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Polices to Enhance the Safety and Public Acceptance of Nuclear Power Plants in China

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OUTLINE

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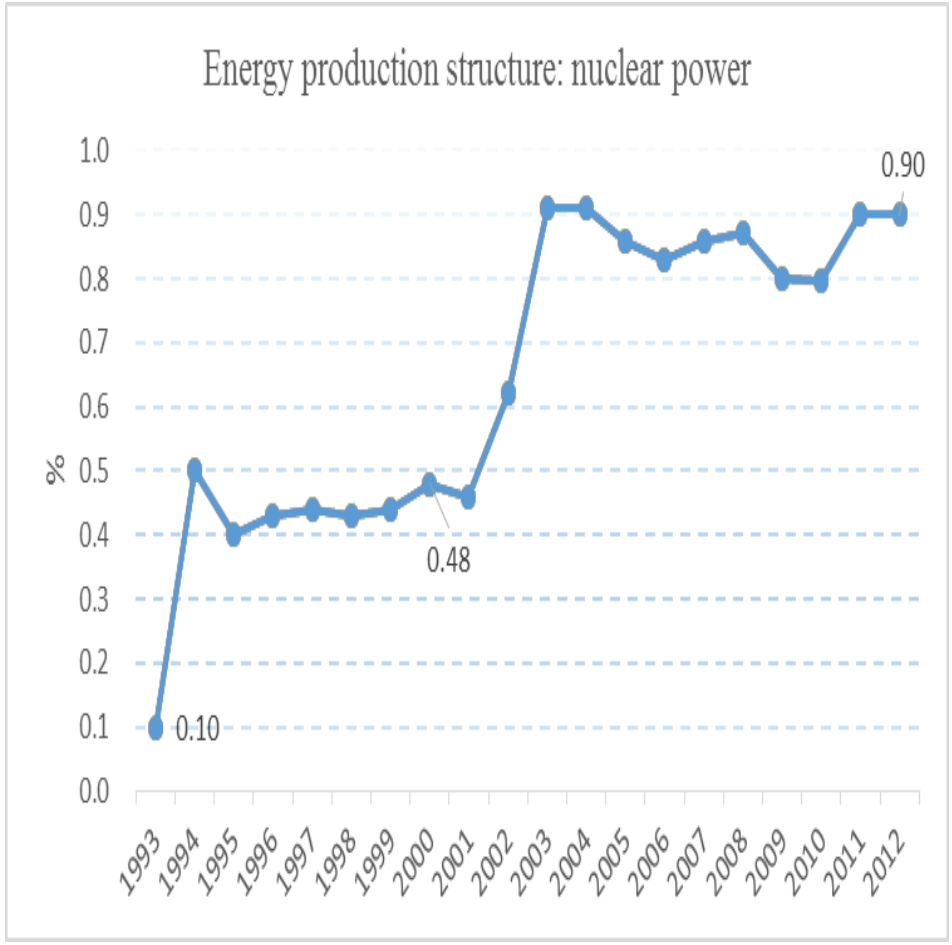
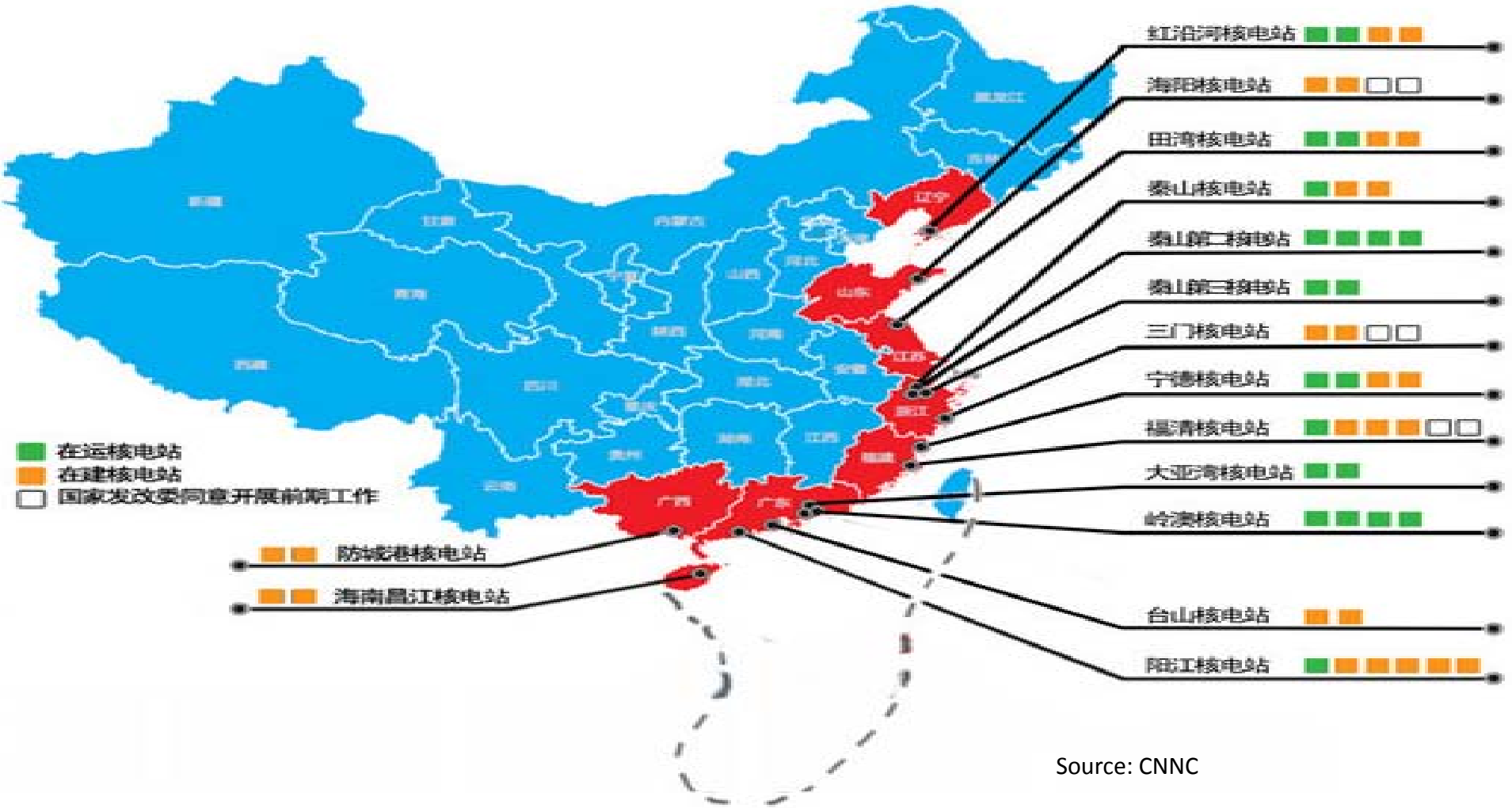
3. Public Acceptance of Nuclear Power Plants in China
4. Polices to Enhance the Safety and Public Acceptance of Nuclear Power Plants in China

1. Status and Trends of the Development of Nuclear Power in China



- Up to the end of 2011
- China's power generation capacity with 6000 kilowatts and above
  - 1028.63 million kilowatts
- Of which the nuclear power installed capacity
  - 12.57 million kilowatts, 1.22%
- China’s Electric Power Generation in 2011
  - Nuclear power generation: 87.2 billion kWh (the total 4730.6 billion KWh)
  - Nuclear power generation by region
    - Jiangsu16.1 billion KWh, Zhejiang 28.6 billion KWh, Guangdong 42.5 billion KWh.

1. Distribution of Nuclear Power Plants



Source: CNNC

1. Distribution of Nuclear Power Plants

nuclear power unit	nuclear reactor type	company	province
Qinshan #1	CNP300	CNNC	Zhejiang
Qinshan II #1,#2,#3,#4	CNP600	CNNC	Zhejiang
Qinshan III #1,#2	CANDU6	CNNC	Zhejiang
Tianwan#1,#2	AES-91	CNNC	Jiangsu
Fuqing#1	CPR1000	CNNC	Fujian
Daya Bay #1,#2	M310	CGN	Guangdong
Ling'ao #1,#2	M310	CGN	Guangdong
Ling'ao #3,#4	CPR1000	CGN	Guangdong
Hongheyan#1,#2	CPR1000	CGN	Liaoning
Ningde #1,#2	CPR1000	CGN	Fujian
Yangjiang #1	CPR1000	CGN	Guangdong

1. Status and Trends of the Development of Nuclear Power in China

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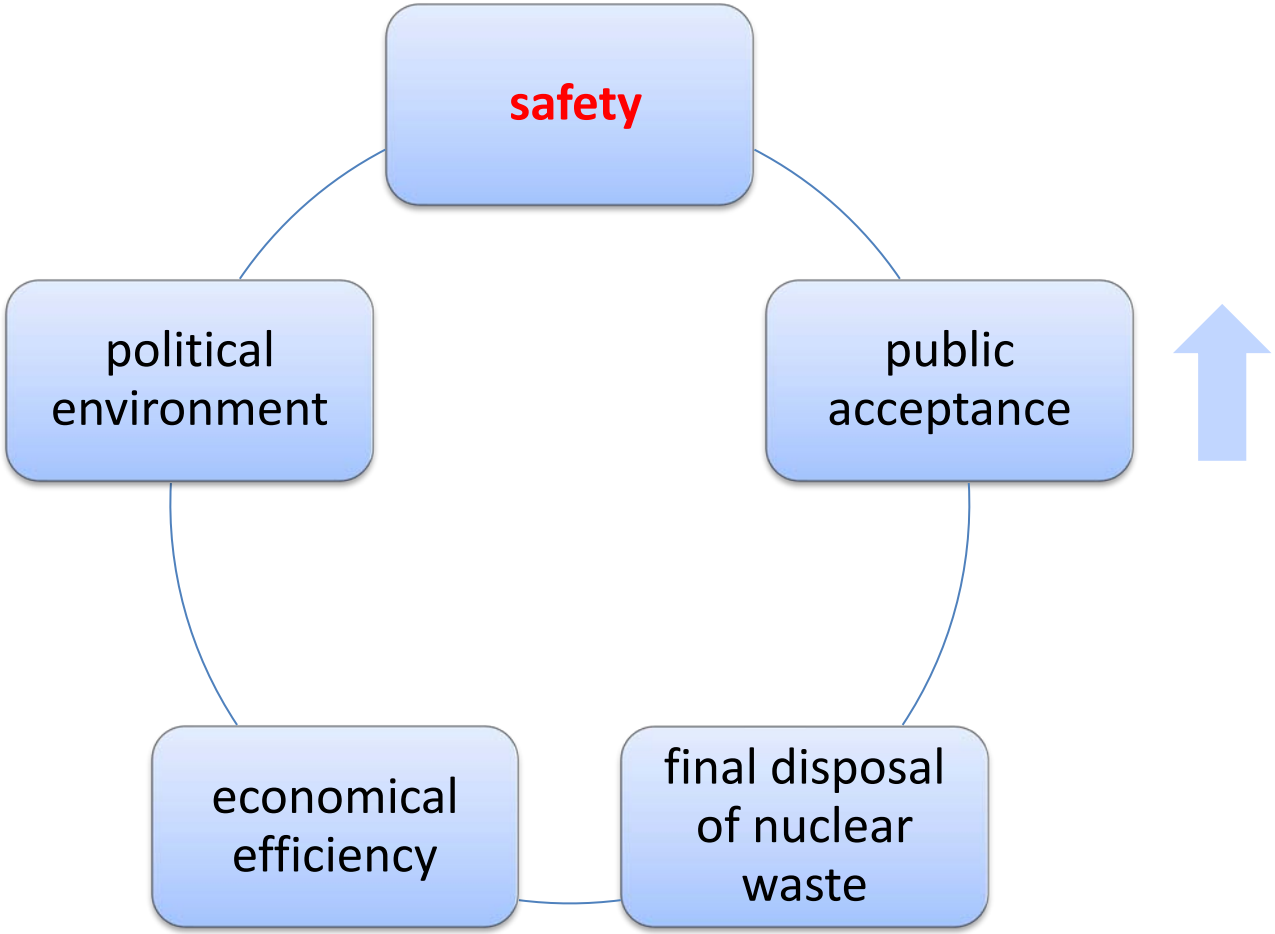
- Nuclear power is a representative of safe, clean and efficient new energy.
- Through increasing investment, introducing foreign advanced technology and encouraging independent research and innovation → nuclear power in China develops well.
- Trend of nuclear power development in the future → Promising
  - Energy development strategy in the future: Green & Low carbon
  - Energy production revolution: establish the energy supply system with coal, oil, natural gas, nuclear power, new energy sources and renewable energy sources as driving wheels.
  - National Long-term Nuclear Power Development Plan(2005-2020)
    - In 2020, the nuclear power installed capacity→40 million kilowatts (4%)
    - Nuclear power generation→260~280 billion KWh

1. Status and Trends of the Development of Nuclear Power in China

Major challenges and key issues



1. Status and Trends of the Development of Nuclear Power in China

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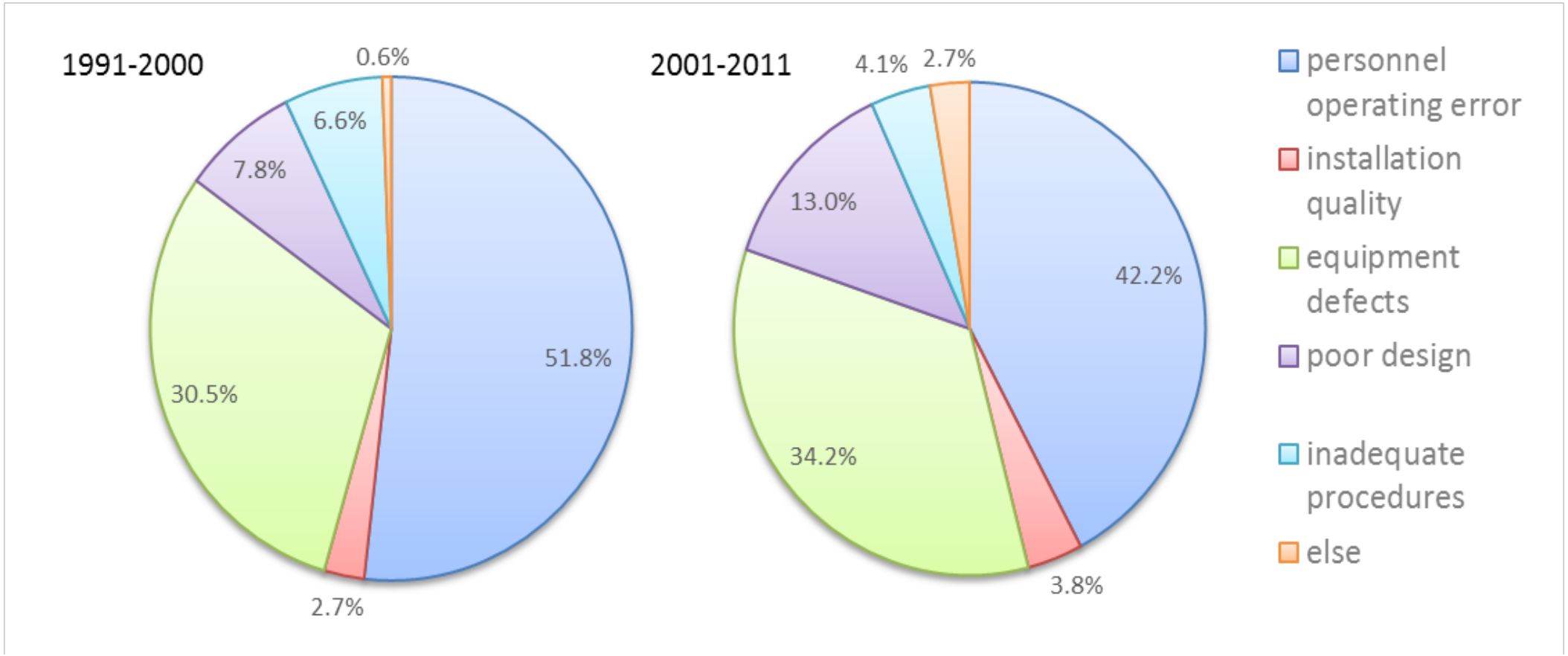
- Operation event data of nuclear power plants in China
- According to the statistics and trend analysis by Ministry of Environmental Protection:
  - 1991~2000: the initial stage of nuclear power development
  - 2001~now: the number of operation events per nuclear power unit decreases significantly
- Possible causes of operation events
  - personnel operating error
  - installation quality
  - equipment defects
  - poor design
  - inadequate procedures
  - ……

1. Status and Trends of the Development of Nuclear Power in China



2. Briefs about China's Nuclear Power Safety Policies

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- Safety is the first element and the lifeline of nuclear power operation. China attaches great importance to the safety of nuclear power plants.
- Nuclear safety is a part of the whole national security system which contains 11 types of safety.
- Nuclear safety concept
  - In the 3rd Nuclear Security Summit, the President Xi Jinping first proposed China's Nuclear safety concept.
  - ➢ Enhance nuclear security capacity;
  - ➢ Strengthen government's ability of nuclear safety regulation;
  - ➢ Increase nuclear safety technology research and development;
  - ➢ Promote human resources development;
  - ➢ Adhere to nurture and develop the nuclear safety culture.

2. Briefs about China's Nuclear Power Safety Policies

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Regulatory System

National and provincial two-layer administration, City-level co-management

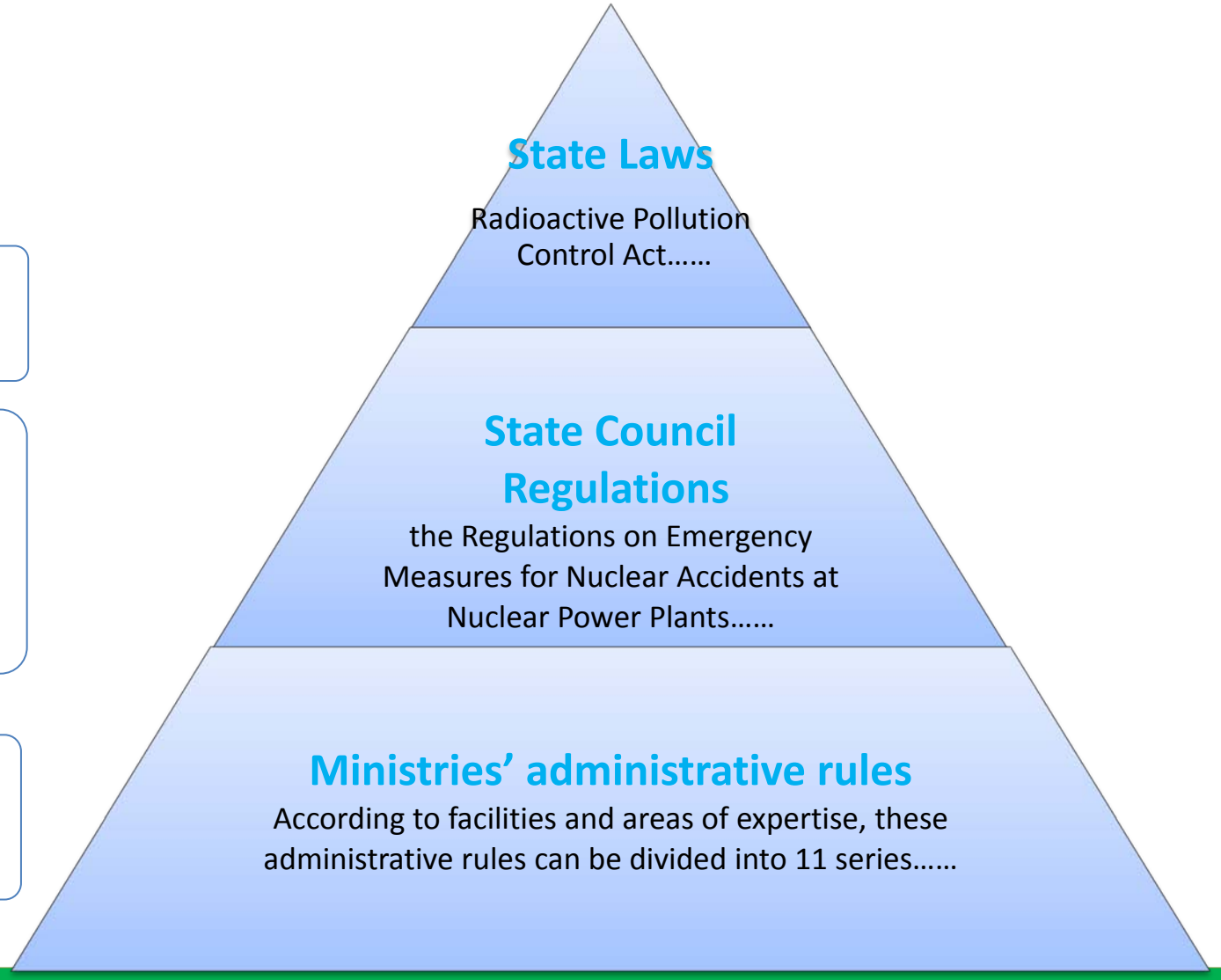
Regulatory Agencies

National Nuclear Safety Administration

http://nnsa.mep.gov.cn/

Central-level
3 departments, 6 Supervision Stations, and 2 monitoring center

Local NNSA



3. Public Acceptance of Nuclear Power Plants in China

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Literature	Factors influencing public acceptance of nuclear power plant
Keller C(2012)	gender, residence area; trust, emotional factors
Visschers V H M(2011)	trust, emotional factors, risk, expected benefits
Truelove H B(2012)	trust, world view, demographic characteristics, risk, expected benefits, environmental concern
Song Y(2012)	risk, expected benefits, communication quality, social trust
He G(2013)	participation, information openness, communication quality, social trust
Venable D(2012)	distance to nuclear power plants, risk expectation, place belongingness
Liu C(2008)	expected benefits and risk, knowledge on nuclear power, social trust
Pidgeon N F(2008)	risk and benefits expectation
Visschers V H M(2012)	equitable participation and distribution
Whitfield S C(2009)	social trust, risk expectation, value concept, demographic characteristics
OECD(2010)	knowledge, gender, education, age, policy-making process, political stand
Quan Shiwen(2012)	education, participation, trust, risk and value judgments
Yang Guangze(2006)	age, gender, education, income, distance to NNP
Li Xiaojuan(2008)	gender, education, income, benefit judgments, government's trust, distance
Li zhe(2009)	personal characteristics, knowledge, risk, expected benefits, trust, risk preference
Wang yilong(2012)	gender, age, education, income
Lu Wei(2003)	familiarity, participation, controllability, trust

3. Public Acceptance of Nuclear Power Plants in China

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- Factors influencing public acceptance
  - gender, age, education, residence area;
  - pros and cons of judgment, emotional factors, the level of understanding, the level of trust;
  - familiarity, participation, controllability, trust.

- Related groups
  - government
  - public media
  - experts
  - residents around

3. Public Acceptance of Nuclear Power Plants in China

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- Some Anti-Nuclear Power Activities

➢ 1986, HongKong, Daya Bay nuclear power plant

➢ 2006, Silver Beach of Beihai in Guangxi province, Silver Beach nuclear power plant

➢ 2012, Wan jiang in Anhui province, Penzer nuclear power plant

➢ 2013, He Shan in Guangdong province, nuclear fuel industrial zone of CNNP

3. Public Acceptance of Nuclear Power Plants in China

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- Over the past 50 years of development of nuclear industry, China is constantly improving nuclear safety law system, standard system and regulatory system, actively promotes cooperation on international nuclear security and technology innovation, and maintains a good record in nuclear safety.
- However, the occurrence of every nuclear power accident will make the public more fearful and worrier than ever.
- After the Fukushima nuclear incident, the distrust of the public on nuclear power increased sharply. Hence, the Chinese government has adopted many measures to smooth the public's emotions.
  - A comprehensive national safety inspection on the nuclear facilities was carried out to ensure that all domestic nuclear power generating units are operating safely.
  - The public propaganda and popular science education on nuclear safety was strengthened to establish a clean, efficient, safe image of nuclear power and improve the transparency of it.

4. Polices to Enhance the Safety of Nuclear Power Plants in China

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- Enhancing the safety of nuclear power plants is a top priority to the development of nuclear power, and also the most fundamental and effective measure to improve public acceptance.

➢ Construct and improve the legal system of nuclear power safety

- Accelerate the introduction of nuclear safety law and nuclear safety regulations…

➢ Establish and improve the standards system of nuclear power

- Harmonize existing standards and improve the standard adoption rate…

➢ Attaches great importance to professional training, to eliminate operation events caused by personnel operating error

➢ Strengthen government regulatory capacity, implement the whole process of supervision

➢ Actively promote technological progress, strengthen international cooperation

4. Polices to Enhance Public Acceptance of Nuclear Power Plants in China

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- Other measures to promote the public acceptance
  - Strengthen the publicity and popular science education
    - Implement a systematic, comprehensive, wide program on popular science education.
    - Propaganda through the exhibition, report, the Internet, television and other modern media
    - Make that "nuclear power is a type of safe, clean and economical energy sources" a public consensus.
  - Improve the transparency of nuclear power development
    - Establish a mechanism which makes the public's visiting to nuclear power plant feasible and regular.
    - Enable the public, especially those living near the nuclear power plant participate in the nuclear power plant emergency exercises.
  - Strengthen the public's participation in decision-making of the construction of nuclear power plant

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Thank you!

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