

GMS Energy Conference

Phnompenh 29-30 Sep. 2009

Coal-based Energy Development Plan in Vietnam

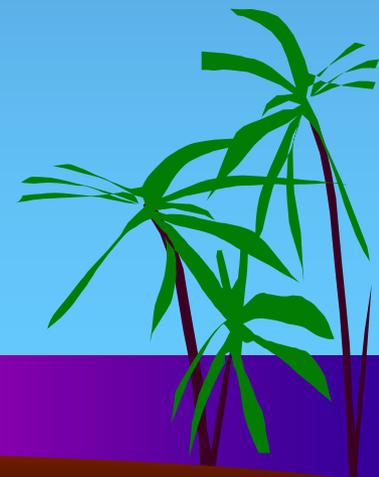
Kieu Kim Truc

Vietnam National Coal & Mineral
Industries Group



Agenda

1. Economic growth
2. Coal reserve
3. Coal demand
4. Coal production
5. Strategy of development
6. Conclusion



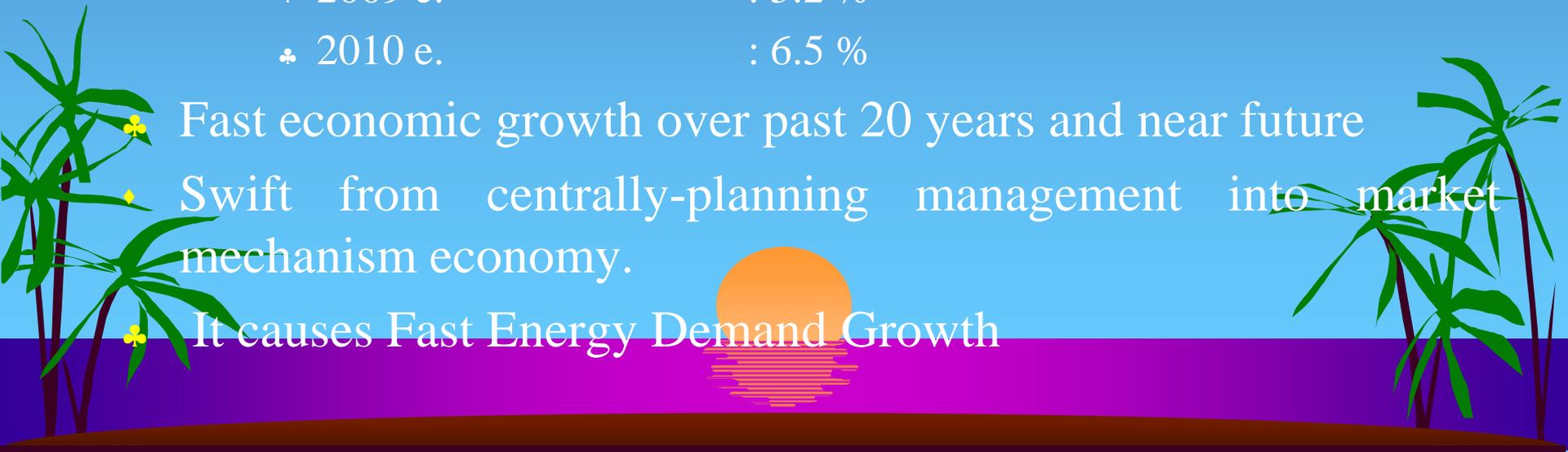
1. National profile – Fast economic and energy demand growth

- ♣ Land area: 328943 km².
- ♣ Population (2009): 85.8 millions
- ♣ GDP (2008): 90 bn. US\$, per capita: 1034 US\$, low among ASEAN countries.

♣ Fast GDP Growth Rate

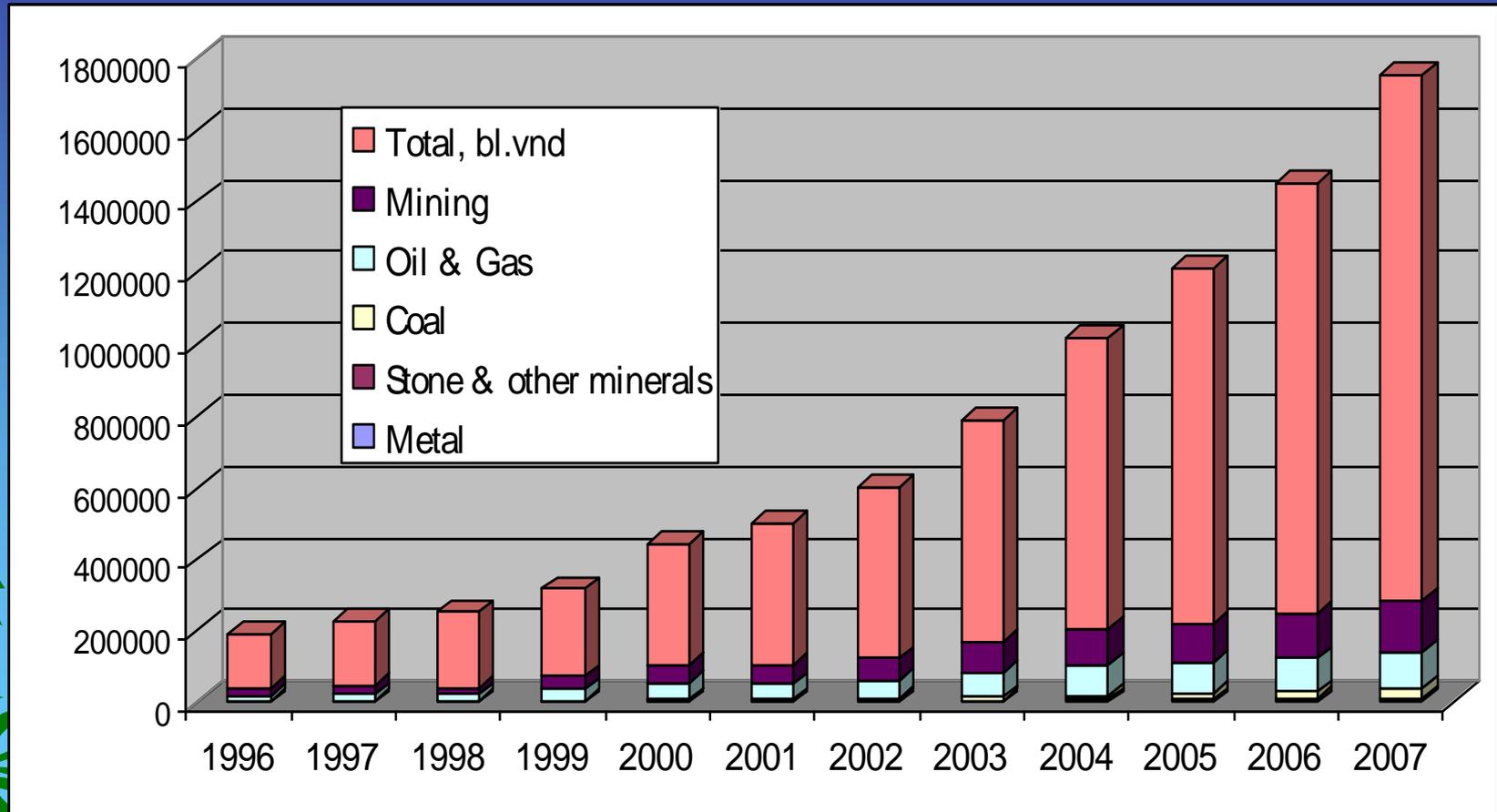
- ♣ 1990-2008 : 7.5 %
- ♣ 2009 e. : 5.2 %
- ♣ 2010 e. : 6.5 %

- ♣ Fast economic growth over past 20 years and near future
- ♣ Swift from centrally-planning management into market mechanism economy.
- ♣ It causes Fast Energy Demand Growth



Mining & Industrial production, bn.vnd

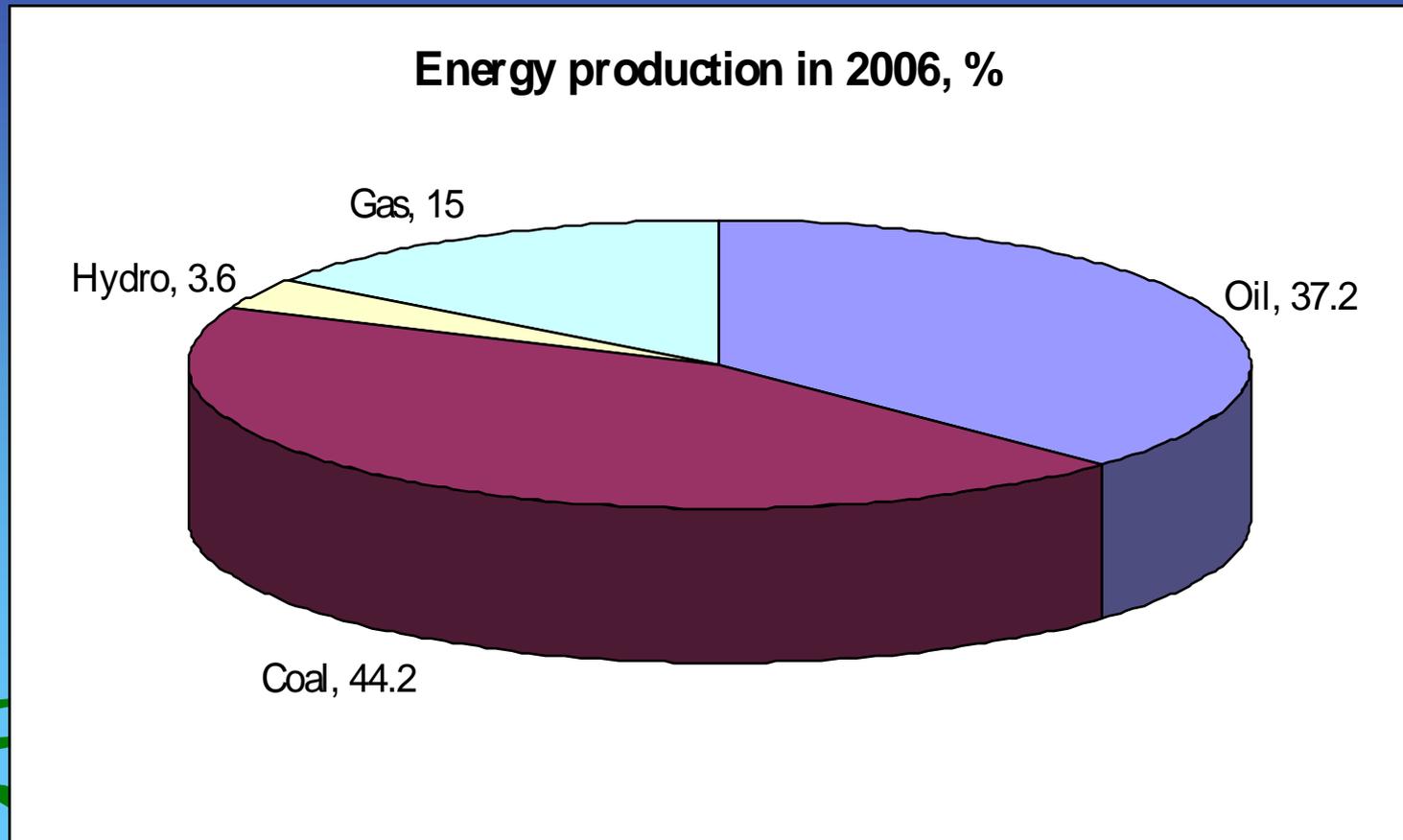
Share of Coal and Mining decrease, but amount raise a lot



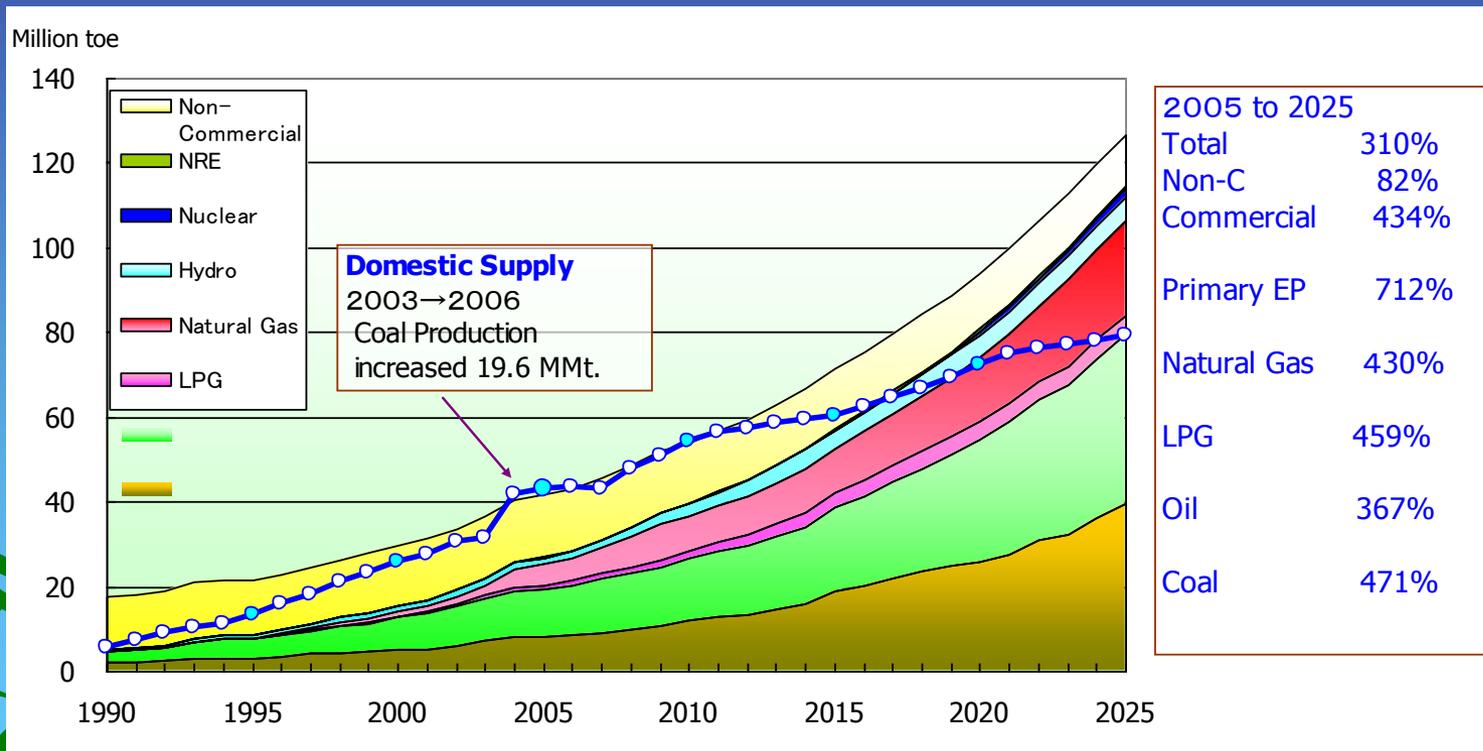
Source: GSO

Energy production,

In 2006: 46.8 mn.toe. Per capita: low at 0.5 toe.



Primary Energy Consumption of Vietnam (Reference Case)

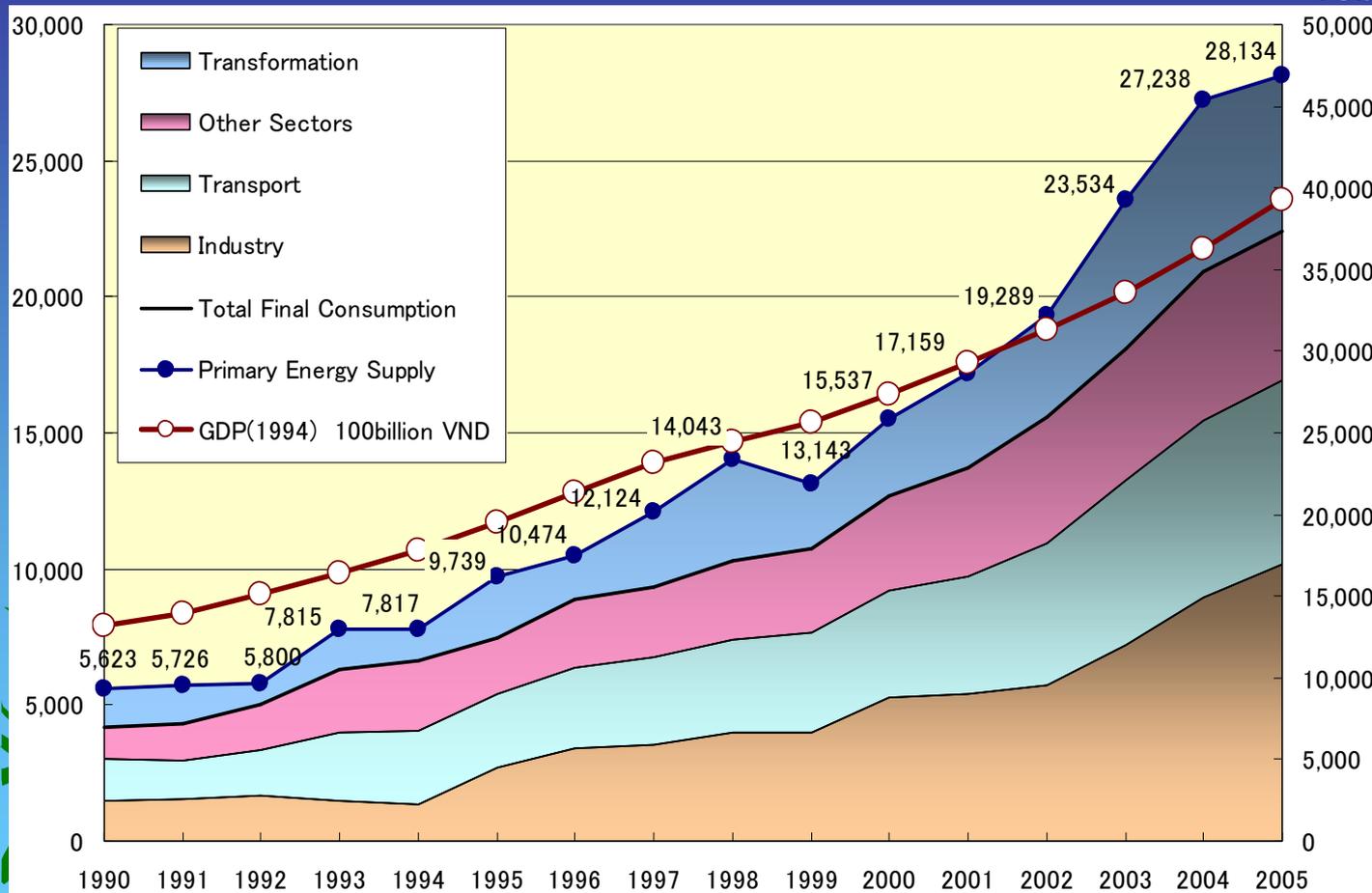


Source: JICA analysis

Economic Development and Trend of Energy Consumption

1,000toe

10bn.VND in 1994 ref.



- ◆ In 1990-2005, growth rate of energy production 14.8%:
- ◆ oil & gas - 16.0%, coal at 14.3%.
- ◆ Energy export increased greatly. VN exported mn.t. of crude oil, coal, but imported petroleum.
- ◆ Net energy export (export - import) in 2005 was 18.2 Mtoe
- ◆ GDP elasticity of the energy production high at 2.0 (e.g.r.7.5%)

Source: JICA analysis

Outlook of energy plan

- VN economy grows 4-5-fold in coming 20 years, so does energy consumption.
- VN has high potential of primary source of energy, like fossil fuel, hydropower, sunlight... VN produces domestic coal, oil & gas, hydro and renewable energies – VN is now self-sufficient and energy exporting nation
- In future, may turn into net energy importing country.
- Worried **factors** are unstable supply of energy, impact on environment, increasing use of energy and materials.
- Aiming at poverty reduction and sustainable socio-economic development, realizing secured supply, optimum distribution and rational utilization of energy are the important policy objectives
- To cope with these issues, construction of energy efficient economy and lower fossil fuel dependent energy structure shall become the fundamental elements of the energy policy.
- It is an urgent issue to establish a comprehensive energy plan, which is positioned above the sectoral development plans aiming at optimal energy distribution with integrated and efficient use. Based on such background, possibility of formulating the **National Energy Master Plan has been discussed in Vietnam**
- Master Plans of Electricity Development and Coal Development are under government approval, but the Plans are being revised now with more reasonable data.
- **Each year VN need more 4000 MW of electricity up to year 2025. Due to that Hydro e. is about at full wing, oil and gas will not last long for ever, so most energy will based on coal for near future.**
- **We at VINACOMIN will focus on coal outlook**

2. Coal production and Vinacomin activity

- ◆ Coal in VN is mined and distributed by Vinacomin
- ◆ VINACOMIN is short for Vietnam National Coal and Mineral Industries Group – State-owned economic multibusiness group of companies.
- ◆ VINACOMIN growing up from coal mining to multibusiness operation:
 - Mineral exploration, exploitation,
 - Thermal power energy development,
 - Explosive production, mine machine manufacturing, ship building and port business, cement production and construction, services for commerce, tourism...
 - **Going to mine bauxite ore of huge reserve in south of Vietnam.**





Big coal resource

- ◆ Anthracite reserve to - 300 m: 4 bn.t.
- ◆ Big resource of sub bituminous in Red River Delta, 250 bn.t., proven 1.5 bn. in 25km².
- ◆ Peat coal in Mekong delta: 10 bn.t., proven 0.2 bn.t.
- ◆ exploited over 160 years (since 1840), most is anthracite in QN coastal area.



Coal Resource Potential, mn.t.

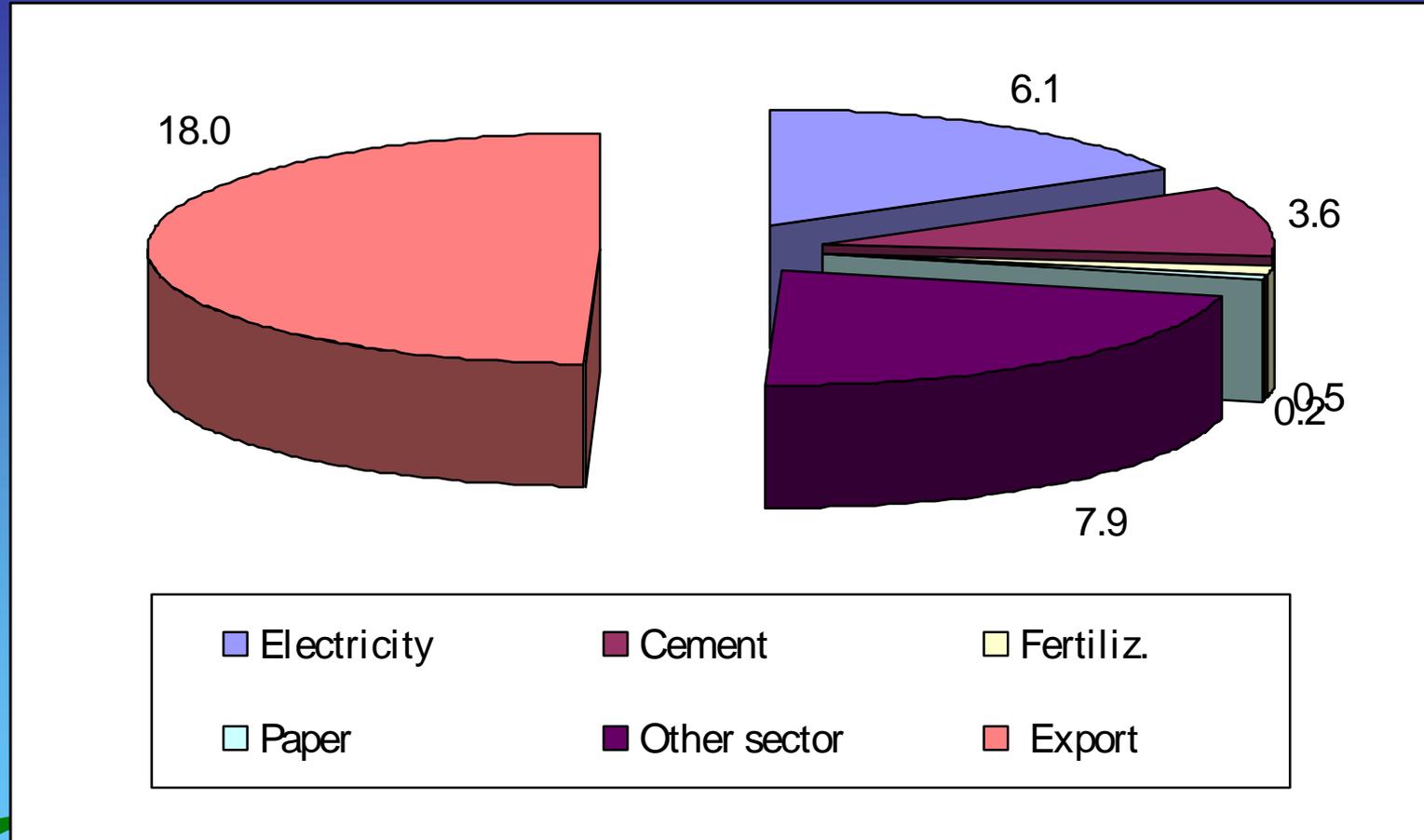
Coal-field	Total	Category A+B	Category C1	Category C2	Category P
Total	6,068.5	370.6	2,157.2	2,464.4	1,076.3
I.Q.Ninh anthracite	4,049.6	315.2	1,401.4	1,768.2	564.8
- C.Pha	1,962.9	260.3	727.6	530.4	444.5
- H.Gai	740.4	37.5	229.7	446.6	26.6
- U.Bi	1,346.3	17.3	444.1	791.2	93.7
II. Inland	2,018.9	55.5	755.8	696.2	511.4
- K.Chau, subbitum	1,581.0	0	524.9	563.6	492.5
- Others	437.9	55.5	230.9	132.6	18.9

A and B categories – equal to Proven reserve;
 C1 category – Probable and Proven reserve and C2 – Estimated resource.
 P category – poorly estimated resource.

So columns of (A+B) and part of C1 can be classified as Proven reserve. Columns of C2 and P can be classified as forecasted resource.

Source: 2006 MP.

3. Coal consumption in 2008, high export rate



Source: Vinacomin statistics,

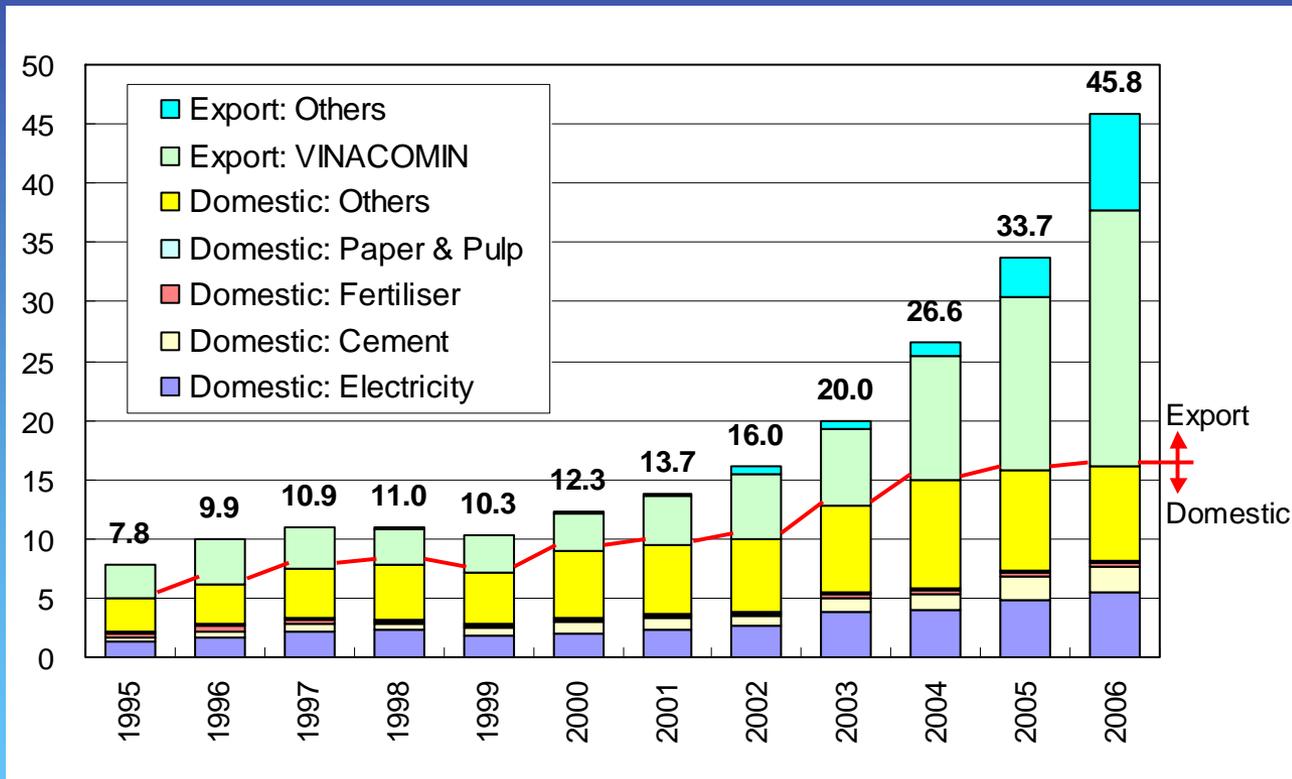
Most coal is used in energy generation (>1345 MWh), in cement industry.

Half exported to over 30 countries, most to Cn (74% or 13.3 mn.t.). 10 triệu tấn than

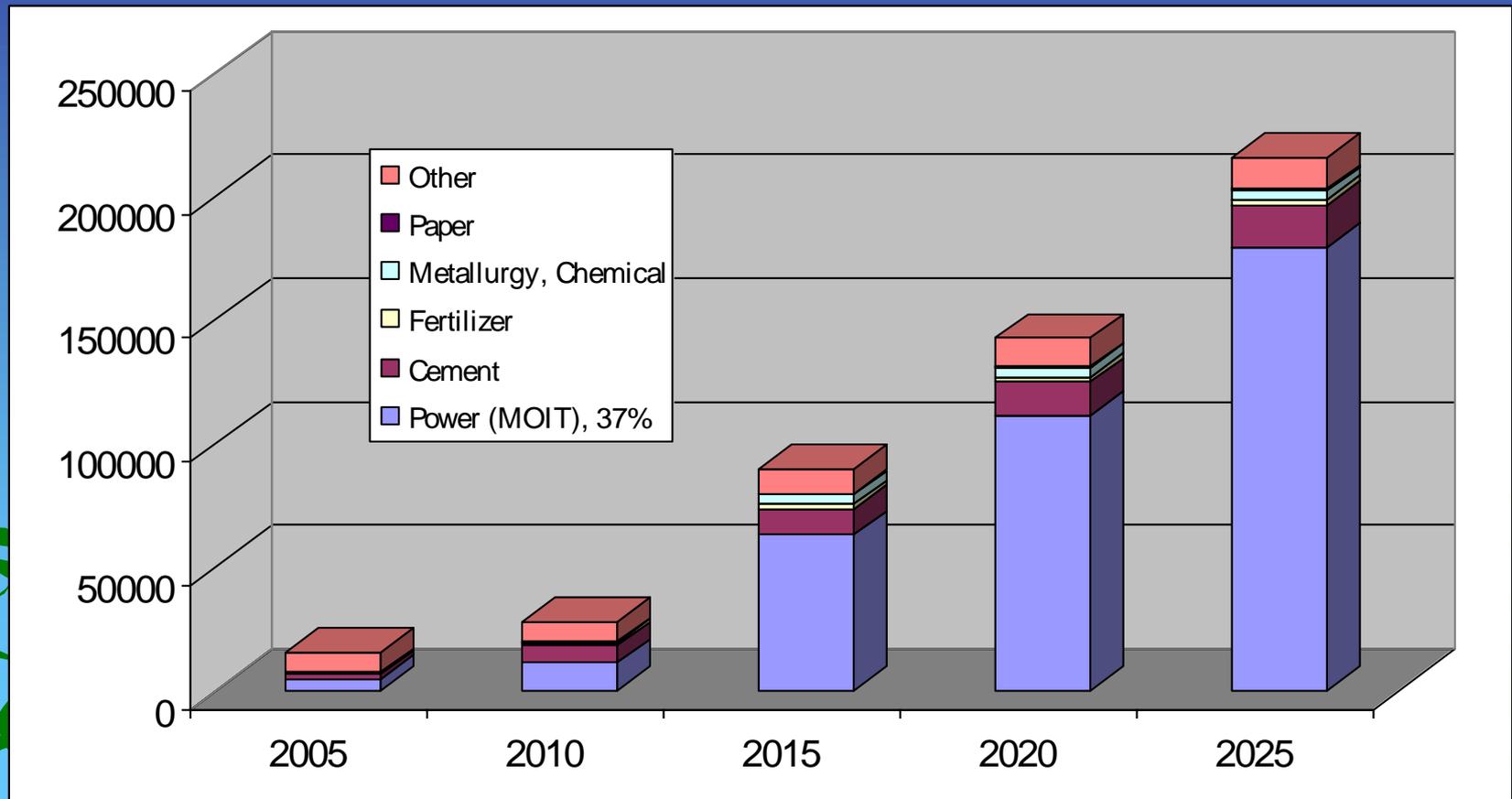
biển nhất là... thiết hai ba... 4.000 tấn... tầng

Coal Demand Trend

increasing export

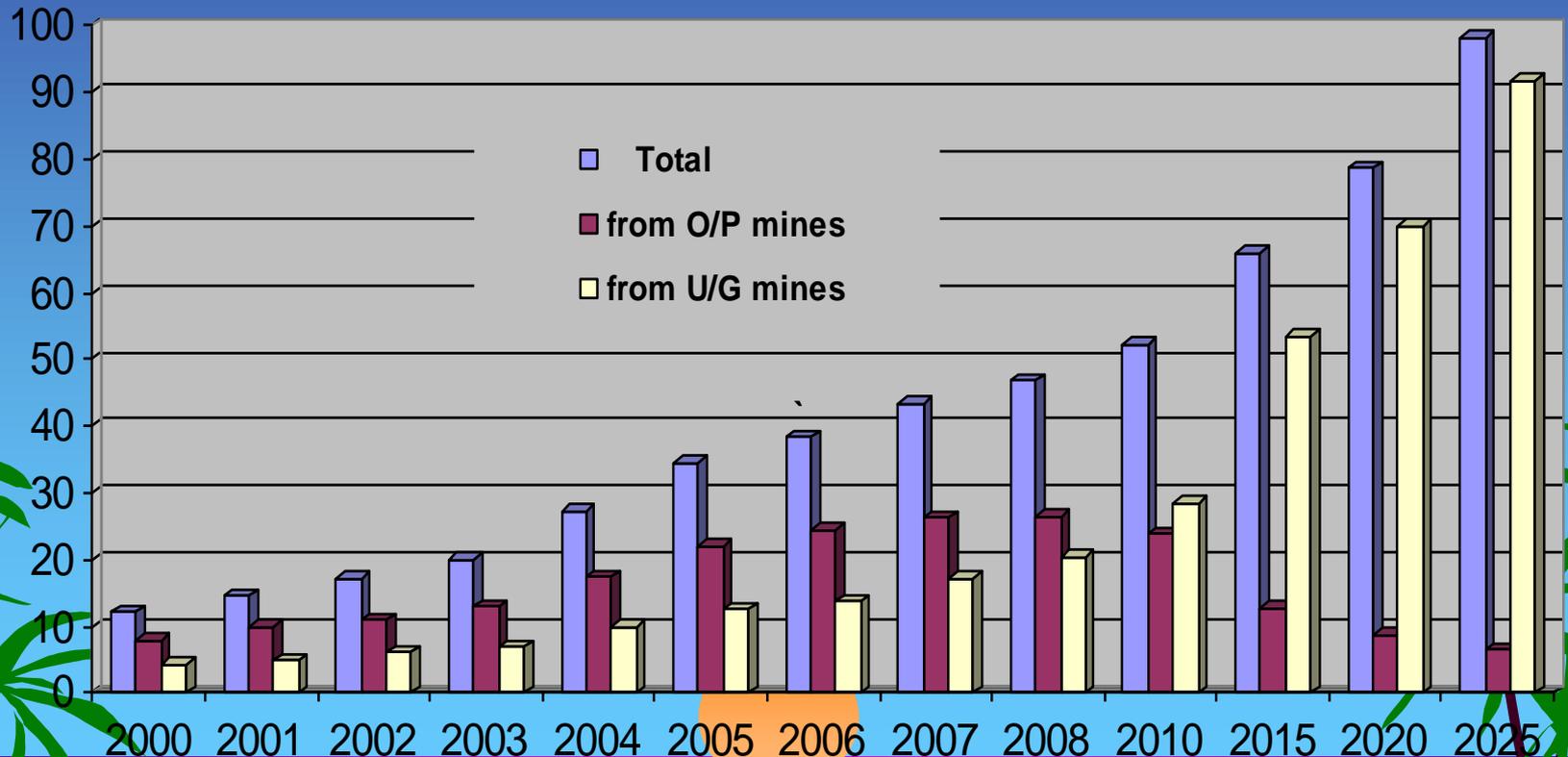


High coal demand by sector, 1000 t. total 20% / y, energy 37%/y.



4. Coal production: Rapid development, mn.t.

- ◆ Over 10 y., great changes in production and business, 18% yearly growth.
- ◆ 2009- 45 mn.t., ev. growth 14%/y., fr. 2000 – 2025.



Master Plan of Coal Development (MPCD)

Base scenario, mn t. of coal

TT	Regions	2009	2010	2015	2020	2025
	Total	48.485	54.435	68.975	83.078	105.420
A	Vinacomin	46.735	52.285	66.025	78.628	98.100
I	Cam Pha region	23.300	26.670	32.660	31.213	29.200
II	Hon Gai region	11.985	11.800	10.700	11.350	12.600
III	Uong Bi region	10.050	12.400	20.050	26.450	40.250
IV	Other inland areas	1.400	1.415	2.615	2.615	2.550
V	Red River Delta (est)				7.000	13.500
B	Outside Vinacomin	1.750	2.150	2.950	4.450	7.320

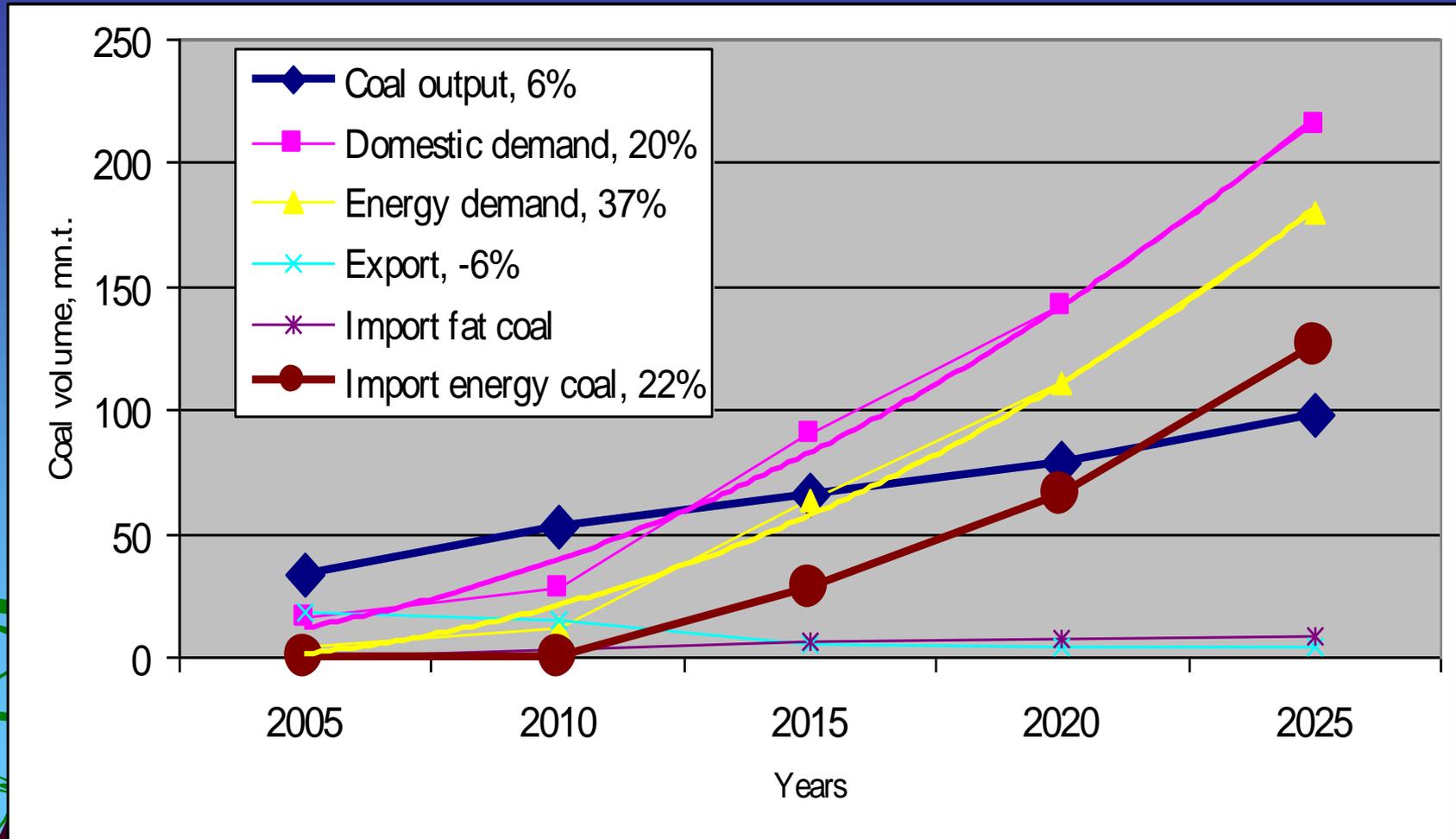
Energy Coal supply and demand balance, mn.t.

Years	2009	2010	2015	2020	2025
1.Total coal demand	22.067	28.017	90.034	142.659	215.756
Demand for power	7.245	11.389	63.225	111.424	179.450
2.Total coal supply	43.000	48.000	60.000	70.000	84.000
Supply for Power	7.500	13.587	34.720	45.173	53.378
3.Import coal for power			28.505	66.254	126.070

Source: Ministry of Industry and Trade

Excluding coal of Red River Delta

Coal demand and supply balance



2013 - Turning point, demand excess supply, have to import coal for power gen., with big volume after 2020

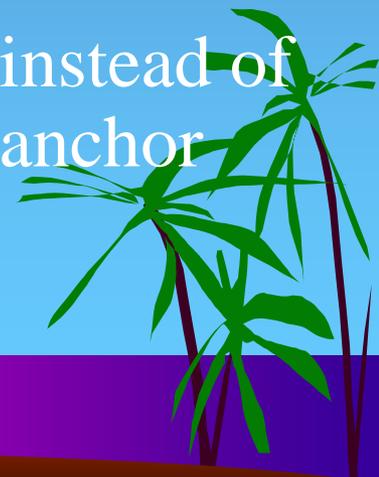
5. Strategy of coal development

- ◆ Moving forward to prosperity from mineral and human resources
- ◆ Sustainable Developing in harmony and friendliness with environment, local community, with partners and customers, and among the Group.



Strategy of coal development, c.

- ◆ 7/08, Government appr. The Strategy of VN Coal Development to 2015 and overlook to 2025:
- ◆ In 2010-2015: clearly estimate reserve below -300m in Northeast and Red River Delta, and 1st mine in RRD should be put in operation,
- ◆ Focus on environment protection, all mining activities must satisfy environment standards before 2020, stop pollute in 2010, allocate 1% of total cost.
- ◆ Applying new material, hydraulic support instead of wood and metal in stopes, resin bolts and anchor supports on roadways and drifts.



Strategy of coal development, c.

- ◆ Technology innovation: mechanization and automation, high efficiency, safety ensuring and environment protection
- ◆ Full mechanized complex (shearer, scraper, roof supports), driving machines, big excavators and trucks, reduce truck coal trans. on national roads.
- ◆ Enhancement of Mine Rescue Center to reduce accidents and losses.
- ◆ Coal industry should transform to work on market mechanism, coal price will be marketable, integrated into world market. Govrn. manages coal price by tax and laws.



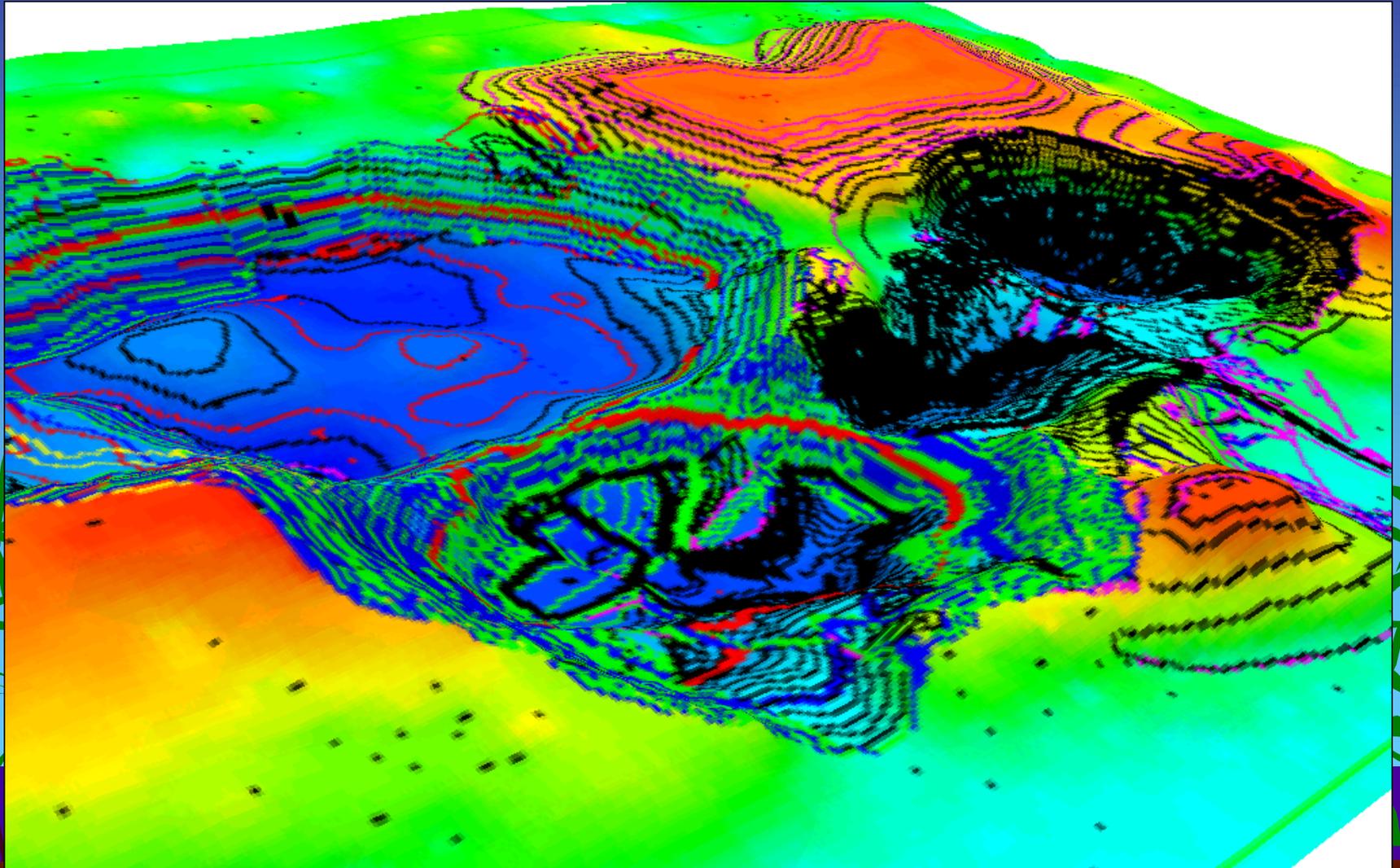
Coal Development at present

- ♦ Jointly producing self-advance power roof support, applying hydraulic support, coal cutter-loader (Khecham, Duonghuy, Vangdanh), TBM at roadways (16 u. AM50-100),
- ♦ In pits (Caoson, Cocsau, Hatu...): Appl. high capacity excavation, CAT96t, excavator 12 m³, ploughing tractors, integrated transport of truck-belt conveyor
- ♦ Improvement of coal transport road system, ports, washing plants
Constr. new ship building factory in Cailan, tube conveyor system from Maokhe mine to port Bencan
- ♦ Planning mines, focusing on Raising output of existing mines, prolong lifetime of pits while constructing new mines (list of 60 mines, 15 new, 5 new in nx y.).
- ♦ Promoting designing Binhminh, Khoaichau mines in RRD by tradit. and gasification methods (UCG).
- ♦ Promotion of CCT, EEC, Environment, R&D, international coop...



Deep pit mining

Deepening, joining and enlarging existing pits, which are at designed limits. Campha region with 4 pits redesigned to the depth of -350m, and new 4 underground mines Khecham 1-4 at close dist.



- Building power plants of CFBC, burning low calorie coal. 2 coal-fired power plants (Na Duong, Caongan of 100 MW each) are working well and new plants (Campha-600MW, Maokhe-440,Sondong-220 MW...) under completion.



Plan of coal-fired projects

Plant	Ins.Cap., MW	Employer	Plant	Ins.Cap., MW	Employer
Total by MPED6	120235	All			
Actual	1345		Mông Duong I#2	500	EVN
New-built in 2007-2015	25890		Mông Duong II#2	600	ASE
Cao Ngạn	100	VINACOMIN	Vĩnh Tân I#2	600	EVN
Uông Bí MR#1	300	EVN	Son Mỹ #1	600	BOO
Son động	220	VINACOMIN	Trà Vinh I#1	600	EVN
Hải Phòng 1#1	300	JSC	Nghi Sơn II#1	600	BOT
Cẩm Phả 1	300	VINACOMIN	Nghi Sơn II#2	600	BOT
Hải Phòng 1#2	300	JSC	Vũng Áng II#1,2	1200	JSC
Quảng Ninh 1#1,2	600	JSC	Son Mỹ #2	600	BOO
Hải Phòng II#1	300	JSC	Trà Vinh I#2	600	EVN
Mạo Khê #1	220	VINACOMIN	Vĩnh Tân II#1	600	EVN
Nông Sơn	30	VINACOMIN	Sóc Trăng I#1	600	EVN
Quảng Ninh II#1	300	JSC	Kiên Giang I#1	600	BOO
Hải Phòng II#2	300	JSC	Vĩnh Tân II#2	600	EVN
Cẩm Phả II	300	VINACOMIN	Son Mỹ #3	600	BOO
Vũng Áng 1#1	600	LILAMA	Sóc Trăng I#2	600	EVN
Mạo Khê #2	220	VINACOMIN	Trà Vinh II#1	600	EVN
Uông Bí MR#2	300	EVN	Kiên Giang I#2	600	BOO
Mông Duong I#1	500	EVN	Hải Phòng III#1,2	1200	EVN
Mông Duong II#1	600	ASE	Vĩnh Tân III#1	1000	EVN
Quảng Ninh II#2	300	JSC	Trà Vinh II#1	600	EVN
Vũng Áng 1#2	600	LILAMA	Kiên Giang II#1	600	BOO/BOT
Thăng Long	300	JSC	Sóc Trăng II#1, 2	1200	BOO/BOT
Nghi Sơn I#1	300	EVN	Son Mỹ #4	600	BOO
Vĩnh Tân I#1	600	VINACOMIN	Hải Phòng III#3, 4	1200	EVN
Nghi Sơn I#2	300	EVN	New-built in 2015-2025	93000	All

Challenges for coal development

- ♦ Poor planning, unrealistic high demand (for energy)
- ♦ Present export < future import (1t = 0.2 t)
- ♦ Import coal – not easy, no contract yet.
- ♦ Inefficient energy utilization
- ♦ Price not commercial, subsidy, illegal smuggling
- ♦ Low percentage of proven and mineable reserve (15%?).
- ♦ Difficult geological and mining condition, in. mechanization c.
- ♦ High coal loss (30% in pit, 70 % ug?) due to technology, geology.
- ♦ Lack of land areas for spoil heap
- ♦ High environment pollution in mining and using (Land, water, air pol., landscape, slide, dust, noise...)
- ♦ Low satisfaction of logistic and coal transport system, bad road, small port, lots of crossings, lack of railway.
- ♦ High rate of accident.
- ♦ Slow construction of new projects
- ♦ Backward and shortage of modern technology and management

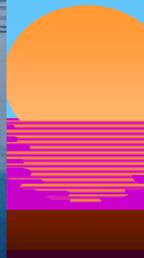


Conclusion

- ◆ VN has high potential source of primary energy, like fossil fuel, hydropower, sunlight... VN produces domestic coal, oil & gas, hydro and renewable energies – VN is now self-sufficient and energy exporting nation.
- ◆ Hydropower is about at full wing, oil&gas will not last long, so most energy will rely on coal for near future.
- ◆ In future, may turn into net energy importing country
- ◆ The targets of the energy policy: Reasonable and effective exploitation and use of domestic energy resources; Supplying sufficient energy with high quality, reasonable prices; Ensuring national energy security; Diversification of investment and business forms in energy field, establishment of competitive energy market; Development of new resource of energy, inc. renewable and nuclear energy; Fast, effective and sustainable development of energy sector in combination with environmental protection”



Halong bay, UN recognized world natural heritage most active coal mining location in VN



Thank you for your attention

