Table 1. Main critical network elements

Critical network element or general constraing (*)	EIC Critical network element	Element type	Voltage level [kV]	EIC Control area 1 where the critical network element is located	EIC Control area 2 where the critical network element is located	Bidding Zone Border (and direction) for which critical network element is relevant	Increase of Cross zonal capacity (per Bidding Zone Border, or Comment on the total import/export capability) when relieving critical network element (or general constraint) [MW]
500 kV OHL Enguri-Zestaponi	N/A	Branch	500	N/A	N/A	Connection of West-East parts of Georgian system	1200
500 kV OHL Enguri-Centralnaya	N/A	Branch	500	N/A	N/A	Georgia-Russia	700
220 kV OHL Gardabani CCGT 2 - Alaverdi 2	N/A	Branch	220	N/A	N/A	Georgia-Armenia	550
500 kV OHL Gardabani-Samukh	N/A	Branch	500	N/A	N/A	Georgia-Azerbaijan	400
400 kV OHL Akhaltsikhe-Borchkha	N/A	Branch	400	N/A	N/A	Georgia-Turkey	700

Table 2. Possible measures to increase Cross zonal capacity

Measure	Bidding Zone Border and direction	Estimated increase of cross zonal capacity [MW]	Estimated costs [EUR]	Comment
Construction of 500 kV OHL Jvari-Tskaltubo-Akhaltsikhe	Connection of West-East parts of Georgian system	1200 *	52 000 000	Completion date - 2024
Rehabilitation of 500 kV OHL Enguri-Zestaponi			30 400 000	Completion date - 2025
Construction of 500 kV OHL Stepantsminda-Mozdok (till the border to Russia)	Georgia-Russia (export-import)	700 **	5 230 000	Completion date - 2025
Construction of 500 kV OHL Marneuli-Ayrum (till the border to Armenia)	Georgia-Armenia (export-import)	550 ***	8 298 000	Completion date - 2023
Installation of 2-circuit 330 kV OHL Gardabani-Agstafa (till the border to Azerbaijan)	Georgia-Azerbaijan (export-import)	400****	9 144 000	Completion date - 2021
Installation of of 400 kV OHL Akhaltsikhe-Tortum (till the border to Turkey)	Georgia-Turkey (export-import)	350*****	9 100 000	Completion date - 2024
Construction of 154 kV OHL Batumi-Muratli (till the border to Turkey)	Georgia-Turkey (export-import)	350*****	2 200 000	Completion date - 2030

Notes:

All the projects are included in TYNDP of Georgia for 2021-2031 (to be approved by the end of 2021), decision on their implementation is already made and investments on several of them are already allocated, for rest of them - will be allocated in near future. Investments as well as completion dates are estimated ones (based on actual progress of the project) and they mean end of respective years.
* Enguri-Zestaponi line is the most important operating line in Georgian electricity transmission system, having influence on whole system stability. In high demand scenarios, it transfers near 800 MW capacity from west to east Georgia. There is no paraller (back-up) 500 kV line, so it's s outage, in case of incorrect operation of RAS, may result in system blackout. Enguri-Zestaponi line will have full back-up after comissioning of 500 kV backbone Jvari-Tskaltubo-Akhaltsikhe. Accodring to TYNDP, next stage is the rehabilitation of 500 kV OHL Enguri-Zestaponi ensuring back-up for Jvari-Tskaltubo-Akhaltsikhe and creating 2000 MW estimated transfer capability between west and east parts of the system in compliance of N-1 criteria. So, increase of cross zonal capacity inside Georgian power system in N-1 case will be 1200 MW. in N case (normal topology), cross zonal capacity increase will be 2000 MW.
** 500 kV Stepantsminda-Mozdok line will increase cross zonal capacity in N case up to 1000 MW. In N-1, backing-up existing 500 kV OHL Kavkasioni (with transfer capacity of 300 MW), cross zonal capacity increase is about 700 MW.
*** 500 kV OHL Marneuli-Ayrum line will be connected to back-to-back station in Ayrum substation (Armenia) and hence trasnfer capacity increase is based on installed capacity of Ayrum HVDC station, will consist of 2 x 350 MW (700 MW in total). Transfer capacity of existing 220 kV OHL Gardabani CCGT 2 - Alaverdi 2 is about 150 MW. So, cross zonal capacity will be increased by 550 MW in N-1 and 700 MW in N scenario.
**** This capacity is based on the installed capacity of second 330/220 kV 400 MVA AT (to be installed in SS Gardabani in parallel of construction of this line) from which these new lines will go to the substations of Azerbaijan power system.
***** These capacities are based on the installed capacity of HVDC units, which these new lines will go to the substations of Turkish power system from - Third HVDC back-to-back unit (350 MW) will be installed in SS Akhaltsikhe and new HVDC converter station in SS Batumi (350 MW) will be constructed. Transfer capability of currently existing 400 kV OHL Akhaltsikhe-Borchka is 700 MW (based on installed capacity of 2 x 350 MW HVDC back-to-back unit). In N case, cross zonal capacity will be 1400 MW, so increase 700 MW. In N-1, backing-up existing 400 kV OHL Akhaltsikhe-Borchkha, in case of its outage, 400 kV OHL Akhaltsikhe-Tortum and 154 kV OHL Batumi-Muratli will transfer up to 1400 MW so cross zonal capacity in N-1 will be increased by 700 MW.