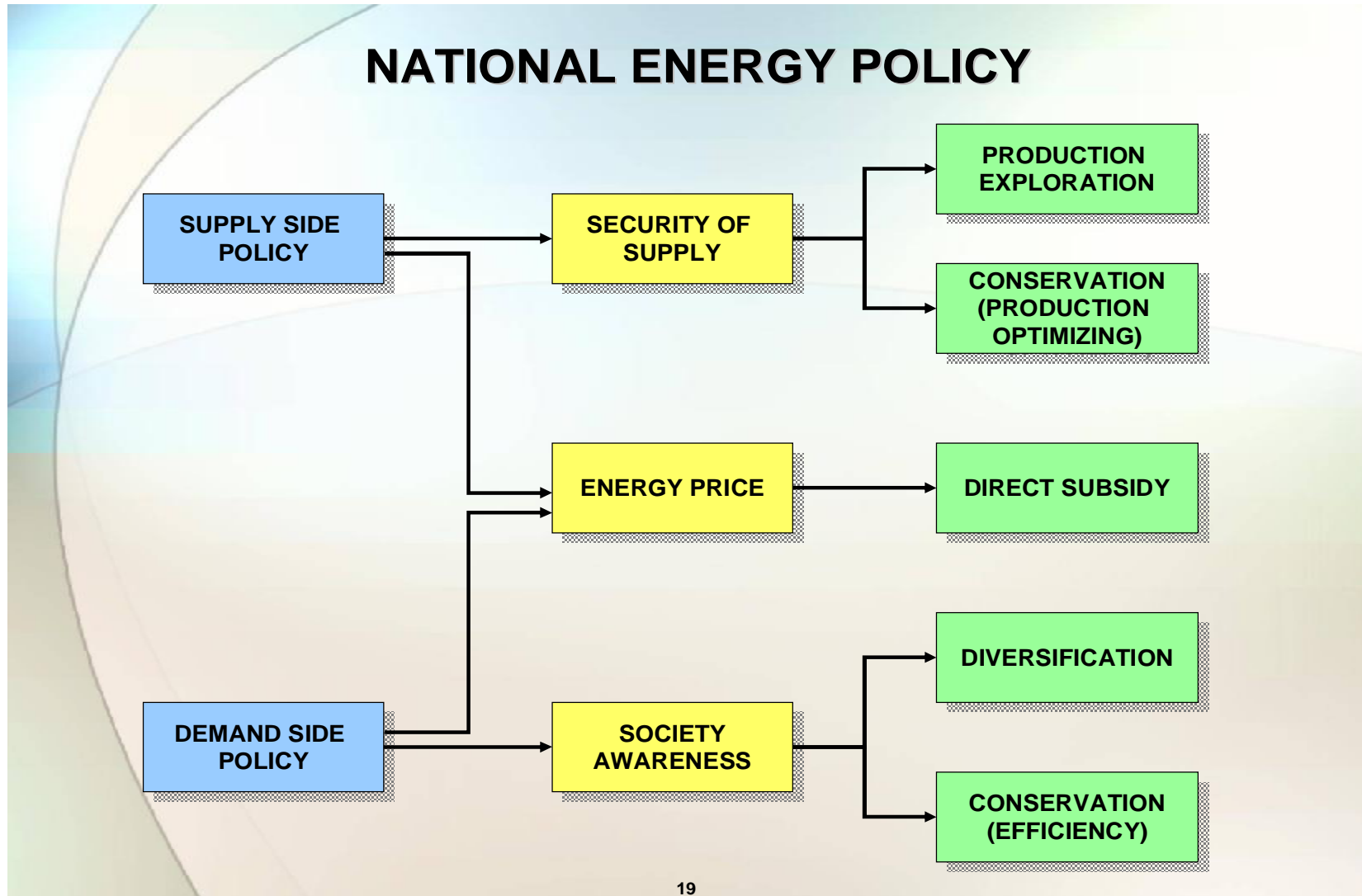
Nuclear Power in Indonesia: a Program under Development

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**BADAN TENAGA NUKLIR NASIONAL / National Nuclear Energy Agency
JL. KUNINGAN BARAT, MAMPANG PRAPATAN, JAKARTA 12710, TELPON: 5204246**

National Energy Policy



National Energy Policy

● Vision :

- ▶ **Guaranteeing the sustainable energy supply to support national interest**

● Mission :

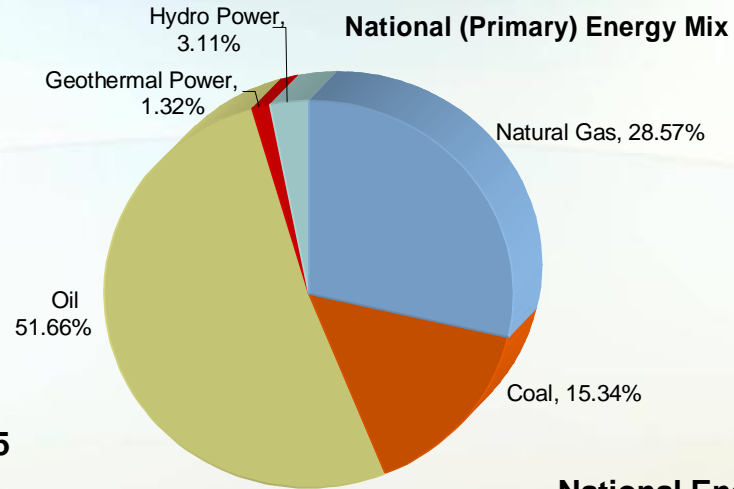
- ▶ **To guarantee a domestic energy supply**
- ▶ **To increase the added values of energy sources**
- ▶ **To manage energy sources in an ethical and sustainable manner**
- ▶ **To provide an affordable energy for low income people and develop domestic capacities in the field of energy management**

● Measures :

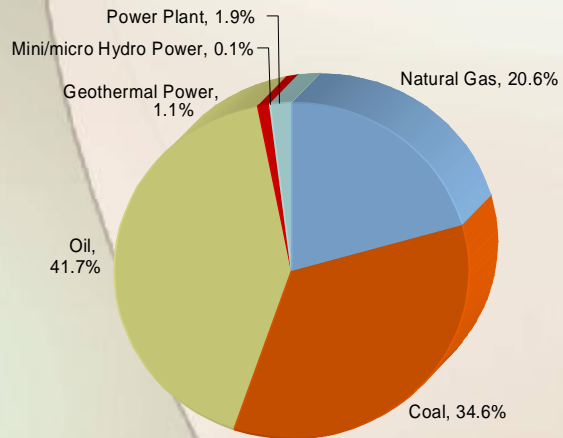
- ▶ **Energy Intensification**
- ▶ **Energy Diversification → Promoting RE with target in year 2020 at least 5% of the total power capacity should be based on RE**
- ▶ **Energy Conservation → Reducing energy intensity 1% per year**

PRESIDENTIAL REGULATION NO. 5 YEAR 2006 NATIONAL ENERGY POLICY

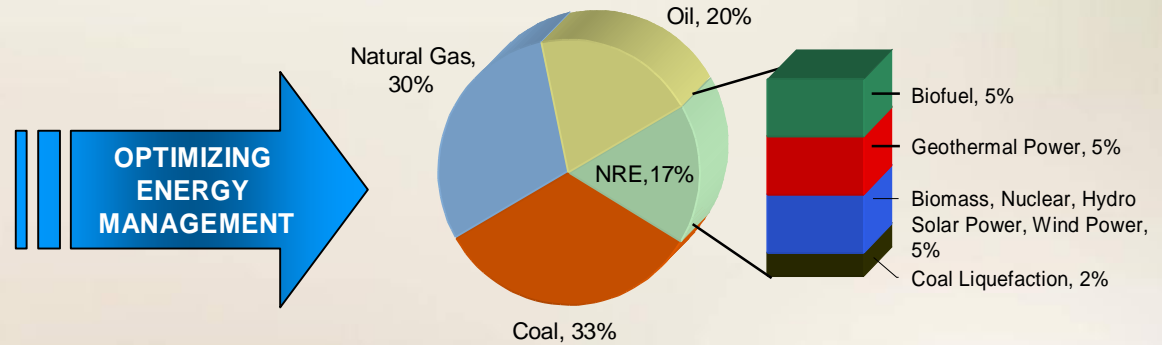
ENERGI MIX GOAL 2025



National (Primary) Energy Mix of 2025 (BaU Scenario)

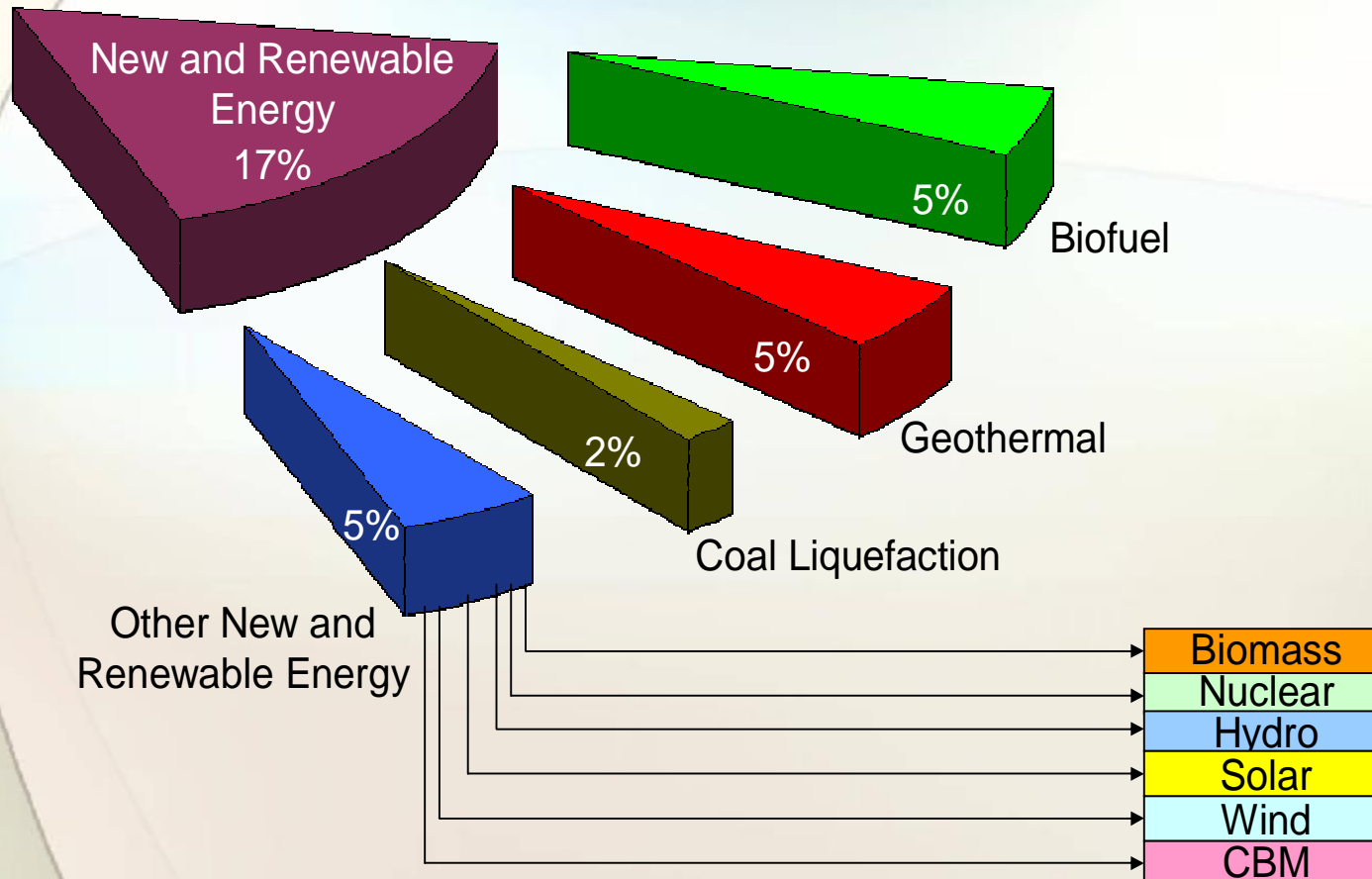


National Energy Mix 2025 (Presidential Regulation Scenario)



NEW AND RENEWABLE ENERGY DEVELOPMENT

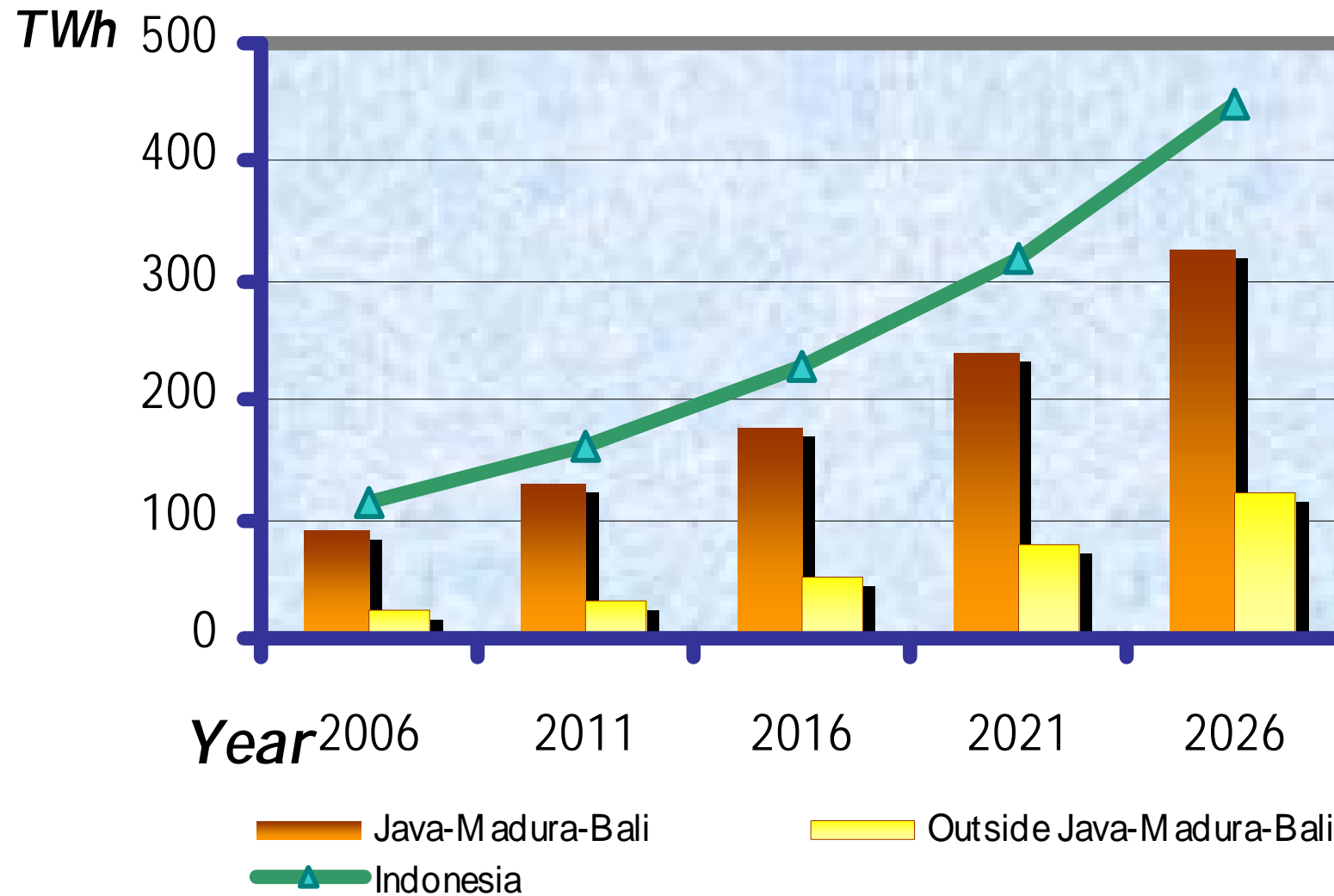
(In accordance with the Presidential Regulation No. 5/2006)



Current Electricity Condition

- q Electricity System:
 - ∅ Interconnection: Java-Madura-Bali and most of Sumatera island;
 - ∅ The others are still isolated.
- q Growth rate of demand for electricity up to 2026: 7.1 % p.a.
- q Total installed capacity 29,083 MW:
 - ∅ PLN's : 24.887 MW (85,57%);
 - ∅ IPP's : 3.450 MW (11,86%);
 - ∅ PPU's : 746 MW (2,57%).
- q Electrification ratio: 63%.
- q Village electrified ratio: 85%
- q Consumption of fuel-oil for power generation is about 24%.
- q Power plant's installed capacity from renewable energy:
 - ∅ Geothermal : 1,032 MW
 - ∅ Hydro : 4.200 MW
 - ∅ Mini/Micro Hydro : 84 MW
 - ∅ Biomass : 445 MW
 - ∅ Solar Cell : 8 MW
 - ∅ Wind Power : 0,6 MW

Electricity Demand (Based on RUKN 2006 – 2026)



Nuclear as An Option for Long Term Energy Supply

q Energy Diversification

- Diversify primary energy use for power generation and reduce fossil fuel dependency (esp. Oil)

q Energy Conservation

- Energy efficiency to reduce total domestic energy and electricity demand and increase added value

q Energy Security and Self Sufficiency

q Environmental Protection

- Reduce SO_x, NO_x and Green-House-Gases emission to support sustainable development and minimize externalities

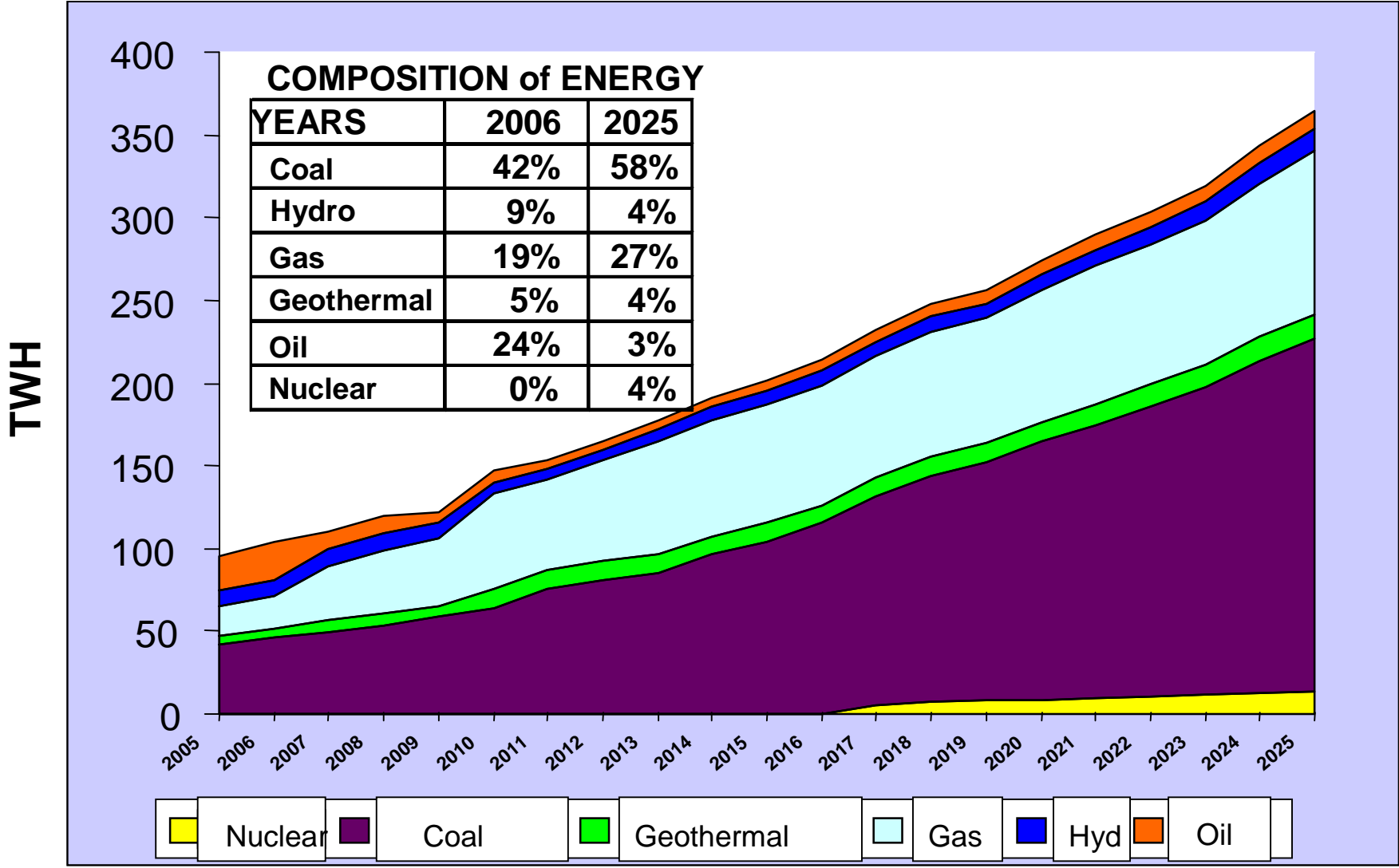
q Electricity Production Cost

- Reduce Electricity Production Cost

q Acquiring of High-Tech Power Generation

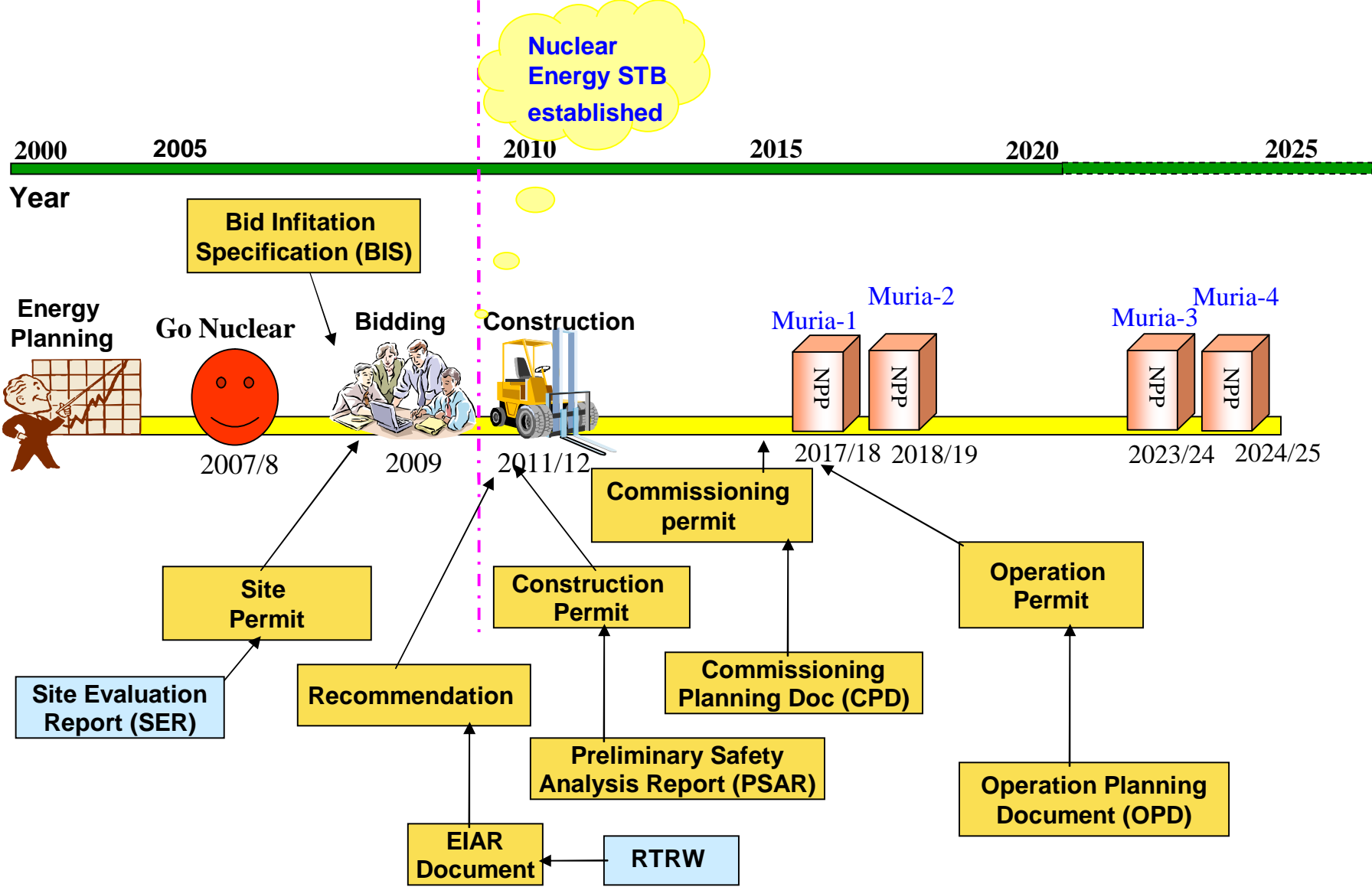
- High Tech utilization will increase national industrial capacity

ELECTRIC POWER PRODUCTION PLANNING Jawa-Madura-Bali (Jamali)



Source : DGEEU-MEMR

Milestone of the NPP Project in Indonesia



Act, Decree, & Regulation related to NPP Development in Indonesia

- Ø Nuclear Energy Act No. 10 Year 1997
- Ø Act No. 17 Year 2007 on National Long-Term Development Planning 2005-2025.
- Ø Energy Act No. 30 Year 2007
- Ø President Decree No. 103, 2001 on BATAN & BAPETEN Tasks, Function, and Responsibility jo President Decree No. 64, 2005
- Ø Presidential decree No. 7 Year 2005 on National Medium-term Development Planning 2004–2009
- Ø Presidential Decree No 5 Year 2006 on National Energy Policy (KEN)
- Ø National Electricity General Planning (RUKN) 2006-2026, DOEMR 2006.
- Ø Presidential Decree No 43 Year 2006 on Licensing of Nuclear Reactor
- Ø Nuclear Energy Programme Implementation Organization (NEPIO), Draft.
- Ø Government Regulation on National Nuclear Emergency Preparedness, Draft

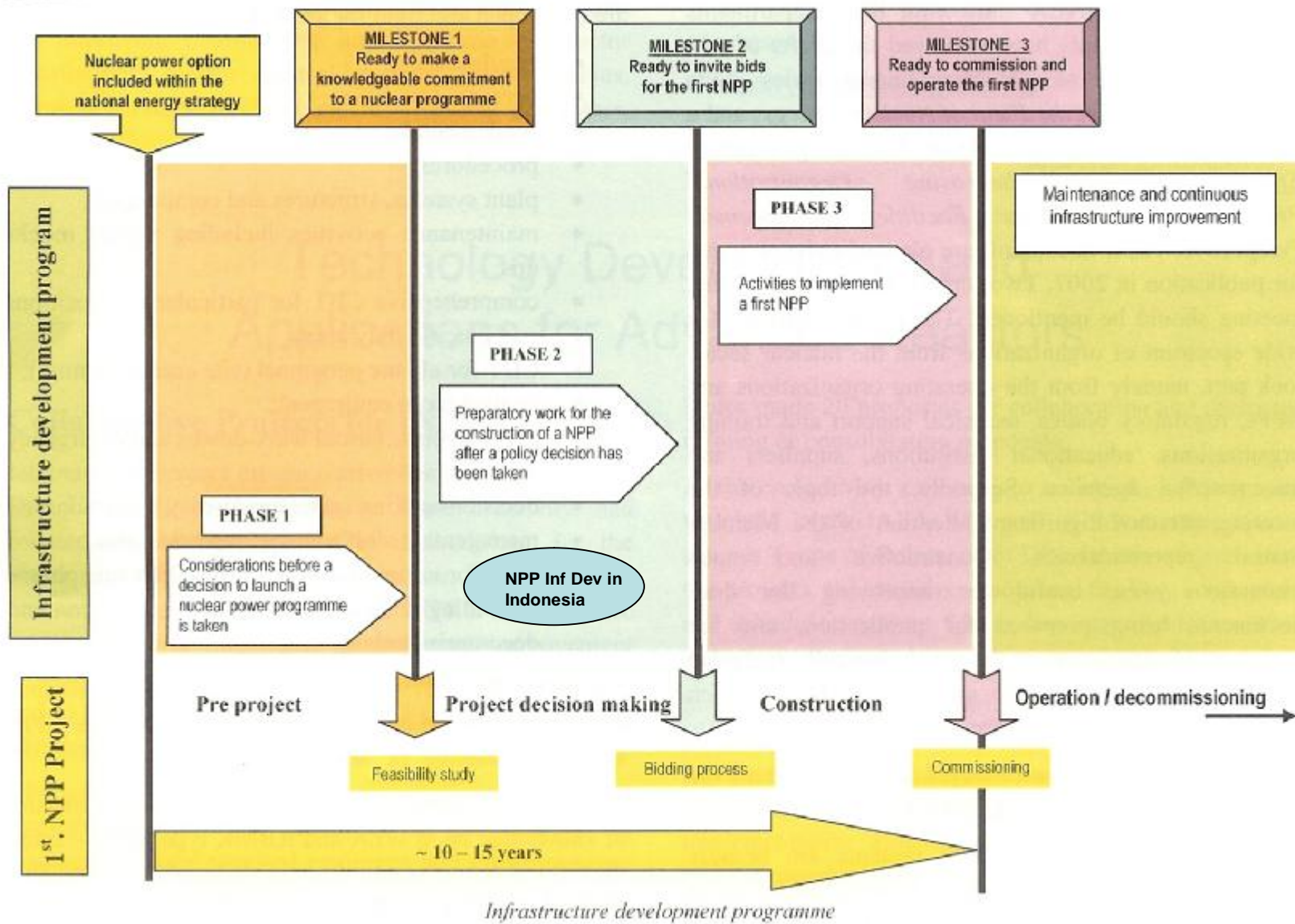
Status of the Government of Indonesian to the International Agreements and Treaties

| No | INTERNATIONAL TREATIES AND AGREEMENTS | STATUS |
|-----------|---|---|
| 1. | §Non-Proliferation Treaty (NPT) §Safeguard Agreement with IAEA §Additional Protocol to Safeguards | §Ratified : Act No.8 / 1978 §Signed (Valid) §Signed (Valid) |
| 2. | Convention on Physical Protection of Nuclear Material, and its Amendment | Ratified : President Decree No.49 / 1986 |
| 3. | Convention on Early Notification of a Nuclear Accident | Ratified : President Decree No.81 / 1993 |
| 4. | Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency | Ratified : President Decree No.82 / 1993 |
| 5. | Treaty on the South East Asia Nuclear Weapon Free Zone | Ratified : UU No.9 / 1997 |
| 6. | Convention on Nuclear Safety | Ratified : President Decree No.106 / 2001 |
| 7. | Comprehensive Nuclear Test-Ban Treaty (CTBT) | Signed 1996 |
| 8. | Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management | Signed (1997) |
| 9. | Protocol to Amend the Vienna Convention | Signed (1997) |
| 10. | Supplementary Compensation for Nuclear Damage | Signed (1997) |
| 11. | Bilateral Cooperation and Supply Agreement (s) | Signed (1997) |

NPP Infrastructure Development in Indonesia

In preparing the infrastructure to introduce nuclear power there are several activities that need to be completed. These activities can be split into three progressive phase of development. The completion of the infrastructure conditions of each of these phases is marked by a specific milestone.

A schematic representation of status of NPP Infrastructure Development in Indonesia is given in the following figure as well as in the following table.



STATUS OF BASIC NUCLEAR POWER INFRASTRUCTURE

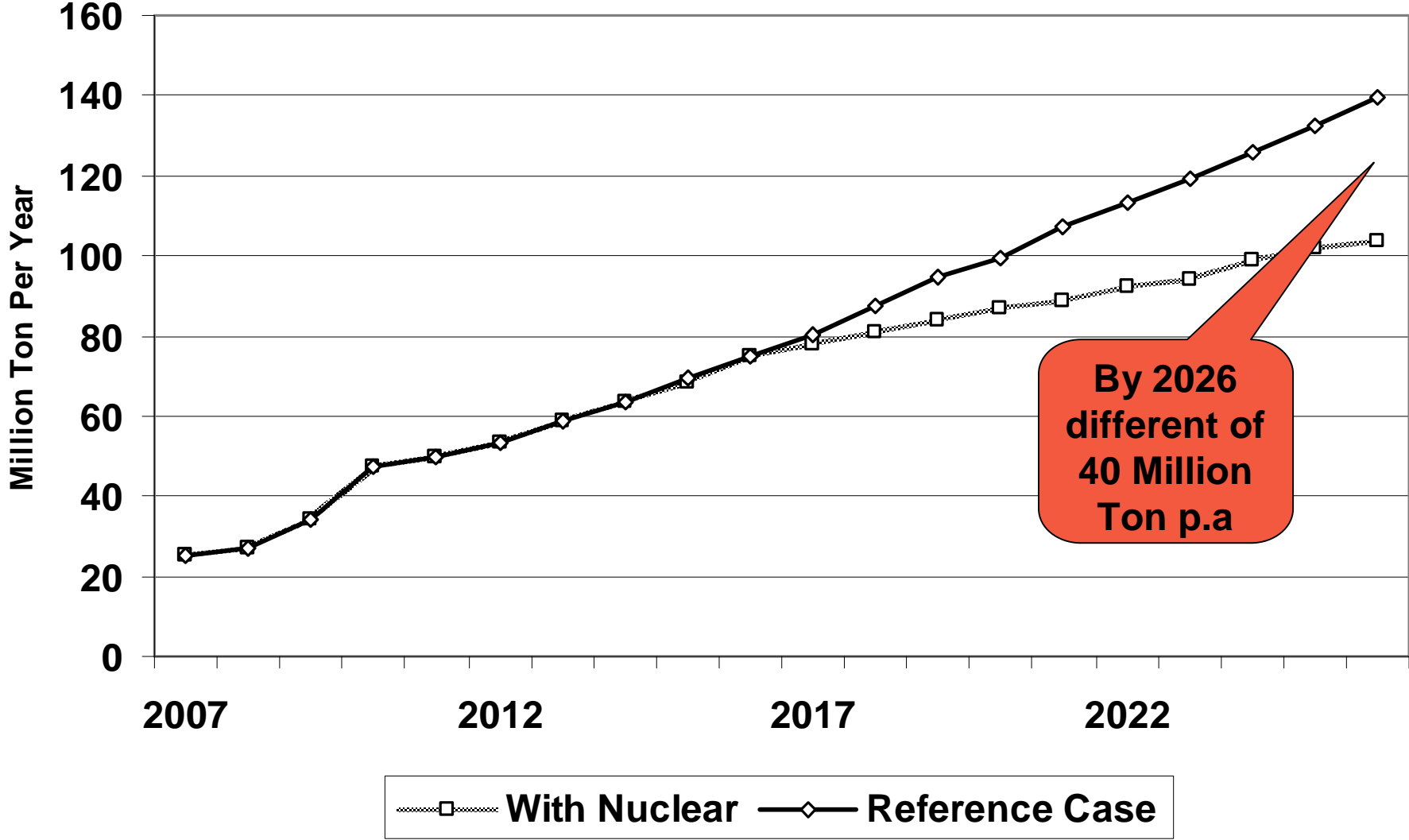
| NO. | INFRASTRUCTURE ISSUES | STATUS |
|-----|--|---|
| 1. | National Team for NPP Development Planning | Under process |
| 2. | Nuclear Power Policy | Under preparation |
| 3. | Act on Nuclear Energy | Act No. 10/1997 on Nuclear Energy |
| 4. | Nuclear Regulatory Body | Bapeten |
| 5. | Educational Institutions | STTN, Pusdiklat Batan, Universities (UGM, UI, ITB, Undip, etc.) |
| 6. | Economic Assessment | Need to be updated |
| 7. | Financial Assessment | Need to be updated |
| 8. | Public Information | It should be carried out continuously. |
| 9. | Siting and Site Infrastructure | 3 potential sites have been selected, updating site data |
| 10. | Grid Strengthening | Grid is available |
| 11. | Transportation Means | Need to be improved |
| 12. | Environmental Assessment | Need to be updated |
| 13. | Bid Request, Evaluation & Vendor Selection | Based on Project Schedule. |
| 14. | Licensing | Under Preparation |
| 15. | Emergency Planning | To be Prepared |
| 16. | National Laboratories | NSTB Batan at Puspitek Serpong, 2010 |
| 17. | Engineering | Need to be Developed |
| 18. | Project Management & Commissioning | Based on Project Schedule |
| 19. | Fuel Supply | Based on Project Schedule |
| 20. | Waste Management | Based on Project Schedule, Operator and Batan. |

Note: Existing, In Function Based on Project Schedule Under Process / Preparation, Need to be updated / improved / developed

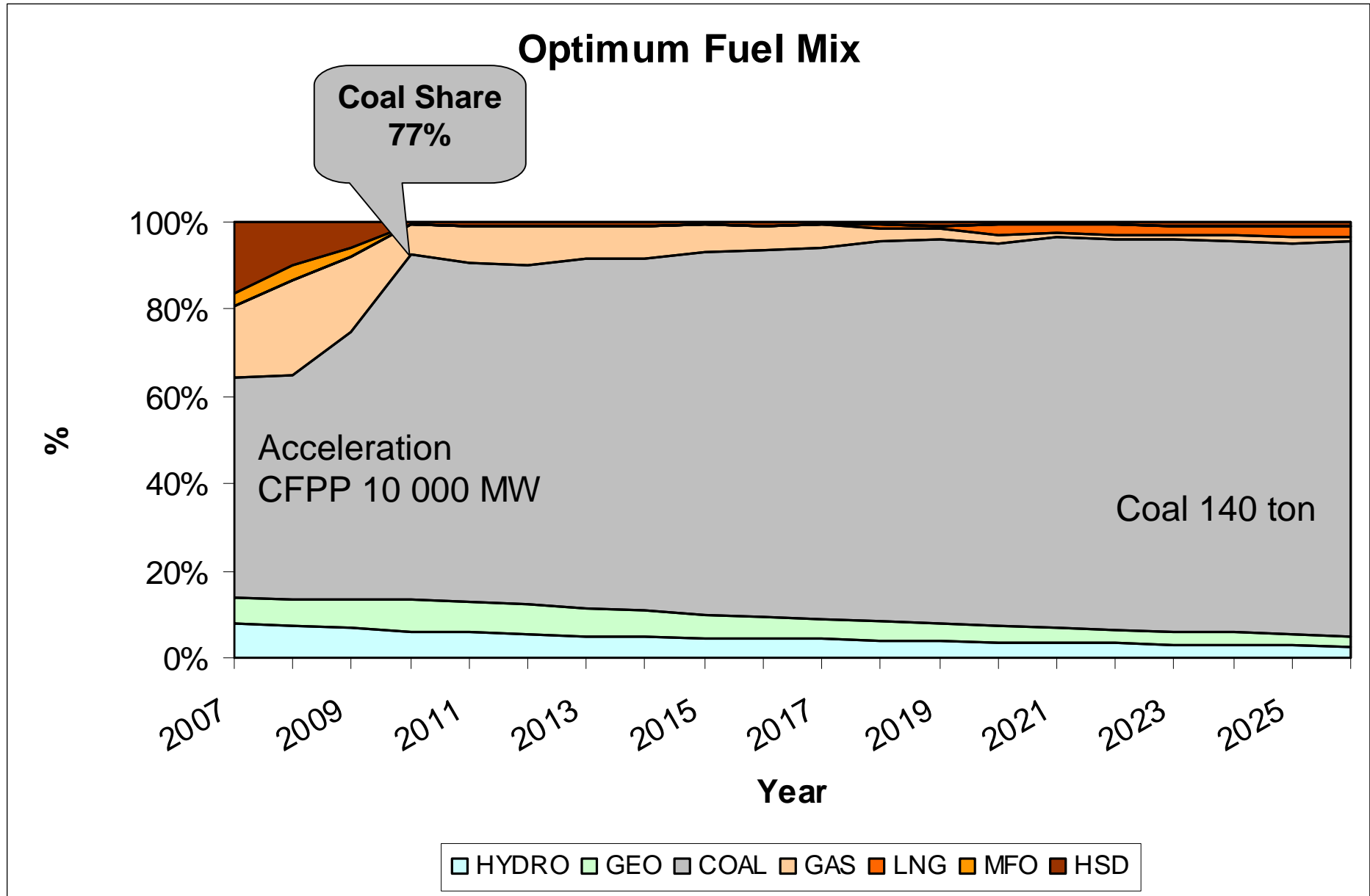
Tools for Power System Planning by PLN

- The WASP model allows user to find an optimum expansion plan over a period of up to thirty years, within given constraints and criteria set by user.
- The optimality of the plan is determined based on minimum discounted total costs.
- **Reference Case:** without any constraint on coal fired plant additions, to produce what we call 'a free optimum plan'.
- **With NPP Case:** to add 1 unit nuclear plant per year since 2017

Coal Consumption for Java-Bali Power System

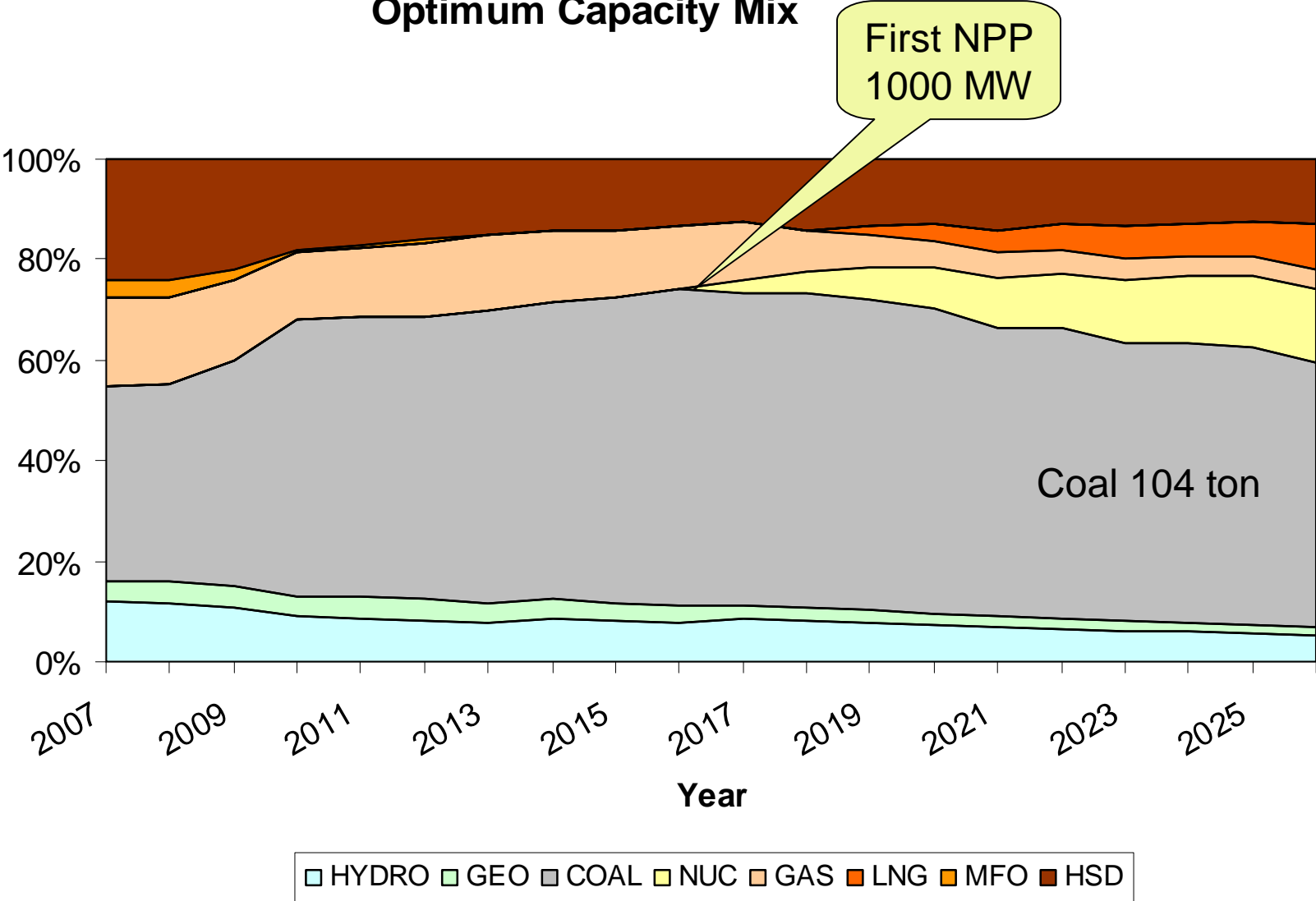


Without NPP Option



With NPP Option

Optimum Capacity Mix



Forum for Nuclear Cooperation in Asia (FNCA)

- Regional Forum in Asia Pacific,
- 10 member countries, promoting peaceful uses nuclear energy for economic development in Asia-Pacific countries.
- Cooperation program and project related, among other:
 - Utilization of Research Reactors
 - Nuclear Medicine and Radiotherapy
 - Nuclear Safety Culture,
 - Nuclear Power Program and CDM,
 - etc.

FNCA countries common recognition and actions at the IAEA Side session in COP-13 to improve its recognition of nuclear power to mitigate GHG emission:

- FNCA countries agreed that nuclear power contributes mitigation of GHG emission, FNCA countries recognized CDM should be applied to nuclear power same as renewable energy
- FNCA countries recognized nuclear power should be considered as an effective clean energy in the discussion of the post Kyoto-protocol frame work
- FNCA countries will issue joint communique related the role of nuclear power, CDM, etc., at the 8th Ministerial Meeting to be held December 18, 2007 to appeal COP or other relevant international institution.

Conclusion

- Nuclear option is consider importance from energy security, environment sustainability, diversification point of view and economically competitive.
- Inclusion of NPP development on Java-Bali power system give various positive aspects, i.e.: meeting electricity demand economically, able to reduce coal consumption annually almost 40 million ton, more environment friendly.
- High technology such as NPP technology utilization will increase national industrial capability . In such case starting up of NPP development at earlier time will give benefits to Indonesia.

THANK YOU

