

Proposed concepts of electric power grid in North-East Asia

Viktor N. MINAKOV

RAO “UES of Russia”

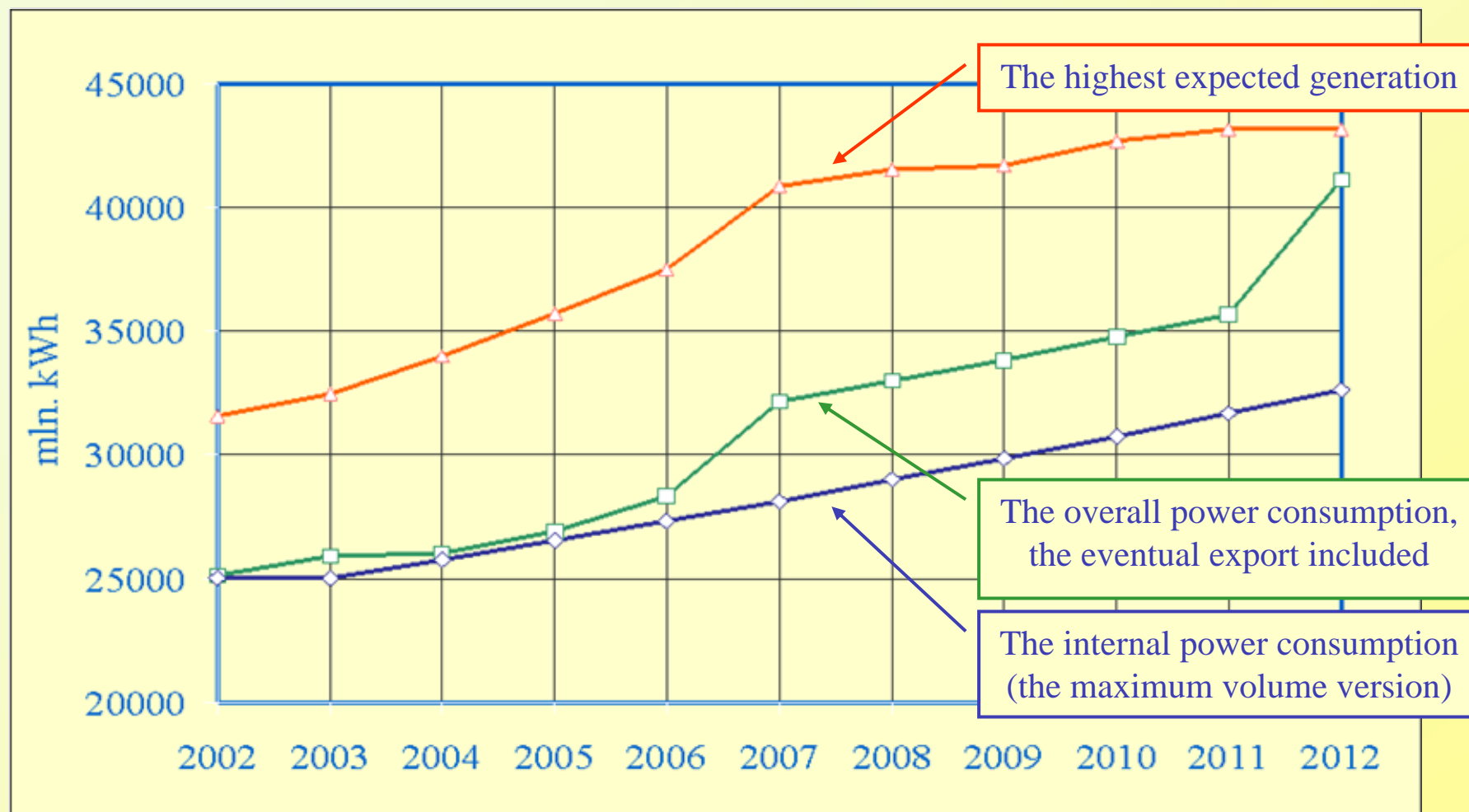
Representation “VOSTOKENERGO”

General Director

The Unified Energy System of the Russian Far East (basic parameters)

| | Power production (mln. kWh) | Installed capacity (MW) | The length of PTL 500 kV (km) |
|----------------------|-----------------------------------|-------------------------------|-------------------------------------|
| 2003 г. | 26 000 | 7 270 | 1 800 |
| 2007 г. (project) | 31 080 | 9 100 | 2 800 |

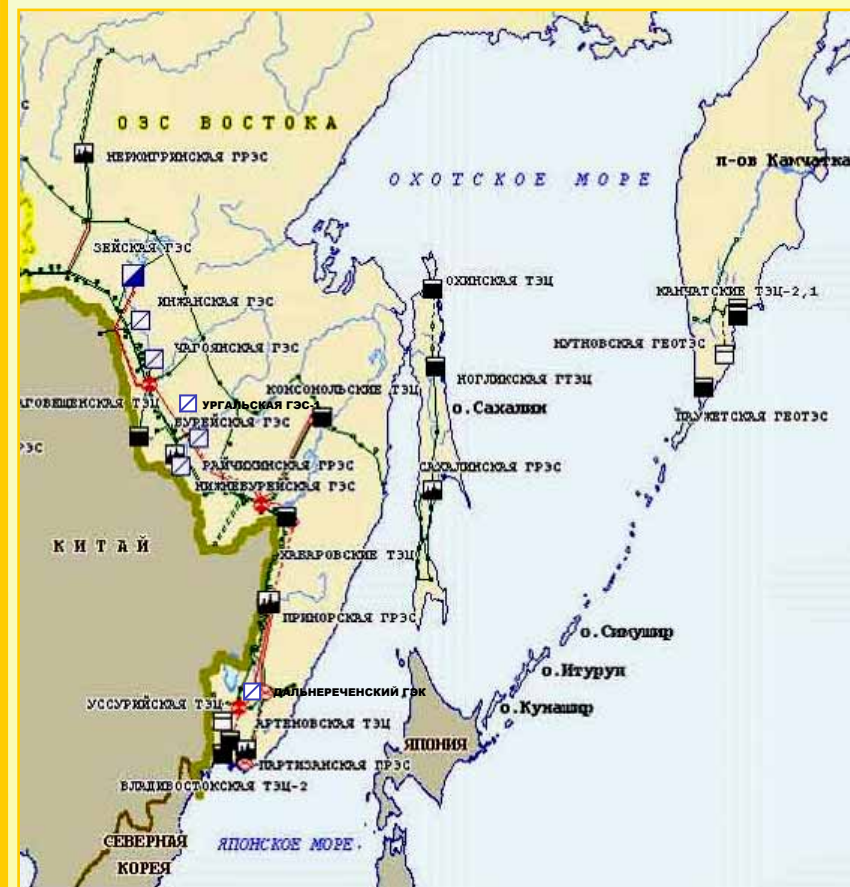
The estimate of the generation and consumption dynamics of the electric power in the Unified Energy System of the East for the 2002 – 2012



The power generation potential ensures the growth of both the internal consumption and the export deliveries until 2012

The hydro energy potential of the Russian Far East

| HPS | River | Install. cap. MW | Power product. Mln kWh |
|-------------------------------------|------------------|------------------------|------------------------------|
| Nizhne-Bureyskaya | Bureya | 321 | 1650 |
| Cascade of Nizhnezeiskaya HPPs | Zeya | 349 | 2120 |
| 1. Inzhanskaya | | 126 | 700 |
| 2. Chagoyanskaya | | 126 | 720 |
| 3. Gramatukhinskaya | | 97 | 700 |
| Urgalskaya HPP-1 | Niman | 600 | 1800 |
| Dal'nerechenskii hydropower complex | Bolshaya Ussurka | 595 | 1400 |
| 1 st - HPP-1 | | 250 | 540 |
| Total on south RFE | | 1520 | 6110 |



ALTERNATIVES:

APS



- The KEDO program has been suspended in the end of 2003
- The commissioning by the DPRK of its own APS does solve the problem (P=5 MW)

HPS



Reconstruction or equipment replacement required

TPS



Substantial funds are needed to modernize the facilities and purchase fuel

PTL



The Russia – DPRK intercountry 500 kV transmission line construction to import electric power from Russia

PROJECT PARAMETERS:

| | | |
|---|------------|-----------|
| The power volume to be transmitted | (mln. kWh) | 1500-2500 |
| The load to be transmitted | (MW) | 300-500 |
| Frequency | (Hz) | 50 |
| Voltage | (kV) | 220/500 |
| The length of the Russian territory portion of the line | (km) | 250 |
| The length of the DPRK territory portion of the line | (km) | 130 |
| The cost of construction | (mln. USD) | 160-180 |
| The period of construction | (years) | 3-4 |
| The period of the investments repayment | (years) | 8-10 |

The project development perspectives

The Russia – DPRK
500 kV transmission
line construction

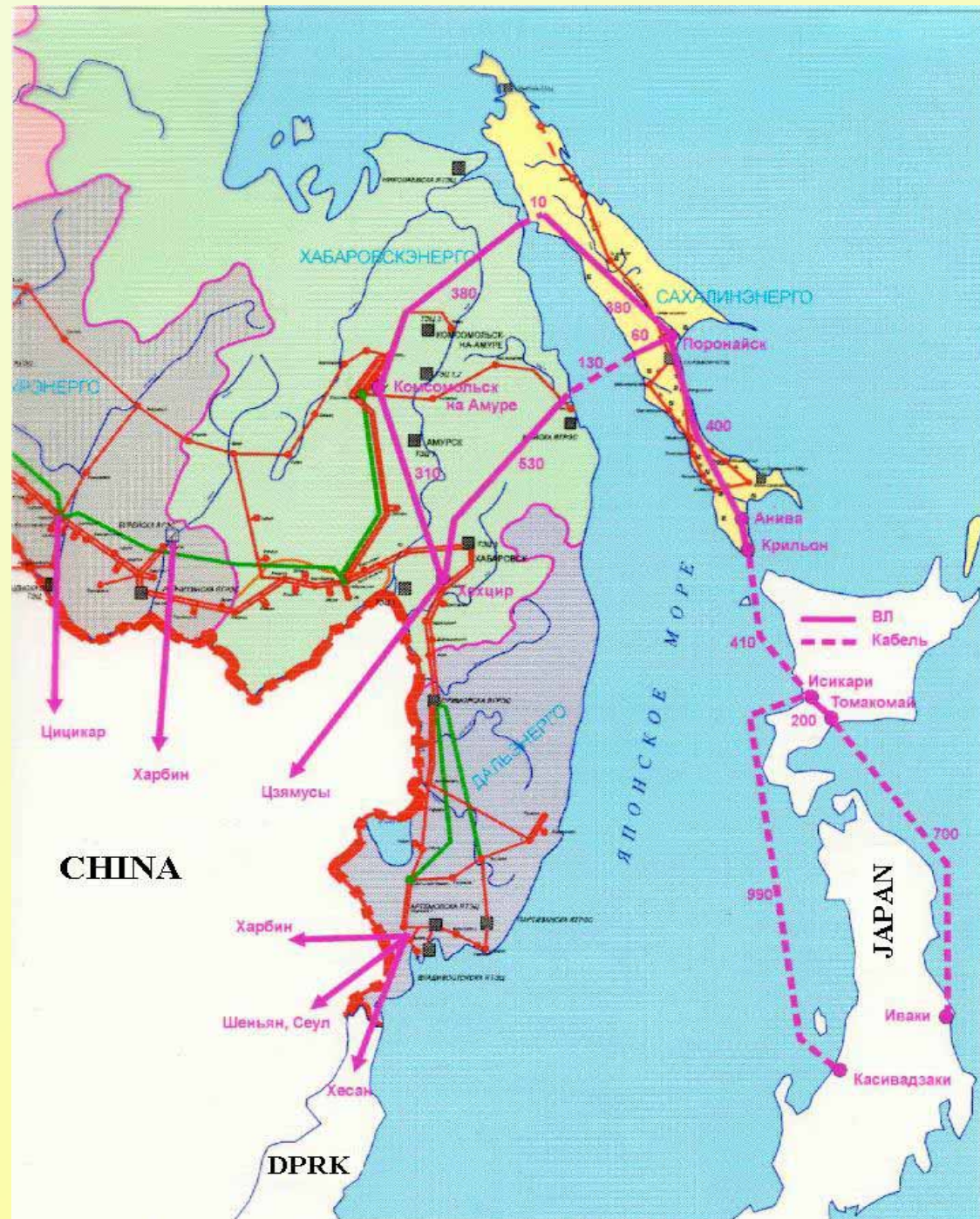
The transmission line
extension to the border
with the Republic of
Korea and on
(900 km, ± 500 -600 kV)



***THE MOST PERSPECTIVE POWER RESOURCES AND
HYDROELECTRIC COMPLEX***

| HPS Name | River | Install. cap. MW | Power product. Mln kWh | Estimated time of commissioning |
|--|------------------|-----------------------------|---------------------------------------|--|
| Tugurskaya tidal power station | Tugur Bay | 6 800 | 16 200 | to be confirm |
| Sredne- Uchurskaya HPS with counter- regulation | Uchur | 3 700 | 17 200 | to be confirm |
| Ijekskaya and Tipton HPS | Tipton | 1 300 | 6 250 | to be confirm |
| Total | | 13 000 | 42 250 | |

Perspective International Linkages in the Russian Far East



THANKS A LOT
for your attention



**RAO “UES of Russia” Representation
“VOSTOKENERGO”**

**✉ 38, Muravyeva-Amursky St.,
Khabarovsk, 680030, Russia**

fax: (7- 4212) 21-35-28

E-mail: v.min@vostok.elektra.ru