

Innovations in Nuclear Technology 2012



Participation of Nuclear Power in the Electric Matrix of Brasil

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The background is a solid bright blue color. At the top, there are several thin, wavy, translucent lines in shades of blue and green, creating a layered, water-like effect.

Opportunities

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Low Electric Consumption

kWh/in habitant: 2010

World: 2.892

Alemanha	7.217	Finlândia	16.484	República Checa	6.323
Argentina	2.904	França	7.756	Romênia	2.392
Brasil	2.485	Grécia	5.245	Rússia	6.460
Chile	3.301	Irlanda	6.023	Sérvia	4.358
Colombia	1.012	Itália	5.384	Suécia	14.939
Croácia	3.808	Noruega	25.177	Suiça	8.216
Dinamarca	6.329	Países Baixos	7.011	Turquia	2.474
Equador	1.055	Paraguai	1.134	Ucrânia	3.550
Eslováquia	5.164	Peru	1.106	Uruguai	2.763
Eslovênia	6.520	Polônia	3.783	Venezuela	3.287
Espanha	6.155	Portugal	4.929		
Estados Unidos	13.361	Reino Unido	5.741		

Population and demand growth

- Need to double electricity supply in a short time
- All sort of energy sources are welcome

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Base load, supply of power

- Old plants large reservoirs
- Guarantee in dry years

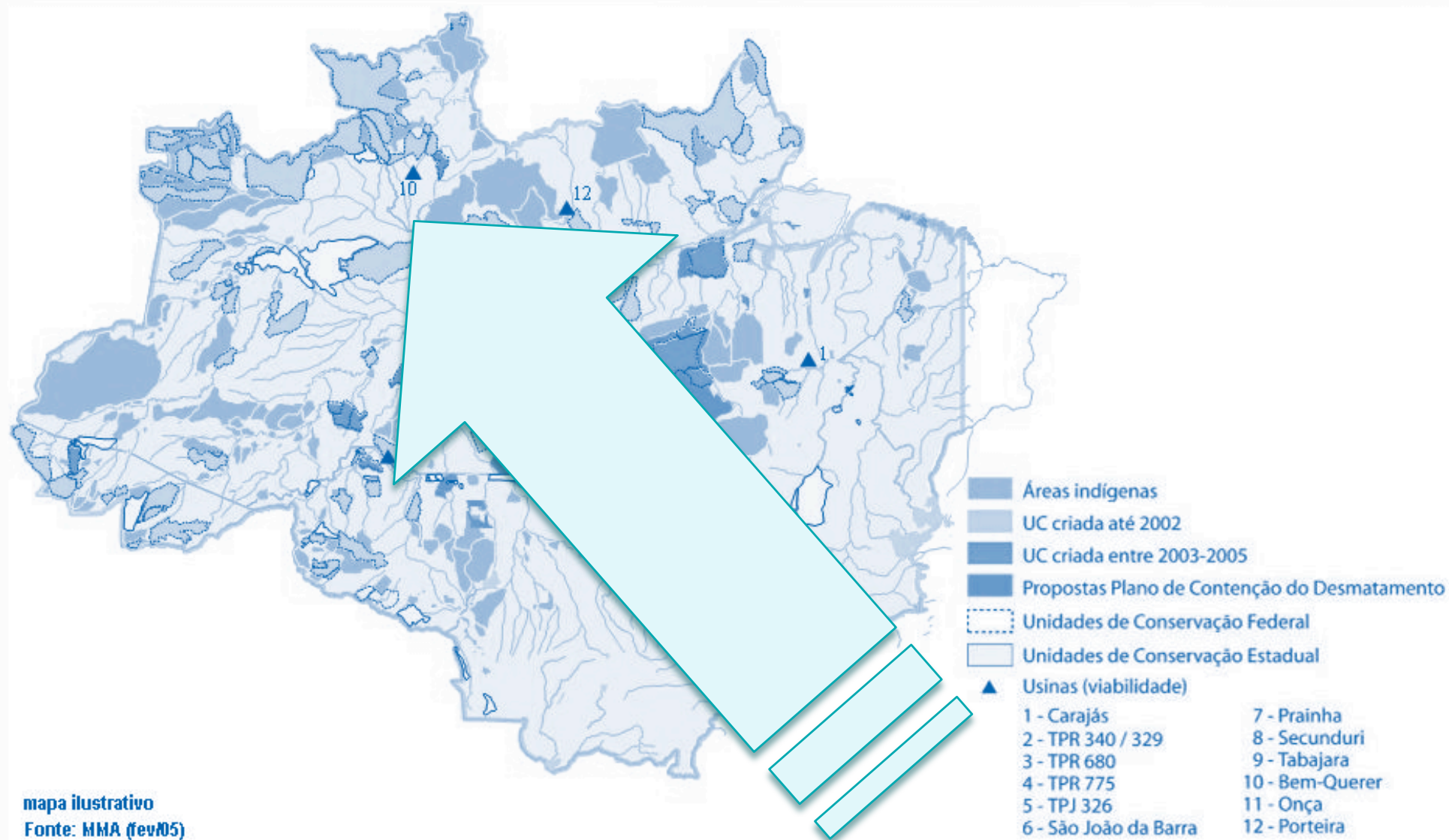
Hidroelectric Reserves – Amazonia

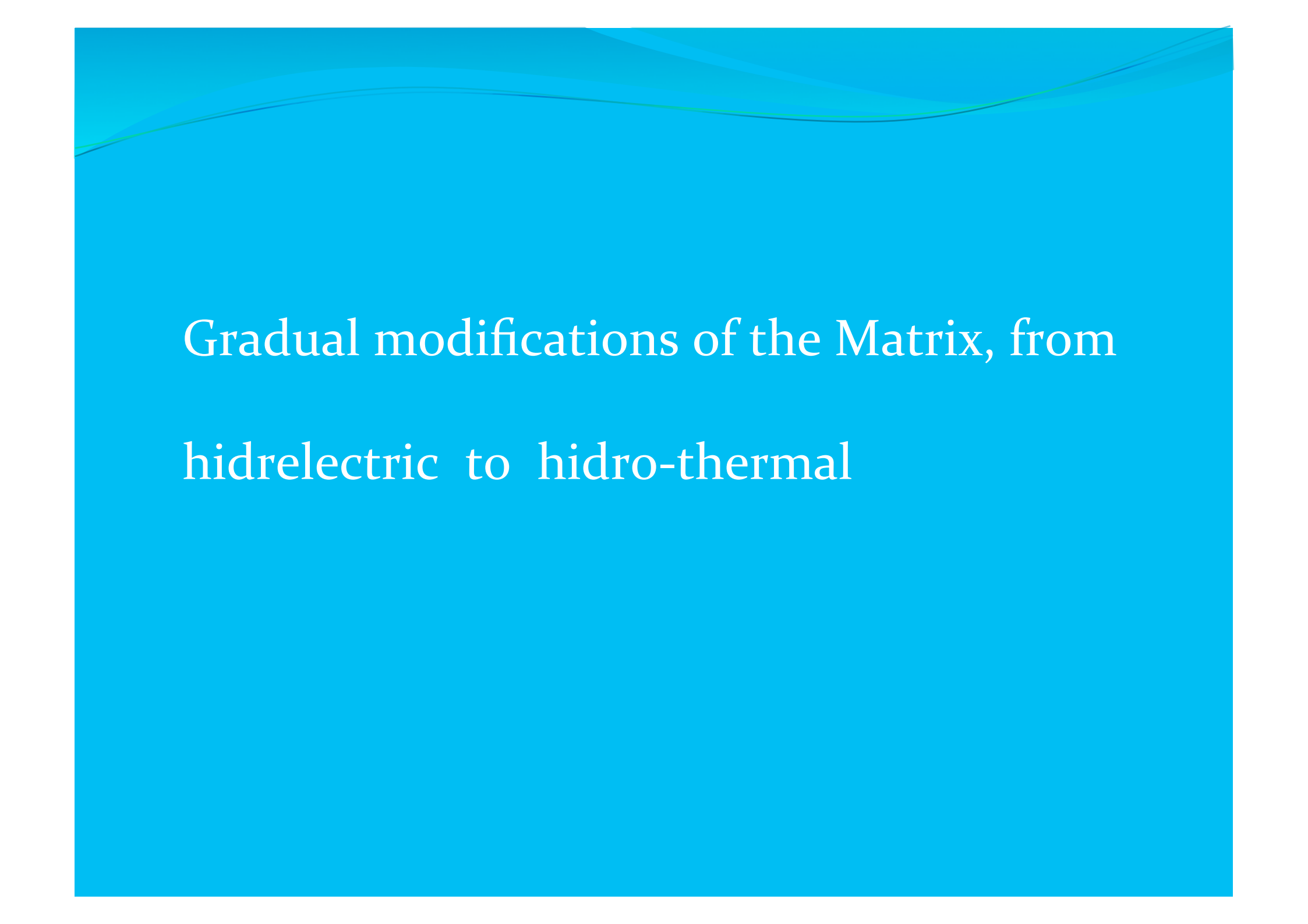
- Enviromental problem

- Fio D'Água Plants - can only count on the normal flow of the river

- Examples: Jirau, Santo Antonio, Belo M

EVOLUTION OF PROTECTION AREAS



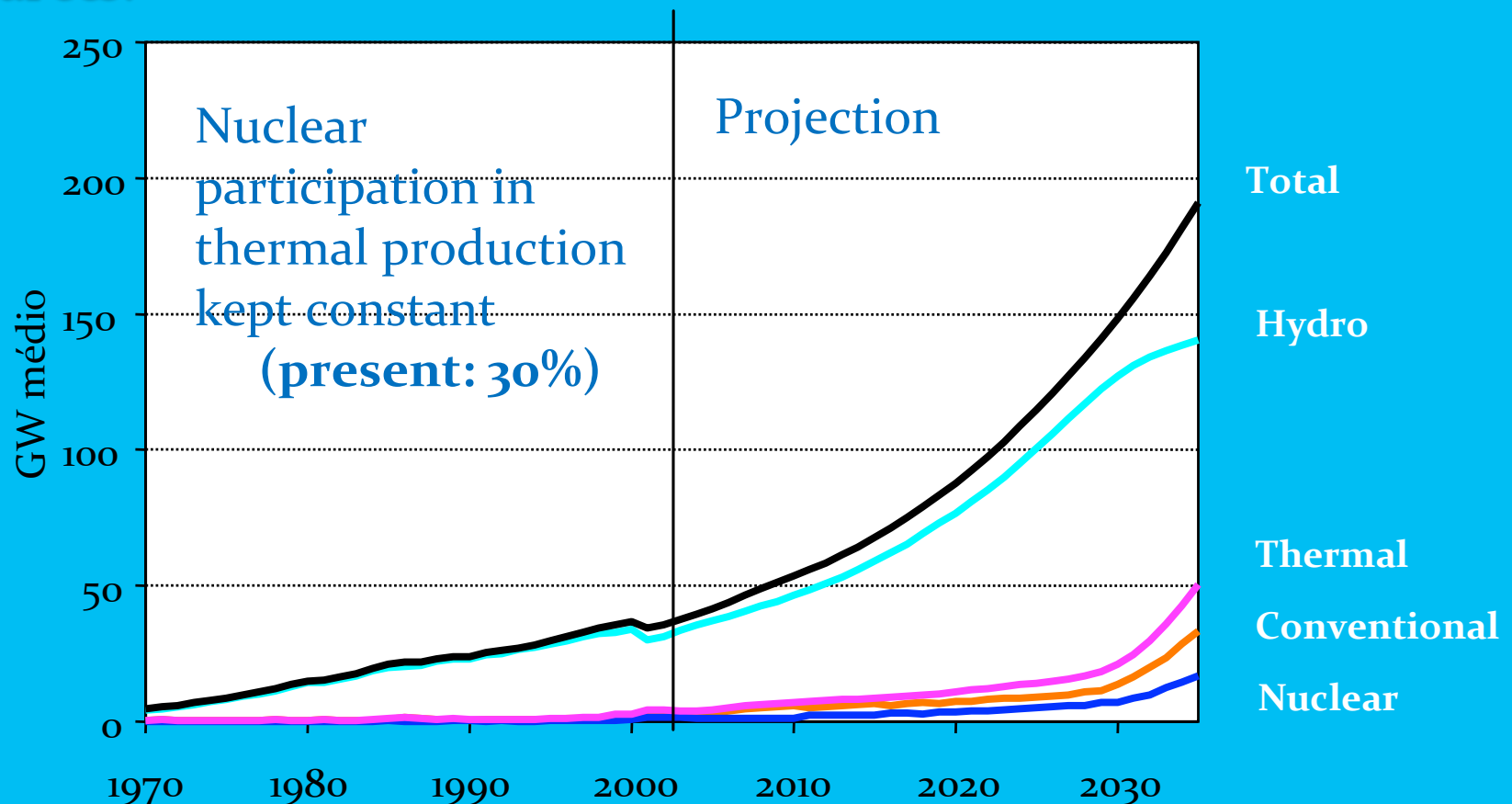
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Gradual modifications of the Matrix, from
hidrelectric to hidro-thermal

EVOLUTION OF THE ELECTRIC MATRIX

HIDRAULIC ➔ HIDROTERMIC

- There should be no competition between energy, but **complement**.
 - Diversification of the portfolio of option, resing all available resources.





Forecast of new plants in the 1930 program

PRODUCTION OF ELECTRICAL ENERGY (GW)

Sources	2005	2015	2030
Large Hidroelectric	68,6	99,0	156,3
Thermal	16,9	24,3	39,9
Natural Gas	8,7	13,0	21,0
Nuclear	2,0	3,3	7,3
Coal	1,4	2,5	6,0
Other	4,8	5,5	5,5
Alternativies	1,4	5,5	20,3
Smal Hidroelectric	1,3	2,3	7,7
Wind	-	1,4	4,7
Biomass	0,1	1,8	7,9
Importations + others	13,6	13,3	8,4
TOTAL	100,5	142,1	224,9

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Support of this large system

Thermal Power

Alternatives for thermal

NATIONAL THERMAL OPTIONS

(plants to be implemented)

FUEL	Price volatility	CO ₂ Emission	Local offer	Price (R\$/MWh)
COAL	Stable local	Yes	Limited	140 – 145
BIOMASS	Stable local	No	Limited	100 – 120
NATURAL GAS	Volatility Commodity	Yes	Limited Needs transportations	130 – 150
OIL	Volatility Commodity	Yes	Limited	>> 150
NUCLEAR Angra 3	Stable Local	No	Easy transportations	135 - 140

Choice of alternative

- nuclear is the most attractive
- reserves of uranium
- domination of the fuel cycle technology
- plenty of coast areas and hidro sources for siting Nuclear Power Plants
- proximity to load centers

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Challenges

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- Low investment capacity from the Govern
 - Importance of private investment

- Construction problem need of na
Ammendment to the constitution – PEC
- Criation a New Regulatory Authority
independent, competent and flexible
- Difficult to atract private capital with
present system

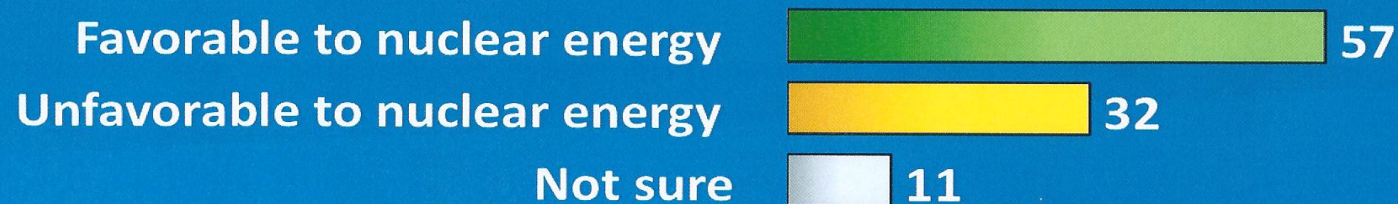
Public Opinions

- Fukushima Accident

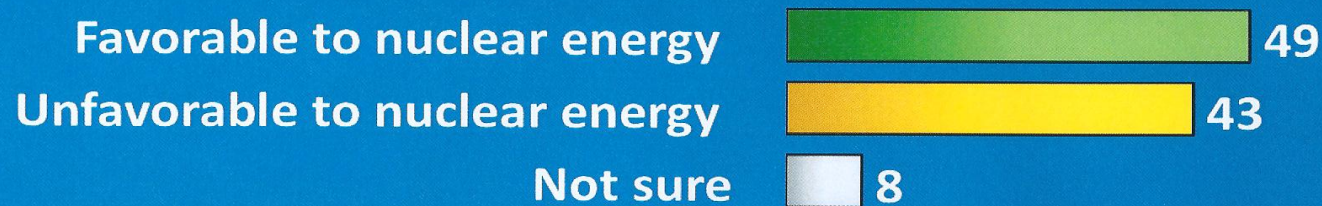
Public Opinion in 47 Countries

Percentages

What was your view prior to Japan earthquake?



What is your view now?



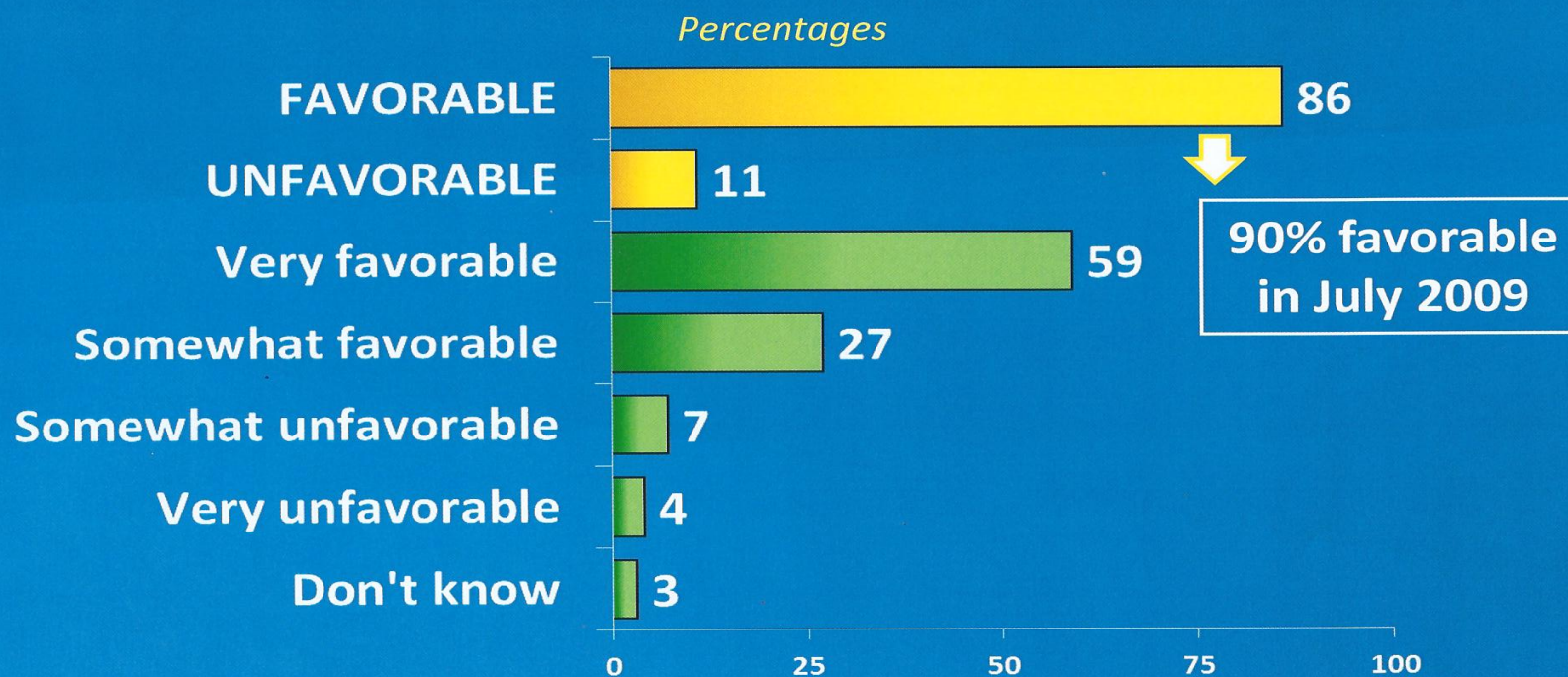
0 20 40 60 80



Source: WIN-Gallup International, March-April 2011

Plant Neighbor Opinions June 2011

Impression of Nearby Nuclear Power Plant and How it Has Operated Recently

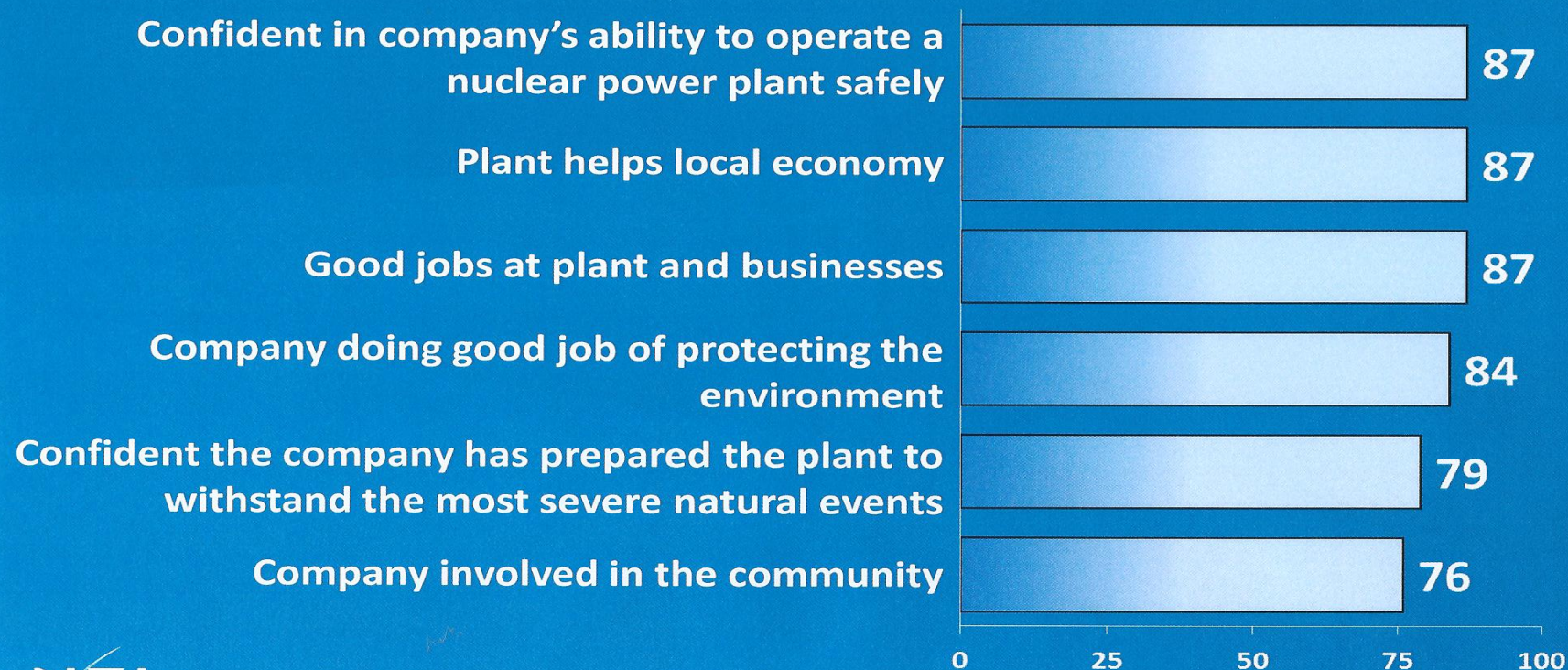


Bisconti Research for NEI

Plant Neighbor Opinions June 2011

Some Reasons for Favorable Impression

Percentages



Bisconti Research for NEI

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Informative seminars already done in
possible future areas

Regions for future NPPs

