Long-term Generation And Transmission Expansion Plan
Software used
Georgia

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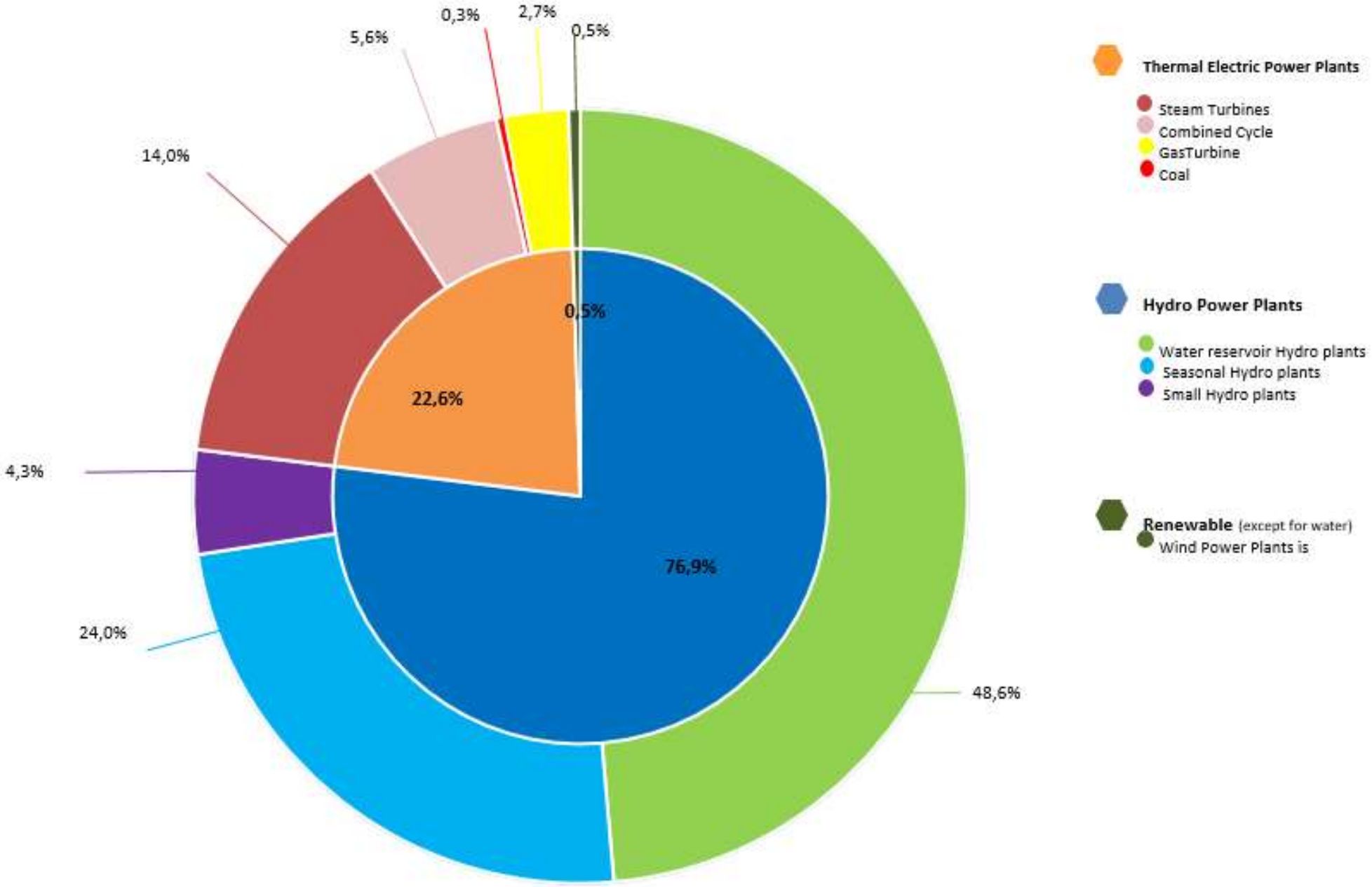
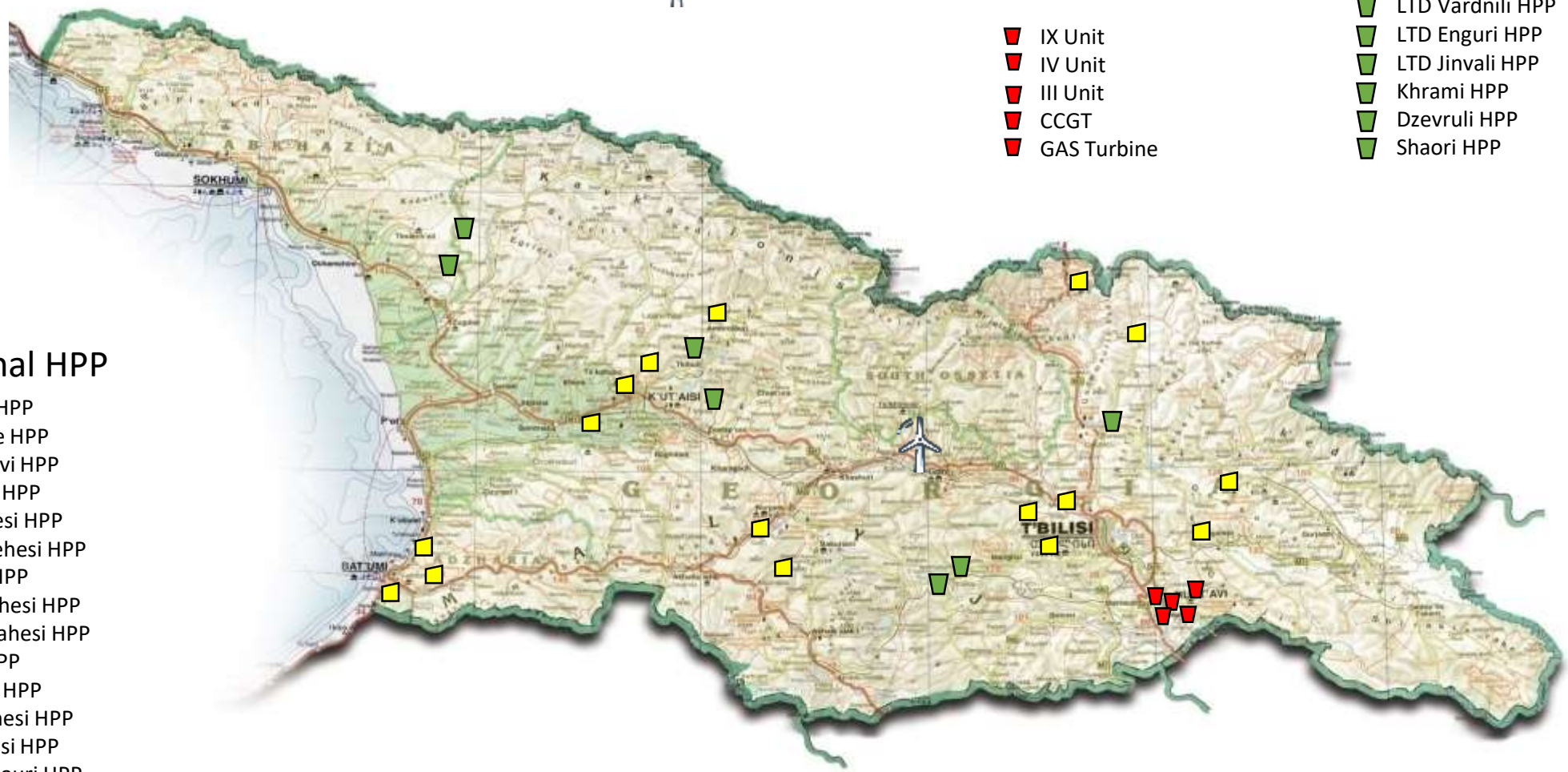
Georgian Power System Structure



Generatioin Cpacities' location



Wind PP

Thermal PP

- IX Unit
- IV Unit
- III Unit
- CCGT
- GAS Turbine

Regulating HPP

- LTD Vardnili HPP
- LTD Enguri HPP
- LTD Jinvali HPP
- Khrami HPP
- Dzevruli HPP
- Shaori HPP

Seasonal HPP

- Khadori HPP
- Vartsikhe HPP
- Chitakhevi HPP
- Rionhesi HPP
- Gumathesi HPP
- Satkhenehesi HPP
- Atshesi HPP
- Ladjanurhesi HPP
- Ortachalahesi HPP
- Zahesi HPP
- Larsihesi HPP
- Faravanhesi HPP
- Darialihesi HPP
- Khelvachauri HPP
- Shuakhevihesi HPP
- Kirnatihesi HPP

Tools We Use

Valoragua-Optimization of operation of a hydro thermal power system

PSS/E - transmission planning and analysis

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Programs

WASP IV – least cost Generation Expansion plan

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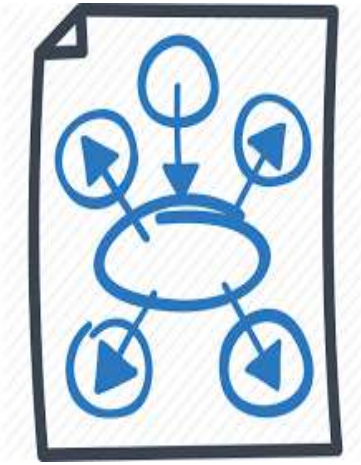
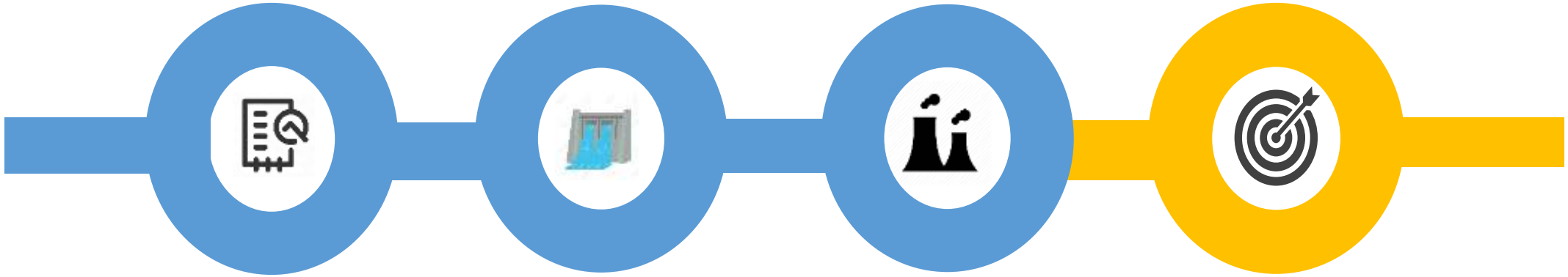


How We Use Tools



TYNDP

Take into account ten years network development plan

Valoragua

Get results from Valoragua about inflow energy, min. generation, avg. capacity

Project(s) CBA

Wasp IV + PSS/E

Put Valoragua results into WASP IV. Analyze transmission network using PSS/E

Results

Take result to create report

TYNDP

Challanges

- Demand Growth And Forecast
- Difference market structure between neighboring countries
- Hydrological Conditions variability and Forecast low accuracy
- Balancing Market
- Low Reserve Margin Generation Unit size
- Long-Term Liability (PPA, TDA, etc)

Studies' Description

Scenario I

- ✓ 2 % growth of Peak Load ;
- ✓ Input is from TYNDP;
- ✓ Mathematical optimal solution is taken

Scenario II

- ✓ 4 % growth of Peak Load ;
- ✓ Input is from TYNDP
- ✓ Gas import is limited
- ✓ 3 HSTO is constructed as soon as possible

Scenario III

- ✓ 4 % growth of Peak Load ;
- ✓ Input is from TYNDP
- ✓ Gas import is limited
- ✓ 3 HSTO is constructed by program suggestion
- ✓ High penetration of Wind (2050 MW in 2046) and Solar (1500 MW in 2046)

*HSTO – Hydro Storage Power Plant

Results For Decision Makers

WASP IV is based on least cost generation planning program and in some scenario we consider (Gas limitation, “forcing” Software to construct hydro, etc.) constraints to get more realistic results for Georgia.

Component	2 % Growth	4% Growth	High penetration of VRE (4 % Growth)
LOLP	0 – 0,132	0 -0,45	0 – 0,58
System Cost (K$)	X	1,722 X	1,525 X
Energy not served (Million $)	0,9	55,8	54,4
	Scenario 1	Scenario 2	Scenario 3

*LOLP – Lost Of Load Probability

Thank you for your Attention