ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΠΕΡΙΦΕΡΕΙΑ ΑΤΤΙΚΗΣ
ΠΕΡΙΦΕΡΕΙΑΚΟ ΣΥΜΒΟΥΛΙΟ
Γραφείο Προέδρου
Ταχ.Δ/νση : Λεωφ. Συγγρού 80-88
Ταχ. Κωδ. : 117 41 Αθήνα
Τηλ.: 213-2065244, 238, 518
e-mail : ssona@patt.gov.gr

Συνεδρίαση 15η

ΑΠΟΦΑΣΗ υπ' αριθμ. 134/2024

Σήμερα 26/6/2024, ημέρα Τετάρτη και ώρα 15:00, συνήλθαν σε τακτική συνεδρίαση τα μέλη του Περιφερειακού Συμβουλίου της Περιφέρειας Αττικής. Η συνεδρίαση πραγματοποιήθηκε δια ζώσης στην αίθουσα εκδηλώσεων "Μάριος Δημήτριος Σουλούκος" στο Δημαρχείο Αχαρνών (*Ταχ. Δ/νση: Φιλαδέλφειας 87 & Μπόσδα, Αχαρνές*), κατά τις προβλέψεις των διατάξεων της παρ. 1 του άρθρου 167 του Ν. 3852/2010 (*ΦΕΚ 87/τ. Α'/07-6-2010*), όπως ισχύει, κατόπιν της i) υπ' αριθμ. πρωτ. 751228/20-6-2024 πρόσκλησης του Προέδρου κ. Βασίλειου Καπερνάρου, ii) της υπ' αριθμ. πρωτ. 757059/21-6-2024 ορθής επανάληψής της και iii) της υπ' αριθμ. πρωτ. 756124/21-6-2024 συμπλήρωσης αυτής, που κοινοποιήθηκαν νόμιμα, στις 20/6/2024 και στις 21/6/2024 αντίστοιχα στον Περιφερειάρχη Αττικής, σε καθένα από τους Αντιπεριφερειάρχες καθώς και σε καθένα από τους Περιφερειακούς Συμβούλους.

Θέμα 20ο Η.Δ.

Γνωμοδότηση επί της Στρατηγικής Μελέτης Περιβαλλοντικών Επιπτώσεων (Σ.Μ.Π.Ε.) του σχεδίου επικαιροποιημένης στρατηγικής για τη διαχείριση των εξαντλημένων πυρηνικών καυσίμων και των ραδιενεργών αποβλήτων της Βουλγαρίας.

Διαπιστώθηκε η απαρτία, κατά την έναρξη της συνεδρίασης, με σύνολο εβδομήντα πέντε (75) παρόντων επί συνόλου ογδόντα πέντε (85) Περιφερειακών Συμβούλων, σύμφωνα με την υπ' αριθμ. 447/2023 απόφαση του Πολυμελούς Πρωτοδικείου Αθηνών, με την οποία επικυρώθηκε το αποτέλεσμα των εκλογών της 8ης Οκτωβρίου 2023 για την Περιφέρεια Αττικής και ανακηρύχθηκε ο επιτυχών και οι επιλαχόντες συνδυασμοί, ο Περιφερειάρχης και οι τακτικοί και αναπληρωματικοί περιφερειακοί σύμβουλοι κάθε συνδυασμού για την περιφερειακή περίοδο από 01-01- 2024 έως 31-12-2028, όπως αυτή διορθώθηκε με την υπ' αριθμ. 538/2023 όμοια και τροποποιήθηκε με την υπ'αριθμ. 186/2024 απόφαση του Διοικητικού Εφετείου Αθηνών.

Οι παρόντες και οι απόντες στη συζήτηση του συγκεκριμένου θέματος έχουν ως εξής:

Παρόντες:
Ο Περιφερειάρχης Αττικής κ. Χαρδαλιάς Νικόλαος
Τα μέλη του Περιφερειακού Συμβουλίου Αττικής:

Ο Αντιπρόεδρος κ. Κάβουρας Κωνσταντίνος
Ο Γραμματέας κ. Μπενετάτος Στυλιανός

Η Αναπληρώτρια Περιφερειάρχης κ. Κεφαλογιάννη Χριστίνα

Οι Χωρικοί Αντιπεριφερειάρχες Αττικής κ.κ.: Αντωνάκου Σταυρούλα, Βαρελάς Κλεάνθης, Βουτσινάς Ιωάννης, Ζώμπος Κωνσταντίνος, Καβαλλάρη Βασιλική (Βίκυ), Κεφαλογιάννη Λουκία, Λώλος Βασίλειος.

Οι Θεματικοί Αντιπεριφερειάρχες Αττικής κ.κ.: Αγγελάκη Δήμητρα, Ασκητής Αθανάσιος (Θάνος), Αυγερινός Αθανάσιος (Θανάσης), Γιακουμάτου Ευαγγελία (Εβίνα), Κοσμόπουλος Ελευθέριος, Μανωλάκος Λεωνίδας, Μιλλούση Βασιλική (Βίκυ), Πρεζεράκου Ευριδίκη (Έρρικα), Σιάτρας Χαράλαμπος (Μπάμπης), Τουμαζάτου Μαριάννα.

Οι Περιφερειακοί Σύμβουλοι κ.κ.:
Αβραμίδης Γαβριήλ, Αβραμοπούλου Ελένη, Αγγέλης Σπυρίδων, Αδαμοπούλου Γεωργία (Τζίνα), Αλεξανδράτος Χαράλαμπος (Μπάμπης), Αλμπάνης Ευάγγελος, Αντωνίου Άννα, Αποστολίδου Κλεονίκη (Νίκη), Αργυράκη Βασιλεία (Μπέσσυ), Βαθιώτης Αθανάσιος, Βάρσου Μαργαρίτα, Βλάχος Γεώργιος, Βλάχου Γεωργία, Γεράκη Αικατερίνη, Γεωργιάδου Παρασκευή (Εύη), Γώγος Χρήστος, Δαμάσκος Δημήτριος, Ιωακειμίδης Γεώργιος, Ιωακειμίδης Ευάγγελος, Καββαδίας Αντώνης, Καζάκου Μαρία, Καραδήμα Ιωάννα, Κασίμης Χρήστος, Κατσικάρης Δημήτριος, Κατσούλης Αθανάσιος (Σάκης), Κόκκαλης Βασίλειος, Κοροβέση Μυρτώ, Κουρή Μαρία (Μαίρη), Κουτσογιαννόπουλος Θεόδωρος (Θοδωρής), Κωνσταντέλλου Αθηνά, Λογοθέτη Αικατερίνη, Μαγκανάρης Νικόλαος, Μακρή Σταυρούλα (Ρούλα), Μαρκουίζος (Ιαβέρης) Κωνσταντίνος, Μελάς Σταύρος, Μουζάλας Μάριος, Μπαϊρακτάρης Πολυχρόνιος (Πολυχρόνης), Μπαλάφας Γεώργιος, Μπαρμπαγιάννη - Αδαμοπούλου Ευγενία, Μωραϊτάκη Πικρού Ελευθερία (Ρίτα), Ντούρος Γεώργιος, Ορφανός Αθανάσιος (Θάνος), Παπαγεωργίου Νικόλαος, Παπασπύρου Αθανασία, Πετρόπουλος Βασίλειος, Πρωτούλης Ιωάννης, Ράπτης Ιωάννης, Σγουρός Ιωάννης, Συρίγος Βάλσαμος, Σφακιανάκης Εμμανουήλ (Μανώλης), Τάτσης Γεώργιος, Τσουκαλάς Γεώργιος, Χιωτάκης Νικόλαος (Νίκος), Χρονοπούλου Νίκη

Απόντες:
Τα μέλη του Περιφερειακού Συμβουλίου Αττικής:

Ο Πρόεδρος κ. Καπερνάρος Βασίλειος

Ο Χωρικός Αντιπεριφερειάρχης Αττικής κ. Θεοδωρόπουλος Χρήστος

Η Θεματική Αντιπεριφερειάρχης Αττικής κ. Πάλλη - Γιαννακοπούλου Αλεξάνδρα

Οι Περιφερειακοί Σύμβουλοι κ.κ.:
Αλυμάρα Σοφία, Αυλωνίτου Χρυσάνθη, Βισκαδουράκης Αθανάσιος (Θανάσης), Βοϊδονικόλας Σταύρος, Ζαμπίδης Μιχαήλ (Άιρον Μάικ), Καμπούρης Φίλιππος, Σαργκάνης Νικόλαος (Νίκος), Σχορτσανίτης Σοφοκλής.

Χρέη υπηρεσιακών γραμματέων άσκησαν οι υπάλληλοι της Περιφέρειας Αττικής κ. Σωτηροπούλου Ευαγγελία και κ. Ζαλοκώστα Ευανθία- Αναστασία.

Λόγω απουσίας του Προέδρου του Περιφερειακού Συμβουλίου, κ. Βασιλείου Καπερνάρου, καθήκοντα προέδρου ασκεί ο Αντιπρόεδρος κ. Κωνσταντίνος Κάβουρας, σύμφωνα με την παρ. 2 του άρθρου 168 του Ν. 3852/2010 (*ΦΕΚ 87/τ. Α'/07-6-2010*), όπως ισχύει.

Ο Αντιπρόεδρος του Περιφερειακού Συμβουλίου κ. Κωνσταντίνος Κάβουρας έδωσε το λόγο στον Αντιπεριφερειάρχη Περιβάλλοντος & Ποιότητας Ζωής, κ Χαράλαμπο (Μπάμπη) Σιάτρα, ο οποίος έθεσε υπ' όψιν του Περιφερειακού Συμβουλίου:

α) την υπ' αριθμ. πρωτ. 629010/24-5-2024 εισήγηση της Δ/νσης Περιβάλλοντος & Κλιματικής Αλλαγής της Περιφέρειας Αττικής, που εστάλη με την πρόσκληση και έχει ως εξής:

Έχοντας υπόψη:

1. *Την υπ' αρ. 37419/13479/2018 «Έγκριση της 121/2018 απόφασης του Περιφερειακού Συμβουλίου Αττικής, περί τροποποίησης – επικαιροποίησης του Οργανισμού Εσωτερικής Υπηρεσίας της Περιφέρειας Αττικής» (ΦΕΚ 1661/Β/11-5-2018).*
2. *Την με αριθμ. πρωτ. 354515/6-5-2021 Απόφαση του Περιφερειάρχη Αττικής με την οποία ανατίθενται καθήκοντα Αναπληρωτή Προϊσταμένου της Διεύθυνσης Περιβάλλοντος και Κλιματικής Αλλαγής της Περιφέρειας Αττικής στον Κο Ακρίβο Κωνσταντίνο του Ιωάννη.*
3. *Την Οδηγία 2011/70/Ευρατόμ του Συμβουλίου της 19ης Ιουλίου 2011 «περί θεσπίσεως κοινοτικού πλαισίου για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων» (ΕΕ L 199/02.08.2011).*
4. *Την Οδηγία 2006/117/ Ευρατόμ του Συμβουλίου της 20ής Νοεμβρίου 2006 σχετικά με την επιτήρηση και τον έλεγχο των αποστολών ραδιενεργών αποβλήτων και αναλωμένου πυρηνικού καυσίμου. (ΕΕ L 337/05.12.2006).*
5. *Η Οδηγία 2014/87/Ευρατόμ του Συμβουλίου της 8ης Ιουλίου 2014 για τροποποίηση της οδηγίας 2009/71/Ευρατόμ περί θεσπίσεως κοινοτικού πλαισίου για την πυρηνική ασφάλεια πυρηνικών εγκαταστάσεων (ΕΕ L 219/25.07.2014).*
6. *Την ΚΥΑ υπ' αριθμ. 35225 «Νομοθετικό, ρυθμιστικό και οργανωτικό πλαίσιο για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων - Προσαρμογή της ελληνικής νομοθεσίας στην Οδηγία 2011/70/Ευρατόμ του Συμβουλίου της 19ης Ιουλίου 2011 περί θεσπίσεως κοινοτικού πλαισίου για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων (ΕΕ L 199/02.08.2011) – Εθνικό πρόγραμμα για τη διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων» (ΦΕΚ 2638/Β/21-04-2023).*

7. *Το Π.Δ. ΥΠ' ΑΡΙΘΜ. 91 Νομοθετικό, ρυθμιστικό και οργανωτικό πλαίσιο για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων και τροποποίηση του π.δ. 122/2013 (ΦΕΚ 130/Α/01-09-2017).*
8. *Το Π.Δ. υπ' αριθμ. 83 Προσαρμογή της ελληνικής νομοθεσίας στην Οδηγία 2006/117/Ευρατόμ του Συμβουλίου της 20ης Νοεμβρίου 2006 σχετικά με την επιτήρηση και τον έλεγχο των αποστολών ραδιενεργών αποβλήτων και αναλωμένου πυρηνικού καυσίμου (ΦΕΚ 147/Α/02-09-2010).*
9. *Την ΚΥΑ υπ' αριθμ. ΥΠΕΧΩΔΕ/ΕΥΠΕ/οικ.107017/28.8.2006 για την εκτίμηση των περιβαλλοντικών επιπτώσεων ορισμένων σχεδίων και προγραμμάτων, σε συμμόρφωση με τις διατάξεις της οδηγίας 2001/42/ΕΚ «σχετικά με την εκτίμηση των περιβαλλοντικών επιπτώσεων ορισμένων σχεδίων και προγραμμάτων» του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της 27ης Ιουνίου 2001 (ΦΕΚ 1225/Β/ 05-09-2006), όπως έχει τροποποιηθεί και ισχύει.*
10. *<u>Το με αρ. πρωτ. 328496/12-03-2024 διαβιβαστικό από το Περιφερειακό Συμβούλιο της Π.Α. με με συνημμένο το με αρ. πρωτ. ΥΠΕΝ/ΔΙΠΑ/24705/1637/05-03-2024.</u>*

Θέτουμε υπόψη την Μελέτη Περιβαλλοντικών Επιπτώσεων (ΣΜΠΕ) για το έργο «Στρατηγική Μελέτη Περιβαλλοντικών Επιπτώσεων του σχεδίου επικαιροποιημένης στρατηγικής για τη διαχείριση των εξαντλημένων πυρηνικών καυσίμων και των ραδιενεργών αποβλήτων της Βουλγαρίας» η οποία διαβιβάστηκε με το (12) σχτ., για την έκφραση απόψεων από την αρμόδια υπηρεσία του ΥΠΕΝ.

Structure of the report

- *Chapters 1 to 3 briefly present the objective and scope of the environmental assessment**,** the description of the updated strategy for management of spent nuclear fuel and radioactive waste, and the environmental impacts of the project, as stated and presented in the submitted environmental assessment and <u>do not constitute</u> opinions or estimates of the Directorate Environment and Climate Change of the Attica Region.*
- *Chapter 4 presents the comments of the Directorate of Environment and Climate Change of the Region of Attica that are proposed to be taken into account in order to minimize and deal with potential environmental impacts from the project.*

ACRONYM	DEFINITION
EC	*Efficiency Coefficient*
EC	*European Commission*
ECT	*Evaporator Concentrate Tank*
EEA	*Executive Environment Agency*
EIA	*Environmental Impact Assessment*
EIAR	*Environmental Impact Assessment Report*
EPA	*Environmental Protection Act*
EU	*European Union*
FPI	*Facility for plasma incineration of waste with a high volume reduction factor*
GHG	*Greenhouse gases*
GP	*General Practitioner*
HLW	*High Level Waste*
HM	*Heavy Metal*
IAEA	*International Atomic Energy Agency*
ICA	*Immovable Cultural Assets*
INRNE-BAS	*Institute for Nuclear Research and Nuclear Energy - Bulgarian Academy of Sciences*
IPUF	*Installed Power Utilization Factor*
MARAW	*Moderately active RAW*
MDA	*Minimum Detectable Activity*
MoE	*Ministry of Energy*
MoEW	*Ministry of Environment and Water*
MoH	*Ministry of Health*
NCRRP	*National Centre for Radiobiology and Radiation Protection*

ACRONYM	DEFINITION
NEMS	*National Environmental Monitoring System*
NFDF	*"Nuclear Facilities Decommissioning" Fund*
NPP	*Nuclear Power Plant*
NRA	*Nuclear Regulatory Agency*
NRDF	*National repository for disposal of short-lived low- and intermediate-level waste*
OECD	*Organization for Economic Cooperation and Development*
PA	*Protected area (in the meaning of the BDA)*
PAA	*Protected Areas Act*
PT	*Protected territory (in the meaning of the PAA)*
RAW	*Radioactive Waste*
RAWPW	*RAW Processing Workshop (EAD RAW-Kozloduy)*
RCC	*Reinforced Concrete Container*
RML	*Radiation Measurements Laboratory*
SB	*Special Block*
SD	*Specialized Division (of the State Enterprise "Radioactive Waste")*
SD „DC Unit 1-4"	*Specialized Division "Decommissioning of Units 1-4"*
SD „NRRAW"	*Specialized Division "National Repository for Radioactive Waste"*
SD „PRRAW-Novi Han"	*Specialized division "Permanent repository for radioactive waste - Novi Han"*
SD „RAW-Kozloduy"	*Specialized Division "Radioactive Waste-Kozloduy"*
SE RAW	State enterprise "Radioactive waste"
SFP	Spent Fuel Pool
SNF	Spent Nuclear Fuel

ACRONYM	DEFINITION
SUNEA	Safe Use of Nuclear Energy Act
UAT	Upper Assessment Threshold
WSFSF	Wet Spent Nuclear Fuel Storage Facility
WWER	Water-Water Energetic Reactor

1. INTRODUCTION

This document represents an Environmental Assessment of a draft of an updated Strategy for the Management of Spent Nuclear Fuel (SNF) and Radioactive Waste (RAW) in Bulgaria - National Program in accordance with Directive 2011/70/Euratom.

The EA procedure is fully compatible with the current procedures for preparing and approving a draft of an updated Strategy for the Management of Spent Nuclear Fuel (SNF) and Radioactive Waste (RAW) in Bulgaria - National Program in accordance with Directive 2011/70/Euratom and is carried out simultaneously with its preparation. The environmental assessment statement is a mandatory condition for the subsequent approval of the draft of the updated Strategy and the authorities responsible for approving and implementing the project for the updated Strategy must comply with the opinion on the EA and the conditions, measures and restrictions set therein.

1.1 Information about the contracting authority of the environmental assessment

Contracting authority: Ministry of Energy
with address: Sofia, 8 "Triaditsa" Str.
Contact person: Antoaneta Zaicheva, Chief Expert, Department "Security in Nuclear Energy", Directorate "Security of Energy Supply and Management in Crisis Situations"
phone: 02/9263235
e-mail: a.zaycheva@me.government.bg

1.2 Grounds for preparation of an EA

According to the requirements of Art. 8 of the EA Ordinance, the competent environmental authority – the Ministry of Environment and Water (MOEW) has been notified about the draft of an updated Strategy for the Management of Spent Nuclear Fuel and Radioactive Waste in Bulgaria - National Program, in accordance with Directive 2011/70/EURATOM of the Republic of Bulgaria.

According to the response of the MOEW, the draft of an updated Strategy for the Management of SNF and RAW is pursuant to Section 5.2 of Appendix No. 1 to Art. 2, para. 1 of the EA Ordinance and in connection with Art. 85, para. 1 of the EPA, and Art. 2, para. 1, item 1 and item 2 of the EA Ordinance, it is subject to a mandatory environmental assessment. Given the provision of Art. 4, item 1 of the EA Ordinance and the fact that the Strategy will be adopted by the Council of Ministers, the competent authority for environmental assessments is the Minister of Environment and Water, and the same is also competent for the procedure for appropriate assessment with the subject and objectives of conservation of protected areas.

Considering the possibility listed in Art. 10, para. 3 of the EA Ordinance, the MOEW will rule on the need to prepare a Report for assessing the degree of impact, at the stage of submitting a ToR for the scope and content of the EA Report.
Under the provision of Art. 81, para. 3 of the EPA, the environmental assessment of the Strategy should be carried out simultaneously with its preparation, taking into account its objectives, territorial scope and degree of detail, so as to identify, describe and evaluate in an appropriate way the possible impacts of the implementation of the investment proposal, which the strategy foresees. In accordance with the letter of the Ministry of Environment and Water regarding the Terms of Environmental assessment of a draft of updated strategy for management of spent nuclear fuel and radioactive waste in Bulgaria - National programme in conformity with Directive 2011/70/EURATOM Reference for the scope and content of the EA with reference No. EO-6/25.05.2023 (shown in Annex 3):
I. Regarding the Terms of Reference for the scope and content of the EA:
The ToR has been prepared taking into account the provision of Art. 86, para. 86(3) of the Environmental Protection Act (EPA) and Article 17(1) of the Ordinance on the Conditions and Procedure for Environmental Assessment of Plans and Programmes (the EA Ordinance) with regard to the requirements for the scope and content of the EA Report.
II. Regarding the Appropriate Assessment of the draft updated Strategy for SNF and RAW in Bulgaria - National Programme in accordance with Directive 2011/70/Euratom:
After reviewing the submitted information, pursuant to Art. 36 para. The draft updated Strategy for the Management of Spent Nuclear Fuel and Radioactive Waste in Bulgaria - National Programme in accordance with Directive 2011/70/Euratom is not likely to have a significant negative impact on the natural habitats, populations and habitats of species of conservation concern in the protected areas of the Natura 2000 network.
Due to this decision of the MoEW, no Appropriate Assessment Report regarding the compatibility with the object and purpose of the protected areas will be elaborated for the Environmental Assessment Report.

1.3 Objective and scope of the environmental assessment

The objectives of the environmental assessment are:
- *to integrate the environmental considerations into the development process as a whole and introduction of the principle of sustainable development in accordance with Art. 3 and Art. 9 of the EPA;*
- *to identify, describe and assess in an appropriate manner the possible impacts of the implementation of the updated Strategy on the components and factors of the environment;*
- *to ensure preventive control with regard to environmental protection and protection of people's health.*

Under the provision of Art. 86, para. 2 of the EPA, the EA Report must include information corresponding to the level of detail of the project for the updated Strategy and the evaluation methods used.

The main objective in preparing the EA, within a certain framework of the level of detail of the draft of the updated Strategy, is to determine the scope and level of detail of the information included in the Environmental Assessment Report (Directive 2001/42/EC) - Strategic Environmental Assessment Directive, (SEA, Article 5, Paragraph 4).
The following requirements have been set by the Contracting Authority on the scope of the environmental assessment:

▪ *Description of the content of the main objectives of the Strategy and connection with other related plans and programs;*
▪ *Current state of the environment (baseline conditions) and possible development without the implementation of the Strategy;*
▪ *Characteristics of the environment for territories that are likely to be significantly affected by the implementation of the Strategy;*
▪ *Existing environmental problems identified at different levels relevant to the Strategy;*
▪ *National and international level environmental protection objectives relevant to the Strategy and how these objectives and all environmental considerations are taken into account;*
▪ *Probable significant impacts on the environment and human health;*
▪ *Measures envisaged to prevent, reduce and compensate as fully as possible the adverse consequences of the implementation of the Strategy on the environment and human health;*
▪ *Motives for selecting the considered alternatives;*
▪ *Methods for carrying out the environmental assessment, used legal framework and documents and difficulties in collecting the necessary information;*
▪ *Measures related to monitoring during the implementation of the Strategy;*
▪ *Conclusions of the environmental assessment;*
▪ *Note on the results of the consultations held in the process of preparing the Strategy and carrying out the environmental assessment;*
▪ *Non-technical summary of the environmental assessment;*
▪ *Appendices to the Environmental Assessment Report.*

The contents of the Environmental Assessment Report is in accordance with the requirements of the Contracting Authority, under Art. 86, para. 3 of the EPA and the requirements of the Competent Authority - MOEW, according to letter with reference No. EO-6/25.05.2023 regarding the Terms of Reference for the scope and content of the EA Report.

2. CONTENTS OF THE DRAFT OF AN UPDATED STRATEGY, SCOPE AND TIME FRAME

2.1. Contents of the draft of the updated Strategy

The draft of the Strategy for Management of Spent Nuclear Fuel (SNF) and Radioactive Waste (RAW), represents the national programme of the Republic of Bulgaria for responsible and safe management of SNF and RAW within the meaning of Directive 2011/70/EURATOM of the Council of the EU for establishing a Community framework for responsible and safe management of SNF and RAW (hereunder referred to as "Directive 2011/70/EURATOM"). It has been developed under Article 74, paragraph 3 of the Safe Use of Nuclear Energy Act (SUNEA) and bylaws.
In fulfilment of the obligations of the Republic of Bulgaria arising from Directive 2011/70/Euratom of the Council of 19 July 2011 on the creation of a Community framework for the responsible and safe management of spent fuel and radioactive waste, under the coordination and guidance of the Ministry of Energy, an interdepartmental working group was created with the task of developing a new draft of an updated Strategy for the management of SNF and RAW, taking into account all the findings of the EC, as well as the recommendations of the ARTEMIS mission conducted in 2018 (Integrated IAEA review of programs for management of radioactive waste, spent nuclear fuel,

Environmental assessment of a draft of updated strategy for management of spent nuclear fuel and radioactive waste in Bulgaria - National programme in conformity with Directive 2011/70/EURATOM decommissioning and reclamation). The update presents changes that have occurred, taking into account technical and scientific progress as appropriate, as well as recommendations, lessons learned and good practices from partner reviews.

The draft of the updated Strategy for the management of SNF and RAW is a fundamental document presenting the national policy, principles, goals and tasks related to the safe and responsible management of all stages of the management of SNF and all types of RAW - from generation to disposal. The draft of the updated Strategy outlines the implemented and planned practical solutions, their stages and deadlines for implementation, as well as the method of their financing. Information is presented on the condition and operation of the existing facilities, as well as the steps for the implementation of future facilities.

The nuclear programme of the Republic of Bulgaria was launched in the early 1960s with the construction and commissioning of the IRT-2000 research reactor at the Institute for Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences. The construction of Kozloduy NPP Unit 1 started in the late 1960s. Over the years, a total of six nuclear power units have been built on the plant site (four WWER-440 units and two WWER-1000 units), equipped with pressure water reactors, using low-enriched uranium fuel and light water as coolant and moderator.

In fulfilment of Bulgaria's commitments related to the country's accession to the European Union (EU), the operation of the first four power units was terminated before the expiration of their design lifetime. Currently, Units 5 and 6 are in operation, having a total output of about 2160 MWe (achieved after completion of the envisaged measures for modernisations of the units). The Republic of Bulgaria has made a decision to continue developing its nuclear programme by maximum extension of the operational lifetime of Kozloduy NPP Units 5 and 6, while strictly following the requirements for nuclear safety, radiation and physical protection, safe and responsible management of radioactive waste and spent nuclear fuel. The construction of new nuclear facilities is planned, as in the "Strategic vision for sustainable development of the electricity sector with a horizon of 2053" adopted by the Council of Ministers in January 2023, the construction of two nuclear units at the Belene site by 2035/2040 is envisaged, as well as two more units at the Kozloduy site until 2045.

When deciding on the construction of new nuclear facilities, according to Art. 45 of SUNEA, the Strategy must be updated taking into account the expected quantities of SNF that will be generated by them.

The national operator for the safe management of radioactive waste and decommissioning of nuclear facilities is the State Enterprise "Radioactive Waste" (SE RAW), which has been operating since 2004.

2.1.1. Fundamental principles, policy and objectives

The policy of the Republic of Bulgaria in the field of SNF and RAW management is in accordance with the following internationally accepted fundamental principles:

• In SNF and RAW management, nuclear safety and radiation protection take priority over all other aspects of this activity;

• The licensees must observe the requirements, norms and rules of nuclear safety, radiation protection and physical protection in SNF and RAW management, as well as to

develop and maintain an effective activity management system that prioritizes safety and ensures a high safety culture;
• SNF and RAW should be managed in such a way as to avoid undue burden on the future generations;
• Optimisation of protection against the ionising radiation from SNF and RAW;
• Application of the graded approach in determining the safety requirements;
• Taking account of the interconnections between all the stages related to RAW generation and management;
• Traceability of RAW at all stages of their management;
• Minimisation of the generated SNF quantities and RAW volumes subject to disposal;
• Participation of all the stakeholders in the decision making on SNF and RAW management.

The policy of the Republic of Bulgaria regarding SNF and RAW management has been specified in the national legislation (mainly in the SUNEA, Environment Protection Act, Health Protection Act and the regulations on their implementation) and includes the following main aspects:
• The SNF and RAW management has to be carried out in a way as to cause minimum negative effects on human health and the environment;
• A fundamental approach to the management of SNF and RAW is their concentration and isolation from the environment, including disposal using passive structures, components and systems to ensure safety; • The SNF and RAW management is regulated by the Government, represented by legal persons only after they have obtained a permit or licence from the Chairperson of the Nuclear Regulatory Agency (NRA);
• Achievement and maintaining a high level of nuclear safety, radiation and physical protection at all the stages of SNF and RAW generation and management;
• Processing of the entire amount of SNF, interim storage in a specialised facility for all types of RAW shipped back to Bulgaria after processing, and final disposal in the DGR.
• The licensee bears the responsibility for observing the regulatory norms and requirements for safe management of RAW until their transfer to SE RAW, or their exemption from regulation;
• The management of RAW outside the sites of their generation is implemented by SE RAW;
• The state bears the final responsibility for the safe disposal of all types of radioactive waste generated from the operation of the nuclear reactors, and those resulting from SNF processing;
• The SNF generating organisations are obliged to bear the cost at all stages of its management, including the disposal of RAW generated from SNF processing, following the principle "the polluter pays", by paying the respective contributions to the specialised fund;
• The RAW generating organisations are obliged to transfer the waste to SE RAW and bear the cost at all stages of their management including disposal, on the "polluter pays" principle, by paying the respective contributions to the specialised fund;
• The state bears the responsibility for management of RAW with unknown owner;
• Import of RAW in the country is prohibited except for the cases specified in the SUNEA;
• The principle of returning certain categories of radioactive sources to their manufacturer after discontinuing their use is applied;

• Radioactive wastes generated in the Republic of Bulgaria are disposed of on Bulgarian territory, unless an agreement has become effective for using a RAW disposal facility in another country;
• Application of the graded approach to RAW management, depending on the risks they create;
• Taking into account the interrelations between all stages of the generation and management Environmental assessment of a draft of updated strategy for management of spent nuclear fuel and radioactive waste in Bulgaria - National programme in conformity with Directive 2011/70/EURATOM of SNF and RAW, and the safety requirements:
o minimisation of RAW volume and activity by implementing all possible measures to reduce their volume and activity during the process of their generation, and by applying appropriate practices in their subsequent management, including recycling and reuse of the materials;
o taking account of the requirements for RAW minimisation at the stages of design, construction, operation and decommissioning of the nuclear facility;
o bringing RAW to a safe passive form fit for storage and disposal within the shortest achievable time after their generation;
• Possibility for declaring SNF to be RAW in compliance with SUNEA.

Strategic objectives
The draft of the updated Strategy covers all the stages of the nuclear facilities life cycle, the application of the most modern technologies available for SNF and RAW management including their disposal, planning the necessary activities, the implementation stages and the financial and human resources required to achieve and maintain a high level of nuclear safety, radiation and physical protection. At this stage, the most important strategic objectives compliant with the requirements of Directive 2011/70/Euratom are, as follows:
• Minimising the time for SNF interim storage, taking into account that it is not an alternative to the final stage of SNF management;
• Processing of the entire amount of SNF generated from WWER-440 and WWER-1000 and disposal in the DGR of the vitrified HLW and other RAW generated during processing and returned to Bulgaria;
• Permanent reduction of the SNF quantities stored on the Kozloduy NPP site, through an average annual shipment of at least 77 t of heavy metal (HM) for long-term storage and processing abroad;
• Preparation of a long-term plan for construction of a repository for interim storage of returned vitrified HLW and other RAW from SNF processing;
• Commissioning of Stage 1 of the NRRAW by the end of 2025;
• Design and construction of Stages 2 and 3 of the NRRAW in the mid-term;
• Design and construction of a DGR in the long-term;
• Providing financial resources for the construction of a DGR through the establishment of a new dedicated fund;
• Providing and maintaining sustainable financial and human resources for ensuring the necessary expertise and skills, including for carrying out the research and development required for the SNF and RAW management and regulation;
• Pursuing a policy of openness and transparency and involving the public in public hearings and decision-making on the SNF and RAW management;
• Pursuing a policy of openness and transparency and involving the public in the discussion and decision-making regarding the management of SNF and RAW.

2.1.2. Nuclear Facilities

There are no plants for conversion, enrichment and production of nuclear fuel, as well as for the processing of SNF in Bulgaria. In Bulgaria there are the following nuclear facilities:

- *2 power reactors (in operation);*
- *4 power reactors (in a process of decommissioning);*
- *2 SNF storage facilities (in operation);*
- *National Disposal Facility for LLW and ILW (in construction stage);*
- *Repository for RAW from nuclear applications (in operation);*
- *Facility for RAW processing and interim storage at Kozloduy NPP (in operation);*
- *Facility for RAW treatment and conditioning with high volume reduction factor (plasma melting facility, PMF) (at the stage of commissioning);*

In the period 1961 - 1989, a research reactor IRT-2000 operated at the INRNE-BAS. The SNF from it was transported to the Russian Federation and the RAW from its operation was handed over to SE RAW.

The SNF from the two operating power units is stored in the spent fuel pools, at the reactor, and in the wet storage facility (WSFSF) on the Kozloduy NPP site.

The SNF has been removed from the reactors of Units 1-4 and their spent fuel pools, and is stored in the storage facilities on the Kozloduy NPP site;

The construction of a National Disposal Facility for low- and intermediate level RAW is under way.

The repository for RAW from nuclear applications in Novi Han has been accepting for interim storage all the RAW generated outside Kozloduy NPP, including radioactive sources with no owner, investigation material and cargo detained during transit passage. In the RAW management facility of SE RAW – Kozloduy is conditioned and stored all the RAW generated by the operation of Kozloduy NPP.

2.1.3. Existing sites

The existing sites are located in the area of two municipalities of the Republic of Bulgaria: Kozloduy Municipality and Elin Pelin Municipality.

Kozloduy Municipality - ***Kozloduy NPP***

- *SNF management facilities:*
  - *Spent Fuel Pools (SFP) units 5 and 6;*
  - *Wet Spent Nuclear Fuel Storage Facility (WSFSF);*
  - *Dry Spent Nuclear Fuel Storage Facility (DSFSF).*
- *Facility for RAW processing and storage in Kozloduy NPP (in operation);*
- *Facilities for temporary storage of RAW from units 5 and 6:*
  - *Storage for low- and medium-active solid RAW (category 2a) with a dose rate below 10 mSv/h - bunker-type cells: 18 units with a volume of 2486 m3;*
  - *Storage for low- and medium-active solid RAW (category 2a) with a dose rate over 10 mSv/h - bunker-type cells: 3 units with a volume of 224 m3;*
  - *Storage for liquid radioactive concentrate: 7 stainless steel tanks with a total volume of 3584 m3;*
  - *Storage for spent sorbents: 2 stainless steel tanks with a volume of 100 m3 each.*

Elin Pelin Municipality - ***Specialized division "Permanent repository for radioactive waste - Novi Han"***

Specialized division "Permanent repository for radioactive waste - Novi Han" (SD "PRRAW-Novi Han"), in the land of the village of Novi Han, Elin Pelin municipality - disused radioactive sources from about 2300 sites of industry, medicine, agriculture and scientific research institutes are RAW and are handed over to the Specialized Division "PRRAW-Novi Han" of the SE RAW for processing and storage.

2.1.4. Facilities envisaged in the draft of the updated Strategy

The facilities envisaged in the draft of the updated Strategy are also located in two municipalities of the Republic of Bulgaria: Kozloduy Municipality and Elin Pelin Municipality, where the existing facilities are also located, as described below:

• National Repository for Radioactive Waste" ("NRRAW") in the locality "Radiana" in the land of the village of Harlets, Kozloduy Municipality, Vratsa Region - under construction;

• FPI - Facility for plasma incineration of waste with a high volume reduction factor - the program for commissioning the FPI has been successfully completed and the documentation for the issuance of a license for operation by the NRA at the site of units 1-4 of the Kozloduy NPP has been prepared;

• Construction of a facility for the production of StBK type packaging by SE RAW. Commissioning of the facility in 2025;

The existing facilities listed above have undergone procedures under Chapter 6 of the Environmental Protection Act.

The rest of the facilities provided for in the strategy are at the feasibility study level or at the concept level (DGR, Borehole burial of spent and closed radioactive sources, SCRS, Decommissioning of the BAS research reactor IRT-2000, Decommissioning of SD PRRAW-Novi Han) and are described below:

• DGR - a preliminary survey of the possibilities for building a geological repository for high level and long-lived waste in Bulgaria has been carried out. Potentially suitable geological blocks have been located and should be further explored. SE RAW has developed an exemplary plan - a schedule with a deadline till 2050 (Appendix No. 7 to the draft of the updated Strategy) for carrying out research activities and narrowing down the range of possible sites, conducting detailed studies, selecting and licensing one site for the construction of DGR.

• Borehole burial of spent closed radioactive sources (SRC) - the possibilities of implementing borehole burial as the final stage of SRC management are being studied. Due to the small infrastructure located on the surface of the borehole disposal site, it could be located on the site of another nuclear facility. There is still no experience in the implementation of the concept of borehole burial in the world. There are several IAEA member countries that are actively developing the concept of borehole burial. It is expected that in the near future, the first borehole burial of SRC will be carried out in Malaysia. A feasibility study is currently being developed in order to assess the applicability of the borehole burial concept in Bulgaria, to assess its advantages and disadvantages and to identify the risks of its implementation. Depending on the results of the feasibility study, further actions will be taken;

• Decommissioning of the BAS IRT-2000 research reactor - The IRT-2000 research reactor was shut down in July 1989 for modernization of its nuclear and radiation safety systems. The entire amount of spent nuclear fuel that was stored at the IRT-2000 site was exported to Russia in August 2008 within the framework of the international program Russian Research Reactor Fuel Return, and at the end of 2009, as part of the project for reconstruction of the reactor, a partial dismantling of all internal body elements was carried

out. The amounts of RAW generated from the dismantling of the reactor were handed over to SE RAW in May 2020. The decision of the Council of Ministers No. 552 of July 6, 2001 for the reconstruction and partial decommissioning of the research reactor IRT-2000 is still in force, for its reconstruction into a low-power 200 kW reactor. There is no new MC decision on the future of the research reactor, including the possibility of final decommissioning.

• Decommissioning of SD „PRRAW - Novi Han". It is planned to be decommissioned. A concept of continuous dismantling with subsequent release of the site for limited use was selected.

2.1.5. Radioactive waste (RAW)

The main volume of low- and intermediate-level RAW is generated during the operation of the nuclear reactors, the first of which was commissioned in 1974. The first four units of the Kozloduy NPP were designed and built without RAW processing facilities, in accordance with the concept of storing them until decommissioning. This practice has led to the gradual occupation of the facilities, the need to concentrate the liquid RAW and the formation of crystallized masses in the tanks, the construction of new temporary facilities for the storage of RAW and other negative consequences.

All RAW generated by the operation of the Kozloduy NPP is conditioned and stored in the RAW management facility - SD "RAW - Kozloduy".

The storage facility for RAW from nuclear applications in Novi Han (SD "PRRAW-Novi Han") receives for temporary storage all RAW generated outside of the Kozloduy NPP, including radioactive sources with no owner, investigation materials and RAW detained during the passage of transit cargo.

The Ordinance on Safety in the Management of RAW introduces requirements to the form and content of the draft of the updated Strategy, as well as a national RAW classification system. The types of RAW generated by the operation of the nuclear reactors are liquid, gaseous and solid, the latter representing the main part of them.

In accordance with the activity and specific characteristics, the solid RAW materials are classified into categories and subcategories:

• Category 1 - waste containing radionuclides with low activity, for which the application of radiation protection measures is not required ,or a high level of isolation and containment is not required; RAW of this category is further subdivided into:

o Category 1a - waste materials that correspond to the levels for exemption from regulatory control according to the SUNEA (no restriction on their use);

o Category 1b - very short-lived activity waste, containing mainly radionuclides with a short half-life (no more than 100 days), the activity of which decreases below the levels for exemption from regulatory control according to SUNEA. These types of waste are managed by appropriate storage at the site for a limited period of time (usually no more than a few years);

o Category 1c - very low-level activity waste - with levels of specific activity minimally exceeding the levels for exemption from regulatory control according to SUNEA and a very low content of long-lived radionuclides, which represent a limited radiological risk; for this category of waste, the application of specific measures for radiation protection or isolation and containment is not required;

• Category 2 - low- and intermediate-level activity waste: RAW containing radionuclides in concentrations that require measures for reliable isolation and containment, but do not

require special measures to remove the heat release during storage and burial; RAW of this category is further subdivided into:
o Category 2a - low- and intermediate level- activity waste, containing mainly short lived radionuclides (with a half-life no longer than that of 137Cs), as well as long-lived radionuclides at significantly lower levels of activity, limited to long-lived alpha emitters below 4.106 Bq/kg for each individual package, and maximum average value of all packages in the respective facility 4.105 Bq/kg; such RAW requires reliable isolation and containment for a period of up to several hundred years;
o Category 2b - low- and intermediate level- activity waste containing long-lived radionuclides at activity levels of long-lived alpha emitters exceeding the limits for Category 2a;

• Category 3 - high-level activity waste: RAW with such a concentration of radionuclides that heat release must be taken into account during storage and disposal; this category requires a higher degree of isolation and containment than low- and intermediate-level waste by burial in deep, stable geological formations.

The classification introduced also applies to liquid and gaseous RAW depending on the characteristics and form of solid RAW suitable for disposal, which is expected to be obtained after the conditioning of liquid and gaseous RAW. When there is no technology available in the country for conditioning the liquid or gaseous RAW, the classification is carried out taking into account the best modern conditioning technologies.

The regulatory documents require that RAW should be separated at the source of generation according to their radiation, physical and chemical characteristics.

RAW Management
RAW Management at Kozloduy NPP
The responsibilities for managing RAW from Kozloduy NPP are divided between the NPP (as licensee) and SD "RAW-Kozloduy". Kozloduy NPP is responsible for collection, sorting, processing and temporary storage of the generated RAW. SD "RAW-Kozloduy" is responsible for processing, intermediate storage of conditioned and packaged RAW and its disposal. The RAW management activities are regulated by a Comprehensive Program for RAW Management from the Kozloduy NPP developed and agreed upon by the two companies.
The currently operating facilities for the temporary storage of RAW from units 5 and 6 are located in Spetskorpus-3 and include:
• Storage for low- and intermediate-level solid RAW (category 2a) with a dose rate below 10 mSv/h - bunker-type cells: 18 units with a volume of 2486 m3;
• Storage for low- and intermediate-level solid RAW (category 2a) with a dose rate above 10 mSv/h - bunker-type cells: 3 units with a volume of 224 m3;
• Storage for liquid radioactive concentrate: 7 stainless steel tanks with a total volume of 3584 m3;
• Storage for spent sorbents: 2 stainless steel tanks with a volume of 100 m3 each.
RAW Management at SE RAW
The State Enterprise "Radioactive Waste" is a national operator for the management of radioactive waste outside the sites where it is generated. The main commitments of the enterprise are related to the collection, handling, pretreatment, processing, conditioning,

storage and disposal of radioactive waste. SE RAW is responsible also for the decommissioning activities of units 1-4 of Kozloduy NPP. The enterprise consists of Head Department and four specialized divisions on the location of the nuclear facilities

• Specialized division "Decommissioning of unit 1-4" (SD "DC 1-4 unit") carries out the decommissioning, dismantling and subsequent activities of unit 1-4 of Kozloduy NPP, while managing and operating the rest of the operational technological systems, facilities and equipment in compliance with the safety requirements;

• Specialized division "Radioactive waste-Kozloduy" (SD "RAW-Kozloduy") collects, sorts, transports, processes and stores RAW from the operation of the plant;

• Specialized division "National Repository for Radioactive Waste" (SD "NRRAW"). The division's activity is related to the construction, commissioning and operation of a repository for the burial of low- and intrmediate-level short-lived radioactive waste;

• Specialized division "Permanent repository for radioactive waste - Novi Han" (SD "PRRAW Novi Han") is designed to receive radioactive waste that is obtained as a result of using radioactive sources in medicine, industry, science and education.

Management of HLW

Internationally, it is accepted that the only way to reliably isolate the long-lived radionuclides in RAW categories 2b and 3 from the environment is by burying them in a repository in deep, stable geological formations.

A preliminary survey of the possibilities for the construction of a geological repository for highly active and long-lived waste in Bulgaria has been carried out, and the conclusion is that in Bulgaria there are suitable geological conditions for the construction of a deep geological repository. A concept has been developed for the construction of a deep geological repository and the ways for its implementation, as well as an indicative plan-schedule (shown in Appendix 7 of the draft of the updated Strategy) for carrying out the activities of the license process for surveys and narrowing down the circle of possible sites, conducting detailed research, selection and licensing of a site for the construction of a DGR with clearly defined stages, timelines and the necessary financial and human resources.

2.1.6. Spent Nuclear Fuel (SNF)

In Bulgaria, SNF is generated by units 5 and 6 of the Kozloduy NPP, and in the past also by units 1 to 4 of the nuclear power plant.

After the energy potential of the nuclear fuel is exhausted, it is removed from the active zone and is further called spent nuclear fuel for clarity. It is an inevitable technological product of the operation of nuclear reactors. It contains at least 95% of all radioisotopes generated during the operation of the NPP. The radioactive emissions are partially absorbed by the nuclear fuel and are turned into heat (residual heat release), which leads to heating of the SNF cartridges and the need for its continuous cooling. For the same reason, when storing SNF, biological protection against the ionizing radiation it emits must be ensured. Due to the presence of fissile isotopes, specific measures must be taken during storage to prevent the formation of a critical mass, as well as physical protection measures, and to prevent unregulated use of the fissile material for other purposes.

SNF management practices in Bulgaria are related to the storage of SNF from WWER-1000 in the near-reactor aging pools and in WSNFS (Wet Spent Nuclear Fuel Storage Facility), and from WWER-440 - in WSNFS and in DSNFS (Dry Spent Nuclear Fuel Storage Facility).

The existing SNF management facilities are described in section 2.1.3.
The planned tasks and activities related to SNF management are determined by the main goal of the Strategy in this area - processing of the entire amount of SNF from WWER-440 and WWER-1000 by 2060, intermediate storage of vitrified HLW and other RAW obtained from the processing on the site and their subsequent burial in the DGR. In connection with the unfavourable geopolitical changes that occurred at the beginning of 2022 after the start of the war of the Russian Federation against Ukraine, these tasks and activities are:
• Conducting intergovernmental negotiations between Bulgaria and France and signing an agreement on the potential processing of the SNF from the previous and future operation of WWER-1000, incl. also from the potential new nuclear power unit in the plants of France;
• Investigation of the technological possibilities for processing SNF from WWER-1000 in the plants of France;
• Development of a transport scheme for the regular removal of SNF from WWER-1000 for processing in the plants of France and for the return of the obtained RAW;
• Development of measures to adapt and test the existing transport scheme for transportation of SNF from WWER-1000 for the purpose of transportation of SNF from WWER-440 for long term storage and processing;
• Updating the program of Kozloduy NPP EAD for the management of SNF in accordance with the goals set in the Strategy;
• Under favourable geopolitical conditions, regular transportation of SNF from WWER-1000 following the previous practice;
• Reaching an agreement between the Republic of Belarus and the EC for processing according to the previous practice of the planned quantities of cartridges for WWER-1000, delivered to the Kozloduy NPP after 01.01.2007 and planned for transportation after 2024;
• Maintaining readiness for transporting SNF for long-term storage and processing according to a transport scheme via third countries.
Due to the unfavourable geopolitical changes that occurred in early 2022 after the start of the war of the Russian Federation (RF) against Ukraine, a number of risks related to the management of SNF and HLW have arisen.
The generation of SNF, its transportation for processing and the amount of SNF stored at the site are being analysed, taking into account that in 2024 and beyond, the 5th unit will be loaded with fresh nuclear fuel (FNF) produced by Westinghouse, and the operation of the 6th unit in the following years will continue with the traditional manufacturer's FNF, and then with the FNF supplied by Framatom France until the end of their operational life.
The introduction of fuel from another manufacturer must be proven by carrying out a full set of safety analyses, their verification and licensing, especially in mixed fuelling of the core.
According to the available information, Westinghouse only offers an option for intermediate storage of SNF (Westinghouse) in a dry method, but not an option for its processing. This means that the processing of the generated amounts of SNF in another country must be planned and carried out.
The following three SNF processing scenarios have been considered, assuming normal operation of units 5 and 6 and an annual SNF generation containing about 38 t HM:

Realistic scenario

The realistic scenario is based on the following preconditions:
• continuing the established practice of processing WWER-1000 SNF may not be possible or may be greatly impeded as a result of transportation and logistics issues or sanctions imposed both by the EU and the RF;
• development of idea for processing SNF from WWER-1000, incl. SNF from Westinghouse fuel and Framatom fuel in the processing plants of France;
• transporting SNF from WWER-440 for processing in compliance with the current practice;
• achieving the set objective - an average annual shipment of 77 t HM as SNF from the site (for a period of 10 years).
This includes implementation of the following activities until the end of 2029:
• 2023 – implementation of the negotiated two shipments with 118 SNF cartridges from WWER-1000 (around 45.3 t HM), with signed contracts and approved by the ESA (if possible, the two shipments will be aggregated into one shipment).
• 2024 – 2029 – clearing the site of all the SNF from WWER-440, which is now stored in the SNFR and DSNFS (a total of 2864 fuel cartridges containing 330.9 t HM). This means sending two/three SNF shipments from WWER-440 per year, each with 240 fuel cartridges containing 27.7 t HM, or about 55.4/83.1 t HM. The fuel cartridges stored in the SNFR are transported first. The activities for moving the fuel assemblies from the DSFSF to the SNFR shall be synchronised with the schedule for their subsequent shipment.
Thus, by the end of 2029, the site will be cleared of a total of 376.2 t HM, which means an average of 47.03 t HM per year. The quantity of SNF generated during these 7 years will be about 312 t HM, i.e. the amount of SNF stored on site will decrease by about 102 t HM to about 855 t HM;
• 2030 - start of SNF shipping from WWER-1000 for processing in the plants of France;
• after 2030 - performing two/three shipments per year, each with 96 cartridges of SNF from WWER-1000 for processing in the plants of France (a total of 9 shipments till 2040, containing about 347 t HM). In this way, in the coming years, a sustainable reduction of the amount of SNF stored at the site will be achieved, with the ultimate goal of clearing the site from SNF by 2060.

Optimistic scenario
The optimistic scenario envisages the implementation of all the activities foreseen in the realistic scenario. In addition, it is assumed that at a certain stage the transportation of SNF from WWER 1000 supplied by the Russian company TVEL for processing according to the current practice will begin, starting with the transportation of 379 SNF cartridges from WWER-1000, subject to the approval of the European Commission. Sending SNF from WWER-1000 for processing at the French plants remains an option, but mainly for SNF (Westinghouse and Framatom).
In this scenario, all objectives are achieved as in the realistic scenario, but with lower costs.

Pessimistic scenario
In this scenario, the sending of SNF from WWER-440 and from WWER-1000 for reprocessing will not be implemented according to the current practice.
This means that the main priority of the draft of the updated Strategy is the realization of the processing of SNF from WWER-1000, and possibly from WWER-440 in the plants of France. From 2029 onwards, the annual transportation of two/three shipments for

processing in France will begin. In this scenario, the main goal of the draft of the updated Strategy - a sustainable reduction of the amount of SNF stored on site - cannot be achieved in the next 7 years, and its implementation in the long term is also at risk. It is necessary to build a buffer capacity for dry storage of SNF from WWER 1000.

When implementing any of the SNF management scenarios, the main goals for its safe management must be achieved, which are:

• not to admit any harmful consequences on personnel, the population, the environment and the future generations;

• not to admit the transfer of significant financial burden to future generations;

• to ensure the necessary minimum free volume for emergency removal of the active zone of the operating units of Kozloduy NPP;

• to introduce new, advanced types of nuclear fuel, which lead to a reduction in the amount of SNF generated and of RAW from its processing;

• to fulfil the safety requirements in the management and storage of HLW generated during the processing of SNF.

In the current conditions, long-term forecasting would contain enormous uncertainty, and for that reason it has not been carried out at this stage. This should be done when updating the Strategy, after clarifying the geopolitical situation in Europe, the possibilities for interaction with the Russian Federation, France, the EC and other factors. The goal of the next update of the Strategy should remain the same, namely, for each 10-year period, the transportation of a total of no less than 770 t HM of SNF, and the clearing of the site of the plant from SNF by 2060.

2.1.7. Implementation monitoring of the draft of the updated Strategy

The monitoring of the overall implementation of the draft of the updated Strategy will be carried out by an interdepartmental working group, determined by an Order of the Minister of Energy. The responsibility for the implementation of each specific activity is clearly assigned to the relevant competent organization, according to the Action Plan to the draft of the updated Strategy. The currently outlined framework with strategic priorities will be subject to periodic updating in the presence of a significant change in the political vision, the legislative base of the country or innovative solutions in the technological development on a global scale.

2.1.8. Action plan according to the draft of the updated Strategy

The action plan includes the targeted measures and tasks to be implemented in the following specific directions:

I. Safe management of spent nuclear fuel - Responsible and safe management of SNF at the Kozloduy NPP site with planned tasks, measures and actions for the implementation of the realistic scenario and of the optimistic scenario;

II. Responsible and safe RAW management - Responsible and safe interim storage of HLW at the site of Kozloduy NPP; Safe management of low- and intermediate-level activity RAW from units 5 and 6 of the Kozloduy NPP, Achieving and maintaining sustainability in the management of RAW, decommissioning of SD "PRRAW - Novi Han", by combining delayed dismantling and possibility of access of the personnel to the facility;

III. Burial of HLW, MARAW and SCRS cat. 2b and 3 - Construction of DGR, Borehole burial of spent closed radioactive sources (SCRS);

IV. Decommissioning of the BAS research reactor IRT-2000 - Decommissioning (DC) of BAS research reactor - IRT 2000;

V. Decommissioning of units 1-4 of the Kozloduy NPP - DC of the units through continuous dismantling; VI. Decommissioning of units 5 and 6 of the Kozloduy NPP and SNFR;
VII. Adequate financial and human resources - Provision of sufficient financial resources for the implementation of the programs for the management of HLW and DC, Provision and maintenance of sufficient human resources by the licensee for the fulfilment of his obligations in relation to safety in the management of SNF and RAW, and DC.
The plan includes specific operations on the tasks, the responsible institutions, the deadlines, the resources (financial, human, etc.), as well as key performance indicators.

2.2. Scope of the draft of the updated Strategy for Management of Spent Nuclear Fuel (SNF) and Radioactive Waste (RAW)

The draft of the updated Strategy covers all stages of the life cycle of the nuclear facilities, the application of the most modern available technologies for the management of SNF and RAW, including their disposal, by planning the necessary activities, stages of implementation and the required financial and human resources to achieve and maintain a high level of nuclear safety, radiation and physical protection.
The territorial scope of the draft of the updated Strategy depends on the location of the existing sites and the projects envisaged in the draft of the updated Strategy.

***Location of existing SNF facilities** - In the Republic of Bulgaria, the spent nuclear fuel of Kozloduy NPP is stored at the Kozloduy NPP site in a dry spent nuclear fuel storage facility (DSNFS), in a "wet" SNF storage facility (WSNFS) and in the near-reactor pools of units 5 and 6 of the Kozloduy NPP, which are in operation and for which the relevant operating licenses have been issued.*

***Location of the existing facilities for RAW** - In the Republic of Bulgaria, the RAW management facilities and related structures, systems and components (SSC) are located at the Kozloduy NPP site and at the site of the Specialized Division "Permanent Repository for Radioactive Waste - Novi Han":*
• SD "PRRAW-Novi Han" temporarily stores unprocessed waste, which is obtained from the use of radioactive sources in industry, agriculture, medicine and scientific research, its processing and conditioning, as well as temporary storage of conditioned RAW;
• RAW from the nuclear fuel cycle is processed and stored at the Kozloduy NPP site;
• The National Repository for the Disposal of Low- and Medium-Level Short-Lived RAW (NRRAW), which is in the process of being built at a site in the immediate vicinity of the Kozloduy NPP, will receive the low- and medium-level short-lived RAW after packing them in reinforced concrete containers in the existing facilities of SD "RAW-Kozloduy".
As described above, the existing and planned facilities are located in and around the Kozloduy NPP, as well as on the site of SD "PRRAW-Novi Han".

2.2.1. Facilities that have undergone procedures under Chapter Six of the Environmental Protection Act

Existing facilities
The following existing facilities have successfully passed procedures under Chapter Six of the Environmental Protection Act:
• Facility for dry storage of spent nuclear fuel of Kozloduy NPP, with a capacity to receive 10,500 cartridges of spent nuclear fuel and a storage period of 50 years "Kozloduy NPP"

EAD, for which there is prepared an EIA report and a Decision on the EIA of MOEW No. 14 7/2006 has been issued.
• Decommissioning of units 1 to 4 of Kozloduy NPP - Kozloduy NPP EAD; SE "Radioactive waste", for which an EIA report has been prepared and a Decision of MOEW No. 8-6/2013 has been issued.
• Facility for plasma incineration of waste with a high volume reduction factor, for which there is an EIA report and an EIA Decision No. 2-2/2014 for "Facility for radioactive waste (RAW) treatment and conditioning with a high volume reduction factor at Kozloduy NPP.

Facilities envisaged
The following envisaged facilities have successfully passed procedures under Chapter Six of the Environmental Protection Act:
• National Repository for the Disposal of Low and Intermediate Radioactive Waste (NRDRAW) - there is an EIA report and Decision of the MOEW No. 7-7/2016. The facility is under construction.
• Facility for the production of StBK-type packaging from SE RAW, located on the site of the Kozloduy NPP - letter with Ref. No. OVOS-79/16.10.2018, MOEW makes an assessment that it is not necessary to conduct a procedure in accordance with Chapter Two of the EA Ordinance. The facility is under construction.

2.2.2. Zones with special status
Zones for emergency planning according to the Ordinance on emergency planning and emergency preparedness in the event of a nuclear and radiation accident In order to ensure a timely and adequate response in the event of an emergency situation, in accordance with the risk category and class of the emergency situation, emergency planning zones are identified, and they are described below:
Kozloduy NPP
The establishment of the zones with a special status around the Kozloduy NPP is related to the need to create a tool for the organization and management of the area, in accordance with the legal and regulatory framework of the country and the pan-European standards for safety and security, according to the requirements of Art. 104, para. 1 of the Safe Use of Nuclear Energy Act.
The following zones for emergency planning of Kozloduy NPP EAD have been identified:
• Zone for emergency planning of the site - protected zone No. 1, at the site of Kozloduy NPP EAD;
• Zone for preventive protective measures (ZPPM) – zone No. 2, with a radius of 2 km and a geometric centre between the ventilation pipes of units 5 and 6. The area of the zone is occupied by the industrial site of Kozloduy NPP, the site for radioactive waste storage and processing of SE RAW Kozloduy and the Radiana site. Its purpose is to limit exposure in emergency situations.
• Zone for urgent protective measures (ZUPM) 1 – zone No. 3, with a conditional radius of 30 km around the Kozloduy NPP EAD. The role of this area is related to carrying out the necessary control for the purposes of radiation protection.
The ZUPM of 30 km is identified for the purposes of emergency planning. The same 30 km zone for radiation monitoring purposes is called the Monitored Zone (MZ).
Radiana site (NRRAW) is located next to the Kozloduy NPP (it is within the limits of the monitored zone of the nuclear power plant), and has the following designated zones:

• zone for preventive protective measures (ZPPM), which is within the boundaries of its fence
• monitored zone (MZ) is below 4 km.

SD "PRRAW-Novi Han"
Until 2017, a Zone for preventive protective measures was identified in SD "PRRAW-Novi Han" with a radius of 470 m, and with central point - the centre of the repository, in accordance with the regulatory requirements at that time.
In 2018, the risk category of the facility was changed from "risk category I" to "risk category III", and accordingly, only one zone for emergency planning was identified in SD "PRRAW-Novi Han". The zone for emergency planning of the site is a protected zone covering the area of the nuclear facility, which is under the direct control of the licensee.
Facilities of INRNE - IRT-2000
The activity of spent nuclear fuel management in the country began with the commissioning of the IRT-2000 research reactor in 1961 at the Institute of Physics of the Bulgarian Academy of Sciences, Sofia. The reactor is intended for scientific research and for the production of radioactive isotopes. The irradiated fuel has been stored in the pool-type shaft facility built within the reactor's biological containment.
The IRT-2000 research reactor was decommissioned in July 1989 for modernization of its nuclear and radiation safety systems. The entire amount of spent nuclear fuel that was stored at the IRT-2000 site was exported to Russia in August 2008 within the framework of the international program Russian Research Reactor Fuel Return at the end of 2009. As part of the reconstruction project of the reactor, a partial dismantling of all internal body elements was carried out. The generated quantities of RAW from the dismantling of the reactor were handed over to SE "RAW" in May 2020. ***Therefore, at the moment there is no need to designate zones with special status around IRT-2000.***
For the entire period of operation of IRT-2000, continuous radiological monitoring of the environment has been carried out. The results of this monitoring clearly show that all measured 1The ZUPM of 30 km is identified for the purposes of emergency planning. The same 30 km zone for radiation monitoring purposes is called the Monitored Zone (MZ) values are within the limits of the maximum permissible norms for content of radioactive elements in samples from the environment. These results have been systematized and archived at the Control Laboratory for Radiation Protection of the INRNE-BAS.

Controlled and supervised zones according to the Radiation Protection Ordinance
Controlled zones
For the purposes of radiation protection, controlled zones are created at the nuclear facilities and sites with sources of ionizing radiation, and within the limits of the controlled zone, the access of persons is restricted and controlled, and radiation monitoring is carried out at the workplaces.

Supervized zones
For the purposes of radiation protection, a supervised zone is created in a nuclear facility or site with sources of ionizing radiation, and radiation monitoring of the workplaces in the supervised zone is carried out, taking into account the radiation risk.
These zones are connected with restricting and controlling the access of persons to them and carrying out radiation monitoring of the workplaces, taking into account the radiation

risk. Such zones have also been designated for Kozloduy NPP and SD "PRRAW - Novi Han".

Zones for radiation monitoring

The radiation monitoring in nuclear facilities and sites with sources of ionizing radiation, depending on the nature of the activities performed and the specific radiation factors leading to external or internal irradiation, includes measurement and assessment of the content of radionuclides in various components of the environment (air, water, soil, etc.) within the limits of the monitored zone around the nuclear facilities.

Kozloduy NPP

Radioecological monitoring at Kozloduy NPP is an integral part of ensuring the safety of the nuclear power plant and the radiation protection of the population and the environment in the area.

The purpose of the monitoring is to carry out an accurate and detailed assessment of the radiation status of the environment and to locate the possible impact of the operation of the nuclear power plant on the population and the environment in the area.

In order to locate and assess the potential impact of the Kozloduy NPP on the environment and the population, 3 control zones with different radii have been designated around the nuclear power plant:

• Supervised zone - in the security perimeter of the site of the previous units 1-4 and units 5 and 6 of the Kozloduy NPP;

• Zone for Preventive Protective Measures (ZPPM) with a radius of 2 km - The NRRAW site is within the 2-km ZPPM of the Kozloduy NPP;

• Monitored zone (MZ) with a radius of 30 km.

For comparing the results, sampling and measurements are carried out at reference points up to 100 km around the Kozloduy NPP, where no impact is expected from the operation of the plant.

Radioecological monitoring at the Kozloduy NPP is carried out in the 30-kilometer Monitored Zone (MZ), whereas on the territory of the Republic of Bulgaria, this zone includes the municipalities of: Kozloduy, Valchedrum, Hairedin, Mizia and part of the settlements in the municipalities of Lom, 35 Environmental assessment of a draft of updated strategy for management of spent nuclear fuel and radioactive waste in Bulgaria - National programme in conformity with Directive 2011/70/EURATOM Byala Slatina, Oryahovo, Boychinovtsi, Krivodol and Borovan. In this area, a Program for Radio ecological Monitoring approved by the National Centre for Radiobiology and Radiation Protection (NCRRP) and the Nuclear Regulatory Agency (NRA) is implemented. A program for radiation control of the industrial site (the supervised zone) is implemented separately, with the aim of preventive monitoring at the source of the radiation emission.

SD „PRRAW - Novi Han“

Radioecological monitoring is carried out according to approved programs included in Appendix 2 of the currently valid licenses for operation issued by the NRA. The programs identify two zones for monitoring:

• Operational zone – a zone with a radius of 1 km around the repository (with a central point - point A2 (KC1));

• Monitored zone - a zone with a radius of 5 km around the repository, within which there are three settlements - the village of Novi Han, the village of Krushovitsa and the village of Gabra.

As described above, the existing and planned nuclear facilities are located in and around the Kozloduy NPP and at SD „PRRAW - Novi Han“. Therefore, the geographical scope of the draft of the updated Strategy has been assumed to be the scope of the monitored zones around the existing and planned nuclear facilities, where radioecological monitoring is carried out, as follows:

• around the Kozloduy NPP – a 30 km zone, which includes the settlements in the municipalities of Kozloduy, Valchedrum, Hairedin, Mizia (28 settlements) and part of the settlements in the municipalities of Lom, Byala Slatina, Oryahovo, Boychinovtsi, Krivodol and Borovan;

• around SD "PRRAW - Novi Han" - a 5 km zone that covers the village of Novi Han, the village of Krushovitsa and the village of Gabra, Elin Pelin municipality.

2.3. Time frame

The draft of the updated Strategy is updated periodically and there is no time frame limitation.

3. Summary of impacts

The potential impacts of both the Strategic Objectives and the envisaged tasks and measures under the Strategic Objectives in the Action Plan are summarized by components below:

3.1 Summarised assessment of expected impacts at Strategic Objectives level - in non-radiation aspect

Summarised assessment of expected impacts on all environmental components and factors at Strategic Objectives level - in non-radiation aspect is displayed the following Table 1.

Table 1 - Summarised assessment of expected impacts at Strategic Objectives level - in non-radiation aspect

Strategic objectives	Ambient air	Climate factors	Surface water	Groundwater	Subsoil	Soils	Landscape	Flora	Fauna	PA and PT	Cultural heritage	Waste	Harmful physical factors	Material assets	Population and health
1. Minimisation of SNF interim storage periods	0	+2	+1	0	0	0	+1	0	0	0	0	0	0	+1	0
2. Reprocessing of the whole quantity of SNF generated by WWER-440 and WWER-1000	-1	+2	0	=	=	=	=	=	0/=	0	=	0	0	0	=
3. Sustainable reduction of SNF quantities stored at Kozloduy NPP site	-1	+2	0	0	+1	0	+1	-1	0/ +1	+1	0	0	0	0	+1
4. Preparation of a long-term plan for the construction of a repository for interim storage of returned vitrified HLW and other RAW from SNF reprocessing	0	+2	=	=	=	=	=	=	=	=	=	0	=	=	=
5. Commissioning of the first stage of the NRRAW by the end of 2025	0	+2	-1	0	-1	-1	-1	0	0	0	0	-1	0	+1	0-pop./ -1-work.
6. Construction of the second and third stages of NRRAW in the medium term	0	+2	-1	0	-1	-1	-1	-1	0/ -1	=	0	-1	0	+2	0-pop./ -1-work.
7. DGR design and construction in the long term	=	+2	=	=	=	=	=	=	=	=	=	-1	=	=	=
8. Ensuring financial resources for DGR construction by establishing a new target fund	0	+2	0	0	0	0	0	0	0/=	=	0/=	0	=	0	0
9. Ensuring and maintaining sustainable financial and human resources	0	+2	+1	+1	0	0	0	+1	+1	+1	0	0	+1	0	+2
10. Pursuing a policy of openness and transparency and involving the public in discussions and decision-making on SNF and RAW management	0	+2	+1	+1	0	0	0	+1	+1/=	+1	0	0	+1	0	+2

3.2 Summarised assessment of expected impacts at Strategic Objectives level – in radiation aspect

Summarised assessment of expected impacts on all environmental components and factors at Strategic Objectives level - in radiation aspect is displayed the following Table 2.

Table 2 - Summarised assessment of expected impacts at Strategic Objectives level - in radiation aspect

Strategic objectives	Ambient air	Surface water	Groundwater	Soils	Flora	Fauna	PA and PT	Waste	Harmful physical	Population and health
1. Minimisation of SNF interim storage periods	+1	+1	0	+1	+1	+1	+1	0	+1	+2
2. Reprocessing of the whole quantity of SNF generated by WWER-440 and WWER-1000	+1	+1	=	=	=	=/ +1/ +2	+2	+2	+2	=
3. Sustainable reduction of SNF quantities stored at Kozloduy NPP site	+1	+1	+1	+1	+1	+1/ +2	+2	0	+1	+2
4. Preparation of a long-term plan for the construction of a repository for interim storage of returned vitrified HLW and other RAW from SNF reprocessing	+1	=	=	=	+1	=	=	+2	=	=
5. Commissioning of the first stage of NRRAW by the end of 2025	+2	0	0	0	0	0/ +2	+2	+2	+2	0-pop./ -1-work.
6. Construction of the second and third stages of NRRAW in the medium term	+2	0	0	0	0	0/ +2	+2	+2	+2	0-pop./ -1-work.
7. DGR design and construction in the long term	+2	=	=	=	0	=/+2	+2	+2	=	=
8. Ensuring financial resources for DGR construction by establishing a new target fund	+1	0	0	0	0	=/0	=	+2	=	0
9. Ensuring and maintaining sustainable financial and human resources	+1	+1	+1	0	+1	+1	+1	+2	+2	+2
10. Pursuing a policy of openness and transparency and involving the public in discussions and decision-making on SNF and RAW management	+1	+1	+1	0	+1	+1	+1	+2	+1	+2

3.3 Summarised assessment of expected impacts at the level of tasks and measures by strategic objectives in Action Plan - in non radiation aspect

Summarised assessment of expected impacts on all environmental components and factors at the level of tasks and measures under strategic objectives in the Action Plan - in non-radiation aspect is displayed in Table 3.

Table 3 - Summarised assessment of expected impacts at tasks and measures level – in non-radiation aspect

Strategic goals, tasks and measures for each objective	Ambient air	Climate factors	Surface water	Groundwater	Subsoil	Soils	Landscape	Flora	Fauna	PA and PT	Cultural heritage	Waste	Harmful physical factors	Material assets	Population and health
I. Safe management of spent nuclear fuel															
Responsible and safe management of SNF at Kozloduy NPP site															
Maintaining WSFSF in safe condition. Renewal of WSFSF licence for SNF storage after 2024 for a new 10-year period	0	0	+1	+1	0	0	+1	0	0	0	+1	0	0	+1	0
Maintaining WSFSF in safe condition. Periodic renewal of WSFSF operating licence after 2034.	0	0	0	0	0	0	0	0	0	0	+1	0	0	0	0
Safe management of SNF at Kozloduy NPP site - realistic scenario															
SNF transportation from WWER-440 from WSFSF and DSFSF for long-term storage and reprocessing as per current practices and existing contracts	0	0	-1/ 0	0	0	0	+1	-1	-1/ 0	0	0	0	0	0	0
Maintaining readiness for SNF transportation from WWER-440 for long-term storage and reprocessing under a transport scheme via third countries	0	0	0	0	0	0	0	-1	-1/ 0	0	0	0	0	0	0
Exploring SNF transportation and reprocessing options from WWER-1000 in EU countries with technological capabilities (France)	=	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SNF transportation from WWER-1000 for long-term storage and reprocessing as per current practice	0	0	0	0	0	0		-1	-1/ 0	0	0	0	0	0	0
Safe management of SNF at Kozloduy NPP site - optimistic scenario															
SNF transportation of from WWER-1000 for long-term storage and reprocessing as per current practice.	0	0	0	0	0	0	+1	-1	-1/ 0	0	0	0	0	0	0
SNF transportation from WWER-1000 for long-term storage and reprocessing.	0	0	0	0	0	0	0	-1	-1/ 0	0	0	0	0	0	0
Safe management of SNF at Kozloduy NPP site															
Licensing of DSFSF extension for SNF storage from WWER-1000, selection of containers for dry storage	0	0	0	0	0	0	+1	0	0	0/ -1	0	0	0	0	0
Amendment to WSFSF licence	0	0	0	0	0	0	0	0	0/=	=	0	0	0	0	0
Safe management of SNF at Kozloduy NPP site															

Strategic goals, tasks and measures for each objective	Ambient air	Climate factors	Surface water	Groundwater	Subsoil	Soils	Landscape	Flora	Fauna	PA and PT	Cultural heritage	Waste	Harmful physical factors	Material assets	Population and health
Updated assessment of the capacity of WWER-1000 dry spent fuel storage facility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
II. Responsible and safe management of RAW															
Responsible and safe management of HLW at Kozloduy NPP site															
Reconciliation of methodology for determining the quantity and characteristics of RAW from reprocessing SNF from WWER-440 and WWER-1000	0/ +1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reconciliation of methodology for determining the quantity and characteristics of RAW from reprocessing SNF from WWER-1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Preparation of a long-term plan for the construction of a repository for interim storage of vitrified HLW and other RAW from SNF reprocessing	=	0	0	0	0	0	0	=/0	0/=	=	0	0	0	0	0
Safe management of low- and intermediate-level active RAW from Kozloduy NPP Units 5 and 6															
Improvement of efficiency in separating RAW by its radiation, physical and chemical characteristics, and achieving compliance with RAW acceptance criteria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimization of RAW generation	=	0	0	0	+1	0	0	0/ +1	0/ +1	+1	0	0	0	0	0
Enhancing safety in the storage and management of liquid and solid historical RAW	0	0	-1	+1	+1	0	+1	0/ +1	0/ +1	+1	0	0	0	+1	+
Achieving and maintaining sustainability in RAW management															
Ensuring safe and efficient RAW storage in the interim storage facilities of SE RAW and its subsequent transportation conditioning and disposal	=	0	0	0	+1	-1	-1	0	0	+1	0	0	0	+1	0
Construction of NRRAW for low- and intermediate-level waste	0	0	-1	0	-1	-1	-1	-1	0/ -1	-1/ 0	-1	-1	-1	+1	0 –pop -1-work.
DC of SD "PRRAW-Novi Han" by a combination of delayed dismantling and option for personnel access to the facility															
Preparation of documents for issuing DC licence. Safe and effective DC	0	0	-1	0	0	0	0	0	-1/0 /+1	+1	0	-1	-1	0	0 –pop -1-work.
Safe management of RAW from previous activities	0	0	+1	0	+1	0	+1	0	0/+ 1	+1	0	0	0	0	0
III. Disposal of HLW, MARAW and SCRS cat. 2b and 3															
DGR Construction															
Activities under Annex 6	=	0	=	=	=	=	=	=	=	=	=	=	=	=	=
Borehole disposal of spent and closed radioactive sources (SCRS)															

Strategic goals, tasks and measures for each objective	Ambient air	Climate factors	Surface water	Groundwater	Subsoil	Soils	Landscape	Flora	Fauna	PA and PT	Cultural heritage	Waste	Harmful physical factors	Material assets	Population and health
Planning and implementation of a borehole disposal concept	=	0	=	=	=	=	=	0	=/0	0	=	0	=	=	=
Packing	0	0	0	=	0	=	+1	=/0	=/0	=	0	0	0	0	0
IV. DC of BAS IRT 2000 research reactor															
DC of BAS IRT 2000 research reactor															
Preparatory activities for DC	0	0	0	0	0	0	0	=/0	0/=	=	0	0	0	0	0
DC activities	0	0	0	0	0	0	0	=/0	-1/ 0/=	=	0	-1	-1	0	0 –pop -1-work.
V. Decommissioning of Units 1-4 of Kozloduy NPP															
DC of units by continual dismantling															
Ensuring safe and effective DC. Temporary storage of generated RAW and its subsequent transportation, conditioning and disposal	0	0	-1	0	-1	-1	-1	+1	- 1/0 /+1	+1	0	-1	-1	0	0 –pop -1-work.
VI. Decommissioning of Units 5 and 6 of Kozloduy NPP and WSFSF															
Decommissioning of Units 5 and 6 of Kozloduy NPP															
Development of pre-concept for DC of units 5 and 6 of Kozloduy NPP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Development of DC plan for Units 5 and 6 of Kozloduy NPP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DC of WSFSF															
Development of pre-concept and plan for DC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Execution of DC activities	0	0	=	=	=	=	=	=/0	=/0	0	0	-1	=	=	=
VII. Adequate financial and human resources															
Ensuring a long-term mechanism to accumulate funds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Methodology for determining the costs of financing DC of Units 5 and 6 of Kozloduy NPP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategy for investment of financial assets of NFDF, RAW fund and DGR construction target fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sufficient funds accumulated	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ensuring and maintaining sufficient human resources by the licensee to fulfil its safety obligations in SNF and RAW management and DC															
Ensuring sufficient and qualified personnel for implementation of SNF and RAW management activities	0	0	+1	+1	0	0	0	+1	0/ +1	0	0	0	+1	0	+2
Ensuring sufficient and qualified personnel for implementation of DC activities	0	0	+1	+1	0	0	0	+1	0/ +1	0	0	0	+1	0	+2

3.4 Summarised assessment of expected impacts at the level of tasks and measures by strategic objectives in the Action Plan – in radiation aspect

Summarised assessment of expected impacts on all environmental components and factors at the level of tasks and measures under strategic objectives in the Action Plan - in radiation aspect is displayed in Table 4.

Table 4 - Summarised assessment of expected impacts at the level of tasks and measures- in radiation aspect

Strategic goals, tasks and measures for each objective	Ambient air	Climate factors	Surface water	Groundwater	Soils	Flora	Fauna	PP and PT	Waste	Harmful physical factors	Population and health
I. Safe management of spent nuclear fuel											
Responsible and safe management of SNF at the Kozloduy NPP site											
Maintaining WSFSF in safe condition. Renewal of WSFSF licence for SNF storage after 2024 for a new 10-year period	+2	0	+1	+1	+1	+1	+1/ 0	0	0	+1	+2
Maintaining WSFSF in safe condition. Periodic renewal of WSFSF operating licence after 2034	+2	0	0	0	0	+1	+1/ 0	0	0	+1	0
Safe management of SNF at the Kozloduy NPP site - realistic scenario											
SNF transportation from WWER from WSFSF and DSFSF for long-term storage and processing as per current practices and existing contracts	+1/ 0	0	-1	0	+1	+1	+1/ 0	0	0	+1	+2
Maintaining readiness for SNF transportation from WWER-440 for long-term storage and processing under a transport scheme via third countries	+1/ 0	0	0	0	0	+1	+1/ 0	0	0	+1	+2
Exploring SNF transportation and reprocessing options from WWER-1000 in EU countries with technological capabilities (France)	+1/ 0	0	+1	0	0	0	0	0	0	0	+2
SNF transportation from WWER-1000 for long-term storage and processing as per current practice	+1/ 0	0	+1	0	+1	+1	+1/- 1/0	0	0	+1	+2
Safe management of SNF at the Kozloduy NPP site - optimistic scenario.											
SNF transportation of from WWER-1000 for long-term storage and reprocessing as per current practice.	+1	0	+1	0	0	+1	+1/ 0	0	0	+1	+2
SNF transportation of from WWER-1000 for long-term storage and processing	+1	0	+1	0	+1	+1	+1/ 0	0	0	+1	+2
Safe management of SNF at the Kozloduy NPP site											
Licensing of DSFSF extension for storage of SNF from WWER-1000, selection of containers for dry storage	+1	0	0	0	0	+1	+1/ 0	0	0	+1	0
Amendment to WSFSF licence	+1	0	0	0	0	0	0/=	=/0	0	0	0
Safe management of SNF at the Kozloduy NPP site											
Updated assessment of the capacity of DSFSF for SNF from WWER-1000	+1	0	0	0	0	0	0	0	0	0	0

Strategic goals, tasks and measures for each objective	Ambient air	Climate factors	Surface water	Groundwater	Soils	Flora	Fauna	PP and PT	Waste	Harmful physical factors	Population and health
II. RAW responsible and safe management											
HLW responsible and safe interim storage at Kozloduy NPP											
Reconciliation of methodology for determining quantity and characteristics of RAW from processing SNF from WWER-440 and WWER-1000	+1	0	0	0	0	0	0	0	+2	+1	0
Reconciliation of methodology for determining the quantity and characteristics of RAW from processing SNF from WWER-1000	+1	0	0	0	0	0	0	0	+2	+1	0
Preparation of a long-term plan for the construction of a repository for interim storage of vitrified HLW and other RAW from SNF processing	+1	0	0	0	0	0	=/0	=	+2	+1	0
Safe management of low- and intermediate-level active RAW from Units 5 and 6 of Kozloduy NPP											
Improvement of efficiency in separating RAW by its radiation, physical and chemical characteristics, and achieving compliance with RAW acceptance criteria	+1	0	0	0	+1	+1	+1/ 0	0	+2	+1	+2
Minimization of RAW generation	+1	0	+1	0	0	+1	+1	+1	+2	+2	+2
Enhancing safety in the storage and management of liquid and solid historical RAW	+1	0	-1	+1	+1	-1	+1	+1	+2	+2	+2
Achieving and maintaining sustainability in RAW management											
Ensuring safe and efficient RAW storage in the interim storage facilities of SE RAW and its subsequent transportation, conditioning and burial	+2	0	0	0	+1	+1	+1	+1	+2	+2	+2
Construction of NRRAW for low and intermediate level waste	+2	0	0	0	+1	0	0/ +2	+1	+2	+2	0
DC of SD "PRRAW-Novi Han" by a combination delayed dismantling and option for personnel access to the facility.											
Preparation of documents for issuing DC licence. Safe and effective DC	0	0	-1	0	0	-1	-1/ 0/+1	+1	+2	+1	0-pop - 1-work.
Safe management of RAW from previous activities	0	0	+1	0	+1	+1	+1	+1	+2	+2	+2
III. Disposal of HLW, MARAW and SCRS category 2b and 3											
DGR Construction											
Activities under Annex 6	+2	0	=	=	=	=	=	=	+2	=	=
Borehole disposal of spent and closed radioactive sources (SCRS)											
Planning and implementation of a borehole disposal concept	+2	0	=	=	=	=	=/0	0	+2	=	=
Packing	+2	0	+1	=	+1	+1	=/+1	=	+2	+2	+2
IV. DC of BAS IRT 2000 research reactor											
DC of BAS IRT 2000 research reactor											
Preparatory activities for DC	0	0	0	0	0	0	0/=	=	+2	0	0
DC activities	0	0	0	0	0	0	0/=	=	+2	+1	0-pop -1-

Strategic goals, tasks and measures for each objective	Ambient air	Climate factors	Surface water	Groundwater	Soils	Flora	Fauna	PP and PT	Waste	Harmful physical factors	Population and health
											work.
V. Decommissioning of Units 1-4 of Kozloduy NPP											
DC of units by continual dismantling											
Ensuring safe and effective DC. Temporary storage of generated RAW and its subsequent transportation, conditioning and burial	0	0	+1	0	-1	-1/ +1	-1/0/+1	+1	+2	+1	0-pop -1- work.
VI. Decommissioning of Units 5 and 6 of Kozloduy NPP and WSFSF											
Decommissioning of Units 5 and 6 of Kozloduy NPP.											
Development of pre-concept for DC of units 5 and 6 of Kozloduy NPP	+1	0	0	0	0	0	0	0	+2	0/ +2	0
Development of plan for DC of Units 5 and 6 of Kozloduy NPP	+1	0	0	0	0	0	0	0	+2	0/ +2	0
DC of WSFSF.											
Development of pre-concept and plan for DC.	+1	0	0	0	0	0	0	0	0	0	0
Execution of DC activities	0	0	=	=	=	=	=/0	0	0	=	=
VII. Adequate financial and human resources											
Ensuring a long-term mechanism to accumulate funds.	+1	0	0	0	0	0	0	0	+1	0	0
Methodology for determining the costs of financing the DC of Units 5 and 6 of Kozloduy NPP.	+1	0	0	0	0	0	0	0	+1	0	0
Strategy for investment of financial assets of NFDF, RAW fund and DGR construction target fund	+1	0	0	0	0	0	0	0	+1	0	0
Sufficient funds accumulated	+1	0	0	0	0	0	0	0	+1	0	0
Ensuring and maintaining sufficient human resources by the licensee to fulfil its safety obligations in SNF and RAW management and DC.											
Ensuring sufficient and qualified personnel for implementation of SNF and RAW management activities	+1	0	+1	+1	0	+1	+1	0	+2	+1	+2
Ensuring sufficient and qualified personnel for implementation of DC activities.	+1	0	+1	+1	0	+1	+1	0	+2	+1	+2

3.5 Summary conclusion

The implementation of the draft of an updated Strategy will have a comprehensive, beneficial effect on the environment and human health.

The Strategic Objectives and the Tasks and Measures in the Action Plan of Alternative 2 are more specific, refined and linked to current strategic documents in the area.

At the level of strategic objectives

The ten strategic objectives identified include wide-ranging activities and tasks leading to the reduction of the potential for environmental pollution and the reduction of impacts on the population, and in general the impacts on the environment and the population can be defined as beneficial, permanent, long-term, direct and indirect, cumulative.

In non-radiation aspect

*In **non-radiation aspect**, the implementation of most of the Strategic Objectives (Strategic Objectives 1 to 6) is not expected to have impacts on all components, with insignificant positive permanent and long-term, local impact expected on climate factors, material assets, surface water, landscape, PAs and PTs, and population and human health in the implementation of some of these 6 Strategic Objectives. Strategic Objectives 9 and 10, related to the provision, training and development of personnel trained and prepared to work on the sustainable improvement of the radiation risk associated with SNF and RAW management, are assessed as important for the environment and especially for the population and of great social importance, and they are expected to have a beneficial, direct and indirect, long-term and permanent impact, which will be mostly local, as well as regional.*

Two of the strategic objectives (Strategic Objectives 7 and 8) are expected to have beneficial impacts in non-radiation aspect in the future, but this assessment is not possible at present due to insufficient detail in the objectives.

Minor local, indirect, temporarily reversible negative environmental impacts of low significance are possible due to dust and emissions from transport activities during the implementation of tasks, measures and actions mostly related to SNF transportation or construction of NRRAW, and the impacts will be negative but reversible, short-term and temporary, local and it will not be significant.

No environmental consequences are expected from the implementation of the Strategic Objectives, as no impacts are expected from the implementation of most of the Strategic Objectives, and the possible negative impacts, as well as the possible positive impacts from the implementation of some of them, are negligible, reversible, short-term, temporary, and mostly local, which would not lead to consequences in non-radiation aspect on the environment and the health of the population. Due to the small scale and insignificance of the expected positive and negative impacts, no transboundary impacts are expected in non-radiational aspect when implementing the Strategic Objectives.

In radiation aspect

In radiation aspect, most of the Strategic Objectives (Strategic Objectives 1 to 6) are related to minimising the SNF interim storage period, reprocessing of the whole amount of SNF generated, sustainable reduction of SNF quantities at Kozloduy NPP site and construction of appropriate storage and reprocessing facilities, and they have a fully beneficial, direct and indirect, local and regional, long-term and permanent and cumulative impact on the environment and human health.

Beneficial radiation impacts are expected in the future with the implementation of two of the strategic objectives (Strategic Objectives 7 and 8), but this assessment is not

possible at present due to insufficient detail in the tasks (to date, no detailed concept has been developed yet).
It is also expected that there will be an indirect permanent, short-term and long-term beneficial impact from providing staff with the necessary expertise and skills to better deal with SNF and RAW management, as well as from involving the public in the discussion and decision-making on SNF and RAW management (Strategic Objective 9 Ensuring and maintaining sustainable financial and human resources and Strategic Objective 10. Pursuing a policy of openness and transparency and involving the public in discussions and decision-making on SNF and RAW management).
Implementation of the Strategic Objectives is likely to result in consequences for air, climate, the PAs and PTs and species and habitats, waste, harmful physical factors, material assets, and the population and its health, as the implementation of many of the Strategic Objectives is expected to result in positive impacts, direct and indirect, with low and high significance (mostly low), local and regional (mostly local), permanent and long-term, cumulative, that would result in positive consequences in radiation aspect. These consequences are expected to be indirect, permanent and long-term and not significant.
As the assessed positive impact on the environment and human health in radiological aspect is expected to be mainly of low significance and of small territorial extent, no positive transboundary impacts are expected to occur.

At the level of tasks and measures under strategic objectives in the Action Plan

In non-radiation aspect

In non-radiation aspect, no impacts are expected from the implementation of most of the tasks and measures under strategic objectives in the Action Plan, with minor positive, predominantly indirect, local, long-term and permanent impacts, that will not lead to consequences, expected from the implementation of some tasks and measures on material assets, surface and groundwater, landscape, cultural heritage, PAs and PTs, and population and human health.
The measures considered to be important for the environment and especially for the population and of great social importance are the following: Ensuring and maintaining sufficient human resources by the licensee to fulfil its safety obligations in SNF and RAW management and DC (under Objective VII. Adequate financial and human resources) related to ensuring sufficient and qualified personnel for implementation of SNF and RAW management activities and for DC activities that are expected to have a positive, direct and indirect, local, long-term and permanent impact which will not be significant.
No environmental consequences in non-radiation aspect are expected to occur as a result of the implementation of the tasks and measures under the strategic objectives in the Action Plan, as the possible positive and negative impacts will not be significant and will not be direct, and therefore they will not result in consequences for the environment.
Transboundary impacts in a non-radiational aspect are also not expected when implementing the tasks and measures under the strategic objectives in the Action Plan due to the small scope and insignificance of the expected positive and negative impacts.

In radiation aspect

Almost all tasks and measures involving the implementation of specific activities for SNF and RAW safe management (mainly under Objective I. Safe management of spent nuclear fuel and Objective II. Responsible and safe management of RAW), the sustainable reduction of the quantities of SNF at Kozloduy NPP site and the construction

of appropriate storage and processing facilities, as well as the provision and maintenance of sufficient human resources to meet the obligations of their safe management, have a direct and indirect, short-, medium- and long-term, permanent beneficial impact in radiation aspect on the components and factors of the environment and human health, as they will ensure the protection of the environment from contamination with radionuclides and ensure a minimum frequency of safety-related operational events. A beneficial cumulative impact of low and medium significance is also expected, associated with lasting positive changes in the existing radiation status of the environment and the population. This impact is not expected to result in transboundary impacts on the territory of other countries.

As a result of these impacts, it is also possible that there will be positive consequences on ambient air, climate, waste, harmful physical factors and population and human health from the implementation of the tasks and measures under the strategic objectives in the Radiation Action Plan, which are expected to be mainly indirect, local, permanent and long-lasting and not significant.

In the implementation of some measures and tasks, no impact is expected as they involve purely administrative activities, i.e. they are related to feasibility studies, preparatory activities and pre concept development,

which does not allow to assess the impact in a radiation aspect.

A local, temporary, reversible negative impact which will not be significant on the environment is expected from:

● all transport schemes, with impacts dispersed along the road corridor (under Objective I. Safe management of spent nuclear fuel);

● Construction of NRRAW for low- and intermediate-level waste (under Objective II. Responsible and safe management of RAW);

● dismantling and reclamation at DC of the BAS IRT 2000 research reactor (under Objective IV. DC of BAS IRT 2000 research reactor);

● reclamation of soils around Units 1-4 and restoration of their sites (under Objective V. Decommissioning of Units 1-4 of Kozloduy NPP);

● dismantling and reclamation at DC of WSFSF until reaching the final "brownfield" condition (under Objective VI. Decommissioning of Units 5 and 6 of Kozloduy NPP and WSFSF).

It can be summarised that the implementation of certain measures and tasks will be associated with insignificant negative impacts on the environment (mainly on soil, air, flora and fauna components) during construction, dismantling and reclamation works are expected due to air pollution and noise and waste generation. This impact is expected to be local, within the construction sites and facilities, temporary and reversible and insignificant.

Due to the insignificance, small territorial scope and reversibility of the possible negative impacts during the implementation of some of the tasks and measures under the strategic objectives in the Action Plan, they are not expected to lead to negative consequences on the environment and human health in radiation aspect.

No negative transboundary impacts in radiological aspect are expected from the implementation of the tasks and measures under strategic objectives in the Action Plan due to the local and not significant extent of the potential negative impacts.

Some of the tasks and measures qualify as measures contributing to environmental objectives (beneficial impact on climate change, adaptation to climate change, sustainable use and protection of water resources, transition to a circular economy,

prevention and control of pollution, protection of aquatic biodiversity and aquatic ecosystems), pursuant to Art. 9 of Regulation 2020/852.

3.6 Transboundary impact

In accordance with the Convention on Environmental Impact Assessment in a Transboundary Context and the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, the draft of the updated Strategy falls under item 2 of Art. 4: Field of application in relation to plans and programs, which sates the following: Strategic environmental assessment shall be carried out for plans and programs which are prepared for agriculture, forestry, fisheries, energy, industry, including mining, transport, regional development, waste management, water management, telecommunications, tourism, spatial planning or land use, and which provide the framework for coherence for the future development of projects listed in Annex I and any other project listed in Annex II requiring an environmental impact assessment.

The draft of the updated Strategy falls within Annex I: List of projects pursuant to Art. 4, para. 2, item 3: Installations intended solely for the production or enrichment of nuclear fuels, for reprocessing of spent nuclear fuels or for the storage, disposal or reprocessing of radioactive waste.

3.6.1. Summarised conclusions regarding the possible presence of transboundary environmental and human health impacts in the developed and adopted EIA Reports

Over the last few years, a number of environmental and population impact assessments have been carried out on the operation of power units and new facilities at Kozloduy NPP site and around it. The impact of Units 5 and 6 has been the subject of a number of EIA reports over the years – starting from EIAR on Unit 5 and 6 Modernisation Program, 1998; EIAR on Kozloduy NPP, 1999; EIAR on the Repository for SNF Dry Storage, 2006; EIAR on Units 1-4 Decommissioning, 2013; EIAR on FPI, 2014; EIAR on New Nuclear Power Build (NNPB) Construction at Kozloduy NPP Site, 2015, and the most up-to-date environmental impact assessment in EIAR on NRRAW, 2016.

Thus, at Kozloduy NPP site and in the surrounding area:

● A National Repository for Disposal of Low- and Intermediate-level Radioactive Waste (NRRAW) is under construction, for which EIAR has been developed and approved by the MoEW by Decision No. 7-7/2016. In this report, an environmental impact assessment in a transboundary context has also been carried out in accordance with the procedure envisaged in the applicable Bulgarian legislation, specifically Art. 8, para. 1 of the Environmental Protection Act and Art. 25 of the Ordinance on the condition and procedures for carrying out 272 Environmental assessment of a draft of updated strategy for management of spent nuclear fuel and radioactive waste in Bulgaria - National programme in conformity with Directive 2011/70/EURATOM EIA, as well as in accordance with the Convention on EIA in a Transboundary Context (Espoo Convention). The EIAR concludes that the impact on humans and the environment on the territory of the Republic of Bulgaria and Romania from the construction and operation and closure of the Repository for Disposal of Conditioned RAW Containers, is well below the limits set by national and international requirements. The radiological effects on humans and the environment during operation and closure have been assessed as negligible, including through mathematical modelling and based on existing experience from the operation of identical facilities in other countries;

● *Kozloduy NPP Units 1 to 4 are being decommissioned, for which an EIAR has been prepared and approved by the MoEW by Decision No 8-6/2013. In this Decision, the environmental and human impacts considered as a result of the decommissioning of Kozloduy NPP Units 1 4 during the decommissioning preparatory stage, Stage 1, Stage 2 of decommissioning and the closure and reclamation stage are assessed as very low. The radiological impacts are reduced to a significantly lower level compared to the final shutdown of the units and are substantially reduced compared to the impacts during the operational lifetime of the units. The radiological impacts tend to be reduced to even lower levels through the consistent implementation of the ALARA principle, which has been successfully applied in all previous activities carried out at Kozloduy NPP site. No transboundary radiological impacts are expected. The non-radiological impacts of the decommissioning activities of Units 1-4, such as the generation of non-radioactive waste and emissions of harmful substances, are assessed to be very low and of local significance and also limited in time. No transboundary non radiological impacts are expected;*

● *A Facility for Plasma Incineration (FPI) of Waste with a High Volume Reduction Factor has been constructed and has been subject to EIA Report which was approved with EIA Decision No. 2-2/2014. The Decision states that, as a result of the summarised assessments of all possible impacts on environmental components and factors, no transboundary impacts are expected as a result of the construction, operation and decommissioning of FPI within the 30 km zone of Kozloduy NPP, both on Bulgarian territory and transboundary on the territory of neighbouring Romania.*

In these EIA procedures, Romania was the country that identified itself as affected and expressed its willingness to participate in the EIA procedure. In accordance with the requirements of the Convention on EIA in a transboundary context, consultations have been conducted in a transboundary context, including making EIA reports publicly available. Also, a public discussion was held in Romania for EIA of national repository for disposal of low- and intermediate-level radioactive waste (NRRAW).

In addition, a transborder procedure was conducted for IP for "Extension of the lifetime of Units 5 and 6 of Kozloduy NPP", which was concluded by Decision No. 6-ПР/2014 on the assessment of the need for carrying out an environmental impact assessment. Romania expressed interest in participating. The Romanian Ministry of Environment and Climate Change sent comments in connection with the notification sent on the part of Bulgaria. In response, Bulgaria provided the necessary information and documentation to Romania. The conclusion of the assessment, based on the transboundary procedure carried out, is that extending the operation of Units 5 and 6 does not substantially alter the operating regime of the nuclear power plant over the years and will not lead to a change in the conclusions about the non-existence of an assessable radioecological impact from the operation of Kozloduy NPP on the population and the environment in the area, both on Bulgarian and Romanian territory. No cumulative radioecological impact is expected from the continued operation of Units 5 and 6. The nature of the investment proposal "Lifetime extension of Units 5 and 6 of Kozloduy NPP" does not foresee the construction of a new facility on site, therefore no change in the transboundary impact assessments of Kozloduy NPP is expected. The assessment of environmental impact of the operation of Units 1 to 6 was subject to EIA in 1999, and the conclusions of no significant impact remain unchanged. No transboundary impact is expected from the operation of Units 5 and 6 and the other facilities at Kozloduy NPP site.

The conclusions on the non-existence of transboundary impacts are also confirmed in the EIA of the IP "Construction of a new nuclear power plant of the latest generation at Kozloduy NPP site", approved by Decision No. 1-1/2015 of the Ministry of Environment and Water. In this EIA procedure, Romania is the country that identified itself as affected and expressed its willingness to participate in the EIA procedure. In accordance with the requirements of the Convention on EIA, consultations have been conducted in a transboundary context, including public discussions in Romania. The conclusion of the assessment is that:

• No non-radiological impacts on environmental components and factors are expected;

• No radiological impacts are expected on water, land and soil, subsoil, land use, mineral diversity, biodiversity, environment and cultural resources; areas inhabited by protected, important and sensitive flora and fauna species; picturesque areas; areas and sites of historical and cultural significance, sites protected by international or national law, as well as on the health of personnel and population;

• The contribution of the new nuclear power build (NNPB) to the radiation background in the vicinity of the town of Kozloduy due to external radiation exposure is negligible even when cumulated with the existing nuclear facilities at Kozloduy NPP site. The cumulative impact on the environment in a radiation aspect is assessed as negligible; no cumulative impact is expected in a non-radiation aspect;

• No transboundary impact is expected;

• During all three phases of the implementation of the IP: construction, operation and decommissioning, no transboundary impact has been identified on the Romanian territory within the 30-km zone around Kozloduy NPP.

It is evident from the above review that in all the transboundary EIA Report procedures carried out, it was concluded that no significant transboundary impact on the environment and human health on the territory of other countries is expected.

In terms of environmental and human health impacts in a transboundary context, the facilities for SNF and for RAW envisaged in the draft updated Strategy may be relevant as follows:

SNF

In Bulgaria, SNF is generated by units 5 and 6 of the Kozloduy NPP, and in the past also by units 1 to 4 of the nuclear power plant. SNF management practices in Bulgaria are related to the storage of SNF from WWER-1000 in the near-reactor aging pools and in WSNFS (Wet Spent Nuclear Fuel Storage Facility), and from WWER-440 - in WSNFS and in DSNFS (Dry Spent Nuclear Fuel Storage, which are in operation and for which the relevant operating licences have been issued. These facilities have been assessed in the EIA reports described above and it has been concluded that no transboundary impacts on the environment and human health are expected on the territory of other countries.

No new SNF management facilities are envisaged in the draft updated strategy, no increase, but on the contrary a decrease in the amount of SNF on the Kozloduy NPP site is foreseen, so their impact, including transboundary impact, is also expected to decrease.

RAW

The existing facilities for the management of RAW include: a facility for the treatment and storage of RAW at Kozloduy NPP, including the Facility for the Treatment and Conditioning of Radioactive Waste with High Volume Reduction Factor at Kozloduy NPP; facilities for the interim storage of RAW from Units 5 and 6 and the Specialised

Division "Permanent Repository for Radioactive Waste - Novi Han". The facilities foreseen in the draft updated Strategy are: the National Repository for Radioactive Waste ("NRRAW") and the StBK packaging facility of the State Enterprise RAW, both of which have undergone an Environmental Impact Assessment, including in a transboundary context.
The EIA Report for NRRAW provides an environmental analysis of the alternative technological solutions for the construction of the NRRAW, proposes a number of measures and recommendations to minimise the impact of the site on the environment and to ensure the full safety of the personnel and the population in the area during the construction, operation and closure of the NRRAW in radiological and non-radiological aspects. With effective management of the NRRAW, no significant negative impacts on the environment are expected and the safety measures envisaged will ensure that no health risks are posed to the site workers and the population in the area. The impact on the individual environmental components and the factors affecting them is assessed as insignificant with a territorial scope of impact within the boundaries of the investment proposal site and the immediate surroundings both during construction and during normal operation and after closure of the NRRAW.
The area of potential impact is limited to the protected area of the NRRAW. This area is not accessible to the public. The area of potential impact does not cross the national borders of Bulgaria and no transboundary impact is expected.

3.6.2. Summarised conclusions about the likelihood of existence of transboundary impacts on the environment and human health based on the analyses and impact assessments in the EAR

The EAR assesses impacts at the level of Strategic Objectives and at the level of tasks and measures under the Strategic Objectives in the Action Plan (including the territorial scope of the impacts), and also summarises in section 9.4 the expected impacts and the potential for consequences for the environment and human health from these impacts, as well as the potential for transboundary impacts. Thus, the assessment of transboundary impacts at the level of Strategic Objectives and at the level of targets and measures under the Strategic Objectives in the Action Plan is as follows:

At the level of Strategic Objectives

In non-radiation aspect *- Regarding the impact at the level of Strategic Objectives, it has been assessed that the expected positive and negative impacts are local in scope and not significant, no effects on the environment and the health of the population are expected and no impacts on the territory of other countries are expected.*

In radiation aspect *- No negative impacts are expected in radiation aspect and therefore no transboundary negative impacts are expected when implementing the Strategic Objectives.*

Due to the predominantly low significance, as well as the small scope of the expected positive impact, no impacts are expected to occur in other countries.

At the level of targets and measures under the strategic objectives in the Action Plan

In non-radiation aspect *- No transboundary impacts in non-radiation aspect are expected in the implementation of the tasks and measures under the strategic objectives in the Action Plan due to the small scope and insignificance of the expected positive and negative impacts.*

In radiation aspect

The assessed direct and indirect, short, medium and long term, permanent positive impact on the environment and human health when implementing some of the tasks and measures under the strategic objectives in the Action Plan is also likely to lead to minor positive effects on ambient air, climate, waste, harmful physical factors and population and human health with a small scope, and these impacts are not expected to extend to the territory of other countries.

No negative transboundary radiological impacts are expected from the implementation of the tasks and measures under the strategic objectives in the Action Plan due to the local extent and the non significance of the potential negative impacts.

Based on the above, it can be concluded that no transboundary impacts on the environment and human health in the territory of other countries are expected from the implementation of the strategic goals and targets and measures under strategic objectives in the Action Plan.

In accordance with the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context, an analysis and assessment of the impact of the assumptions of the draft of an updated Strategy on the environment and human health, including other countries, has been carried out against the criteria for identifying the likelihood of significant impact.

Table 5 - Criteria for assessment of presumed transboundary impact

No.	Criteria for identification of possible significant impacts on the environment, including health impact under Annex III of the Protocol on Strategic Environmental Assessment to the EIA Convention in a transboundary context	Analysis and assessment of the presumed transboundary impact of the draft of an updated Strategy under the relevant criteria
1	The compliance of the draft of an updated Strategy in terms of integrating environmental, including health considerations, in particular to support sustainable development.	Based on the analysis of the assumptions of the draft of an updated Strategy against other relevant plans and programs and against national, European and international documents setting environmental targets, the draft of an updated Strategy takes into account and integrates environmental, including health considerations.
2	The extent to which the plan of an updated Strategy provides a framework for projects and other activities either in terms of location, nature, size and operating conditions, or through the allocation of resources.	The strategic objectives of the draft of an updated Strategy set the framework for the development of projects and other activities, with a local scope of the implementation of the assumptions, respectively a local scope of the impact on the environment and human health.

3	The extent to which the plan of an updated Strategy has an impact on other plans and programs, including those in the hierarchy	The draft of an updated Strategy complies with, derives from, is consistent with and is not in conflict with the national and European strategic, planning and programming documents with which it is correlated (as per the analysis under item 3 of the EAR)
4	Environmental, including health issues related to the plan of an updated Strategy	The draft of an updated Strategy and its Strategic Objectives are focused on sustainable development, also linked to the resolution of existing environmental and health issues within its scope.
5	The nature of environmental impacts, including health impacts such as likelihood, duration, frequency, reversibility, magnitude and distribution (e.g. geographical area or population likely to be affected).	Environmental and human health impacts are expected mainly for the construction phases in relation to the individual tasks and measures envisaged to be financed, such as the construction of the second and third phases of the NRRAW, as well as the DC of Kozloduy Units 1-4. The nature of the environmental impacts, including health impacts, are assessed in the approved EIA reports in which Romania identified itself as an affected country. The impacts on environment and the population considered in the EIA Decisions are assessed as very low, reversible and of local significance, and also limited in time - the duration is small
6	Risks to the environment, including human health	The conducted analysis of expected impacts concludes that no serious or significant risks to the environment and the health of the population in Bulgaria, as well in other countries are predicted from the
7	The extent to which the draft of an updated Strategy would affect valuable or sensitive areas, including landscapes with recognised national or international protected status	The analysis carried out in the EAR has established that the Strategic Objectives envisaged in the draft updated Strategy, as well as the tasks and measures under the Strategic Objectives in the Action Plan, are not expected to affect such areas and landscapes, both in Bulgaria and in other countries.
8	Transboundary nature of impacts • Likelihood of occurrence of impact • Type of impact • Magnitude (degree of impact) • Duration	Based on the analysis of the expected impacts from the implementation of the draft updated Strategy, it has been assessed that positive and negative impacts are likely to occur, which will be direct and indirect, with predominantly low to high impact, short and long term, permanent
	• Frequency • Reversibility • - Territorial scope of impact	and temporary, reversible and predominantly local in scope. Regarding the potential transboundary impact, it is assessed that: • at the level of the Strategic Objectives, both in radiation and non-radiation aspects, no negative and positive transboundary impacts are likely to occur; • at the level of tasks and measures under the strategic objectives in the Action Plan - no transboundary impacts are expected to occur either Transboundary radiological and non-radiological impacts on other countries are not expected

No significant transboundary impacts on the environment and human health in the territory of other countries are expected from the implementation of the strategic goals and tasks and measures under strategic objectives in the Action Plan.

4. Comments of the Directorate of Environment and Climate Change of the Region of Attica

Due to the unfavourable geopolitical changes that occurred in early 2022 after the start of the war of the Russian Federation (RF) against Ukraine, a number of risks related to the management of SNF and HLW have arisen.

1. As stated in the EA, «in 2024 and beyond, the 5th unit will be loaded with fresh nuclear fuel (FNF) produced by Westinghouse, and the operation of the 6th unit in the following years will continue with the traditional manufacturer's FNF, and then with the FNF supplied by Framatom France until the end of their operational life.
The introduction of fuel from another manufacturer must be proven by carrying out a full set of safety analyses, their verification and licensing, especially in mixed fuelling of the core».

The process should be evaluated by performing pilot tests under very strict safety protocols, while it is proposed to aim for cooperation with special experts from the Greek Atomic Energy Commission (EEAE), and respective authorities of the other affected parties, to provide advice on technical and practical issues.

In any case the nuclear facilities should operate according to the Council Directive 2014/87/EURATOM, establishing a Community framework for the nuclear safety of nuclear installations (EE L 219/25.07.2014), in which is also underlined that «The consequences of a nuclear accident can go beyond national borders, therefore close cooperation, coordination and information exchange between competent regulatory authorities of Member States in the vicinity of a nuclear installation, irrespective of whether those Member States operate nuclear installations or not, should be encouraged. In this respect, Member States should ensure that appropriate arrangements are in place to facilitate such cooperation on nuclear safety matters with cross-border impacts»

2. *According to Council Directive 2011/70/EURATOM «Radioactive waste, including spent fuel considered as waste, requires containment and isolation from humans and the living environment over the long term. Its specific nature, namely that it contains radionuclides, requires arrangements to protect human health and the environment against dangers arising from ionising radiation, including disposal in appropriate facilities as the end location point.* ***The storage of radioactive waste, including long-term storage, is an interim solution, but not an alternative to disposal****». Therefore, solutions are being sought for the disposal of radioactive waste including spent fuel which is considered waste.*

In the present study, it is reported that it is investigated the Borehole burial of spent and closed radioactive sources along with the possibility of building a deep geological repository for high level and long-lived waste in Bulgaria. The investigation is still at an

early stage and therefore there is an inability to assess possible environmental impacts from the construction of the repositories.
In any case, ***the evaluation of the location of the RAW (including SNF) management facility, should take into account as a minimum the provisions mentioned in articles 13 and 14 of the presidential decree 91/2017 (Government Gazette 130/A/01-09-2017) for the assessment of the location of the RAW management facility.***
In addition, ***it is emphasized that Greece is a non-nuclear country, with a clear position against the use of nuclear energy (https://eeae.gr)****, and therefore it is proposed to locate the facilities at sufficient distances from the borders of our country in order to minimize the effects of a possible nuclear accident.*

The investigation results for the RAW management facility should be shared with the EEAC and the respective authorities of the other affected parties, to which this study has been sent, for evaluation.

3. *Further to the above,* ***the study does not contain data on the seismicity of the areas in which existing or envisaged nuclear infrastructures are/will be cited****.*
This information is considered necessary especially after the earthquake disaster at the Fukushima nuclear plant in 2011 and the enormous environmental consequences it had.

4. For the facilities that are in the construction phase or in the commissioning stage, the provisions mentioned in articles 13 and 14 of the presidential decree 91/2017 (Government Gazette 130/A/01-09-2017) for the construction, operation, maintenance, modifications, use of a RAW management facility should, as a minimum, be taken into account*.*

5. In the present study, it is reported thatf the BAS IRT-2000 research reactor and the SD facility "PRRAW - Novi Han" are planned to be decommissioned. For these decommissions should be taken into account, as a minimum, the provisions mentioned in par. 6 of article 13 of the presidential decree 91/2017 (Government Gazette 130/A/01-09-2017) for the dismantling of the facilities*.*

6. *According to the available information, Westinghouse only offers an option for intermediate storage of SNF (Westinghouse) in a dry method, but not an option for its processing.* ***This means that the processing of the generated amounts of SNF in another country must be planned and carried out.*** *According to three SNF processing scenarios that have been considered (realistic, optimistic, pessimistic), the processing of SNF, supplied by the Russian company TVEL, will either take place according to the current practice or along with SNF from Westinghouse and Framatom will be processed in the plants of France. At this stage, and since the geopolitical situation in Europe is not clarified yet, no further detail in is given on wastes' route.*
In any case, it is pointed out that in accordance with Article 18 of the Governmental Decree 35225/2023 (Government Gazette 2638/B/21-04-2023) and Article 18 of the Presidential Decree 91/2017 (Government Gazette 130/A/01-09-2017) "It is prohibited to import spent fuel and radioactive waste for any purpose, including processing, storage or disposal within the country's borders."

It is also emphasized that the transport of RAW/SNF falls within the provisions of Directive 2006/117/Euratom on the supervision and control of shipments of radioactive waste and spent fuel.

β) το υπ' αριθμ. πρωτ. 756769/21-6-2024 υπόμνημα της Δ/νσης Περιβάλλοντος & Κλιματικής Αλλαγής της Περιφέρειας Αττικής - για τη διευκόλυνση των Περιφερειακών Συμβούλων- όπως διαβιβάσθηκε με το ταυτάριθμο έγγραφο της αυτής Υπηρεσίας και έχει ως εξής :

1. ΕΙΣΑΓΩΓΗ

1.1 Σκοπός

*Η παρούσα μελέτη εκπονήθηκε στο πλαίσιο της Στρατηγικής Περιβαλλοντικής Εκτίμησης του σχεδίου επικαιροποιημένης στρατηγικής για τη διαχείριση αναλωθέντος πυρηνικού καυσίμου (**Spent Nuclear Fuel**-**SNF**) και ραδιενεργών αποβλήτων (**Radioactive Waste-RAW**) στη Βουλγαρία - Εθνικό Πρόγραμμα σύμφωνα με την Οδηγία 2011/70/Ευρατόμ.*

*Η μελέτη έχει αποσταλεί στη Ρουμανία, Δημοκρατία της Σερβίας, Δημοκρατία της Βόρειας Μακεδονίας, Ελληνική Δημοκρατία και Δημοκρατία της Αυστρίας **ως επηρεαζόμενα μέλη**, για την έκφραση των απόψεων τους στο πλαίσιο της διαβούλευσης. **Οι απόψεις ζητείται να αποσταλούν στα αγγλικά**.*

*Η πρόθεση συμμετοχής της Ελλάδας στην εκτίμηση των διασυνοριακών περιβαλλοντικών επιπτώσεων του σχεδίου επικαιροποιημένης στρατηγικής για τη διαχείριση των εξαντλημένων πυρηνικών καυσίμων και των ραδιενεργών αποβλήτων, γνωστοποιήθηκε στις αρμόδιες Αρχές της Βουλγαρίας, με το υπ' αριθμ. ΥΠΕΝ/ΔΙΠΑ/107998/7067/27.10.2023 σχετικό έγγραφο, **βάσει του συμπεράσματός ότι το σχέδιο αυτό δεν αποκλείεται να προκαλέσει σημαντικές περιβαλλοντικές επιπτώσεις εντός της ελληνικής επικράτειας.***

1.2 Υπεύθυνη αρχή για την διαδικασία της Στρατηγικής Περιβαλλοντικής Εκτίμησης

Υπουργείο Περιβάλλοντος και Νερού της Δημοκρατίας της Βουλγαρίας

2. ΠΕΡΙΓΡΑΦΗ ΤΟΥ ΕΡΓΟΥ

*Η κατασκευή της Μονάδας 1 του **Nuclear Power Plant (NPP) Kozloduy (Πυρηνικός Σταθμός Κοζλοντούι)** ξεκίνησε στα τέλη της δεκαετίας του 1960. Με την πάροδο των ετών, συνολικά έξι μονάδες πυρηνικής ενέργειας κατασκευάστηκαν (τέσσερις μονάδες WWER-440 και δύο μονάδες WWER-1000), εξοπλισμένες με αντιδραστήρες νερού υπό πίεση, χρησιμοποιώντας ως καύσιμο ουράνιο χαμηλού εμπλουτισμού.*

Σε εκπλήρωση των δεσμεύσεων της Βουλγαρίας σχετικά με την ένταξη της χώρας στην Ευρωπαϊκή Ένωση (ΕΕ), η λειτουργία των πρώτων τεσσάρων ηλεκτροπαραγωγικών μονάδων τερματίστηκε πριν από τη λήξη της διάρκειας σχεδιασμού τους. Αυτή τη στιγμή λειτουργούν οι Μονάδες 5 και 6 συνολικής ισχύος περίπου 2160 MWe (που επιτεύχθηκε μετά την ολοκλήρωση των προβλεπόμενων μέτρων για τον εκσυγχρονισμό των μονάδων). Η Βουλγαρία αποφάσισε να συνεχίσει να αναπτύσσει το πυρηνικό της πρόγραμμα με μέγιστη παράταση της λειτουργικής διάρκειας ζωής των μονάδων 5 και 6 του NPP Kozloduy, ακολουθώντας αυστηρά τις απαιτήσεις για πυρηνική ασφάλεια,

ακτινοβολία και φυσική προστασία, ασφαλή και υπεύθυνη διαχείριση ραδιενεργών αποβλήτων και αναλωθέντος πυρηνικού καυσίμου. Όπως περιγράφεται στο «Στρατηγικό όραμα για τη βιώσιμη ανάπτυξη του τομέα της ηλεκτρικής ενέργειας με ορίζοντα το 2053» που εγκρίθηκε από το Υπουργικό Συμβούλιο τον Ιανουάριο του 2023, ***σχεδιάζεται η κατασκευή δύο πυρηνικών μονάδων στην τοποθεσία Belene έως το 2035/2040, καθώς και δύο ακόμη μονάδων στην τοποθεσία του Kozloduy μέχρι το 2045****.*
Κατά τη λήψη απόφασης για την κατασκευή νέων πυρηνικών εγκαταστάσεων, η Στρατηγική πρέπει να επικαιροποιηθεί λαμβάνοντας υπόψη τις αναμενόμενες ποσότητες SNF που θα παραχθούν από αυτές*.*

Ο εθνικός φορέας για την ασφαλή διαχείριση ραδιενεργών αποβλήτων και τον παροπλισμό πυρηνικών εγκαταστάσεων είναι η Κρατική Επιχείρηση «Ραδιενεργά Απόβλητα» (SE RAW), η οποία λειτουργεί από το 2004.

2.1 Αναλωθέν πυρηνικό καύσιμο (SNF) (Spent Nuclear Fuel)

Στη Βουλγαρία, το SNF παράγεται από τις μονάδες 5 και 6 του NPP Kozloduy*. (Στο παρελθόν παραγόταν επίσης και από τις μονάδες 1 έως 4 του πυρηνικού σταθμού).*
Αφού εξαντληθεί το ενεργειακό δυναμικό του πυρηνικού καυσίμου, αφαιρείται από την ενεργό ζώνη και για λόγους σαφήνειας, ονομάζεται περαιτέρω αναλωθέν πυρηνικό καύσιμο. *Είναι αναπόφευκτο τεχνολογικό προϊόν της λειτουργίας των πυρηνικών αντιδραστήρων.* ***Τα αναλωμένα καύσιμα μπορούν να θεωρηθούν πολύτιμοι πόροι που μπορούν να υποβληθούν σε επανεπεξεργασία ή, εάν θεωρηθούν ραδιενεργά απόβλητα, να διατεθούν για άμεση απόρριψη. Τα αναλωθέντα καύσιμα, βάση της επικινδυνότητας τους, είναι υψηλού επιπέδου απόβλητα (High Level Waste).***

2.2 Ραδιενεργά απόβλητα (RAW) (Radioactive Waste)

Σύμφωνα με τη διεθνώς χρησιμοποιούμενη ταξινόμηση των ραδιενεργών αποβλήτων, αυτά διαχωρίζονται, κατά αύξουσα σειρά επικινδυνότητας, σε πολύ βραχύβια απόβλητα (Very Short Lived Waste, VSLW), πολύ χαμηλού επιπέδου απόβλητα (Very Low Level Waste, VLLW), χαμηλού επιπέδου απόβλητα (Low Level Waste, LLW), μετρίου επιπέδου απόβλητα (intermediate Level Waste, ILW) και υψηλού επιπέδου απόβλητα (High Level Waste HLW). Ενδεικτικά, τα απόβλητα από πυρηνικούς αντιδραστήρες είναι κυρίως μετρίου και υψηλού επιπέδου (ILW και HLW), από ιατρικές εφαρμογές πολύ βραχύβια (VSLW), από βιομηχανικές πολύ χαμηλού ή χαμηλού επιπέδου (VLLW και LLW).
Το νομοθετικό πλαίσιο απαιτεί τα RAW να διαχωρίζονται στην πηγή παραγωγής τους ανάλογα με την ακτινοβολία τους και τα φυσικά και χημικά χαρακτηριστικά τους*.*

2.3.1 Υφιστάμενες Εγκαταστάσεις

Οι υφιστάμενες εγκαταστάσεις βρίσκονται στην περιοχή δύο δήμων της Βουλγαρίας: του δήμου Kozloduy και του δήμου Elin Pelin.

2.3.1.1 Τοποθεσία υφιστάμενων εγκαταστάσεων SNF

Δεν υπάρχουν εργοστάσια μετατροπής, εμπλουτισμού και παραγωγής πυρηνικών καυσίμων, καθώς και επεξεργασίας SNF στη Βουλγαρία *Στην Βουλγαρία, το αναλωμένο πυρηνικό καύσιμο του NPP Kozloduy* ***αποθηκεύεται*** *στον*

NPP Kozloduy σε ξηρή εγκατάσταση αποθήκευσης αναλωμένων πυρηνικών καυσίμων (dry spent nuclear fuel storage facility, DSNFS), σε "υγρή" εγκατάσταση αποθήκευσης SNF ("wet" SNF storage facility, WSNFS) και στις δεξαμενές κοντά στον αντιδραστήρα των μονάδων 5 και 6 του NPP Kozloduy, τα οποία βρίσκονται σε λειτουργία και για τα οποία έχουν εκδοθεί οι σχετικές άδειες λειτουργίας.

2.3.1.2 Τοποθεσία των υφιστάμενων εγκαταστάσεων για RAW

Στην Βουλγαρία, οι εγκαταστάσεις για την διαχείριση των RAW βρίσκονται στην τοποθεσία του NPP Kozloduy και στο χώρο του Εξειδικευμένου Τμήματος «Permanent repository for radioactive waste (PRRAW) - Μόνιμη Αποθήκη Ραδιενεργών Αποβλήτων - Novi Han»:

• Η "PRRAW-Novi Han" αποθηκεύει προσωρινά τα μη επεξεργασμένα απόβλητα, τα οποία προέρχονται από χρήση ραδιενεργών πηγών στη βιομηχανία, τη γεωργία, την ιατρική και την επιστημονική έρευνα, καθώς και ρυθμισμένα RAW.

• RAW από τον κύκλο του πυρηνικού καυσίμου υποβάλλονται σε επεξεργασία και αποθηκεύονται στις εγκαταστάσεις του NPP Kozloduy.

• Το Εθνικό Αποθετήριο για την Απόρριψη Χαμηλού και Μεσαίου Επιπέδου Βραχείας Διάρκειας RAW (Low- and Medium-Level Short-Lived RAW, NRRAW), το οποίο βρίσκεται σε διαδικασία κατασκευής σε τοποθεσία που βρίσκεται σε άμεση γειτνίαση με τον NPP Kozloduy, θα λαμβάνει τα χαμηλού και μεσαίου επιπέδου βραχείας διάρκειας RAW αφού τα συσκευάσει σε δοχεία από οπλισμένο σκυρόδεμα στις υπάρχουσες εγκαταστάσεις της «RAW-Kozloduy».

2.4 Εγκαταστάσεις που προβλέπονται στο προσχέδιο της επικαιροποιημένης στρατηγικής

Οι εγκαταστάσεις που προβλέπονται στο προσχέδιο της επικαιροποιημένης στρατηγικής βρίσκονται επίσης σε δύο δήμους της Βουλγαρίας: τον δήμο Kozloduy και τον δήμο Elin Pelin, όπου βρίσκονται και οι υπάρχουσες εγκαταστάσεις, όπως περιγράφεται παρακάτω:

• Εθνικό Αποθετήριο Ραδιενεργών Αποβλήτων (National Repository for Radioactive Waste -NRRAW) στην τοποθεσία "Radiana" στην περιοχή Harlets, Δήμος Kozloduy, Περιφέρεια Vratsa - ***υπό κατασκευή****.*

• FPI (Facility for plasma incineration) - Εγκατάσταση αποτέφρωσης απορριμμάτων πλάσματος με υψηλό συντελεστή μείωσης όγκου

Το πρόγραμμα θέσης σε λειτουργία του FPI ολοκληρώθηκε με επιτυχία ενώ έχει προετοιμαστεί και το σύνολο των εγγράφων που απαιτούνται για την έκδοση άδειας λειτουργίας της εγκατάστασης από την NRA (Nuclear Regulatory Agency) στο χώρο των μονάδων 1-4 του NPP Kozloduy.

• Κατασκευή εγκατάστασης παραγωγής συσκευασιών τύπου StBK από τη State Enterprise "Radioactive Waste" (SE RAW). Η εγκατάσταση θα τεθεί σε λειτουργία το 2025.

Οι υπόλοιπες εγκαταστάσεις που προβλέπονται στη στρατηγική είναι σε επίπεδο μελέτης σκοπιμότητας ή σε επίπεδο ιδέας *και περιγράφονται παρακάτω:*

• ***Αποθετήριο σε γεωλογικούς σχηματισμούς μεγάλου βάθους (Deep Geological Repository-DGR)-*** *διενεργήθηκε προκαταρκτική έρευνα των δυνατοτήτων κατασκευής DGR για την αποθήκευση αποβλήτων υψηλής ραδιενέργειας και μακράς διάρκειας ζωής στη Βουλγαρία. Έχουν εντοπιστεί δυνητικά κατάλληλα γεωλογικά τετράγωνα και θα πρέπει να διερευνηθούν περαιτέρω. Η SE RAW έχει αναπτύξει ένα υποδειγματικό σχέδιο - ένα χρονοδιάγραμμα με προθεσμία έως το 2050 για τη διεξαγωγή ερευνητικών δραστηριοτήτων και τον περιορισμό του εύρους πιθανών τοποθεσιών, τη διεξαγωγή λεπτομερών μελετών, την επιλογή και την αδειοδότηση χώρου για την κατασκευή του DGR.*

• ***Εναπόθεση σε γεώτρηση (Borehole burial)*** *αναλωθέντων κλειστών ραδιενεργών πηγών (spent closed radioactive sources-SRC) - μελετώνται οι δυνατότητες υλοποίησης της εναπόθεσης σε γεώτρηση ως το τελικό στάδιο διαχείρισης SRC. Δεν υπάρχει ακόμα εμπειρία στην εφαρμογή της εναπόθεσης σε γεώτρηση στον κόσμο. Υπάρχουν πολλές χώρες μέλη της ΔΥΑΕ (Διεθνής Υπηρεσία Ατομικής Ενέργειας) που αναπτύσσουν ενεργά τον σχεδιασμό ταφής σε γεωτρήσεις. Αναμένεται ότι στο εγγύς μέλλον θα πραγματοποιηθεί η πρώτη γεώτρηση για SRC στη Μαλαισία. Επί του παρόντος εκπονείται μελέτη σκοπιμότητας προκειμένου να αξιολογηθεί η δυνατότητα εφαρμογής της εναπόθεσης σε γεώτρηση στη Βουλγαρία, να αξιολογηθούν τα πλεονεκτήματα και τα μειονεκτήματά της και να εντοπιστούν οι κίνδυνοι από την εφαρμογή της. Ανάλογα με τα αποτελέσματα της μελέτης σκοπιμότητας, θα ακολουθήσουν περαιτέρω ενέργειες.*

• ***Παροπλισμός του ερευνητικού αντιδραστήρα BAS IRT-2000*** *- Ο ερευνητικός αντιδραστήρας IRT-2000 έκλεισε τον Ιούλιο του 1989 για τον εκσυγχρονισμό των συστημάτων του πυρηνικής ασφάλειας και ακτινοπροστασίας. Ολόκληρη η ποσότητα αναλωθέντος πυρηνικού καυσίμου που ήταν αποθηκευμένη στην τοποθεσία του IRT-2000 εξήχθη στη Ρωσία τον Αύγουστο του 2008 στο πλαίσιο του διεθνούς προγράμματος Russian Research Reactor Fuel Return, ενώ στα τέλη του 2009, ως μέρος του έργου για την ανοικοδόμηση του αντιδραστήρα, πραγματοποιήθηκε μερική αποσυναρμολόγηση όλων των εσωτερικών στοιχείων του σώματος. Οι ποσότητες RAW που προέκυψαν από την αποσυναρμολόγηση του αντιδραστήρα παραδόθηκαν στη SE RAW τον Μάιο του 2020. Η απόφαση του Υπουργικού Συμβουλίου αριθ. 552 της 6ης Ιουλίου 2001 για την ανακατασκευή και μερικό παροπλισμό του ερευνητικού αντιδραστήρα IRT-2000 σε αντιδραστήρα χαμηλής ισχύος 200 kW εξακολουθεί να ισχύει. Δεν υπάρχει νέα απόφαση για το μέλλον του ερευνητικού αντιδραστήρα, συμπεριλαμβανομένης της πιθανότητας οριστικού παροπλισμού.*

• ***Παροπλισμός SD «PRRAW - Novi Han»****. Προβλέπεται να παροπλιστεί. Επιλέχθηκε το σενάριο συνεχούς αποσυναρμολόγησης με επακόλουθη απελευθέρωση της τοποθεσίας για περιορισμένη χρήση.*

ΠΑΡΑΤΗΡΗΣΕΙΣ ΤΗΣ Δ/ΝΣΗΣ ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΚΑΙ ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ ΤΗΣ ΠΕΡΙΦΕΡΕΙΑΣ ΑΤΤΙΚΗΣ

Λόγω των δυσμενών γεωπολιτικών αλλαγών που σημειώθηκαν στις αρχές του 2022 μετά την έναρξη του πολέμου μεταξύ της Ρωσικής Ομοσπονδίας (RF) εναντίον της Ουκρανίας, έχουν προκύψει μια σειρά από κινδύνους που σχετίζονται με τη διαχείριση των SNF και HLW.

1. *Από το 2024 και μετά, η 5η μονάδα του Kozloduy θα τροδοδοτηθεί με φρέσκα πυρηνικά καύσιμα (Fresh Nuclear Fuel-FNF) που παρήγαγε η Westinghouse (ΗΠΑ) ενώ η λειτουργία της 6ης μονάδας τα επόμενα χρόνια θα συνεχίσει με το FNF του παραδοσιακού κατασκευαστή (ρωσική εταιρεία TVEL) και στη συνέχεια με το FNF που παράγει η Framatom (Γαλλία) μέχρι το τέλος του χρόνου ζωής τους.*
Η εισαγωγή καυσίμου από άλλο κατασκευαστή εμπεριέχει σοβαρούς κινδύνους ιδίως σε περιπτώσεις τροφοδοσίας με μεικτά καύσιμα. ***Συνεπώς η διαδικασία θα πρέπει να αξιολογηθεί με την εκτέλεση πιλοτικών δοκιμών υπό πολύ αυστηρά πρωτοκόλλα ασφαλείας ενώ προτείνεται η συνεργασία με ειδικούς εμπειρογνώμονες της Ελληνικής Επιτροπής Ατομικής Ενέργειας (ΕΕΑΕ) και αντιστοίχων φορέων των άλλων επηρεαζόμενων μελών για την παροχή συμβουλών επί τεχνικών και πρακτικών θεμάτων.***
Σε κάθε περίπτωση για την λειτουργία πυρηνικών εγκαταστάσεων θα πρέπει να τηρείται η Οδηγία 2014/87/Ευρατόμ περί θεσπίσεως κοινοτικού πλαισίου για την πυρηνική ασφάλεια πυρηνικών εγκαταστάσεων (ΕΕ L 219/25.07.2014) στην οποία επιπλέον αναφέρεται ότι «Οι συνέπειες ενός πυρηνικού ατυχήματος μπορούν να υπερβούν εθνικά σύνορα, συνεπώς πρέπει να ενθαρρύνονται η στενή συνεργασία, ο συντονισμός και η ανταλλαγή πληροφοριών μεταξύ των αρμόδιων ρυθμιστικών αρχών των κρατών μελών που βρίσκονται στη γειτονία μιας πυρηνικής εγκατάστασης, ανεξαρτήτως του αν τα εν λόγω κράτη μέλη διαθέτουν πυρηνικές εγκαταστάσεις σε λειτουργία. Ως εκ τούτου, τα κράτη μέλη θα πρέπει να εξασφαλίζουν τη θέσπιση κατάλληλων διευθετήσεων ώστε να διευκολύνεται αυτή η συνεργασία σε θέματα πυρηνικής ασφάλειας που έχουν διασυνοριακές επιπτώσεις.».

2. *Σύμφωνα με την Οδηγία 2011/70/ Ευρατόμ «Τα ραδιενεργά απόβλητα, συμπεριλαμβανομένων των αναλωθέντων καυσίμων που θεωρούνται απόβλητα, απαιτούν περιορισμό και απομόνωση από τους ανθρώπους και το περιβάλλον διαβίωσής τους μακροπρόθεσμα. Λόγω της συγκεκριμένης φύσης τους (περιεκτικότητα σε ραδιονουκλεΐδια), απαιτούνται ρυθμίσεις για την προστασία της ανθρώπινης υγείας και του περιβάλλοντος έναντι κινδύνων οι οποίοι προκύπτουν από την ιονίζουσα ακτινοβολία, συμπεριλαμβανομένης της διάθεσης σε κατάλληλες εγκαταστάσεις, όπως στην τελική τοποθεσία.* ***Η αποθήκευση ραδιενεργών αποβλήτων, συμπεριλαμβανομένης της μακροπρόθεσμης αποθήκευσης, αποτελεί ενδιάμεση λύση, αλλά όχι εναλλακτική της διάθεσης****». Συνεπώς, αναζητούνται λύσεις για την διάθεση των ραδιενεργών αποβλήτων συμπεριλαμβανομένων των αναλωθέντων καυσίμων που θεωρούνται απόβλητα.*
Στο πλαίσιο της παρούσας μελέτης αναφέρεται ότι διερευνάται η δυνατότητα διάθεσης ραδιενεργών αποβλήτων σε γεωτρήσεις και γεωλογικούς σχηματισμούς μεγάλου βάθους. Η διερεύνηση βρίσκεται ακόμα σε πρώιμο στάδιο και γι αυτό υπάρχει και αδυναμία αξιολόγησης πιθανών επιπτώσεων στο περιβάλλον από την κατασκευή των αποθετηρίων.
Σε κάθε περίπτωση στα πλαίσια της μελέτης σκοπιμότητας για την αξιολόγηση τοποθεσίας εγκατάστασης διαχείρισης ΑΚΡΑ θα πρέπει ***κατ' ελάχιστον να ληφθούν υπόψη τα αναφερόμενα στα άρθρα 13 και 14 του Π.Δ. 91/2017 (ΦΕΚ 130/Α/01-09-2017) για την αξιολόγηση της τοποθεσίας εγκατάστασης διαχείρισης ΑΚΡΑ (Αναλωθέν Καύσιμο - Ραδιενεργά Απόβλητα).***
Επιπλέον, ***τονίζεται το γεγονός ότι η Ελλάδα είναι μια μη πυρηνική χώρα, με καθαρή θέση κατά της χρήσης της πυρηνικής ενέργειας (https://eeae.gr)****, και*

συνεπώς προτείνεται η χωροθέτηση των εγκαταστάσεων σε ικανές αποστάσεις από τα σύνορα της χώρας μας ώστε να ελαχιστοποιούνται οι επιπτώσεις από ενδεχόμενο πυρηνικό ατύχημα.

Κατά την άποψη της Υπηρεσίας μας τα αποτελέσματα της μελέτης σκοπιμότητας για την εγκατάσταση διαχείρισης ΑΚΡΑ πρέπει να κοινοποιηθούν στην Ελληνική Επιτροπή Ατομικής Ενέργειας (ΕΕΑΕ) και στους αντίστοιχους φορείς των άλλων επηρεαζόμενων μελών στα οποία έχει αποσταλεί η παρούσα μελέτη προς αξιολόγηση.

3. Σε συνέχεια του ανωτέρω, στην μελέτη δεν παραθέτονται στοιχεία για την σεισμικότητα των περιοχών στις οποίες χωροθετούνται ή πρόκειται να χωροθετηθούν πυρηνικές εγκαταστάσεις*.*
Κατά την άποψη της Υπηρεσίας μας τα εν λόγω στοιχεία είναι απαραίτητα μετά και την καταστροφή λόγω σεισμού στο πυρηνικό εργοστάσιο της Φουκουσίμα το 2011 και τις τεράστιες περιβαλλοντικές επιπτώσεις που αυτό προκάλεσε.

4. Για τις εγκαταστάσεις που είναι σε φάση κατασκευής ή στο στάδιο θέσης σε λειτουργία να ληφθούν υπόψη κατ' ελάχιστον τα αναφερόμενα στα άρθρα 13 και 14 του Π.Δ. 91/2017 (ΦΕΚ 130/Α/01-09-2017) για την κατασκευή, λειτουργία, συντήρηση, τροποποιήσεις, χρήση εγκατάστασης διαχείρισης ΑΚΡΑ.

5. Στο πλαίσιο της παρούσας μελέτης αναφέρεται ότι προβλέπεται να παροπλιστούν ο ερευνητικός αντιδραστήρα BAS IRT-2000 (μερικώς) και η εγκατάσταση SD «PRRAW - Novi Han». Κατ' ελάχιστον να ληφθούν υπόψη τα αναφερόμενα στην παρ. 6 του άρθρου 13 του Π.Δ. 91/2017 (ΦΕΚ 130/Α/01-09-2017) για την αποξήλωση των εγκαταστάσεων.

6. *Σύμφωνα με τις διαθέσιμες πληροφορίες, η Westinghouse προσφέρει μόνο επιλογή για ενδιάμεση αποθήκευση του SNF (Westinghouse) με ξηρή μέθοδο, αλλά όχι επιλογή για την επεξεργασία του.* ***Αυτό σημαίνει ότι η επεξεργασία των παραγόμενων ποσοτήτων SNF πρέπει να προγραμματιστεί και να πραγματοποιηθεί σε άλλη χώρα.*** *Στα πλαίσιο της παρούσας μελέτης, σε όλα τα πιθανά σενάρια τα οποία διερευνώνται (ρεαλιστικό-αισιόδοξο-απαισιόδοξο),* ***περιλαμβάνονται διασυνοριακές μεταφορές αναλωθέντος πυρηνικού καυσίμου*** *(προς την Ρωσία σύμφωνα με την τρέχουσα πρακτική και εφόσον οι συνθήκες το επιτρέπουν και προς την Γαλλία), χωρίς να δίνονται περαιτέρω πληροφορίες για την διαδρομή που θα ακολουθήσουν τα απόβλητα.*
*Σε κάθε περίπτωση επισημαίνεται ότι σύμφωνα με το άρθρο 18 της ΚΥΑ 35225/2023 (ΦΕΚ 2638/Β/21-04-2023) και το άρθρο 18 του Π.Δ 91/2017 (ΦΕΚ 130/α/01-09-2017) «****Απαγορεύεται η εισαγωγή αναλωθέντος καυσίμου και ραδιενεργών αποβλήτων για οποιονδήποτε σκοπό, συμπεριλαμβανομένης της επεξεργασίας, αποθήκευσης ή διάθεσης εντός των συνόρων της χώρας****».*

Τονίζεται ότι η μεταφορά των ΑΚΡΑ εμπίπτει στις διατάξεις της Οδηγίας 2006/117/Ευρατόμ σχετικά με την επιτήρηση και τον έλεγχο των αποστολών ραδιενεργών αποβλήτων και αναλωμένου πυρηνικού καυσίμου.

Πηγές:

1. Το σχεδίο επικαιροποιημένης στρατηγικής για τη διαχείριση αναλωθέντος πυρηνικού και ραδιενεργών αποβλήτων στη Βουλγαρία - Εθνικό Πρόγραμμα σύμφωνα με την Οδηγία 2011/70/Ευρατόμ.

2. Η Οδηγία 2011/70/Ευρατόμ του Συμβουλίου της 19ης Ιουλίου 2011 «περί θεσπίσεως κοινοτικού πλαισίου για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων» (ΕΕ L 199/02.08.2011).

3. Η Οδηγία 2006/117/ Ευρατόμ του Συμβουλίου της 20ής Νοεμβρίου 2006 σχετικά με την επιτήρηση και τον έλεγχο των αποστολών ραδιενεργών αποβλήτων και αναλωμένου πυρηνικού καυσίμου (ΕΕ L 337/05.12.2006).

4. Η Οδηγία 2014/87/Ευρατόμ του Συμβουλίου της 8ης Ιουλίου 2014 για τροποποίηση της οδηγίας 2009/71/Ευρατόμ περί θεσπίσεως κοινοτικού πλαισίου για την πυρηνική ασφάλεια πυρηνικών εγκαταστάσεων (ΕΕ L 219/25.07.2014).

5. Η ΚΥΑ υπ' αριθμ. 35225 «Νομοθετικό, ρυθμιστικό και οργανωτικό πλαίσιο για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων - Προσαρμογή της ελληνικής νομοθεσίας στην Οδηγία 2011/70/Ευρατόμ του Συμβουλίου της 19ης Ιουλίου 2011 περί θεσπίσεως κοινοτικού πλαισίου για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων (ΕΕ L 199/02.08.2011) – Εθνικό πρόγραμμα για τη διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων» (ΦΕΚ 2638/Β/21-04-2023).

6. Το Π.Δ. υπ' αριθμ. 91 Νομοθετικό, ρυθμιστικό και οργανωτικό πλαίσιο για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων και τροποποίηση του π.δ. 122/2013 (ΦΕΚ 130/Α/01-09-2017).

7. Το Π.Δ. υπ' αριθμ. 83 Προσαρμογή της ελληνικής νομοθεσίας στην Οδηγία 2006/117/Ευρατόμ του Συμβουλίου της 20ης Νοεμβρίου 2006 σχετικά με την επιτήρηση και τον έλεγχο των αποστολών ραδιενεργών αποβλήτων και αναλωμένου πυρηνικού καυσίμου.

8. Την Εισηγητική Έκθεση της ΕΕΑΕ (Ελληνική Επιτροπή Ατομικής Ενέργειας) για το Σχέδιο Προεδρικού Διατάγματος «Περί θεσπίσεως εθνικού νομοθετικού, ρυθμιστικού και οργανωτικού πλαισίου για την υπεύθυνη και ασφαλή διαχείριση αναλωθέντων καυσίμων και ραδιενεργών αποβλήτων».

Στη συνέχεια, ο Περιφερειάρχης Αττικής διευκρίνισε στο Σώμα ότι η εισήγηση της διοίκησης είναι οι παρατηρήσεις επί της ΣΜΠΕ που αναφέρονται στην ανωτέρω εισήγηση της Δ/νσης Περιβάλλοντος & Κλιματικής Αλλαγής της Περιφέρειας Αττικής.

Μετά το πέρας των τοποθετήσεων, ο Αντιπρόεδρος έθεσε προς ψήφιση την ανωτέρω εισήγηση με τις παρατηρήσεις επί της αναφερομένης ΣΜΠΕ.

Το Περιφερειακό Συμβούλιο Αττικής
μετά από διαλογική συζήτηση μεταξύ των μελών του
και

έχοντας υπόψη:

- την υπ' αριθμ. 69/2024 (ΑΔΑ: 62Ρ1Ω1Ε-1ΡΖ) απόφαση του Δημοτικού Συμβουλίου του Δήμου Σαλαμίνας,
- την ανωτέρω εισήγηση και το σχετικό υπόμνημα της Δ/νσης Περιβάλλοντος & Κλιματικής Αλλαγής της Περιφέρειας Αττικής,

αποφασίζει κατά πλειοψηφία

Γνωμοδοτεί επί της Στρατηγικής Μελέτης Περιβαλλοντικών Επιπτώσεων (ΣΜΠΕ) του σχεδίου επικαιροποιημένης στρατηγικής για τη διαχείριση των εξαντλημένων πυρηνικών καυσίμων και των ραδιενεργών αποβλήτων της Βουλγαρίας, θέτοντας τις παρατηρήσεις που αναφέρονται στην ανωτέρω εισήγηση της Δ/νσης Περιβάλλοντος & Κλιματικής Αλλαγής της Περιφέρειας Αττικής και έχουν ως εξής:

Λόγω των δυσμενών γεωπολιτικών αλλαγών που σημειώθηκαν στις αρχές του 2022 μετά την έναρξη του πολέμου μεταξύ της Ρωσικής Ομοσπονδίας (RF) εναντίον της Ουκρανίας, έχουν προκύψει μια σειρά από κινδύνους που σχετίζονται με τη διαχείριση των Spent Nuclear Fuel (SNF) και High Level Waste (HLW).

1. Από το 2024 και μετά, η 5^{η} μονάδα του Kozloduy θα τροδοδοτηθεί με φρέσκα πυρηνικά καύσιμα (Fresh Nuclear Fuel-FNF) που παρήγαγε η Westinghouse (ΗΠΑ) ενώ η λειτουργία της 6^{ης} μονάδας τα επόμενα χρόνια θα συνεχίσει με το FNF του παραδοσιακού κατασκευαστή (ρωσική εταιρεία TVEL) και στη συνέχεια με το FNF που παράγει η Framatom (Γαλλία) μέχρι το τέλος του χρόνου ζωής τους.

Η εισαγωγή καυσίμου από άλλο κατασκευαστή εμπεριέχει σοβαρούς κινδύνους ιδίως σε περιπτώσεις τροφοδοσίας με μεικτά καύσιμα. **Συνεπώς η διαδικασία θα πρέπει να αξιολογηθεί με την εκτέλεση πιλοτικών δοκιμών υπό πολύ αυστηρά πρωτοκόλλα ασφαλείας ενώ προτείνεται η συνεργασία με ειδικούς εμπειρογνώμονες της Ελληνικής Επιτροπής Ατομικής Ενέργειας (ΕΕΑΕ) και αντιστοίχων φορέων των άλλων επηρεαζόμενων μελών για την παροχή συμβουλών επί τεχνικών και πρακτικών θεμάτων.**

Σε κάθε περίπτωση για την λειτουργία πυρηνικών εγκαταστάσεων θα πρέπει να τηρείται η Οδηγία 2014/87/Ευρατόμ περί θεσπίσεως κοινοτικού πλαισίου για την πυρηνική ασφάλεια πυρηνικών εγκαταστάσεων (ΕΕ L 219/25.07.2014) στην οποία επιπλέον αναφέρεται ότι «*Οι συνέπειες ενός πυρηνικού ατυχήματος μπορούν να υπερβούν εθνικά σύνορα, συνεπώς πρέπει να ενθαρρύνονται η στενή συνεργασία, ο συντονισμός και η ανταλλαγή πληροφοριών μεταξύ των αρμόδιων ρυθμιστικών αρχών των κρατών μελών που βρίσκονται στη γειτονία μιας πυρηνικής εγκατάστασης, ανεξαρτήτως του αν τα εν λόγω κράτη μέλη διαθέτουν πυρηνικές εγκαταστάσεις σε λειτουργία. Ως εκ τούτου, τα κράτη μέλη θα πρέπει να εξασφαλίζουν τη θέσπιση κατάλληλων διευθετήσεων ώστε να διευκολύνεται αυτή η συνεργασία σε θέματα πυρηνικής ασφάλειας που έχουν διασυνοριακές επιπτώσεις.*».

2. Σύμφωνα με την Οδηγία 2011/70/ Ευρατόμ «*Τα ραδιενεργά απόβλητα, συμπεριλαμβανομένων των αναλωθέντων καυσίμων που θεωρούνται απόβλητα, απαιτούν περιορισμό και απομόνωση από τους ανθρώπους και το περιβάλλον διαβίωσής τους μακροπρόθεσμα. Λόγω της συγκεκριμένης φύσης τους (περιεκτικότητα σε ραδιονουκλεΐδια), απαιτούνται ρυθμίσεις για την προστασία της ανθρώπινης υγείας και του περιβάλλοντος έναντι κινδύνων οι οποίοι προκύπτουν από την ιονίζουσα ακτινοβολία, συμπεριλαμβανομένης της διάθεσης σε κατάλληλες εγκαταστάσεις, όπως στην τελική τοποθεσία.* ***Η αποθήκευση ραδιενεργών αποβλήτων, συμπεριλαμβανομένης της μακροπρόθεσμης αποθήκευσης, αποτελεί ενδιάμεση λύση, αλλά όχι εναλλακτική της διάθεσης***». Συνεπώς, αναζητούνται λύσεις για την διάθεση των ραδιενεργών αποβλήτων συμπεριλαμβανομένων των αναλωθέντων καυσίμων που θεωρούνται απόβλητα.

Στο πλαίσιο της παρούσας μελέτης αναφέρεται ότι διερευνάται η δυνατότητα διάθεσης ραδιενεργών αποβλήτων σε γεωτρήσεις και γεωλογικούς σχηματισμούς μεγάλου βάθους. Η διερεύνηση βρίσκεται ακόμα σε πρώιμο στάδιο και γι αυτό υπάρχει και αδυναμία αξιολόγησης πιθανών επιπτώσεων στο περιβάλλον από την κατασκευή των αποθετηρίων.

Σε κάθε περίπτωση στα πλαίσια της μελέτης σκοπιμότητας για την αξιολόγηση τοποθεσίας εγκατάστασης διαχείρισης ΑΚΡΑ **(Αναλωθέν Καύσιμο - Ραδιενεργά Απόβλητα)** θα πρέπει **κατ' ελάχιστον να ληφθούν υπόψη τα αναφερόμενα στα άρθρα 13 και 14 του Π.Δ. 91/2017 (ΦΕΚ 130/Α/01-09-2017) για την αξιολόγηση της τοποθεσίας εγκατάστασης διαχείρισης ΑΚΡΑ (Αναλωθέν Καύσιμο - Ραδιενεργά Απόβλητα).**

Επιπλέον, **τονίζεται το γεγονός ότι η Ελλάδα είναι μια μη πυρηνική χώρα, με καθαρή θέση κατά της χρήσης της πυρηνικής ενέργειας (https://eeae.gr)**, και συνεπώς προτείνεται η χωροθέτηση των εγκαταστάσεων σε ικανές αποστάσεις από τα σύνορα της χώρας μας ώστε να ελαχιστοποιούνται οι επιπτώσεις από ενδεχόμενο πυρηνικό ατύχημα.

Κατά την άποψη της Υπηρεσίας της Περιφέρειας Αττικής, Δ/νσης Περιβάλλοντος

& Κλιματικής Αλλαγής, τα αποτελέσματα της μελέτης σκοπιμότητας για την εγκατάσταση διαχείρισης ΑΚΡΑ πρέπει να κοινοποιηθούν στην Ελληνική Επιτροπή Ατομικής Ενέργειας (ΕΕΑΕ) και στους αντίστοιχους φορείς των άλλων επηρεαζόμενων μελών στα οποία έχει αποσταλεί η παρούσα μελέτη προς αξιολόγηση.

3. Σε συνέχεια του ανωτέρω, στην μελέτη δεν παραθέτονται στοιχεία για την σεισμικότητα των περιοχών στις οποίες χωροθετούνται ή πρόκειται να χωροθετηθούν πυρηνικές εγκαταστάσεις.
Κατά την άποψη της Υπηρεσίας της Περιφέρειας Αττικής, Δ/νσης Περιβάλλοντος & Κλιματικής Αλλαγής, τα εν λόγω στοιχεία είναι απαραίτητα μετά και την καταστροφή λόγω σεισμού στο πυρηνικό εργοστάσιο της Φουκουσίμα το 2011 και τις τεράστιες περιβαλλοντικές επιπτώσεις που αυτό προκάλεσε.

4. Για τις εγκαταστάσεις που είναι σε φάση κατασκευής ή στο στάδιο θέσης σε λειτουργία να ληφθούν υπόψη κατ' ελάχιστον τα αναφερόμενα στα άρθρα 13 και 14 του Π.Δ. 91/2017 (ΦΕΚ 130/Α/01-09-2017) για την κατασκευή, λειτουργία, συντήρηση, τροποποιήσεις, χρήση εγκατάστασης διαχείρισης ΑΚΡΑ.

5. Στο πλαίσιο της παρούσας μελέτης αναφέρεται ότι προβλέπεται να παροπλιστούν ο ερευνητικός αντιδραστήρα BAS IRT-2000 (μερικώς) και η εγκατάσταση SD «PRRAW - Novi Han». Κατ' ελάχιστον να ληφθούν υπόψη τα αναφερόμενα στην παρ. 6 του άρθρου 13 του Π.Δ. 91/2017 (ΦΕΚ 130/Α/01-09-2017) για την αποξήλωση των εγκαταστάσεων.

6. Σύμφωνα με τις διαθέσιμες πληροφορίες, η Westinghouse προσφέρει μόνο επιλογή για ενδιάμεση αποθήκευση του SNF (Westinghouse) με ξηρή μέθοδο, αλλά όχι επιλογή για την επεξεργασία του. **Αυτό σημαίνει ότι η επεξεργασία των παραγόμενων ποσοτήτων SNF πρέπει να προγραμματιστεί και να πραγματοποιηθεί σε άλλη χώρα.** Στα πλαίσιο της παρούσας μελέτης, σε όλα τα πιθανά σενάρια τα οποία διερευνώνται (ρεαλιστικό-αισιόδοξο-απαισιόδοξο), **περιλαμβάνονται διασυνοριακές μεταφορές αναλωθέντος πυρηνικού καυσίμου** (προς την Ρωσία σύμφωνα με την τρέχουσα πρακτική και εφόσον οι συνθήκες το επιτρέπουν και προς την Γαλλία), χωρίς να δίνονται περαιτέρω πληροφορίες για την διαδρομή που θα ακολουθήσουν τα απόβλητα.
Σε κάθε περίπτωση επισημαίνεται ότι σύμφωνα με το άρθρο 18 της ΚΥΑ 35225/2023 (ΦΕΚ 2638/Β/21-04-2023) και το άρθρο 18 του Π.Δ 91/2017 (ΦΕΚ 130/α/01-09-2017) «**Απαγορεύεται η εισαγωγή αναλωθέντος καυσίμου και ραδιενεργών αποβλήτων για οποιονδήποτε σκοπό, συμπεριλαμβανομένης της επεξεργασίας, αποθήκευσης ή διάθεσης εντός των συνόρων της χώρας**».

Τονίζεται ότι η μεταφορά των ΑΚΡΑ εμπίπτει στις διατάξεις της Οδηγίας 2006/117/Ευρατόμ σχετικά με την επιτήρηση και τον έλεγχο των αποστολών ραδιενεργών αποβλήτων και αναλωμένου πυρηνικού καυσίμου.

(Παρατηρήσεις στα αγγλικά - Comments in English)

«Due to the unfavourable geopolitical changes that occurred in early 2022 after the start of the war of the Russian Federation (RF) against Ukraine, a number of risks related to the management of SNF and HLW have arisen.

1. As stated in the EA, «in 2024 and beyond, the 5th unit will be loaded with fresh nuclear fuel (FNF) produced by Westinghouse, and the operation of the 6th unit in the following years will continue with the traditional manufacturer's FNF, and then with the FNF supplied by Framatom France until the end of their operational life.
The introduction of fuel from another manufacturer must be proven by carrying out a full set of safety analyses, their verification and licensing, especially in mixed fuelling of the core».

The process should be evaluated by performing pilot tests under very strict safety protocols, while it is proposed to aim for cooperation with special experts from the Greek Atomic Energy Commission (EEAE), and respective authorities of the other affected parties, to provide advice on technical and practical issues.

In any case the nuclear facilities should operate according to the Council Directive 2014/87/EURATOM, establishing a Community framework for the nuclear safety of nuclear installations (EE L 219/25.07.2014), in which is also underlined that «The consequences of a nuclear accident can go beyond national borders, therefore close cooperation, coordination and information exchange between competent regulatory authorities of Member States in the vicinity of a nuclear installation, irrespective of whether those Member States operate nuclear installations or not, should be encouraged. In this respect, Member States should ensure that appropriate arrangements are in place to facilitate such cooperation on nuclear safety matters with cross-border impacts»

2. According to Council Directive 2011/70/EURATOM «Radioactive waste, including spent fuel considered as waste, requires containment and isolation from humans and the living environment over the long term. Its specific nature, namely that it contains radionuclides, requires arrangements to protect human health and the environment against dangers arising from ionising radiation, including disposal in appropriate facilities as the end location point. **The storage of radioactive waste, including long-term storage, is an interim solution, but not an alternative to disposal**». Therefore, solutions are being sought for the disposal of radioactive waste including spent fuel which is considered waste.

In the present study, it is reported that it is investigated the Borehole burial of spent and closed radioactive sources along with the possibility of building a deep geological repository for high level and long-lived waste in Bulgaria. The investigation is still at an early stage and therefore there is an inability to assess possible environmental impacts from the construction of the repositories.
In any case, **the evaluation of the location of the RAW (including SNF) management facility, should take into account as a minimum the provisions mentioned in articles 13 and 14 of the presidential decree 91/2017 (Government Gazette 130/A/01-09-2017) for the assessment of the location of the RAW management facility.**
In addition, **it is emphasized that Greece is a non-nuclear country, with a clear position against the use of nuclear energy (https://eeae.gr)**, and therefore it is proposed to locate the facilities at sufficient distances from the borders of our country in order to minimize the effects of a possible nuclear accident.

The investigation results for the RAW management facility should be shared with the EEAC and the respective authorities of the other affected parties, to which this study has been sent, for evaluation.

3. Further to the above, **the study does not contain data on the seismicity of the areas in which existing or envisaged nuclear infrastructures are/will be cited**.
This information is considered necessary especially after the earthquake disaster at the Fukushima nuclear plant in 2011 and the enormous environmental consequences it had.

4. For the facilities that are in the construction phase or in the commissioning stage, the provisions mentioned in articles 13 and 14 of the presidential decree 91/2017 (Government Gazette 130/A/01-09-2017) for the construction, operation, maintenance, modifications, use of a RAW management facility should, as a minimum, be taken into account.

5. In the present study, it is reported that the BAS IRT-2000 research reactor and the SD facility "PRRAW - Novi Han" are planned to be decommissioned. For these decommissions should be taken into account, as a minimum, the provisions mentioned in par. 6 of article 13 of the presidential decree 91/2017 (Government Gazette 130/A/01-09-2017) for the dismantling of the facilities.

6. According to the available information, Westinghouse only offers an option for intermediate storage of SNF (Westinghouse) in a dry method, but not an option for its processing. **This means that the processing of the generated amounts of SNF in another country must be planned and carried out.** According to three SNF processing scenarios that have been considered (realistic, optimistic, pessimistic), the processing of SNF, supplied by the Russian company TVEL, will either take place according to the current practice or along with SNF from Westinghouse and Framatom will be processed in the plants of France. At this stage, and since the geopolitical situation in Europe is not clarified yet, no further detail in is given on wastes' route.
In any case, it is pointed out that in accordance with Article 18 of the Governmental Decree 35225/2023 (Government Gazette 2638/B/21-04-2023) and Article 18 of the Presidential Decree 91/2017 (Government Gazette 130/A/01-09-2017) "It is prohibited to import spent fuel and radioactive waste for any purpose, including processing, storage or disposal within the country's borders."
It is also emphasized that the transport of RAW/SNF falls within the provisions of Directive 2006/117/Euratom on the supervision and control of shipments of radioactive waste and spent fuel.»

Κατά της ανωτέρω απόφασης ψήφισαν :
- οι Περιφερειακοί Σύμβουλοι της παράταξης «ΛΑΪΚΗ ΣΥΣΠΕΙΡΩΣΗ ΑΤΤΙΚΗΣ» κ.κ.: Ι. Πρωτούλης, Αικ. Γεράκη, Π. Γεωργιάδου, Α. Καββαδίας, Χρ. Κασίμης, Στ. Μπενετάτος, Β. Πετρόπουλος, Β. Συρίγος, Γ. Τάτσης, Ν. Χρονοπούλου,
- οι Περιφερειακοί Σύμβουλοι της παράταξης «Γιάννης Σγουρός ΑΤΤΙΚΗ ΑΝΕΞΑΡΤΗΤΗ ΑΥΤΟΔΙΟΙΚΗΣΗ» κ.κ.: Ι. Σγουρός, Γ. Αβραμίδης, Ε. Αλμπάνης, Α. Αντωνίου, Δ. Κατσικάρης, Ν. Μαγκανάρης, Γ. Ντούρος, Α. Ορφανός, Ι. Ράπτης,
- οι ανεξάρτητες Περιφερειακές Σύμβουλοι κ. Ε. Αβραμοπούλου, Ι. Καραδήμα.

Οι Περιφερειακοί Σύμβουλοι της παράταξης «ΑΤΤΙΚΟΣ ΚΥΚΛΟΣ ΣΥΝΕΡΓΑΣΙΑΣ ΚΑΙ ΕΜΠΙΣΤΟΣΥΝΗΣ» κ.κ.: Γ. Ιωακειμίδης, Σπ. Αγγέλης, Κλ. Αποστολίδου, Ε. Ιωακειμίδης, Κ. Κάβουρας, Μ. Καζάκου, Μ. Κοροβέση, Αικ. Λογοθέτη, Μ. Μουζάλας, Γ. Μπαλάφας, Γ. Τσουκαλάς, υπερψήφισαν την ανωτέρω απόφαση με την επισήμανση του επικεφαλής της παράταξης κ. Ιωακειμίδη να ληφθούν υπόψη οι παρατηρήσεις που κατέθεσαν για τα πρακτικά της συνεδρίασης.

Ο ΑΝΤΙΠΡΟΕΔΡΟΣ ΤΟΥ Π.Σ. **Ο ΓΡΑΜΜΑΤΕΑΣ ΤΟΥ Π.Σ.**

ΚΩΝΣΤΑΝΤΙΝΟΣ ΚΑΒΟΥΡΑΣ **ΣΤΥΛΙΑΝΟΣ ΜΠΕΝΕΤΑΤΟΣ**