Current Emergency Response Capacity of the Municipalities of Varna and Burgas

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Legal Framework, Institutional and Procedural Paradigm. Technical, Human Resource and Operational Capacity with an Outline of Potential Weaknesses

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Aim and Methodology of Research

This research is aimed at exploring the current institutional and operational capacity of the Black Sea Municipalities of Varna and Burgas with regards to their emergency response capabilities. Within this paper we will outline and analyse the full spectrum of what these two Local Public Administrations have available in terms of equipment, access to external coordinated response capabilities, trained staff and main types of procedural algorithms (and their variations according to events and scenarios).

Having accumulated a sufficient body of quantitative and qualitative information describing these parameters of “preparedness”, an integrated inductive approach will help us identify potential shortcomings in technical and human resource availability and their effects on response capacity.

The instrumental objective of the study is to contribute to a subsequent analysis of critical gaps in the built-up response system in both municipalities, as well as to lead to the identification and comparison of leading current trends in the sector that are suitable for adoption in Bulgaria. The current status of emergency response groups and their capabilities in the two regions (and not only Municipalities) by regions and smaller municipalities will be organised, and meetings will be organised to emphasise the need for new facilities, equipment and capacity building for a more efficient territorial coverage.

As a result of this research, we will be able to build up a strategy for successive measures, as well as an action plan to be adopted by each of the two municipalities with view of improving their capacity and emergency response readiness status for the next decade. This will have a positive impact on local socio-economic preparedness and stability, as well as on regional environmental protection efforts.

An Initial Premise

When facing the necessity to plan for and mitigate disaster risks of any kind, a firm conviction of most (if not all) national and regional public bodies has long been established that the necessity to prevent and prepare for major categories of significant hazards comes before reaction and mitigation. This underlying principle is more evident in relation to natural disasters and calamities.

While man-made incidents (primarily industrial, since household-scale events rarely influence larger plans and capacities) are heavily dependent on social, economic, cultural (and/or religious), as well as political factors, they cannot involve ubiquitous prevention outside critical infrastructural areas. Therefore, all related plans and preparedness capacity tend to overlap with the major disaster scenarios potentially caused by natural events and general technical malfunction. The latter two categories can be systematically planned for with certain organisational, staff and technical capacity accumulated.

This leads us to the necessity to take a specific look at the main types of natural risks and urban hazards that determine the structure and operational preparedness of the units and institutions responsible for risk prevention and disaster mitigation. The below categories of main risks are based on historical data, statistical analyses, local factors (geographical, socio-economic, logistical) and the patterns that characterise territorial usage and coverage within the two municipalities. Naturally, such probabilities and traits affect the overall prevention strategies and plans and affect the capacity that we are looking to explore in detail.

Natural Disaster Incidence and Risk Profile

A statistically ascertained fact is that, overall, natural disasters in the country have been on the rise. In recent years, **heavy floods** alone have frequently involved large parts of the country and taken casualties. The issue at hand which is directly relevant to our research study is the infrastructural preparedness and institutional capacity to prevent and face such events. Both the current state and exploitation practices related to primary

natural sources (e.g. dams and riverbeds, to name a couple), as well as the series of established disaster response mechanisms, influence preparedness and the outcome of such undesirable events greatly.

Quite similarly, train crashes and various **industrial incidents** (e.g. several explosions in ammunition factories throughout the country over the past decade) have produced devastating effects with dozens of casualties. In such disaster scenarios, **natural risk factors count less than human efficiency and organisation**, preparedness and mitigation of the resulting situation.

Overall, each year critical and disastrous events account for tens of millions of BGN in losses, with 2011 and 2013 reportedly the worst, as per the following statistics:

Table 1 – Damage from crises and disasters 2010 – 2018 (NSI, 2020)

Indicators	Damages determined – BGN, thousands								
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Total	100594	487254	106160	443067	190218	191820	65243	148305	44694
Fires	**2239**	**2186**	**1437**	**2013**	**729**	**1795**	**1061**	**1250**	**1703**
Landslides	**2182**	**224790**	**17384**	**294459**	**9291**	**10011**	**9632**	**7720**	**6248**
Earthquakes	224	.	59037	915	62	.	.	.	.
Droughts	1	117	149	.	1	.	.	.	.
Floods	**38882**	**206659**	**20898**	**15285**	**177604**	**171032**	**30617**	**135530**	**28384**
Storms: tornado, wind spout, etc.	**54722**	**1614**	**3488**	**99387**	**746**	**1640**	**3267**	**45**	**3266**
Hailstorms	505	50150	187	.	853	583	10	1978	89
Snowfall / -storms	441	1205	945	200	410	5436	351	757	79
Icings, frosts	.	128	135	.	.	200	2	20	25
Accidents	24	39	319	257	231	204	9	718	3376
Vehicle accidents	926	285	2164	528	64	700	20052	18	963
Pollution (chemical, dangerous, waste)	2	68	8	30023	55	1	1	.	1
Epidemic (human)	.	.	.	.	.	5	.	.	.
Epidemic (animal)	.	2	.	.	76	5	1	.	.
Calamity	30	.	.	.	41	120	240	125	450
Other crises or natural disasters	416	11	9	.	55	88	.	144	110

N.B. Data obtained via annual reports (provided by between 74 and 141 municipalities)

Natural and man-made disasters and industrial incidents have their direct effect on a

given region's population, industry, infrastructure, cultural heritage, as well as its surrounding natural environment. Public authorities and private infrastructure operators have long since come to the conclusion that an effective and efficient disaster mitigation and risk prevention strategy entails a coordinated effort at all levels of governance. And while we cannot possibly provide an exhaustive overview of all leading global approaches and practices, we need to be able to contextualise and refer any regional (from national down to local level) risk prevention and disaster response systems within the wider trans-national cooperation mechanisms and the overall legal and operational paradigm in the field.

One of the most relevant sources for a historical background in the field is the International Disaster Database. Elaborated by the Centre for Research on Epidemiology of Disasters (CRED) at the Catholic University of Louvain (Belgium), it reports more than **46 significant disasters** on the territory of Bulgaria since 1977, with more than **85%** to those related directly to **meteorological phenomena**. Direct damage is estimated at more than $ 1.4 billion. Floods are evidently the most relevant, with the largest magnitude of direct damage and population affected. While this is valid for the entire national territory, for Varna and Burgas it is even more relevant, given their coastal location.

Accordingly, **disaster response mechanisms** and **local capacity** are established and maintained in a proportional relation and foreseeable functional utility. Since floods and extreme temperatures are the most common (the latter also directly tied to fire incidents in natural settings), we would expect to see significant capacity being dedicated to such phenomena, above and beyond standard response mechanisms, defining the national systemic approach.

Natural disasters may not be under direct human control, beyond surrounding conditions at least. Important aspects which are governable, however, point to urban and civil establishment of **order, infrastructural efficiency and institutional preparedness**. As a brief example: authorities consider how impermeable surfaces – roads and spaces covered with concrete – react to more rain and snow in urban areas, and they need to

plan and act accordingly, with the state of these surfaces influencing the chances of floods or critical events. Bulgarian sewage and wastewater systems are frequently clogged, inefficient and, essentially, designed for lesser flow rates and cannot handle higher average quantities, let alone occasional critical events and peak discharges.

An important group of calamitous events also influences preparedness and reaction capacity – **landmass instability**. Earthquakes, landslide/rockfall incidents and other related disasters are all quite relevant for almost any Bulgarian region. Overall, a relatively high potential earthquake risk is combined often with vulnerable buildings and infrastructures. While not always statistically frequent, the mere possibility of such marginally probable events can exert devastating social, material and financial consequences. A recent topical study revealed that an earthquake with a 250-year recurrence benchmark could result in approximately 5,000 casualties, 2 million people affected at a different degree, which is roughly a third of the Bulgarian population. Moreover, direct damages would reach up to BGN 4 billion, further affecting the production of a quarter of all Bulgarian GDP (~BGN 30 billion).

These events affect local **planning and strategic cooperation** with increasing importance. We need to consider the fact that about 30% of the entire Bulgarian Black Sea coast is subject to landslide activity as a result of soil erosion, poor ground water management or inefficient construction control (especially relevant in Varna and Burgas cases, including suburban and resort areas). An emphasis is placed not upon the trends themselves being caused by local public regulation and private practices but rather on their direct aggravating effects to disaster risks.

Aggravating factors include widespread sediment shortages – e.g. beach depletion along the Black Sea coast – not the least of all because of inefficient coastal protection. Bulgarian Academy of Sciences teams have established predominant sediment movements with a constant direction. While coastal protection activities have an influence on processes with mostly regional socio-economic importance and environmental impacts, they are a State prerogative and jurisdiction. Given that the

Black Sea coast is exposed to frequent storms and regular wave action – resulting often in considerable economic losses due to infrastructural damage and consequent decrease of tourist spaces and facilities – they remain of extreme importance to Burgas and Varna and their surrounding economic areas.

Whatever line of reasoning prevails in Municipal fiscal planning, the above trends reveal some emblematic inadequacies in coastal management and disaster prevention practices which can be corrected through better planning and coordinated program-level measures in close collaboration with upper-level public administrations. Otherwise we will probably witness – despite beach loss and natural habitat decrease – certain infrastructural damage (both public and private property) and its direct impact on tourism. The latter will be undoubtedly "noticed". Therefore, planned interventions, including funding of important infrastructural projects to protect the beach fronts, are essential and should be projected in at least mid-term municipal and district investment plans. Mapping, monitoring and contingency planning, on the other hand, is inevitable and crucial.

NSI and international databases both indicate floods as the leading natural disasters. Accordingly, the Government publishes maps of flood risk areas for the 4 major River Basin Directorates the country is divided into. One of the most important catchment areas is in the Black Sea Basin region – the Kamchia River which reaches the Black Sea near Varna. The (several) lakes and dams around Burgas are also taken into serious consideration. However, given the state of updates, mapping and monitoring practices, many scholars consider them not sufficient or adequately extensive to support National or Municipal disaster prevention and contingency planning. In fact, most of these planning and risk mapping activities are left entirely up to the local administrations, as they implement both a synthetic analysis of hydro meteorological incoming data and certain small targeted projects which we will outline for each city.

A coordinated disaster prevention and risk management system requires a solid foundation of legislative, political and working institutional models. As much as Bulgaria

has its own experience and expert capacity (i.e. top-down strategy and bottom-up planning), the country relies ever more intensively on EU coordination and involvement, financing and good practice implementation. The subject matter transcends even continental planning and practice, and is comprehensively addressed by UN-level strategic agreements such as the Sendai Framework for Disaster Risk Reduction 2015-2030. This accord aims to guide and enable countries to reduce risks and prevent disasters on a global scale by strengthening social and economic resilience. Its mid- to long-term scope focuses as much on climate and its negative effects on socio-economic safety, as on man-made and natural disasters. Consequently, the European Commission adopted an action plan in 2016 that transforms Sendai priorities into EU policies and funding instruments.

While there are no „universal" disaster response mechanisms, basic preparedness and risk mitigation procedures are established through historical, legal and political accumulation of experiences and civic expectations. Normally, these are codified via legislative measures and standard written operational practices.

To be able to comment and assess the translation of European and global priorities and program documents by the Bulgarian national legislative and political organs into working disaster mitigation systems, we need to shift our focus to the current standards of legal and operational reality – from National down to Local/Regional levels.

Legal Framework. Established National Coordination Mechanisms.

It is safe to summarise that in Bulgarian disaster preparedness and risk mitigation practice the Top-Down perspective is primarily strategic while the Bottom-Up framework is operational and illustrates local capacity more precisely. In our analysis we will outline mid-level considerations, which result in relatively short-span programme documents, and will emphasise overall strategic paradigms and – on the other end of the spectrum – detailed local plans with roles, numbers and operational prescriptions.

We need to specifically understand the role of the Fire Safety and Civil Protection (FSCP)

network as a cornerstone national institution in the sector. While the former Bulgarian civil defence system was inherently related to military formations and command before 1990, several reforms brought it under the control and of the Ministry of the Interior (MoI). The current General Directorate of Fire Safety and Civil Protection has nationally established management procedures and top-down strategies which are sent town by direct order and coordinated by territorial competence units.

These units are ultimately in charge of implementing most EU policies and programs for disaster risk management, including first-response actions, civil preparedness and protection, coordination of external cooperation and humanitarian aid. The main legal act regulating their activities is the Disaster Protection Law. It reflects currently prevailing conceptual views on crisis management and disaster response – both on a national scale and in synergy with all primary international agreements and conventions.

Crucially, a number of additional strategies and executive regulations complement the law and detail specific norms in disaster prevention, volunteering, advisory bodies. Moreover, these auxiliary documents establish and regulate mid-term programmes and annual implementation plans. Specifically in the case of Municipal responsibility and preparedness, they delegate responsibilities and expectations related to Municipal disaster prevention plans. Furthermore, crisis preparedness norms on several levels adhere to other laws such as the Law on the Interior Ministry, Environmental protection Laws, Water usage and conservation Laws, territorial regulations and the like.

The **Disaster Protection Law** (DPL) “regulates public relations related to ensuring the protection of the life and health of the population, the protection of the environment and property in the event of disasters”. The Law is in force since 2006 but has had numerous amendments and additions, with the last one coming in 2018. It defines disasters as significant disruptions of normal societal functioning, caused by natural phenomena and/or human activity (Art.2). The law does not pursue the definition of all types of negative effects on the “population, property, economy and environment” but provides a fundamental guideline on responsibility sharing in prevention, control and mitigation of

disaster effects. Such definitions set the stage for capacity building of the entire system in service of public protection activities.

According to the current governance paradigm, disaster protection is implemented at national, regional and municipal level but coordinated in a single Disaster Protection System. Its leading organisational principles are directly related to local response capacity and the room for Municipal organisational independence. The latter principles prioritise the publicity of information on disaster risks and executive authorities activities (at least nominally and under standard administration practices); they assign priority to preventive measures in providing protection; and prescribe the gradual provision and distribution of forces and resources for such protection.

Being a top priority, **preventive action** has a broad spectrum of intervention with the aim of reducing disaster risks. It foresees a non-exhaustive list of institutional functions and obligations:

- analysis, assessment and mapping of disaster risks;

- development of programs and plans for disaster risk reduction;

- identification of critical infrastructures, related risk assessment and protection measures;

- disaster protection planning;

- territorial spatial planning regulations, along with urban and rural building standards;

- establishment of monitoring and early warning systems;

- providing temporary accommodation facilities and conditions for potentially affected population;

- stockpiling of individual and mass protection equipment and medical supplies;

- staff preparation and training in central and regional institutional units, first responders, volunteers and the general population.

All plans for disaster risk prevention and preparedness are carried out at national, regional and municipal level, according to the dispositions of the Law. Executive authorities and agencies of respective competence are indicated as units of precise

responsibility – whether sole or coordinated – when delivering such plans, dispositions and operational mechanisms. As an example, the Minister of Regional Development and Public Works (MRDPW) has a prominent position of responsibility and coordination authority – "alone or jointly with the ministers responsible for the respective risk" – in delegating planning activities and issuing ordinances for the definition of preventive and safety standards when it comes to construction safety measures and building norms. Other Ministries and central Executive Agencies have their own separate or shared responsibilities according to their field of expertise.

As for the normative documents that provide more detailed dispositions (although briefly mentioned above), they assume a clear interrelated structure with decreasing scope and timespan and increasingly extended details, as the nominative categories suggest:

1. a National **Strategy** for Disaster Risk Reduction;
2. a National **Program** for Disaster Risk Reduction;
3. **Sectoral** and **Regional Programs** related to disaster risk reduction;
4. **District Programs** for Disaster Risk Reduction;
5. **Municipal Programs** for Disaster Risk Reduction;

Their planning and implementation involves regular updates with increasing frequency going down the framework (e.g. National Strategies last more than 10 years, Programs between 5 and 10, specific Plans need revising every 3-5 years typically).

National Disaster Risk Reduction Strategy (NDRRS)

The current strategy has a scope set for the next 10 years (2018 – 2030). It includes an analysis of the environment, a SWOT analysis and the setting of the strategic priorities and objectives for disaster risk reduction on a national scale. It also favours prevention over mitigation, and is followed functionally by a National Disaster Risk Reduction Program (NDRRP). The latter has a validity of 5 years and explicates the strategic

objectives of the former; sets operational goals and related activities; establishes implementation deadlines, expected results, indicators and monitoring and control mechanisms. Crucially, it refines any definitions of responsibility in terms of dedicated institutions and their interrelation, if and when not exhaustively defined by the National Strategy. These parameters are especially useful when translating the dispositions of the National Strategy into Regional and Local/Municipal Plans for disaster prevention, preparedness and mitigation. The indicated executive units (both public and private) have designated funding sources and budget frameworks, although annual Budget Laws give a more precise set of numbers as the Programmes and Plans are implemented.

From the hierarchy of normative sources we can clearly deduce the role and importance of Municipal Plans since they define local capacity and readiness, allow for decentralised planning and enactment of strategic and long-term priorities and goals. There are, on the other hand, additional intermediate normative documents – the Municipal Disaster Risk Reduction Programs. They link National and Regional DRR Programs to local operational objectives and the activities needed to implement them. However, since they are also passed by Local City Councils, they tend to emphasise strategic goals and highlight any needs for updates in the Plan itself. They do not identify specific resources or assign additional operational functions and responsibilities to already existing infrastructure or human resources.

According to existing categorisation under Art.6 of the NDRR Strategy, Varna and Burgas are “urbanized territories of special importance” – along with Sofia, Plovdiv and Ruse. And with bottom-up planning a standard delegated procedure, **Municipal Disaster Protection Plans (MDPP)** assumes a role of utmost importance in contingency planning and risk mitigation. MDPP’s are elaborated with separate preparedness algorithms for each specific type of hazard, although many resources tend to naturally overlap and cover general civil needs. Site- and event-specific characteristics of local territorial risks result in separate chapters, while sections on

earthquakes, floods and nuclear/radiation emergency remain mandatory for all Municipalities.

The Disaster Protection Law specifies (amendment of 2016) that MDP Plans need to explicitly define the risks and their probability; the locally implementable sets of measures to prevent and mitigate disaster risks; civil protection measures. The above requirements inevitably end up in listing the distribution of responsibilities, authorities and persons that need to enact the envisaged measures – with precise resources, cooperation mechanisms and the units' relation within the Unified Rescue System (URS). Moreover, the DPL requires MDP Plans to explicate any Early Warning System order and notification mechanisms towards all levels of Public, Private and Civil entities. Finally, the MDPP needs to outline recovery measures, priorities and resource availability.

Given the importance that the DPL assigns to detailed MDPP, the latter are voted upon by Municipal Councils and updated at least once every 5 years. Their implementation is further ensured through specific agreements signed between the Interior Minister, the District Governor and the Mayor. This is to reinforce the principle that city governance should be functionality sufficient during disaster events but that overall management and response may flawlessly „outgrow" city competence and be passed onto regional and national bodies.

Monitoring and early warning systems are essential in that respect, as they connect local and national emergency response units which have a list of standard practices to follow. Such surveillance and communication systems are based on formal and informal data provided by individuals, organizations and institutions. As defined by the DPL, those include "monitoring systems for meteorological, hydrological, seismological, chemical, biological, radiological, nuclear, ecological and other objects and phenomena". More specifically, these may be hydro-meteorological forecasting stations which provide instant and (mathematically) predictable information on dangerous phenomena. The responsibility for maintaining those falls upon state-level agencies such as the National Institute of Meteorology and Hydrology and the Agency for Research and Maintenance of the Danube River Level. All of these stations and Agencies, nowadays, maintain

regular contacts and exchange information with international colleagues, formal networks and professional associations.

Last but not least, collecting such information falls within the competences of all operators of Emergency calls placed with the European unified number 112.

Prompt and appropriate measures that may reduce disaster risk and facilitate subsequent actions on behalf of Municipalities and all national-level units requires the efficient and responsible dissemination of emergency alerts to the local public. Early warning follows monitoring and preliminary analysis in most cases when decisions should be taken by the Authorities. Some instances, however, follow standard protocol and result in eliminating certain steps when arriving at such conclusions, being straightforward or inevitable. All warnings about impending disasters are required to include information about further appropriate actions.

Article 12 of the above Law defines the local infrastructural collective means of protection: facilities and shelters (e.g. anti-radiation shelters) “the main purpose of which is the concealment of the population in the event of military air raids, industrial toxic substances, radioactive substances or biological agents”. According to regional Fire Safety and Civil Protection (FSCP) representatives, there are more than 2000 such shelters in Varna alone, with Burgas following suit. These are, however, mostly within residential buildings and are smaller in capacity. In most urban contexts (and throughout the country where there is no subway system, i.e. outside Sofia) these are additional underground structures within manufacturing or public service buildings. They have higher capacity and are maintained and inspected by the Ministry of Interior and the FSCP. There are 62 in Varna and 24 in Burgas, although some have been used as commercial spaces throughout the years, while others are abandoned, frequently flooded or suffer other structural deficiencies. An important (in terms of capacity) shelter in Varna is located under the memorial complex of the soviet soldiers at the North-Eastern exit of the city, while for Burgas probably the most significant facility is under the Municipal building itself. But they are rarely monitored and in the case of the former, practically abandoned to environmental factors. Therefore, the main defence and

protection capacity in most cases lies within residential underground storage spaces and active commercial and industrial structures of private operators.

Hence, we can conclude that these collective shelters are a mix of public State, Municipal or private property and are maintained and managed by their respective operators or owners. In several cases this means the Mayors.

Any personal safety equipment (protecting “respiratory organs, eyes and skin from toxic and radioactive substances, vapours and aerosols, from high temperatures and burns, from explosions and other mechanical effects”) is stockpiled and distributed throughout public institutional buildings and critical infrastructure spots. These include Municipal buildings, schools, sports halls and other structures. All such equipment is overseen specifically by the Mayors for their municipal staff and the entire population under their jurisdiction – they are personally responsible for creation, storage, updates, maintenance, distribution and reports. The MoI reserve quantities serve as a backup for the executive authorities and for employees of the public Administration. Crucially, owners or managers of commercial companies need to supply such equipment for their employees. While the last part is an obligation by law, there are few instances reported where smaller companies are able to provide personal protection equipment while most of the larger operators have some stockpiles available.

When there are centrally imposed and managed measures, there is a somewhat better linear execution of legal requirements – such as the iodine prophylaxis tablets for the entire population those are planned, purchased, renewed and made available to the municipalities by the Ministry of Interior.

Bulgaria as a whole has a large and interconnected public administration, territorial agencies of national executive branches, territorial divisions of administrative organs and municipal directorates. Varna and Burgas are no different. In some respect, this practice has its positive effects, as it establishes and maintains a lasting national practice in following emergency and contingency preparedness action plans.

Executive bodies and other government agencies, as well as the population, have the

obligation to be trained in disaster protection. Most operational structures, public services and stationed units oversee the implementation of training and protection activities. Schools and universities, in turn, provide disaster protection training and first aid. What is essential from municipal perspective is that training of the entire remaining population – on basic behaviour and implementation of all necessary protective measures in case of disasters – is organized by the mayors of the municipalities by providing information in an appropriate manner. We will see instances of such information being disseminated but nowadays most of such interventions are limited to an updated emergency and preparedness information on public information websites and municipal resources. The national level of the executive supports such training and information campaigns by maintaining some online instructional and visual manuals on disaster risk reduction, appropriate behaviour and disaster mitigation procedures.

DPL notes specifically certain aspects that distinguish Critical Infrastructures (CI) and European Critical Infrastructures (ECI) from the rest of disaster response facilities. Being designated with such roles and relevance, CI and ECI receive special attention within MDPPs and Regional Programmes. For example, the respective Ministry notifies specifically the CI infrastructure owner or operator of its designation as a CI or ECI (within appropriate classification levels of the Bulgarian Classified Information Protection Act and European Union law). Said owner or operator has three months to prepare a Safety Plan establishing appropriate prevention and mitigation measures.

Unified Rescue System

Legislators have also given particular attention to the Unified Rescue System (URS). Municipal contingency and response structures and operative units are part of it, on one hand, while on the other the URS takes precedence in its entirety over any decisions or actions of the Local Public administration. The URS includes several ministries, all municipalities, emergency medical centres and other medical and health establishments, non-profit legal entities (including and especially volunteer associations), the Armed Forces and all commercial companies within their legally imposed responsibilities.

Beyond this as a legal definition, we see that the most relevant URS units include the Directorate General of "Fire Safety and Civil Protection", the Ministry of Interior (with its Regional Directorates), the Bulgarian Red Cross and the emergency medical assistance centres. They ensure continuous preparedness in receiving, reporting and providing immediate responses to any disasters. The Armed Forces provide additional assistance mainly with rescue and emergency restoration.

Accordingly, training of URS units and members is carried out by directly responsible authorities or local actors. Essentially, for all national and municipal emergency response teams, the aim of regular trainings and instructional meetings is to monitor the state of the communication and information system, as well as the overall preparedness of the disaster response teams. Exercises are planned and conducted with view of improving the coordination between units and functional components of the URS, especially when it comes to the difference in jurisdiction levels – municipal to regional to national. Respectively, any training campaigns or single events are ordered by the Minister of the Interior, the Regional Governor or the Mayor. There are no specific legal prescriptions as to their frequency and content.

As with all theoretical, legal and practical considerations so far, the URS has its driving force in the hands of the General Directorate (Regional for Varna and Burgas) of the FSCP. All coordination and management of rescue and emergency relief work in potential and eventual disaster areas is implemented through their Operational Centres. These centres receive and evaluate all available and incoming information related to emergencies; notify the competent units of the URS and coordinate further activities on the basis of standard operational procedures.

A category with growing importance in Bulgarian disaster protection and contingency planning has lately been notices in the volunteer associations and single physical persons making themselves formally available for such activities. That has not been the case over the past couple of decades but fortunately it seems that the trend is turning. Presently, by law, both natural persons and legal entities are obliged to provide public assistance in emergency circumstances – according to their ability and capacity. Formal

or informal requests on behalf of the Mayor and the head of operations are considered sufficient.

Legal entities need to have an emergency plan based on their internal risk assessment, with respective measures, resources and personnel training. More importantly, they need to provide the Municipality with all relevant contingency information, including significant risk sources based on their activities, prevention plans and potential effects on the population and the environment.

Likewise, volunteering is defined in legal terms as healthy adults (physically and mentally), “not convicted of premeditated crime of unless rehabilitated”. Such individuals receive a personal ID and participate in voluntary formations created by the Mayor upon a decision of the Municipal Council. And while legal entities may create voluntary formations at their own expense, the Mayor is obliged to sign a formal contract with the Volunteer – after apposite training – provide said training along with equipment, insure the Volunteer, and register them with the FSCP as part of a Volunteer formation.

Factors that influence favourably volunteering movements include an improved urban wellbeing and growing social consciousness on matters of common civil importance. Younger generations also tend to be better informed and more involved in social causes and civil movements that share volunteering values. Nevertheless, it always helps that outside of mere social recognition and equipment provision by the authorities, the DPL states that all volunteers (in case of emergency and disaster events) must be released by their employer for the performance of their civil duties. They also receive a remuneration (and insurance) at the expense of the state budget, approved ad hoc by the Council of Ministers, while their public service time is recognised as work experience for social insurance purposes. The Mayor (or appointed official) is obliged to notify employers of the volunteer appointment, issue them a certificate (no later than three days after the end of the event) and provide the voluntary formations with all necessary facilities and needed equipment.

State of Emergency

An important legal instrument and operational „lever" in calamitous times is the proclamation of a "state of emergency". It is therefore not to be used with casual consideration, especially as the Law gives the right to declare it to all levels of the Public Administration – Mayors, District Governors and National Executives – Ministers and the Prime Minister. By definition, it is proclaimed when a disaster is or is likely to occur and result in the loss of life, relevant damage to population health, and/or significant economic or environmental damage.

On a Municipal level, the Mayor issues a Decree for the State of Emergency covering the whole or part of the Municipality. District Governors do likewise, and their decrees may have effects on up to 13 Municipalities around Burgas and 12 around Varna. While formally declared Emergencies last usually days, they may be extended to a month by simple accord between Mayors and District Governors.

When mitigating the effects in the aftermath of disasters and emergencies, higher levels of governance have more effective power over local authorities. This stems from budget allocation and respective resource control. There is a Joint Commission for Restoration and Relief reporting to the Council of Ministers which delegates the District Governors to exercise control over the implementation of the Commission decisions. While annual and emergency budgets are also approved on a State level, with most of the essential and substantial financial and logistical support for disaster protection provided by the budgets of the Ministries and their respective departments. There are, naturally, responsibilities placed upon Municipal budgets, as much as upon legal entities (companies) within the jurisdiction of their offices and production facilities.

There is, moreover, a **National Coordination Office** (a.k.a. **Headquarters**, virtually operational at all times, rather than physically assembled) which is serviced logistically, communication-wise and administratively by the DG "FSCP". In times and events of emergency and distress – even regionally and locally – it assumes control and coordinates the actions of Ministers, Agencies, District Governors, Mayors and Legal entities which have been assigned or perform any functions related to civil defence and

disaster mitigation.

The District Governor is a formal and direct territorial representative of the Government, and as such he or she manages all disaster protection activities in the district (12 and 13 municipalities respectively). Coordination and control of all activities of the above groups of stakeholders may be delegated to the District Governor by the National Coordination Office, or they may simply execute such functions in the absence of such direct and explicit order. Prevention, preparedness, early warning, declaration of State of Emergency, disaster relief and recovery – all are direct prerogatives of the District Governor and as such they are above a Mayor's jurisdictional coverage and power of action. However, in reality, they are never exercised without a coordinated plan which is mutually agreed with the Mayor of the Urban centres, Varna and Burgas.

From Schematic to Operational: Strategy – Program – Plan

As we already outlined, national priorities and strategic goals are established in the Disaster Protection Law and the National Disaster Risk Reduction Strategy. Those set the jurisdiction limits and coordination mechanisms that distribute responsibility down the command chain. More importantly, such an approach disperses available resources in a way which gives priority to better local self-governance which supplies terrain efforts but also short and mid-term planning. These translate up to programmable strategic documents and mechanisms with medium and long-term vision, taking consideration of local and regional specifics but contributing to a common national vision. The latter is complemented by European and international agreements and good practices, forming a State policy and vision of preparedness.

Middle level agencies and strategic units tend to have less operational importance, although they provide a link between the state policy and resource distribution and the local implementation. For example, there is a **District-level Disaster Reduction Council**. Its members are the Mayors of composing Municipalities (or delegated representatives), one representative per Municipal Council, the Director of the Regional

Directorate of the FSCP, the Head of the MoI Regional Directorate, the Commander of the district military formation, the territorial Head of the National Security Agency, Emergency medical department Heads and other territorial Agency Heads of the Executive branch, as well as Legal entities with direct relevance to disaster protection and emergency preparedness.

The District Council coordinates implementation activities related to municipal disaster reduction, and that is valid especially for smaller municipalities, although the DC has its governing authority over Varna and Burgas as City units as well. “Coordinate” does not mean plan or actually perform but it relates to Government prerogatives and their local delivery. The DC also coordinates Municipal Plans, especially between different municipalities. Most importantly, it reviews and prepares an annual report on the state of disaster protection in the territory of the entire District.

We turn our attention to explicitly granted **rights and responsibilities** of the **Mayors of Varna** and **Burgas**. They cover a wide range of systemic planning, strategic coordination and operational monitoring activities. The Mayors “organize and manage disaster protection on the territory of the municipality; organize, coordinate and implement prevention and mitigation measures; establish an early warning system; plan for financial resources for disaster protection within the municipal budget project; establishes a Municipal Coordination Office (MCO, also referred to as “Crisis Headquarters”) which implements the Municipal Disaster Protection Plan”. The Mayor appoints a Head of Operations in all such cases.

Quite essentially, these measures, activities and plans are all to be prepared and trained upon in detail before any contingency needs require their testing in real life. Therefore, the responsibilities of Municipal Mayors are given extra weight if only because the City managers are the one that coordinate and control the development and implementation of the Municipal Disaster Risk Reduction Programs and MDP Plans. These dispositions, more than anything else, provide the municipality's readiness and responsiveness, and they serve as the basis for regional and national programming and strategic overviews.

Additionally, the Mayor’s administration is responsible for the training of all City Hall

administration and the population in its entirety. The Mayor's offices provide temporary housing for citizens in distress as a result of possible disasters – prefabricated houses or tents if the City does not have sufficient spare Municipal residential quarters. We will list the latter for each of the two cities below.

The Mayors have the power to declare a State of Emergency on the territory of Varna and Burgas, respectively, and may attract legal and natural persons to provide assistance in accordance with their capabilities. The latter include primarily the voluntary formations, as created and recorded in the apposite Register. If the Emergency declared is not sufficient to perform all activities foreseen in the MDPP, according to the Mayor's views, they may request a District-wide declaration of Emergency from the Governor.

Finally, the Mayors are in charge of rescue and emergency assistance to victims, provide disaster relief to the population and provide aid to that end to the Social Assistance Agency (a National executive body with territorial directorates).

As we can see, the Mayor is "personally" responsible and in charge of numerous activities, from planning to implementation and control. Naturally, these are delegated to respective vice-mayors, City Hall departments, and most importantly, to the Municipal Coordination Office (Crisis Headquarters) and its Head of Operations. The MCO in turn performs an analysis and evaluation of the disaster situation and proposes to the Mayor decisions to be approved on scope, resource provision, rescue and disaster relief works. All actual operational activities – from prevention to mitigation and relief, all the way to post-event assistance to the affected population – are delegated to and performed by the units coordinated by the MCO. It informs the population via standard media channels on any relevant developments, actions taken or to be taken and further necessary precautionary measures. The MCO reports directly to the Mayor.

An additional consultative unit has been deemed necessary at city level – the Municipal Council for Disaster Risk Reduction. Chaired by the Mayor, it includes Vice-Mayors, the Chief Municipal Architect, selected representatives of the Municipal Council, Heads of emergency response units – territorial detachments of national agencies and independent local units – as well as any legal entities that may have critical and direct

involvement in disaster risk prevention and management. The MCDRR is entrusted with the Municipal Program for DRR, the actual development and update of the MDP Plan, as well as an annual report on the state and capacity of the Municipality emergency response preparedness.

European Union Law integration and overall Institutional Preparedness

Certain legal definitions reveal a large extent of what is encompassed in emergency response capacity and expected of the relevant institutions. **Response capacity** is specified as "ability to provide equipment and appropriate number of persons, using available resources, to effectively deal with or assist in disaster management". **Preparedness** is defined as "knowledge and capabilities of governmental structures, organisations, communities and people [to] anticipate, respond to, and eliminate the consequences of likely, imminent or occurring disasters as a result of contingent actions". Therefore, the emphasis in an efficient civil preparedness system is the prevention and contingency of actions – planning, training and resource provision.

Overall, disaster management is defined in Bulgarian legal terms (i.e. DPL and NDRRS primarily) as "a process of coordinating the efforts of various structures of the URS". This view also stresses the above view on the importance of coordinated contingency planning and prevention.

To strengthen the importance of all strategies and programs developed, as well as the implementation of all subsequently developed Municipal Plans, the DPL and NDRRS create a direct and explicit link with cornerstone **European Law** requirements and dispositions.

The most relevant EU Law acts that have helped shape Bulgarian legislature are:

- Council Directive 2008/114/EC on the establishment and designation of European Critical Infrastructures and the assessment of the need to improve their protection;

- Directive 2012/18/EU of the EP and the EC on the control of major-accident hazards

involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC;

- Council Regulation 2016/369 of on the provision of emergency support within the EU;

- Directive 2007/60/EC of the EP and the EC on the assessment and management of flood risks;

- Decision No. 1313/2013/EU of the EP and the EC on a Union Civil Protection Mechanism.

Acting **primacy of European Union Law** makes these acts practically obligatory through their transposition into national legal norms. Respectively, the Bulgarian Disaster Protection Law has been amended several times over the past few years, in order to respect both EU accords and commitments made within the Sendai Framework Program. There is an EU Action Plan in force which follows 2015 EC peer reviews and outlines a “disaster risk-informed approach for all EU policies” for the 2015-2030 Sendai Program period.

Therefore, not only the main two acts analysed above are aligned with such strategic commitments but also any and all supporting and related national, regional and municipal acts of legislation and operational codes. We will complete this legal synopsis by mentioning briefly a couple of other determining acts.

The Law on the Ministry of Interior concerns MoI activities related to the protection of civil rights and freedoms, national security and the protection against crime. It also treats fire safety and civil protection assigning specific duties to DG “Fire and Population Protection”, as we saw above.

Finally, the Defence and Armed Forces Act provides that the Ministry of Defence “shall ensure, inter alia, the maintenance and use of the Armed Forces in disasters, as well as the participation in overcoming and/or elimination of disaster consequences.

Both Varna and Burgas are Municipalities with well-established and experienced structures. They, however, cannot avoid a close collaboration and even heavy reliance

on the above government agencies and national operative units. Hence, their emergency response capacity is greatly facilitated and supported by "centralised" resource provision and coordination measures. While District and Municipal authorities have their own disaster protection plans, each District has a local FSCP directorate. Moreover, the FSCP provides contact points and coordination with relevant international bodies and networks – including humanitarian aid, disaster response and relief and protection of European Critical Infrastructure.

The FSCP on its own has about 8,000 personnel and is wholly sustained through the budget of the MoI. Monitoring and early warning systems have separate budgets via respective ministries, agencies, and institutes. Inevitably, certain equipment categories, infrastructure and training programmes are financed via international projects and programmes, including EU structural funds.

A significant level of overall disaster response preparedness is entrusted upon the **Joint Commission for Restoration and Relief** (**JCRR**), directly reporting to the Council of Ministers. The JCRR has an annual budget of almost BGN 100 mln (approximately 0.1% of national GDP) to finance "prevention, containment, and overcoming of disaster consequences."

We need to also be able to identify additional approaches and factors that directly or indirectly influence disaster risk preparedness and territorial resilience. As reported in the 2018 Assessment of the Disaster Risk Management Sector – an extensive analysis conducted by the Ministry of Environment and Water – climate-change-related events currently account for nearly 90 percent of all major disasters in the last two decades in Bulgaria. And they are only expected to increase in intensity, presenting an even bigger threat to national and local disaster preparedness. While investing in reducing population vulnerability to weather-related threats has become a commonly declared political priority, it takes time, effort and resources to implement such strategic dispositions.

Accordingly, in order to focus on risk management – and not disaster management – Bulgarian practice recently has adopted a series of guiding principles that are destined to remain a foundation for further development in the sector. These can be summarised as a combination of three distinctive approaches:

- **contingency risk management** in order to avoid accumulation of new risks (and factors);
- **corrective risk management** to mitigate existing risks;
- **compensatory risk management**, in order to support the civil resilience to residual risks that could not be effectively reduced.

These principles lay the foundation of local – Municipal and District – Programs and Plans, especially the Municipal Disaster Protection Plan (MDPP).

Another factor which influences positively municipal capacity and disaster preparedness is the **top-down support** received from all levels of national and **international** executives, as outlined above. Council Regulation 2016/369 establishes the framework for Union emergency, with specific economic support measures. Urgent support is provided when there are humanitarian consequences, with requirements for procedures and eligible costs, while protecting the Union's financial interests. Such actions are to be undertaken along with national coordination and support.

Decision 1313/2013/EC establishes the **EU Civil Protection Mechanism** which enhances cooperation between the Union and the Member States and facilitates coordination in the field of civil protection. The Mechanism rules improve effectiveness in prevention, preparedness and response systems between EU MS and apply also for financial assistance, subsequent monitoring and evaluation. Crucially, the mechanism focuses first and foremost on actions that deal with risk assessment, mapping and planning for disaster risk management, including cross-sector planning.

Any coordinated assistance interventions are deployed via one of the three main units of a relatively simplified structure: an Emergency Response Coordination Centre

(ERCC), a European Emergency Response Capacity (EERC) “in the form of a voluntary pool of pre-committed capacities from the Member States” (e.g. trained experts or the European Medical Corps (EMC), established 2016), and a Common Emergency Communication and Information System (CECIS) managed by the EC and MS contact points. Clearly, one does not expect such interventions to be relevant to locally-based emergency events of a limited scale but such an established coordination and support chains does enhance immensely preparedness of any given European urban realities.

We cannot avoid mentioning the **DG for European Civil Protection and Humanitarian Aid Operations (ECHO)** which provides EU-wide assistance through humanitarian aid and civil protection. Dedicating specific attention to such growing needs since 2010, the Commission has shaped a more effective and specialised disaster response mechanism. The directly related EC Peer Review Program is an ECHO initiative, which conducted a review of Bulgaria’s disaster management system last in mid-2015.

There is also a Disaster Risk Management Knowledge Centre (DRMKC), acting as an EC “initiative to improve communication between policy makers and scientists in the field of disaster risk management”, contributing with research on various topics. Threat modelling and forecasting, early warning systems, crisis management technologies, critical infrastructure protection and risk standards (e.g. Eurocodes, loss and damage data, lessons learned) are concrete tools that help local and national governance plan and act upon informed strategical decisions.

The Critical Infrastructure Warning Information Network (CIWIN) is an Internet-based information and communication system designed to facilitate the implementation of the European Critical Infrastructure Protection Program (EPCIP).

Making the best out of international and institutional support

With resources limited and threats growing, small and medium cities with high regional importance such as Varna and Burgas need to be able to make efficient use of all direct and institutional support available nationally and internationally.

The first and most obvious source of funding and expert human resources are the annual Municipal (and state) budgets, including JCRR funds. The EU Structural and Cohesion funds have also significantly grown in importance and relevance, especially over the current Financial Framework (2014-2020).

What both municipalities report as a **common shortcoming** is not uncommon for other municipal realities (of all sizes): there is deficiency in integration – or complete lack of, in some cases – of **mapping and preliminary analysis instruments**. An illustration of this is the National Disaster Protection Program (incidentally expired, with a last version valid for the period 2014–2018). The NDPP identifies and analyses a number of standard risks. Mapping is available for earthquakes and landslides only, with some flood risk maps available separately and unrelatedly to the NDPP at the MOEW since 2016. There is no instrumental and analytical mapping available for radiation, industrial threats, fire threats (forest, industrial, urban or energy sector) or even Critical Infrastructure – while all of these are crucial in the risk prevention and protection of large urban masses of the population. Additionally, there are no similar considerations for meteorological phenomena such as drought, snowfall, hail, geomagnetic storms – neither at city level, nor at national. Clearly, expert capacity and financial resources need to be planned towards closing this critical analytical gap in dealing with disaster risk prevention.

As regulated by current legislative norms, a new analysis and re-assessment of all disaster risk types – along with **mapping** – should be carried out once every 6 years by relevant public authorities. Those are:

• Ministry of Regional Development and Public Works – seismic/geological risks: earthquakes, landslides;

• Ministry of Environment and Water – flood risks;

• Ministry of Agriculture, Food and Forestry – forest fire risks;

• Nuclear Regulatory Agency – nuclear and radiation risks.

The above Ministries do not actually carry out proprietary modelling of threats and risks,

but rather purchase such analyses from the private and academic sectors. The Bulgarian Academy of Sciences (BAS) is a key provider of scientific and research data on disaster risk.

We must emphasise that apparently the issue is present on some level within national strategic units, since the 2020 Work programme of the Council of Ministers on Disaster Risk Reduction has projected to adopt some directly related measures. Among those "a review and an annual report on the state of disaster protection; a report on priority disaster risk reduction activities requiring funding in the next calendar year; development of a National Disaster Risk Reduction Program; development of a National Disaster Protection Plan; guidelines for the development of District and Municipal disaster risk reduction programs." As might be expected, the Council limits its action range on Program and Strategic level mostly, leaving final planning to the Municipalities. The NDPP itself is quoted as "implemented through district and municipal programs, [merely] setting operational goals and activities for their implementation".

What is less reassuring, however, is the lack of an implementation timetable with clearly set deadlines and responsibilities within the 2020 Work Programme as such, especially since the expiry of the 2014-2018 NDPP, with the last Annual Plan publicly available and approved has been the 2017 one, based on the 2015-2016 annual reports. 172 specific tasks for 2017 have been presented in a table format but most include equipment procurement, trainings and some sectoral planning (e.g. critical hydrological site restoration, such as dams), as well as the development of a proprietary emergency satellite communication system.

Despite DPL requirements, annual reports (including the last one from 2017) frequently present only part of all financial expenditures – planned or already spent – but merely mentions the funding sources: state, municipal or EU funds. It also does not have an explanatory section to distinguish priority interventions.

The National Programme for Prevention and Limitation of **Landslides** covers policies

and planned intervention measures against “erosion and abrasion along the Danube and Black Sea coasts”, and it covers the period from 2015 through 2020. The criteria for targeted landslide interventions are developed upon an assessment of multiple factors, including impacts on infrastructure, health and well-being. What becomes apparent from these analyses is that that the Franga Plateau, standing over Varna and its surroundings rises up to 300 m, with some steep slopes, terraces and numerous landslides.

On the other hand, while the Southern Black Sea coast around Burgas is lower and more fragmented by natural lakes, it is more exposed to **floods**, which remain a major threat to the City as well. Municipalities can get support when planning appropriate measures from a National Catalogue of measures and priorities for flood risk management. In their standard practice, the Catalogue is used by the four national Water Basin Directorates in mapping potential risks and preparing Flood Risk Management Plans. The WBD directly responsible for Varna and Burgas coordinated measures is WBD “Black Sea Region”. It has the task of strict monitoring and appropriate updating of plans – including contribution to Municipal Plans. Still, what is concerning is that currently **climate change impacts are not considered** a factor in flood risks, “due to the high degree of uncertainty and conditionality of climate models”. That, in our view, is an omission and something certainly to be rectified in the next programme period, from 2020 onwards.

A **further review of strategic and legislative frameworks** should also cover other major and related Acts – namely the Forestry Act, Water Act, Environmental Protection Act, Waste Management Act, Safe Nuclear Usage Act, Biodiversity Act, Plant (floral) Protection Act, Agricultural Land Conservation Act, National Emergency Call System Act (UEN #112), Local Governance and Self-Administration Act. These frequently refer to local (Municipal and District) jurisdictions, PA duties and institutional relations that influence the capacity and preparedness of Varna and Burgas as local administrative units. All in all, what is restated in the majority of these legal formulations is that Mayor and District governor responsibilities include activities at all stages of disaster risk management, not simply emergency planning and response.

The last **Peer Review** initiated by ECHO in 2015 continued through 2016 and revealed "well-established civil protection and disaster response system" with clearly defined roles and responsibilities under the Unified Rescue System. Moreover, a good overall cooperation with EU partners enhances civil protection, training and integration. The Bulgarian Red Cross and civil society are specifically mentioned favourably in disaster response and preparedness evaluations.

Nevertheless, specific recommendations were issued regarding a transition which assigns due (and equal) importance to prevention, preparedness, response and recovery. An institutional response to those references is deemed to be the National Disaster Risk Reduction Strategy 2018 – 2030. What has been established as a revised framework for adequate prevention and reduction of risks foresees standards that go beyond better preparedness and responsiveness. Crucially, the latest NDRRS pays more attention to rapid disaster recovery through the implementation of the so-called **BBB** Principles: **Building Back Better**. This essential approach to post-disaster recovery "reduces vulnerability to future disasters and builds community resilience". Its aim is to address the complexity physical, social, environmental, and economic vulnerabilities by reviewing socio-economic functionality of all systems – especially relevant in urban contexts – and projecting their functions to integrate disaster response and resilience. We are not only referring to infrastructure and physical urban systems – these principles apply to institutional reform and better operational coordination as well.

Equipment, Staff and Procedures – Common Municipal Framework

A strong – and essentially top-down – institutional support to disaster risk management is clearly evident at all levels in Bulgaria, including Municipal. However, for all relevant sectors to be efficient and contribute sufficiently, they should be adequately provided with financial, technical and administrative capacity. Rational use of available resources can be planned for and optimised but their provision is indispensable. The current

paradigm (NDRRS) foresees drawing up of Plans, their review and update, contributing to relevant disaster risk reduction Programs and Strategies at national, regional and municipal levels; additionally, a periodic assessment of risk management capabilities covering **administrative, technical and financial capacity**; and finally, introducing incentives for the private sector, professional and scientific organizations to get involved.

This kind of modus operandi has achieved some measurable progress in decentralisation of capacities and response structures, especially considering the resource base and expert potential of municipal structures, related to their direct responsibilities. . With regard to the other elements of SDS, progress is uneven, with some municipalities with larger and better capacities being able to take on responsibilities more easily, while for others this remains a significant challenge. Naturally, certain Municipalities are in better shape and have learnt to adapt and evolve their capacity, designating flexible usage to resources and designing better local prevention and reaction Plans. Others quite simply lack the resources and HR capacity to tackle the challenge.

A major and repetitive **shortcoming** is that essential data sets (Big Data, specialised information, etc.) are repeatedly collected by different government and local institutions, thus leading to duplication of scarce resources and overlapping of research and planning actions. Both Varna and Burgas rely completely on state strategic coordination in some emergency situations and lack a clear vision of how to prepare their population and territory in a better way. According to the MOEW, key data sets that are essential for risk maps include “land use and vegetation, soil and geology, topography, river drainage networks, transportation networks, public buildings, CI” but also “residential structure types, demographic information, GDP, replacement costs”, while others enrich the picture and facilitate contingency analyses.

To indicate some basic segmentation of the above groups, we should list “state or municipal transport systems”; “elementary, secondary or higher education institutions” – public, private or “other”; “medical and healthcare facilities” – again, public, private, basic wellness, general or specialised; demographic data (age, gender, earnings, etc.); types

of residential, commercial or industrial buildings ("location, year of construction, number of floors, replacement costs, type of roof and walls, etc."). Most importantly, it is difficult to judge these structures' internal capacity, preparation levels, resource provision and level of adoption of institutional emergency recommendations. With these considerations in mind, Ministries, the NSI and the Municipalities do manage to collect most exemplary information types, although it is a challenging and long process, and their validity is questioned by mere practices and even common sense. The issue at hand is how to optimise distribution of information collection responsibilities and, consequently, risk analysis action pertinent to various municipal or national structures.

The MOEW admits in its own **2018 Disaster Risk Management Sector Assessment** that a number of "documents are not coordinated and consistent with each other, albeit some indirect links. Data and analyses are not based on the same methodological approach. The sectoral analyses are fragmented, unrelated and not included in a summary document and threat map – i.e. there is no single document that maps all identified risks, their geographical distribution and extent." This is a common shortcoming which further limits Municipalities and impedes them to examine exposure levels related to their population, as well as "housing, CI, social and cultural infrastructure, agriculture, industrial facilities and the environment".

Moreover, as emphasised above, the MOEW admits that sectoral strategies, programs and action plans do not address climate change induced risks. In fact, there is "no critical data collection" in the field. An example is the missing inventory on dams, including small and Municipal dams, let alone an analysis of climate-related effects on such structures.

"General and sporadic links and comments" alone do not lead to conclusions, measures and funding. Clearly, an urgent update – with shared ownership and responsibility – of existing databases, strategic and legal framework is more than necessary.

Critical monitoring infrastructure and facilities is mostly state-owned. As a fundamental Early Warning System (EWS) component, hydro-meteorological

observatories provide real-time data to DG FSCP which then shares such signals with Municipal units or services, along with other related Ministries. Varna and Burgas FSCP Directorates, in turn, circulate warnings to citizens and relevant local institutions (e.g. schools). DG FSCP has proven to maintain well-established preparedness and emergency functions, including at district levels, mostly relevant within Varna and Burgas urban centres and suburban socio-economic levels. **Municipal units**, however, seem to receive less favourable reviews from national analyses over the years, mostly because of "**unsteady progress** and insufficient improvement".

Inevitably, this brings us back to **investment and funding** considerations. Targeted risk reduction investment – both public and private – significantly lowers post-disaster response and recovery costs. When designing response and protection mechanisms and attempting to achieve a healthy risk-sharing scheme between public and private operators, a detailed and comprehensive cost-benefit analysis is indispensable. It can warrant public interest and attract more investment in risk mitigation measures. However, risk reduction investment is perceivable only (usually) in the long run. That is the major problem in attempting to stimulate and justify such investment, especially in the private sector and among less strategically oriented stakeholders – the measures and "sacrifices" do not show an immediate and **tangible effect**.

Likewise, introducing disaster risk reduction mechanisms as a criterion for financing large public and private infrastructure projects is more of a wishful thinking by Municipal and District public administrations. The need for any kind of investment in Varna and Burgas is irrefutable, thus causing the Black-Sea municipalities to prioritise attracting local and external investments even without setting limitations and requirements, let alone long-term incentives to better disaster risk reduction as a cornerstone element of all new projects. This goes against the new, widely declared, state-level priorities of Build-Back-Better but we cannot find one single municipality that has set such requirements to economic operators of any scale.

Investing in innovative monitoring, forecasting, modelling and Early Warning solutions is also garnered with similar considerations as the ones above. It is much cheaper in itself

but even less directly related to socio-economic returns and structural improvements, and as such, left to Public Authorities alone.

Finally, both public and private entities need to improve their use of "pre-financing instruments" such as insurance (or even secondary insurance), deploy/request financial reserves and emergency loans or emit contingency bonds – all of which complement standard collateral disaster protection and may provide further adaptability to public protection systems. If tied to the three types of above investments, they should be able to get better support in turn by both public entities of superior order and private financial institutions.

Varna Municipality Specifics

Let us now take a more detailed look at the regulatory and organisational reality, as well as the equipment and human resource provision of the two municipalities separately. We start with the city of Varna.

The "central" Municipality alone – not considering the entire urban catchment area (suburbs, resorts and directly tied socio-economic areas) – has a population of 359 681 inhabitants, as of December 2015 (NSI). With tourism and services as main occupational areas, the city is well served by a port, an airport, as well as all major types of transport, energy and typical urban Critical Infrastructure (including energy: pipelines, compressor stations, high-power electric stations, etc.).

The Municipal Administration has a **Directorate of "Security Management and Public Order Control" (SMPOC)**. The Directorate has six separate Departments, directly or indirectly related to disaster risk prevention, preparedness and mitigation:

- Public order protection,
- Construction Control (i.e. buildings),
- Commercial Activity and Tourism Control,
- Civil Protection,
- Video Surveillance,

- Defence Mobilization and Training.

The Municipal Directorate responsibilities include: preserving public order and ensuring safety and security of citizens, including through the activities of its Municipal Police corps; quality control of cleaning and drainage activities of subcontracting companies; construction requisites, control and monitoring (territorial development and secure functional distribution of urban facilities and residential buildings); pro-active participation in the development of the Municipal Disaster Protection Plan; as well as the maintenance and control of the video surveillance system within Varna Municipality.

Accordingly, the Municipal Council has voted upon their proposals (coordinated with a number of regional and national safety-related entities and subordinated to the National Strategy and Program) and adopted a Municipal Plan for civil disaster protection and the mitigation/elimination of consequences (MDPP). It envisions a series of measures and systematic preparedness against floods, landslides, adverse weather conditions (especially winter) and fires, as well as against more rare but understandably more dramatic events such as radiation, industrial pollution and earthquakes. Certain measures are standardised for all disaster event types: chains of “command” and reporting, training and provisioning mechanisms. Others are more subject-specific, more technically segmented according to the essence of the calamity – underground sheltering vs. over-ground rescue actions, types of mitigation actions or paramedical reaction to symptoms, etc.

The plan has been developed pursuant to Art. 9, Comma 1 and 2 of the Disaster Protection Law, and has as its declared goal “the creation of optimal organisation and planning of management, coordination and interaction between the main units of the Unified Rescue System (URS) – Regional Directorate of FSCP, District Directorate of MoI, the Emergency Medical Care Centre – and all related Municipal units, along with legal and commercial entities involved in disaster relief works”. The MDPP aims for “effective rescue and emergency recovery works to save and protect population lives and health, property, the economy and the environment in the event of disasters”.

Considering the fact that the plan is developed and approved by the Municipal council

in 2016, the lack of more emphasis on prevention and preparedness in its introductory section, stating missions and visions, is somewhat surprising. However, those are covered more pragmatically in the further sections.

The Varna MDPP has a structure which follows the basic problems it tackles and the tasks which the administration has outlined as necessary to do so: disaster analysis and forecasts, preliminary planning of the actions pertinent to the municipal "leadership", and directly relevant to the prerogatives of the Municipal Headquarters created for the implementation of the MDPP in case of need. The MDPP plans allows for preliminary planning and "timely establishment of necessary provision of task forces and means for reaction, performing rescue and relief actions". The MDPP has entered into force by a Mayor's order.

The Plan straight away **identifies Critical Infrastructure** in the City, besides and beyond the facilities already designated (with the cooperation of national and international entities) as European Critical Infrastructure. Potentially dangerous sites on the territory of Varna Municipality are numerous and exceed CI in its narrow definition. For example, the petroleum product storage facility "Varna Storage" is licenced to receive, store and ship oil products. Located in the Southern Industrial Zone, it lies on an island between two waterways and under a bridged highway (including a quay for docking and loading). The entire site is already categorized as High Risk according to the Environmental Protection Act but is also highly relevant to disaster prevention and protection planning. Several other company facilities have been identified and listed as storing ammonia (e.g. Nestle, for cooling systems), natural gas (storage and distribution – 3 companies/locations), explosive materials (when of considerable quantities, e.g. for geology, research, etc.). The MDPP points out that municipal CI is every structural facility that has the capacity to host mass gatherings of people – such as train and bus stations, the airport, sporting facilities (several private and professional Clubs own such, along with some Municipal structures).

Explicitly identified as vulnerable CI facilities are:

- the Asparuhov Bridge, with its 2054-metre reinforced concrete load-bearing structure (16 metres wide and rising 45,50 m over the water);
- the bridge leading to the Southern Industrial Zone – metal, with train tracks and a road (55m long, 16 metres wide and 5,50 m over the water);
- all overpasses and underpasses for vehicles (listed in a separate Annex: 15 for vehicles and 28 for pedestrian traffic only);
- the three train stations: Main Passenger Train Station with 8 railroad tracks; the Cargo Train Station with 10 tracks; the “Topoli” mixed-use train station with 2 tracks;
- 8 high-voltage electric power distribution Substations within Municipal territory;
- 2 high-voltage Power Lines – one Overhead, above the Channel, and 1 underground;
- 5 Main water supply pipelines;
- all gas pipelines and distribution points throughout the city;
- all other facilities for mass gatherings, see above.

While vulnerability and importance is assigned as “high” to most civil infrastructure, especially logistics-related and power lines, population risk is evaluated as higher for any threats related to the petroleum storage and distribution facilities, as well as the ones which host population gatherings.

The Plan continues with a brief overview of potential disasters which may hit Varna municipal territory, and the ones taken into direct consideration are earthquakes, floods, radioactive pollution, landslides, heavy snowfall and fires in proximity to populated areas. The MDPP is thus divided into thematic chapters according to type of threat and corresponding measures. We will follow this structure and highlight mostly differences, grouping together measures and resources that delineate the Municipal preparedness.

Earthquake Preparedness

An important category of natural hazards, Varna Municipality belongs to the extended

Shabla Zone of the North-west seismic region. Potential seismic calamities could reach magnitudes of 8 on the Richter Scale (or 9 on the Modified Mercalli Intensity Scale).

The Municipal analysis shows that an earthquake of the higher orders of magnitude and intensity may resulting in structural damages, floods (by broken pipelines), cracks in the ground or activated landslides that will disrupt the municipality's overall communications network. Furthermore, higher magnitude earthquakes **may cause**:

- disruption of management and functioning of vital local socio-economic systems;

- more than 20% of residential buildings to be destroyed or rendered unusable;

- significant human casualties, people being trapped people and in need of recovery and rescue;

- material and cultural assets on the territory of Varna Municipality to be destroyed;

- power, gas and water supply to the population to be completely interrupted;

- numerous fires along the power grids (caused by short-circuits), at distribution substations, as well as explosions along gas distribution network, storage and trading facilities for petroleum products;

- said fires may release toxic substances, polluting the environment and reducing immediate visibility;

- industrial accidents with the release of gaseous substances over significant areas, especially around economic operators utilizing such hazardous substances (e.g. the mentioned “Varna Storage” petroleum facility and the Nestle cooling facilities).

The Municipal Administration has placed such considerations at the foundation of **preparation measures and capacity development**, with view of potential “dire environment” being created in the densely populated city area, including suburbs and neighbourhoods (surrounding villages) with old anti-seismic building requirements. To that end, the City Council has voted on the following preventive measures deemed necessary to reduce the adverse effects of seismic impact at local level: an analysis and updated assessment of seismic risks and (micro-)zoning; technical certification of

buildings, with emphasis on levels of seismic security, including cultural sites of national and international importance; geo-protective and coastal protection measures; strict control for existing regulations in spatial planning and construction works; reinforcement of unsecure and buildings and facilities against seismic impacts; development of contingency scenarios for consequences of strong earthquakes in the extended urban area, highlighting vulnerable spots and additional measures needed; training and practical preparation of local and territorial executive bodies, first responders and the population. The list itself shows greater regard to preparation, training and contingency planning than mere response mechanisms suggest and delineates an integrated approach to capacity building at a local level, despite the strong reliance on central executive support that we saw in legal and institutional dispositions.

Since earthquakes are a sudden event with a short duration, the focus immediately after is directed towards **restoration and (re-)construction** of facilities and urban structures, whatever the level of supposed preparedness. Varna municipality has established a series of criteria for designating facilities that have a priority or need to be reconstructed or newly built. Considering that buildings should all comply with the Regional Ministry seismic requirements, in the immediate aftermath certain resilience signs and obvious damages are decisive in allowing any further inspection and potential habitability of buildings and facilities after the earthquake has subsided. There is, however, the straightforward need to classify sites and facilities by public importance – life-saving needs and essential public service maintenance for the population in the Municipality. Thus, the Council has set the criteria for identifying restoration activities:

- current compliance with technical regulations for design and types of construction (load and impact; seismic resistance; fire prevention standards);
- actual post- earthquake vulnerability;
- the degree of present danger to the public and economy;
- urgency of need for rehabilitation or new construction of sites and facilities;
- ultimate control over construction completion.

Naturally, city administration assigns priority to technical infrastructure and “systemic” buildings and engineering facilities with direct relation to transportation, water supply and sewerage, energy supply (electricity, heat, gas) and telecommunications, as well as public service buildings of prime importance. Expert conclusions on damage degrees are decisive, according to dispositions by the Joint Commission for Restoration and Relief (JCRR) and the Council of Ministers. The same set of JCRR regulations provide technical guidance on characteristics, significance, complexity and risks for site exploitation related to the construction type and category. Besides linear considerations for structural integrity and disaster scale, the Municipal administration is bound to assess the social priority of the site (healthcare, education or other sector), existence of alternatives for functional mitigation, maintenance costs and actual use. Damage assessments and reconstruction considerations are carefully documented for monitoring and reporting purposes but also as a “starting point for further detailed evaluation or to be useful to managers and companies organizing and conducting restoration work”, contributing thus to future preparedness capacity.

Certain officials and administrative units are designated as being **formally responsible** for the application of such criteria for restoration works and assigning priority to buildings and facilities for rehabilitation works. Within the Central Municipal Administration of Varna these are:

- Deputy Mayor in charge of construction;
- Head of the “Engineering Infrastructure and Public Works” Directorate; all “EIPW” employees;
- Head of the “Architecture, Urban and Spatial Planning” Directorate; all “AUSP” employees;
- Chief Municipal Engineer.

Within District Municipal Administration units these are the Heads of “Spatial Planning” Directorates and their employees, as well as the Chief District Engineer. Lastly, central and district Municipalities may engage chartered engineers, as well as freelance designers and architects. Such restoration and relief Committees are set up for each

administrative district.

In most cases, visibly (or possibly) damaged urban structures may undergo such evaluations and receive institutional attention according to the above criteria. Critical and potentially dangerous infrastructure, however, are mandatorily inspected after an earthquake has subsided and before any disaster recovery activities. These are water mains, heating and gas distribution pipelines, high- and medium-voltage power lines, electric substations, bridges, industrial sites which use or store toxic substances and petroleum products. A comparative examination (before-after) of their condition should reveal damages and potential perils to public safety, initial steps for restoration (e.g. partial or new construction), as well as anticipation of post-recovery operational risks.

While the abovementioned Municipal staff (Deputy Mayor, Directors and staff) remain legally responsible for preparing expert reports and guiding recovery plans, the legal and commercial entities (as owners or operators) of such Critical Infrastructure should in turn designate a responsible Manager, Chief Engineer, technical staff and a general disaster response group.

Municipal **Early Warning and Monitoring Systems** are outlined in the MDPP, with view of their external supervising and possible upgrade and update. While it explicitly states that “the establishment of a seismic monitoring system, as part of the National Seismological Network (NSM) is not within the powers of the Municipality and hence a national priority”, the Plan points out that most relevant Varna Municipality Officials, as well as District Mayors, are an indispensable part of the National Disaster Alert System.

First and foremost, any announcements to the population is managed by and mostly performed by the Operations Centre of the FSCP for Varna District. An automated voice notification system carries over the alert messages, including brief and simple directions for short-term actions. There is, however, no such system available in surrounding villages and second home (villa) zones of Varna. Sufficient urban coverage is deemed ample, nonetheless, as radio and other means of contemporary communication (e.g.

individual and chain virtual messaging systems) complement population awareness on a sufficiently short notice. The central Municipal Administration of Varna divulges any official and procedural messages to district (zonal) Municipal divisions.

An alert system called “Technical Complex for Disclosure” (TCO) is developed and set up by allowing for segmentation, prioritisation and automatic availability withdrawal for a number of communication channels. The five urban Municipal Districts, as well as the Port of Varna East, are the main coverage zones included in the system, where its signals are transmitted by Operations Duty Officers (of FSCP).

Varna Municipal administration – in accordance with FSCP jurisdiction and competence – is aware that local Early Warning systems need improvements. City Council has debated the need to establish a municipal “situational centre” with an advanced monitoring and EWS for the needs of Varna Municipality. An updated EWS must allow better and continuous monitoring and (real-time) analysis of the situation throughout municipal territory, possibly based on Big Data and Blockchain segmentation of generated information for improved security and access. As noted, such a Centre must be coordinated with any operational and strategic units of the FSCP and the MoI for many obvious reasons, not the least because of the crucial need to ensure two-way exchange of up-to-date relevant information. At present, the most improved system component over the past couple of years is the expanding video surveillance system which is based on traffic monitoring but may be exploited for civil security and urban safety with growing efficiency.

The municipal administrative personnel (and units) responsible for managing the city EWS and its synchronisation with various URS components are not quite the same as with response and relief operations. Directly accountable are the following:

- “Information and Administrative Services” Directorate (specifically its ICT Department);
- “Security Management and Public Order Control” Directorate (SMPOC); and the Heads of its
- ICT Department;
- “Civil Protection Activities” Department;

- “Video surveillance” (CCTV) Department.

The MDPP has a subsection – in each of its disaster-type Chapters – dedicated to organisational and operational aspects of **trainings** made available to the Municipal Administration and the general population. The DPL prescribes (Art.14) that the Mayor is personally responsible for disaster prevention and response trainings of their Staff and Varna residents. To that end, an annually updated municipal employee training plan is approved and executed, with “theoretical and practical sections [including] basic rules of conduct and action, and a situational will play out”. The training of the general population, on the other hand, is mostly organised on a voluntary and optional basis, by request. More importantly, it also includes “broadcasts on local radio and TV stations, the development and dissemination of informative material, recommendations for action and behaviour in the event of a disaster”.

What is more relevant in a directional and capacity building perspective is the training aimed at facilitating and improving all interaction and coordination between national government units, local response forces and the population. Such trainings and practical “drills” are conducted on a running basis in schools and companies according to internal plans but with “assistance and methodological guidance by Varna Municipality”. Trainings are ran jointly with local URS units (FSCP Regional Directorate, MoI District Directorate, the Emergency Medical Care Centre).

A central issue when discussing preparedness, capacity and optimisation potential, especially in the public sector and its critical functions, is inevitably their **funding: sources, structure, sustainability, outlooks**. Any considerations related to disaster preparedness and response capacity – including specific activities according to calamity types, trainings and other related activities – cannot prescind from a general outlook of what the Municipality has at its disposal for direct and indirect financing of security and disaster preparedness capacity.

The particular Budget category for Varna Municipality is assigned the “Defence and security” (D&S) denomination. For the current 2020 the total available budget for D&S is set at BGN 4.24 mln (or approximately € 2.17mln). Budgeted as such, the amount

does not include or indicate other related expenditures, investment plans or funding programs for municipal, regional and indirect capacity for disaster response mechanisms. As an example, in 2020 Varna Municipality has budgeted BGN 23.7 mln. for Healthcare and related activities. They certainly improve disaster response capacity, although less measurably in a direct way. As do investments in repair, reinforcement, engineering and infrastructural developments.

The BGN 4.24 mln for D&S activities represents a slight growth from the BGN 4.14 mln available for 2019. This also is a major raise compared to the BGN 3.31 mln dedicated to the sector in 2018. Hence, Varna Municipality is increasing its commitment in safety, security and preparedness. It is also worth noting that most of these activities are funded directly by delegated state budgets, considerably complemented by local taxes and services. A sizeable portion of the municipal budget is planned and carried out through EU Structural and Cohesion funding – yet again, mostly national Operational Programs, with some rather small direct financing by Brussels executive agencies (N.B. Total projected 2020 budget amounts up to BGN 492 mln, out of which we would highlight the “European projects and programs” budget segment contributing with more than BGN 108 mln).

Back to our operational considerations: Likewise, training and preparedness activities of all kinds are mostly financed through Municipal budgets under the function "Defence and Security", Activity #283 "Preventive activity"; while external and correlated preparedness capacity and training is financed independently by the budgets of respective legal entities (companies, NGOs, other associations).

Response capacity and preparedness is greatly enhanced by **risk reduction activities**. For earthquakes (according to the MDPP) that means:

- EWS maintenance and constant readiness (for immediate relay to Municipal and URS units and Heads);
- ensuring continuous communication with local media (TV and radio) to provide

behavioural guides;

- preliminary preparation and planning of Municipal governance actions and URS reaction scenarios;
- early planning and creation of pertinent response units able to perform Rescue and Disaster Recovery (RDR) activities;
- creation and training of voluntary municipal units, available on call for involvement in emergency and recovery work;
- Municipal and District Authorities' training for earthquake behaviour and action;
- population preparedness and training – via professional, educational or other environments;
- conducting efficient and targeted prevention via continuous monitoring on CI sites and facilities at higher risk due to potential seismic activity. This latter function includes systematic CI status control, video surveillance and continuous EWS enhancement and improvement.

The **measures taken to protect the civil population** are guided by the Mayor's cabinet, consequently delegated to Varna District Municipalities, and in close cooperation with national and territorial executive authorities. Earthquake forecasting (with profiling of possible consequences for various regions of Varna) is referenced to annual MDPPs and their updates. Both systematic and specific (and urgent) measures are channelled towards reducing the impact of earthquakes on the territory of the city and its suburbs. Examples of the former are the dedicated staff on 24 hour duty (at the central Municipal building, District administrative bodies and main Municipal Enterprises); EWS channels and pre-set messages; dedicated management and operations personnel for rescue operations; coordinated response mechanisms between Municipal and URS units in the event of RDR activities.

Ad hoc actions and flexible response capacity includes effective and streamlined summoning of forces and resources made available by legal and natural persons involved in emergency disaster recovery. More standardised, although on a case by

case basis, are the coordinated yet largely independent actions of medical teams that provide first aid (and psychological assistance) to victims and teams working in affected areas. Municipal response units are more involved with coordinating search and rescue operations, supporting regional coordination in timely population evacuation (and sheltering, according to existing and updated evacuation plans), providing protective equipment and implementing measures against infectious and parasitic disease outbreaks as a possible consequence of extensive damages.

To illustrate further Varna capacity in ensuring civil protection (in this case specifically related to earthquakes), we need to break down enacted measures in two main categories: Rescue and Emergency Recovery.

Rescue activities cover, first and foremost, the detection and rescue of trapped citizens. It is performed by rescue units of the territorial FSCP, Regional MoI working groups, as well as by other survivors and their relatives. An essential role is also always performed by volunteers enlisted in a Municipal Register. If needed and when available, local efforts may be supplemented by units and resources of neighbouring unaffected municipalities and other territorial URS units.

Another important aspect of emergency preparedness is represented by **medical and paramedical services** available to the local population. Varna is an important regional centre in that respect – not only District but truly leading the North-East Region of Bulgaria in healthcare services, facilities, experts and operational capacity.

Local public authorities have outlined essential Emergency and First Aid care and services as well that characterise disaster preparedness and capacity for reaction. First Aid is carried out generally by response units on duty at the Emergency Medical Care Centre – a mostly municipally funded healthcare structure. The District Hospital itself which hosts the EMCC facilities is not the leading healthcare structure in Varna, as it lacks some additional general and specialised structures, staff and equipment. However, the EMCC is the preeminent First Aid point for the whole urban area and sufficiently

equipped, well-connected and infrastructurally supplied to that end. It is moreover close to the principal blood transfusion centre, with haematology teams from all city Hospitals actively involved in Emergency and First Aid services. Last but not in importance, Varna has always counted upon volunteers registered with the Bulgarian Red Cross, who are frequently an additional group of citizens, besides those listed as Municipal volunteers. The BRC staff and volunteers offer paramedical aid, as well as assistance with evacuation, sheltering and relocation.

Having mentioned that the EMCC is not part of the most well-equipped hospital, it is important to reiterate that the total capacity of Varna healthcare facilities is significant. General and specialized medical care can be provided in the following publicly owned and managed structures:

- first and foremost, the University Hospital "St. Marina", with cutting edge diagnostic and treatment facilities, leading medical professionals and the largest hospitalization capacity in the North-East.
- Hospital “St. Anna" (hosting the EEMC), in the centre of the City;
- University Hospital of the Military Medical Academy (MMA);
- Specialised Cardiology Hospital.

Additional healthcare capacity can be made available in times of need at the Regional Hospital for Pneumo-Phthisiatric Diseases, as well as the Inter-Regional Dispensary for Oncological Diseases (with inpatient capacity). Specifically in cases of burns, treatments are carried out at the MMA hospital.

The two biggest general Hospitals (technical term: Multidisciplinary Hospital for Active Treatment, MHAT) have a number of specialised wards and clinics. These include, for UMHAT “St. Marina” (the University Hospital): Oncology, Internal Medicine, Pulmonology, occupational diseases, therapy and rehabilitation, Cardiology, Rheumatology, Nephrology, Clinical Haematology, Endocrinology, Gastroenterology, Nervous System Diseases, Paediatrics, 4 Surgery wards (Vascular, Urology, Chest, Cardiac), Anaesthesia and Intensive Care, Infectious Diseases, Otolaryngology (Ear, Nose & Throat). MHAT “St. Anna” has department of Orthopaedics and Traumatology, 4 Surgery

wards (Vascular, Abdominal, Maxillofacial and Neurosurgery), Gynaecology, Dermatology, Anaesthesiology and Intensive Care. Available equipment in all specialized medical care wards is in accordance with current requirements and standards, while total inpatient bed capacity of these hospitals is indicated in Annex 5 of MDPP (which we will list further on).

It should also be pointed out that there are 12 smaller private clinics with specific competence and equipment but which are also potential emergency responders and add to the overall urban capacity in healthcare and recovery options. There are 2 small public hospitals in the immediate vicinity of Varna – in Provadia and Devnya – two towns which are at a distance of about 20 km from the city centre.

All healthcare facilities and clinics have medication and protection stocks which are reported as such to the Municipal administration:

- the two MHATs have 7 to 10 days of provisions at any time for emergency assistance; these stocks (and other relevant materials) should last for about 12 to 15 days for inpatients.
- Dedicated Ophthalmology clinics (Eye centres) have stocks for 3-4 days;
- the specialised Obstetrics and Gynaecology Hospital has medication stocks for 7 days and auxiliary supplies for up to 30 days.

Lastly, Veterinarian facilities provide coordinated epizootic control – in accordance with District Directorate “Food Safety” (territorial units of the Agricultural and Food Ministry) – on any possible animal diseases and related human epidemics which may have occurred as a result of the disasters. DD “FS” provides local operators with uncontaminated food, water supplies, medicines and vaccines, as well as rescue and monitoring procedures. Moreover, they order and dispatch units that may have to slaughter animals if needed, ensure expedient animal burials, disposal of animal origin waste and provide safe animal camp zones. Besides sensitive human contact considerations, these series of potential interventions may serve, ultimately, as means for restoring of production and technological processing in farms and meat processing

plants.

Earthquake induced and related fires. Ensuing procedures

While we will not present intricate details of capacity building practices at Municipal level for all types of disasters, we need to be able to distinguish general preparedness capacity and highlight main differences between contingency scenarios. A substantial chapter in the MDPP, as well as municipal information and training practices, are dedicated to fire hazards, fire prevention and protection. We will tackle substantial fires as an urban disaster further on. However, earthquakes are frequently followed by fires and we need to touch upon some basic firefighting capacity on the territory of Varna Municipality.

As might be expected, firefighting and protection activities are almost entirely the responsibility of District units of the FSCP and their local firefighting teams. Worth noting is that although FSCP is set up and maintained largely by the MoI central command, Varna Municipality contributes significantly to the funding and support of local FSCP teams, both through delegated budgets and own revenue streams. In the event of aggravated need, the city may count upon “firefighting teams from neighbouring unaffected municipalities, private legal persons and army units”.

In regular (not general emergency) circumstances, Varna FSCP units focus their efforts mostly on accidents in industrial enterprises that use toxic substances, as well as – naturally – extinguishing fires in residential and public service buildings. To perform such actions, the FSCP has its own standardized equipment, with additional consumables with extinguishing capacity (e.g. water carrier vehicles) provided by private companies, the Army, private water reservoirs, urban fountains and even the Black Sea. The firefighting services emphasise that one of the most relevant and efficient types of assistance they can receive from local public authorities is the clearing of traffic routes and approaches to fire sites.

In the immediate aftermath of a significant fire, the Municipal administration (formally,

the Mayor) has the responsibility to provide water and food supplies to the affected population. Central and District Mayors' offices prepare a report on necessary food and water quantities, a plan for their distribution and access points. The Municipality has the direct responsibility to ensure the provision of such first necessity products – whether from large distribution chains or from food stock markets. Shortages and logistic difficulties are coordinated with the District Directorate of FSCP which, in turn, seeks assistance from unaffected cities and districts.

Another priority for firefighters is the prompt removal and accommodation of the affected population. Such operational standards are shared with earthquake response practices and concern the removal of civilians from areas of fire of destruction, including the immediate vicinity of buildings that require rescue and emergency restoration work. Citizens must follow rules of conduct, with the FSCP teams facilitating the calm and organised manner.

Formally, the population evacuation is organised by the Mayor of Varna Municipality and managed by the Head of operations. Evacuation routes are determined in advance and must be secured (i.e. wide streets are selected; no structures that present further peril along these routes may be present, e.g. because of related damages). After having gathered enough information about the disaster site, sufficient forces and resources are summoned to ensure proper evacuation, with routes being announced to all local URS members and the general public. Municipal and FSCP staff establish a limited access zone and a temporary regime of restrictions and measures to protect the population. This regime limits movement emergency response activities have precedence over any other civil actions (establishing passageways, retrieving trapped citizens, providing first aid); checkpoints limit the movement of people and vehicles, divert or close traffic altogether; and what goes almost without saying is that high priority is assigned to care for children, elderly and disadvantaged people that may be affected, while food and medicines are distributed first to children, healthcare and social care facilities, as well as to rescue teams.

Serious earthquakes and fire-related disasters both produce a common effect – the need

to provide **secure temporary accommodation** to affected persons. Varna Municipality has the following capacity for temporary accommodation in terms of available beds at the shortest of notices:

- Secondary school hostel at 150, “Tsar Osvoboditel” Blvd., with 230 beds;
- 22 bungalows at “Baba Aleno” recreational centre, 5 beds per bungalows, 110 total;
- 5 bungalows at "Chernomorets" recreational centre, 4 beds per structure, 20 total.

In addition to these 360 beds with immediate availability, possibly affected population may be accommodated in public service buildings which have not suffered damages. Recommended buildings are listed in Annex 6 of the MDPP (list provided below).

When larger scale events create the need to accommodate higher number of citizens, tent camps are foreseen. Varna Municipality has established a logical ordinance that such temporary accommodation is to be arranged and constructed in places where there no construction is currently present (within stadiums and other sports grounds, parking lots and parks). Moreover, deploying auxiliary First Aid centres there is standard practice and easier to set up. Such tent camps can be built within the following stadiums: "Black Sea", "Spartak", "Lokomotiv", "Mladost", as well as the stadiums in "Vladislav Varnenchik" and "Asparuhovo" neighbourhoods. Suitable parks include the "Vladislav Varnenchik", “Mladost”, “Asparuhov” and Seaside Parks. Municipal calculations for the deployment of a tent camp for 200 people are provided in the apposite Appendix 7 of the MDPP. Tents may be also requested from the Ministry of Interior.

If and when necessary, longer-term accommodation for people “whose homes are completely destroyed or severely damaged and dangerous for occupancy” is provided by Varna Municipality. In the case of earthquake events, these buildings are first inspected thoroughly. Parts of affected population may also be evacuated to neighbouring unaffected municipalities at the discretion of the District Governor.

As far as relocation and accommodation responsibilities, the Mayor of Varna should order such measures, with zonal (district) Mayors within Varna having similar powers in areas under their jurisdiction. If and when citizens in need of special assistance (disadvantaged, currently in social service homes and hospitals) have to be relocated

and thus accommodated, the Mayors are aided by the Heads of the “Social Activities” and “Social Patronage” municipal directorates.

General population logistics is largely dependent on Municipal capacity in emergency events. Mostly because mass evacuation and relocation of affected population groups is made possible and carried out by the **Municipality-owned company “Urban Transport”**. There is a list of available mass transit vehicles at the disposal of the Municipality (see below).

Earthquake affected areas need to be **isolated and protected**. Local police forces (District MoI) carry out such functions, inherent to their core activities. They are supplemented by the coordinated contribution of Municipal Police and local private security companies. Said law enforcing units providing access control (via checkpoints), organise patrol and commandant services in affected areas. Such services are needed in almost all cases but even more in scenarios which involve CI or other sites of high territorial or national relevance. A further example is the protection of material and cultural values performed mostly by Municipal Police forces, with the aid of personnel from the respective concerned entities – in case a relocation of particularly valuable museum exhibits is needed, they are extracted and moved with expert assistance from the Ministry of Culture. MoI forces complement security efforts.

We should also emphasise Municipal dispositions which list employees of the “Security Management and Public Order Control” Directorate (SMPOC) as directly responsible for “ensuring order and legality” on the territory of Varna Municipality, right along MoI units and Municipal Police. SMPOC staff is entrusted with the following duties in times of earthquake recovery:

- safeguard areas of greatest damage;
- ensure order during the evacuation of affected persons and material assets;
- provide safe passage (routes) to FSCP rescue teams;

- set up victim identification procedures;
- “organize the fight against looters and rumours” (as per the mainstream neologism: “fake news” sources);
- protect temporary accommodation facilities;
- ensure order in food, water and medicine distribution to the affected population;
- collaborate with governmental, NGOs and international entities on support activities;
- protect and assist in the removal of material and cultural values.

All of the above security and safety functions are pertinent to almost all types of emergency protocols, and the Head of the SMPOC Directorate stands alongside the Heads of District Directorate MoI, Police Precincts and the Municipal Police group as directly responsible for maintaining order and security needed to efficiently perform disaster response actions.

Unfortunately, disasters in general and earthquakes in particular end up sometimes with a number of casualties. Rescue operations which reveal with victims require their identification. A designated group of officials from the MoI (passport service), MoJ (investigation service), a medical professional and an administrator from Varna Municipality proceeds with the identification, an issue of certificate and an initiation of contact with relatives and close ones if not known at the time. Funeral services are performed exclusively by a Municipal enterprise.

Earthquakes are not the only type of disaster that requires emergency restoration works. However, they are among the most directly related in terms of **construction recovery** and the need to ensure structural safety. An initial stage requires road clearing and traffic reorganisation to facilitate necessary recovery works. The Municipal Coordination Office (MCO, also referred to as “Crisis Headquarters”) designates operations units and resources needed to support said emergency restoration works. The MCO determines optimal logistics routes, priorities for disaster recovery works; sequence and type of cleaning works; responsible personnel; composition of teams and equipment needed for each area or type of intervention (including gradual need for additional and specialised

equipment and personnel); debris disposal sites.

Actual cleaning works are performed with equipment provided by private companies operating on the territory of Varna Municipality. The Administration cannot reasonably maintain an adequate base of construction and demolition equipment, whether heavy or precision. These devices and machines are however provided for in the MDPP and are called upon any time a need arises (see list below). Should such equipment be unusable for any reason at the time, assistance is sought for "from neighbouring settlements unaffected by the disaster". Considering the regional socio-economic importance of Varna, however, we can reasonably expect that not to be the case. More often than not, these companies are the same which have specific contracts with Varna Municipality for road maintenance and cleaning (including in winter conditions).

Road clearing serves to facilitate not only recovery and restoration works but also to ensure efficient supply of water, food and medicine in the area. Passageways and cleared roads allow switching out damaged urban sections from water, gas and electricity networks, thus avoiding further damage, explosions and prolonged restoration works.

Considering population rescue activities an absolute priority – including chronological – road clearing and passage creation is then followed by reinforcement or demolition of certain supporting structures (i.e. walls, columns) or entire buildings. Municipal construction control and safety staff – technical expert committees appointed by the Mayor(s of districts) and Heads of Departments – together with FSCP teams perform a preliminary examination of affected buildings and facilities and determine imminent construction, reinforcement or demolition actions.

Recovery and relief continues with actions needed to restore public services and infrastructural functionality of affected zones. Nominally, it is the Mayor in person (and district Mayors within Varna) who oversees the recovery progress. The municipal administration monitors the steps taken by the heads of institutions involved in the provision of services. Additionally, responsibility for defining coordinators and works for specific sites to be restored lies with the Deputy Mayor for Construction and the Heads

of the “Engineering Infrastructure and Public Works” and “Architecture, Urban and Spatial Planning” Directorates. QA is assigned to EIPW staff and Municipal Enterprise “Investment Policy”.

Coordination with CI operators and public service providers is crucial. To that end, the management of these companies – namely “Water and Sewage” Varna, “Energo-Pro” (Distribution) Networks, “Bulgarian Telecommunications Company”, “Overgas Networks”, “Primagas” and “Veolia Energy” – provides a ranking of objects and sites in order of importance that facilitate assigning a priority of restoration.

Immediate and short-term **disaster relief** to affected citizens and areas runs along two main procedural channels. A number of assistance measures are funded and **internally** managed by the Municipal Administration, on one hand. Headed by the Mayor of Varna (with the contribution of District Mayors), municipal Committees identify the citizens and households and the type of assistance they need. A summarised report is submitted by these committees to the MCO and the “Social Affairs” Directorate for the administration to be able to optimise distribution of relief funds (whether material or financial). Actual relief delivery is managed by the Directors of “Social Activities” and “Property Management”, district Mayors and their staff.

A mechanism of **external** relief and support is also available at city level, although again managed and delivered by municipal administration personnel. Requests reports for immediate population necessities (e.g. water, food, medicines or other material needs) are prepared by the “Healthcare”, “Property Management” and “Social Affairs” Directorates based on information submitted by district Mayors and sanctioned by the Mayor of Varna. Actual supplies are procured from the commercial distribution network when available (hypermarkets, food and pharmaceutical stock markets) or, alternatively, requested via the District Governor and the Minister of the Interior from other unaffected cities and districts. Actual distribution is carried out by the same administrative units as above.

As noted above, any significant relief interventions which require a more complex organisation or more substantial funding are deliberated upon and handled by the Joint Commission for Restoration and Relief (national level) which then operates territorially through the District Governors.

Responsibility for all of the above interventions is clearly stated in Local, District and National dispositions. General management of all recovery, restoration and relief activities on the territory of Varna is the Mayor (as per the DPL). Operationally assisted by the MCO (Headquarters), district Mayors and their administration, civil protection is channelled through URS units located in Varna (FSCP, MoI, EMCC).

The Headquarters executes primarily dispositions contained in the MDP Plan. Within its structure, logical designation of responsibilities for management and control of disaster response actions is distributed among the Mayor of Varna (almost always present as directly responsible), district Mayors, as well as an appropriate combination of competent Municipal Directorates:

- “Security Management and Public Order Control” (SMPOC)
- “Property Management”
- “Social Affairs”
- “Healthcare”
- “Engineering Infrastructure and Public Works” (EIPW)
- “Architecture, Urban and Spatial Planning”
- “Municipal Property and Economic Activity”
- “Finances and Budgeting”
- “Financial and Economic Activity”,

and Municipal Enterprises (separate legal entities owned by the Varna Municipality and controlled by the Municipal Council)

- "Disinfection, Deratization Disinfestation"
- “Investment Policy”.

Moreover, important positions of responsibility in managing post-disaster environments are assumed by the Head of the MoI District Directorate (for security operations above a certain complexity level), the Director of the Regional Health Inspectorate (for any direct or indirect healthcare and containment measures) and the managers of all transportation companies listed in the MDPP for logistics support.

An example of a relatively complex intervention requiring coordinated actions may be provided by the need to restore infrastructural facilities owned or financed by Varna Municipality. The Director of EIPW handles QA, the Director of "Financial and Economic Activity" appoints a Committee to control spending, while experts on district administration levels and personnel from ME "Investment Policy" are involved in daily operational and administrative activities.

An overview of human resources immediately available for earthquake aftermath operations can be seen in the below table provided by the Municipality, with its central administration building a meeting point in the event of disaster mobilisation:

Table 2. General function response units at Varna Municipality.

Formal name	*Number of people*	*Part of*
Emergency group	**8**	municipal administration
Inspection group	**20**	municipal, district and mayoral administrations
Voluntary formations	**41**	Varna citizens

Convocation of additional civil forces for disaster protection activities is foreseen in the DPL. Although thoroughly prepared for post-disaster management situations, the above groups are weighing in with about 70 people who are inevitably less specialised expert

personnel from state-level institutional entities.

The latter are at the disposal of Varna Municipality, being based or permanently dislocated on its territory, and are presented in the below table.

Table 3. Extended personnel capacity among response units in Varna.

Formation type and related site	*number of people*	*Institutional extraction*	*Gathering point*
Emergency and public order forces			
"Emergency and rescue activities" Unit	**45**	DD "FSCP" Varna	FSCP premises
District offices I, II and III of FSCP	**80**	DD "FSCP" Varna	District offices
Police Precincts I, II, III, IV, and V	***involved on a case basis***	DD of MoI - Varna	Police Precincts
Medical formations			
Emergency Care units	**18**	EMCC – Varna	EMCC – Varna
Microbiology Laboratory	**19**	Regional Health Inspectorate (**RHI**)	RHI
Microbiology Laboratory for drinking waters	**2**	"Water and Sewage" Varna, Ltd. (**"W&S"**)	"W&S" premises
Sanitary Control Unit	**18**	RHI	RHI
Veterinary (Medical) formations			
Health and Zoo prophylaxis unit	**4**	District Directorate "Food Safety" – Varna (**DDFS**)	DDFS
Disinfection unit	**3**	DDFS	DDFS
State "Veterinary Sanitary Control" unit	**4**	DDFS	DDFS
Chemical Laboratory			
RHI Chemical Laboratory	**19**	RHI	RHI
Regional Laboratory – Varna	**5**	Executive Agency Environment, MoEW (**EAE**)	RHI

Formation type and related site	*number of people*	*Institutional extraction*	*Gathering point*
Chemical Laboratory at the National Institute of Meteorology and Hydrology (**NIMH**)	**4**	NIMH – Varna branch	NIMH
Chemical Laboratory for drinking waters	**5**	"W&S"	"W&S" premises
Chemical Laboratory for sewage waters	**5**	"W&S"	"W&S" premises
Radiation Laboratory			
RHI Laboratory – Varna	**18**	RHI	RHI
EAE Regional Laboratory – Varna	**1**	EAE at MOEW	RHI
NIMH Laboratory	**3**	NIMH – Varna	NIMH – Varna

Varna Municipality has clearly ample access to expert bodies and personnel for planning, management and control of disaster-related threats to the population. These specialist units can help maintain public safety and facilitate decision making based on actual data, direct research and established analytical tools.

As for material and financial resources, there are some which are foreseen and planned (in advance) for disaster response procedures and some which arise subsequently, need to be formally justified and dispatched – whether within Municipal financial capacity or beyond that. Funding for tackling earthquake aftermath and consequences are, under normal circumstances, budgeted annually by Varna Municipal Council. Any exceptional cases and important shortages are subsidised by the State Budget through the JCRR and the Council of Ministers.

Moreover, the Mayor may request additional operative units and resources from the URS, including those based within other municipal territories or jurisdictions. Such requests are authorised, again, by the District Governor or the District FSCP, according to their direct competence. Under certain extraordinary conditions, these may even be the Naval Forces stationed in Varna.

EWS Notification procedures. Operation and Responsibilities

Varna has an acoustic notification system for perilous conditions or disaster events which covers the entire Municipality. A (parallel) siren system may also be activated at the Operational Centre of General Directorate “Fire Safety and Civil Protection” in Sofia. Varna suburbs and zonal divisions have a mixture of locally or centrally activated sirens.

The Municipality has an officer on duty for disaster related notifications. Once alerted, a report is immediately brought to the Mayor’s Office attention, as well as to the Head of the “Civil Protection Activities” Department. Upon their approval and instructions, the same officer relays warning messages to district Municipalities’ officers on duty, as well as to Deputy Mayors, Directorate Heads and the disaster Headquarters (after its summoning by order of the Mayor). Even outside of office hours, the Head of “CPA” Department receives the alert message and transmits it to the Mayor in order to coordinate the subsequent course of action.

The officials who are directly responsible for the EWS and the flawless functioning of the chain of notifications are the Mayor, the Deputy Mayors for Security and Construction (specifically in the case of earthquakes), the Secretary of the MCO, the Municipal officer on duty and the District Mayors. They are all part of a National Disaster Alert Network.

In line with their above direct responsibility of relaying the warning message to operative stakeholders, the Municipal officer on duty transmits it also to any other disaster response units which are not an essential and specialised part of the URS (i.e. DD FSCP, DD MoI and EMCC). An explicit Mayor’s request serves to summon and instruct these response units – according to situation specifics and chosen course of action. An example of such disaster response forces would be the volunteer formations – as a next level official within the chain of notifications and command, the Head of the “CPA” Department executes the Mayor’s order and notifies such volunteer units.

The Varna **population** is notified by the Municipal Press Office via local digital media (radio, tv, web). Given an impossibility to channel such messages through mass media,

the FSCP divulges the alert on the ground by employing specially equipped vehicles with megaphones.

Municipal functionaries and operative workers communicate with URS members and all response units using standard contemporary means: landline and mobile telephones; internet and direct messaging devices; radio phones “Len-B” over the VHF network; as well as parallel landline-wire and “technical-alert-kit” connections in case of failures of any or a combination of the above.

Ultimately, EWS and other notification chains have the primary goal to reduce reaction times and optimise readiness levels – both of which are almost always crucial for any interventions by URS units. The main institutional structures involved (FSCP, MoI and EMCC) always have teams on duty, ready to react. They all respond to FSCP summons and immediately mobilise first responders and other operative units.

Other URS components are able to rally and respond within a “readiness period” of up to 4 hours, depending on the type notification (or the event) and their actual location. In particular, volunteers from registered Municipal formations are called upon only by an order of the Mayor and should appear at designated places within two hours being alerted.

Flood Preparedness

We have already highlighted the “modular” systematic principles that depict the preparedness and capacity of Varna Municipality to handle disasters and any related risks – many units and organisational procedures coincide inevitably; others differ because of specific environmental, technical or civil needs being exposed by (potential) disastrous events.

With that in mind, the city of Varna has established a pattern of recurring systematic preparedness which takes separately into account the different types of contingency

planning, thus providing for somewhat different outlook on disaster response mechanisms but always making the best possible use of institutional and material foundations made available and illustrated so far.

An important chapter in Varna's Municipal Disaster Protection Plan (MDPP) is dedicated to flooding and potential flood consequences. Especially considering the frequency of such events and their destructive potential, the goal of a specific set of guidelines that consider in detail potential floods is quite apparent: the creation of an optimal management of relations and interventions by URS units and teams, municipal resources and all citizens in an effort to prevent, respond and mitigate the consequences of possible floods. The exposure of a seaside city – which moreover has an important lake running through some of its vital parts – to massive water bodies can only aggravate its positioning at the foothill of a tall plateau, the increasing frequency of seasonal torrential rains and other risk factors. An urban area with high density and socio-economic fragility needs therefore advanced and coordinated measures of prevention, monitoring and managing of flood risks.

Much of the operational needs and preparedness requirements is defined within the DPL and is performed by the various URS units. The so-called "**Permanent protection**" is defined as activities provided directly by **water body owners and contractors** under their obligation to establish public protection services.

Those include the "construction and maintenance of dikes, corrections of rivers and ravines and other hydro-technical and protective facilities"; monitoring, forecasting and warning systems; regulating systems for water levels; erosion prevention and active protective intervention; maintaining the conductivity of river beds; coastal protection facilities against wave impact; as well as any other flood prevention and mitigation measures in accordance with the local and national flood risk management plans.

Additionally, owners and operators of water management systems and facilities have the obligation to **develop emergency plans**, as per DPL requirements. Operators need to provide in those plans certain essential technical and organisational data:

- technical characteristics of the water system or body in question;
- evaluation of possible (integrated) disaster risks – including natural, man-made or technical causes;
- an estimate of potential collateral damages to nearby civil and industrial facilities;
- prevention and mitigation measures; personnel protection;
- plan enactment – task distribution; responsible figures;
- required time frame for response and necessary resources;
- physical and technical security systems; early warning systems;
- chain of command and information flow, including to external and URS units.

It the responsibility of District Governors to appoint an **inspection commission** which then performs an annual preparedness check-up of almost all significant water bodies. Minor facilities and water bodies are inspected once every three years. These commissions include representatives from the State Metrological and Technical Inspection Agency (SMTIA), the GD FSCP, the District Administration, the Black Sea Basin Directorate, as well as the Municipality. The Commission forms a common evaluation based on the individual conclusions of its members regarding each water body's safety status and operational conditions. Consequently, possible instructions, recommendations for repair and other technical and organisational requisites are prescribed as needed.

An important State act was the 2018 establishment of the State Enterprise "Dam Management". It has been entrusted with the exploitation of a number of dams and water bodies which have not been sufficiently (and perennially) maintained and safely exploited for years, being all of State or Municipal property but lacking the financial, technical or personnel resources case by case. This State Enterprise acts and operates as an owner of all incorporated public water bodies. In observance of its operational obligations, local management teams make use of state resources and national information and monitoring systems, mostly the SMTIA.

Certain responsibilities are directly delegated to District Governors and Mayors. These are some minor interventions related to freshwater body basins (removal of trees, trunks; cleaning of river beds from alluvial deposits to ensure normal conductivity), as well as the more complicated and costly “protection of river banks from erosion, strengthening of banks and protection of coastal vegetation”. Sea shores remain a State prerogative, as emphasised above.

A series of prohibited activities near and within important water basins are not directly imputable to Municipal control and enforcement. Those are any alterations, clogging, construction along dams and river shores, agricultural and industrial activity which might threaten the safety of operation. However, much like similar bans on urban areas (i.e. city canals, critical infrastructure), local authorities are closest to their monitoring and in most cases tend to exercise prevention and control.

Potential flood threats are analysed in detail in municipal documents – strategies, mid-term programs and the mostly operational MDP Plan. Analyses and statistical proof records show that Varna and its surroundings may often (and increasingly) experience severe flood incidents. An important and quite recent example of systemic yet local vulnerability is the flooding which occurred on **June 19, 2014** in Varna. Torrential rains clogged certain suburban drainage canals in the neighbourhood of Asparuhovo. Combined with infrastructural and regulatory issues in the area, the result was a disastrous flooding which caused the **death of 13** citizens and millions of BGN in property losses.

As mentioned briefly above, intense floodings due to heavy (although mostly brief) rainfall often disrupts the drainage system of many Varna neighbourhoods. The latter system includes both the natural terrain and the man-made sewage system. When torrents come down intensely albeit briefly, significant water volumes flow down towards the lower parts of the city which is situated along the sea coast. Urban and suburban drainage canals are in practice rarely a man-made part of an established system, rather a minor river network. Lacking the necessary capacity, they absorb intense rainfall up to

certain levels and those mostly result in drastic changes in flow regimes.

The above example of a watertight city landscape (streets and paved areas) combined with an imperfect throughput of many outdated sewage systems facilitates the generation of high-volume streams with rapid accumulation and little to no soil infiltration. Urban drainage creeks (both natural and man-made) experience such short-lived yet even more intense effects. And although they normally serve to relieve excess ground waters, they lack the capacity to handle intense water flows in their catchment areas.

City streets become scenes of overflowing sewage systems, water rising above curb levels, basements and even ground floors flooded. That is especially relevant in the lower parts of the city, including its Central parts. Often, excess water flows destroy street infrastructure and remove earth masses. Construction and municipal waste worsen the situation by clogging the sewage network – both its underground and over-ground gutters. Varna municipal analytical reports indicate those parts of the city most vulnerable to such scenarios: the Central part between “Primorski” Blvd., “Slaveykov” Square, “Devnya” Street, “Vladislav Varnenchik” Blvd. and “Maria Luiza” Blvd; in Asparuhovo neighbourhood, all streets under “Narodni Buditeli” Blvd.; as well as many other sections which are naturally situated at the lowest points of the urban catchment area. Although such floods are also probable in fall and spring (and leaves clogging drainage systems further), they are statistically more problematic and ever more frequent in the summer – more (short) torrential rains have become a regular sight in recent years. Destruction of infrastructure and economic losses to the Municipal budget are a major problem. Moreover, citizens tend to experience intensely even smaller and temporary difficulties to urban functions – flooding of road and pedestrian underpasses, significant traffic difficulties. Even large puddles and mud deposits end up considerably disrupting traffic in affected areas, thus directly reducing institutional and civil response capacity to any critical event and its related secondary effects.

Varna Municipality has identified **21 specific areas** which are subjected to such effects more frequently than others. Amongst those are the Ring Road in 2 of its sections; the Seafront road in 4 sections; 6 vehicle and 5 pedestrian underpasses; as well as several

other road junctions and drainage areas.

The Water Act sheds further light on risk management plans regarding flooding in particular. Many prevention, protection, preparedness and early warning responsibilities are above Municipal level, or fall within a parallel system of accountability.

Such is the **Black Sea Basin Water Management Directorate** (**BSB Directorate**) which is a State-funded agency with direct responsibility of monitoring and managing the majority of prevention activities.

The Director of BSB is personally responsible for the planning, development, updating and monitoring of a Marine Strategy and a system of measures for achieving a quality state of the marine environment. The BSB preliminary evaluation determines regions which have significant potential risk of flooding, along with **flood threat and risk maps**.

The BSB develops such maps along certain leading reporting principles such as:

- a cost-benefit analysis;
- the scope and route of flooding;
- the existence of water retention areas;
- actual management status of waters and soils;
- territorial structure and agricultural exploitation.

Those operational procedures which remain **standard for Varna as a** city and administrative centre have been well-established. They aim to prevent and decrease flood risks, as well as mitigate their effects. Schematically, they can be outlined thus:

- Regular physical maintenance of facilities and infrastructure – to the best of its possibility, to monitor, maintain, repair and optimise usage of drainage channels, ditches and the underground drainage and sewage systems;

- Implement measures to maintain normal throughput via: constant monitoring of the above facilities; control and prevent the dumping of municipal and construction waste;

periodic cleaning of accumulated biomass and urban waste from drainage system components; regular street maintenance;

- Risk reduction and prevention activities, in collaboration with Basin Directorate “Black Sea”, in all natural ditch and channel passages (including vegetation);

- Commissioning the cleaning of the water drains and the inspection of the sewers in the immediate vicinity of populated areas.

These series of strategic and operational activities are largely regular in nature, either active or observational (monitoring and analysis). They are the responsibility of Directorates “Engineering Infrastructure and Public Works” (EIPW) and “Security Management and Public Order Control” (SMPOC) in terms of supervision and organisational aspects (including material maintenance and repair), while cleaning and sanitization works are outsourced to private companies according to contracts via public tenders (usually medium-term length).

With Basin Directorate “Black Sea”, on the other hand, the Municipal administration maintains a monitoring system and a flat notification hierarchy which also includes the National Institute of Meteorology and Hydrology (NIMH). The latter analyses meteorological conditions and issues warnings in case of expected heavy rainfall. Contingency actions in such cases include:

- timely notifications (via mainstream mass media) to all managing staff of Municipal and District administrations and the population about forthcoming adverse weather conditions and possible consequences;

- timely alerting of scouting units that gather information needed to coordinate subsequent actions;

- preparing municipal emergency response groups.

Both municipal and state-level authorities carry out a number of prescribed analytical studies, mapping and preparedness planning. On the other hand, the above reference

to the catastrophic flood in 2014 reveals that, unfortunately, relatively sudden natural calamities bring about only post-event analyses. If must be noted that the civil society response was extraordinary, exceeding public institutional actions through volunteer rescue, recovery and restoration. However, what is worrying is that the apparently deficient (or at least insufficient) prevention systems cost 13 lives (in addition to considerable economic losses for the residents of Asparuhovo).

An interagency report on reasons, consequences and recommendations was only fully available a couple of years after, and at **218 pages** of length, it had a brief summary version of 13 pages. Plenty of annexes, evaluations, aerial photos and maps accompanied the official publication of Varna Municipality, although we cannot discern of any noticeable or instrumental changes in the way similar situations might be handled better in the future. Objectively, however, there might not be even such a need, should the proper prevention, engineering and spatial planning requirements have been implemented in a timely manner, including as a response to a proper estimation of potential damages that exceeding natural forces might have caused in the area.

Civil protection (in cases of floods) is also clearly outlined in terms of what Varna Municipality has the plans and capacity to perform. Additionally, local and national public institutions expect the population to be involved in training initiatives which – as is the case with earthquakes and most other disaster scenarios – is optional and jointly organised by the Mayor's office and the DD of FSCP. The MDPP has an apposite Annex 11 with some guidelines as to the nature and contents of such trainings. Such educational and practical initiatives are frequently carried out via digital media broadcasts (tv, radio stations), the development and distribution of short but practical written guidelines (leaflets and posters), all aimed at clarifying the main recommendations for civil action and behaviour in times of floods.

As noted in our previous section – on earthquake preparedness capacity and reaction mechanisms – we will not detail response algorithms which are identical for all types of disasters. In this particular case, instances of limited or extensive flooding may cause

the need to evacuate citizens and provide them with temporary accommodation. Both activities converge towards the same capacities, structures and local normative prescriptions as listed above.

The same is valid for the evaluation of the needs of the affected population in terms of food, drinking water, medicines and other necessities. Supply of the latter is carried out in the same way, as well, through the administrations of Varna district mayors. There are no differences in the approach adopted for the clearing of roads and providing passageways and the restoration of destroyed infrastructure. Any relief for the affected population – when involving internal financing and support by Varna Municipality – is organised and implemented by the Mayor's office and the District Mayors, as was the case above.

Due to the specifics of a disastrous event which involves flooding, there may be some slight differences in the response capacity of healthcare structures to assist the population and provide specialised care. Those are, however, small and largely irrelevant, and more directly related to the disinfection of flooded zones of the City. Hence, in order to prevent the spread of infections and epidemics, the RHI has a leading role in all paramedical and veterinary interventions which ensure the control and determine the need to treat flooded areas. The actual treatment is carried out by Municipal Enterprise **"Disinfection, Deratization Disinfestation"** ("DDD").

As for the distribution of responsibility among entities and personnel for the implementation of all foreseen measures, the MDPP mostly conforms to DPL schematic layouts in the matter. Local norms give priority to synchronised planning and operations between Local executive authorities and their relation with District and National structures for flood management.

General direction of all civil protection activities in case of floods is entrusted formally to the Mayor of Varna. He appoints a municipal Headquarters for the implementation of the MDPP which, in turn, works along with the district mayors and their administrations.

Naturally, the principal units of the URS are essential disaster protection stakeholders and first-line responders on the territory of Varna Municipality – DD FSCP, DD MoI and the EMCC of Varna.

The Municipal "Headquarters" for disaster response includes the main officials and authorities responsible for evacuation and temporary accommodation of affected citizens, their supply with food, water, medicines and other essential necessities. In the event of floods, besides the Mayor, the Heads of "Property Management", "Social Affairs", "Healthcare" and "SMPOC" Directorates, the HQ includes the Directors of the Regional Health Inspectorate and the District Directorate of Food Safety. Moreover, for health and hygiene reasons, directly responsible (although not in leading management positions in relation to overall operations) are the Heads of the "Healthcare" Directorate, the „Medical Institutions, Juvenile and School Healthcare" Department and the Municipal Enterprise "DDD". The increased monitoring and control capacity in relation to health and food safety is justified by potential complication

Specific testing, verification and analytic activities related to any **water purification** procedures are divided between three of the most pertinent public entities in Varna:

- the "Water and Sewage" Ltd., being the main competent public enterprise (51% controlled by the Regional Ministry and 49% by Varna Municipality) monitors drinking water quality in its various district labs, with immediate alerts issued if and when any concerns arise;

- the Regional Health Inspectorate of Varna also implements parallel laboratory control on drinking water quality and potential spread of contagions in and around flooded areas;

- the Head of ME "DDD" coordinates and sends out teams to disinfect flooded areas after waters have retreated and debris and mud have been cleaned.

Finally, all safety and order regulations and implementation at on a city-wide scale but especially within affected areas and their surroundings remains the prerogative and responsibility of the SMPOC Directorate (and formally its Director), as well as a

coordinated intervention by the District Directorate of the Ministry of Interior – Varna.

The internal resources that the Municipal administration has available to tackle the aftermath of floodings are similar to those described above for earthquake response mechanisms. To the Emergency group (municipal staff of 8), the Inspection Group (numbering 20 staff) and the citizen Volunteer formations (totalling 41 people) we have to add the personnel of the Municipal Enterprise "**Disinfection, Deratization Disinfestation**" – **6 people**.

As for external resources, there is a specific Municipal "Ordinance for actions in the aftermath of disasters, accidents or complex meteorological conditions" (e.g. torrential rains, snow), which allows the Municipality to summon technical and human resources that are integral parts of legal entities (commercial or otherwise) and which may serve the common purpose of facing the consequences of disastrous events. Article 7 of the above Ordinance assigns a relatively flexible but formal status to these external resources as available for common coordinated activities – "all managers and/or owners of commercial enterprises which are in contractual relations with the Municipality of Varna have 2 (two) hours after a state of Emergency has been declared or after significant damages have been suffered as a result of disasters, accidents or adverse weather conditions" to "commit their equipment [and] service personnel to the Headquarters (operational units, groups) for activities related to the MDPP and their inclusion in the rescue and disaster recovery activities".

Practically, those dispositions mean that waste collection and cleaning companies, along with landscaping and road maintenance companies (working in direct contractual relations with the City) can be involved in such efforts and are integral parts of the Varna disaster response capacity.

The MDPP and related pertinent Ordinances list the precise current availability of other external resources belonging to national or regional institutions territorially dislocated or permanently operating in Varna:

Table 4. URS Units external to Varna Municipality response capacity.

Unit and related Institution	*number of people*	*Available equipment / Facility*
Duty rescue group at DD "FSCP"	7	2 vehicles and 4 motor pumps
Emergency Units of "Water &Sewage - Varna"	3 units	Each unit with a sewer machine, engine and pump
Regional Office (RO) of FSCP (part of DD MoI)	18 firefighters over 3 RO	I RO – 2 fire trucks, 1 car lift, 1 automatic ladder, 1 emergency car, 8 firefighters; II RO – 1 fire truck, 1 auto-ladder, 5 firefighters; III RO – 1 fire truck, 5 firefighters.
Emergency Medical Care units	8 teams of at least 2 (driver/paramedic and a medic)	EMCC – Varna
Chemical laboratory at the Regional Health Inspectorate	19	RHI – Varna
Chemical laboratory for drinking water	5	Test Lab at "W&S Varna" Ltd.
Chemical laboratory for waste water	5	Test Lab at "W&S Varna" Ltd.

Varna does not have a separate system (much less automated) for **early warning and alerting** of authorities, responders and the population which may be dedicated to flood risks and calamities. Considering, however, that there is no potentially critical hydraulic equipment that transfers accumulated risks to civil and urban integrity and safety (e.g. dams, rivers, etc.) such a system is not crucial. The Lake is placed at sea level and the Black Sea itself does not present sudden dangers such as tsunamis or other similar events. Any direct dangers to urban population or infrastructure is accumulated at least over a few hours' time and does not therefore require a specific EWS.

Nevertheless, a timely response mechanisms has been established at Varna

Municipality. Weather bulletins are monitored constantly and necessary actions are coordinated beforehand upon a warning from the NIMH – Varna, the Ministry of Interior or the “Black Sea” Basin Directorate.

Post-event notification systems replicate what we have outlined above for earthquakes and general emergency protocol. Response units (i.e. internal Municipal teams and resources listed above as such) are mobilised for any necessary rescue and recovery activities by an order of the Mayor. Forces which are external to the Municipal administration but integral parts of the URS are committed via coordinated involvement of the DD FSCP, DD MoI and the EMCC.

Similarly, all resources and personnel support which is dedicated to flood prevention and management are budgeted by the Municipal Council. Naturally, we are excluding any major CI of national importance and ownership (e.g. State-owned infrastructure such as the Port and other seashore facilities). The latter are maintained by the central Government, along with any substantial investments, including risk prevention interventions. Situational management, however, remains the responsibility of Varna Municipality and territorially dislocated national and regional units.

Any resources designated for risk prevention and consequence management are budgeted as "Defence and security" items, as is the case with all other types of risks and disasters presented herewith. Crucially, there is sufficient integration with State and Regional authorities and Agencies which have specialised resources – equipment and personnel – able to provide many of the essential external monitoring tasks which are not attributable to the Municipalities. Most relevantly, the Minister of Environment and Waters manages the entire national water monitoring process, with the **NIMH** reporting on precipitation levels, underground and surface water levels, while the BAS Institute Of Oceanology – located in Varna – performs monitoring on the overall status, as well as a list of ecological and chemical indicators of the Black Sea waters.

Nuclear Accidents and Radiation Emergency

A statistically much less probable event but with consequences much more concerning health wise – both physically and psychologically for mass control – is a scenario which involves industrial incidents with nuclear radiation. Bulgaria is a country with a **Nuclear Power Plant** which supplies about a third of its electric power. The NPP is located in Kozloduy, a town which is 330 km from Varna and 325 from Burgas (direct air distance). Moreover, the North-East is bordering on Romania which has its own NPP located in Cernavoda – 120 km from Varna and 200 km from Burgas (again, air distance). Additionally, other military, industrial and medical devices and systems may use and emit various smaller decrees of nuclear or other radiation. The latter group is legally controlled by local and national authorities and, fortunately, with infinitely less potential of exposing large population groups to direct danger.

The creation of a coordinated prevention and response system between local and national public organs able and responsible for managing potential radiation risks (the URS, namely) aims to implement effective measures for civil protection in the event of accidents primarily at one of the two above NPPs. Radioactive contamination or other related emergency events may have dire consequences for the population and the environment, with aerosols that contain Alpha and Beta radiation, external (air) or internal (solid body) radiation, Gamma radiation and other direct and indirect perils.

Varna municipal and district coordination documents outline the characteristics of the main types of population groups that are exposed to risks (according to intensity of exposure to ionizing radiation):

- Category A: “personnel – working permanently or temporarily under the influence of artificially received ionizing radiation or performing work in sites with increased radiation risk”.
- Category B: “limited population groups that live or work near sources of ionizing radiation” (e.g. nuclear facilities);
- Category C: rest of the population.

A critical group by definition (in the above sense) depends on their place of work, residence (age or other factors). On the other hand, the risk of (over)exposure of the

civil population is high enough by any “acceptable risk” paradigms and standards, so that institutional dispositions are needed to prevent and prepare for any radiation events, no matter how little probable.

Large-scale critical events with radioactive pollution may possibly occur after an incident at NPP “Kozloduy” or as a consequence of a trans-border radiation transfer from NPP “Cernavoda” or other radio-active CI. Additionally, according to Varna MDPP, there are risks associated with:

- incidents involving land vehicles, water- and air-craft carrying radioactive materials;
- discovery of an abandoned **Source of Ionizing Radiation** (**SIR**);
- transportation of radioactive waste or SIR;
- the use of nuclear or radioactive materials for terroristic aims, sabotages, etc.;
- deliberate radioactive contamination of public spaces, drinking water sources, food or consumer products
- the crash of a nuclear-powered or SIR satellite;
- fire at a SIR facility.

The above list may not be exhaustive but outlines the main industrial, military and medical uses and scenarios. The most relevant risks, all factors considered, remain the ones associated with the two NPPs. They determine a separate chapter within the Municipal DPP and are reflected significantly in the preparedness capacity of both Municipalities. That is despite the fact that Varna and Burgas are outside the so-called “strict control zone” of NPP "Kozloduy”, and even that of “Cernavoda”, even though it does not get a separate consideration.

Potential threats are defined mostly by meteorological conditions and the extent of emitted radiation. Time – an important factor as well – is pertinent in that it takes about 9 to 32 hours for a radioactive cloud to reach Varna (or Burgas), depending on average wind speed and direction. That is only if and when such “unfavourable” wind occurs. As per MDPP, expected intensity of radioactive exposure is measured at 7 mGy/h or 0.7 mR/h, Total dosage of median expected exposure ranges from 0.5 cGy (within a day) to

up to 5 cGy (over a period of a year), if conditions persist. These probability scenarios have lead the authorities to the conclusion that no immediate loss of life is to be expected.

Varna and Burgas are both much closer to NPP "Cernavoda" which makes meteorological conditions more relevant than accident probability. Collateral contamination with tritium (a radioactive isotope of hydrogen) is accounted for, although again both Varna and Burgas are outside the immediate "strict control zone". Especially for Varna, nevertheless, the city could be reached by radioactive clouds within much shorter timeframes – from 12 hours down to under 3 hours.

Therefore, both aspects are important – the lack of immediate threat within several hours (and the respective time to react properly), as well as the gravity of the collateral effects of such disasters. **Measures** to deal with radioactive contamination and establish an efficient local operational settings to protect the population stem mostly from standard safeguards are laid down in the National Protection Plan.

Whenever radiation limits are reached or exceeded, a notification system is activated to alert local and national institutions – including those which are situated along the trajectory of the radiation cloud. Preliminary planning involves the creation of task forces that have the training to provide the population with means to mitigate the disaster impacts. Measures include:

- readiness for an "iodine prophylaxis" intervention (pharmaceutical and organisational);
- ensuring response capacity of all rescue and emergency recovery units;
- maintenance and readiness of all existing shelter facilities (residential and administrative);
- population training (especially in sealing of premises);
- recurrent training of emergency rescue and recovery teams;
- implementation of the Plans for the protection of the population by the regional administrations, municipalities and legal entities (sole traders) in the EPA;
- notifying the population accordingly.

Such dispositions are both national and included in the MDPP of Varna (and Burgas, for that matter). Radioactive contamination – whether in Kozloduy or via transnational radioactive waste transfer does in fact activate protective measures aimed at preventing population exposure, first and foremost. Given the fact that complete elimination of consequences is unrealistic, their mitigation involves continuous monitoring and exchange of data on radiation backgrounds via a series of radiation monitoring posts operating on the territory of the municipality and the region (listed in Annex 13, Varna MDPP). There are, additionally, mobile reconnaissance patrols: the Rescue Units of DD "Fire Safety and Civil Protection". Should the situation require it, additional units may be stationed by the Naval Forces based in Varna.

Just as the general population must be informed and receive instructions and concise trainings on situational awareness and appropriate behaviour, so do the Municipal and other institutional leaders prepare and plan for timely reaction and trained course of action. The RHI of Varna transmits constantly updates on activities and measures to be carried out to protect public health, while the situational HQ determines routes, conditions, evacuation protocols and shelter locations. Inevitably, given the potential gravity and the transmissibility of the radioactive cloud, centrally approved instructions and coordinated measures are issued by a National Crisis HQ and largely followed by municipalities along and around the contamination trajectory.

All locally based branches of national institutions that have as direct prerogatives the management of incidents of this kind – the Regional Inspectorates of Environment and Waters (RIEW), the Regional Health Inspectorate (RHI), the "Black Sea" Basin Directorate (BSBD), the District Directorate of the FSCP, etc. – perform frequent and continuous sampling and monitoring (automated where possible) of radiation indicators in the air, drinking water, food, livestock and plants.

The same organs coordinate with the Municipality any impending needs of prompt iodine prophylaxis of the population. To that end, the Municipality has in stock 115,200 Potassium Iodide tablets stored at the Diagnostic Consultative Centre in the Vladislav Varnenchik district (a.k.a. City Polyclinic №3) and has established protocols for their

distribution to the population upon receiving such instructions from the National Crisis HQ or the Health Ministry.

As with other comparable disasters, the City of Varna may count upon internal and external resources in implementing the measures foreseen in its disaster protection plans. Under standard conditions, preparedness and prevention is ensured by the Municipality via:

- a Radiation Monitoring Station (RMS) – coordinated by the Operational Duty Officer (ODO) of the Municipality. Radiation background is registered every two hours with a specific device – dosimeter "PP-55M". Whenever the data log indicates a continuously rising of currently excessive radiation, the ODO immediately reports to the MDPP implementation Headquarters;

- an Emergency Unit – 8 staff and 4 vehicles – Municipal personnel performing inspection rounds of its territory and reporting on situational developments.

Besides these particular functions and units, the Municipality has its regular (and above listed) Inspection Group of 20 staff and the citizen Volunteer formations of 41 people.

Much more response capacity is ensured by the presence of state and district administration structures in Varna. These are URS units which possess the resources and expertise necessary to support complex prevention and protection operations, including radiation incidents. These teams report to their central and station management Heads but also take an active part and collaborate in all activities initiated and managed by the Mayor's administration. Below are relevant resources of state institutions based in Varna.

Table 5. State-level Institutions based in Varna with Expertise in Radiation Protection

Formation	*number of people*	*Structure/Facility*	*Gathering point*
Radiation Monitoring Station (RMS)			
DD FSCP	3	Rescue Unit	Rescue Unit zone
Regional Security Council (No.490)	4	Officer on Duty at RSO	District Administration building
RMS at HIMH – Varna, No.956		National Institute of Meteorology and Hydrology, Varna	NIMH building
Radiation measurement Labs			
Regional Laboratory of the Executive Agency for the Environment, Varna	1	EAE at MOEW	RIEW building, Varna
Regional Health Inspectorate Lab	18	RHI – Varna	RIEW building, Varna
Laboratory at NIMH – Varna	3	NIMH – Varna	NIMH – Varna

What we have outlined in terms of FSCP and EMCC resource availability in Varna is naturally valid for radiation preparedness and planning. The District Directorate of the FSCP has three Regional Offices. Their total number includes 4 fire trucks, 2 automatic ladders, 1 car lift, 1 emergency and 2 rescue vehicles, 18 firefighters and 7 rescue workers. (The FSCP of Varna maintains a 24/7 duty service with 4 fire trucks, 1 emergency vehicle and 13 firefighters). The Emergency Medical Care Centre has a total of 8 teams available, with at least 2 people per unit/vehicle (a driver/paramedic and a medic). There are, moreover, 10 local police units, a number of flexible units at the District Directorate of the Ministry of Interior and 3 Traffic Police units available to facilitate public order and the implementation of response and disaster mitigation interventions. As with other disaster scenarios above, the Mayor may request additional URS forces and resources from territories and jurisdictions outside Varna Municipality through the FSCP and the District Governor.

Landslide Prevention and Protection

Municipal preparedness protocols as a response to landslide risks have the same aims and operative goals that serve to prepare, protect and relieve the population and infrastructures in the urban and suburban zones, in order to safeguard and ensure a quick and efficient restoration of optimal socio-economic conditions.

The particular characteristics of Varna region see its low-laying beaches combined with highly dense residential, touristic and park areas located under or directly on top of a land-sliding cliff. There is also an artificial island occupied by industrial activities. Any natural buffer and mitigation capacities of local ecosystems has been gradually depleted by illegal construction (in critical areas) or certain unclear management decisions over the years. Outdated, poorly designed or maintained protection structures add to the lack of reliable man-made defence structures – especially when considering their ability to sustain natural beaches, seriously depleted in the past couple of decades.

Notably, these risks and deficiencies have been analysed in relation to beach exposure within the EU Project RISC-KIT (FP7 ID 603458) between 2013 and 2017. Project reports classify Varna as being vulnerable to a number of erosion risks, most relevantly landslides. The majority of the North-Eastern coastline is “directly affected by wave-induced erosion”, which is aggravated by the presence of a high-rise plateau over the city and its extended urban area. Accordingly, municipal and regional authorities consider crucial the prevention and response mechanisms in relation to landslides and overall erosion processes.

Coastal protection alone reveals itself a difficult and expensive task but probably the one which extends its effects the deepest into the economic structure of the region. In addition, the length of both Varna lakes and their accessory canals exceeds 30km, making the area the largest Port agglomeration in Bulgaria: the Varna-Beloslav-Devnya industrial complex. It covers an area of about 150 km^2 and represents a driving force of all local and regional socio-economic activity.

In view of the above specifics, Varna Municipality has a clear need to develop, update

and implement an effective policy of reducing landslide risks, being the part of erosion processes that can have direct and more immediate impacts on the health of its citizens and the infrastructure of the extended urban area.

On the other hand, the local administration is always considering possible interventions to mitigate shore and beach erosion, although these are mainly of the exclusive jurisdiction of the State Government, not to speak of the scale of investments needed to have realistic effects on shore protection. The Varna metro area is geologically defined as “rugged terrain”, with “fluctuations in groundwater levels, high seismic activity”. The latter is a cause of frequent activation of landslides and earth collapse incidents, although varying in scale and intensity (area and depth).

The Municipal Council task groups admit in their reports, however, that such activity is “largely **conditioned by anthropogenic factors** (illegal construction, increasing urbanization processes, illegal logging, etc.)”. Many of those actions are within the prerogatives and responsibilities of Municipal (and District) monitoring and control institutions, whether they have the proper capacity and efficiency to influence sufficiently such processes or not.

Preventive measures are mostly aimed at avoiding the (aggravation) of landslide areas. We saw in the beginning of our report that the latter have a leading negative impact in terms of frequency and economic effects on the territory of Varna. The administration is aware that it manages one of the municipalities – on a national level – in which the constant population growth meets the expansion of the resort areas and intensive construction, thus causing serious housing and landscaping problems. In addition, limited by the Black Sea on the Ease and the Franga Plateau on the North, any available areas within and around city limits which are suitable for industrial and residential development are largely restricted. The relief is certainly not facilitating urban planning, since it other areas are frequently confined by active or old landslides (the latter: usually only temporarily inactive).

Hence the large areas with construction ban imposed by the Regional Development Ministry, at least until any sustainable and somehow “permanent fortification and

drainage measures" may be implemented in these urban zones, followed by the approval of an updated "Detailed Development Plan" which may serve as a basis for future construction and rehabilitation activity. Given the actual state of the territories affected by (potential) landslides, earth collapse zones and other gravitational geodynamic phenomena – combined with exorbitant financial resources needed to stabilise them – more "liberal" regulatory regimes seem far off at present.

These environmental limitations only make more pressing the needs to establish efficient prevention and preparedness measures in and around potentially affected areas. The Varna MDPP lists them in detail:

- **updated mapping** of territories with landslide activity of any scale; zonal mapping illustrates areas under a construction ban, areas removed from it and those to be included, as **risk factors evolve**;
- constant monitoring of landslide activity, including a **register** with measurable characteristics;
- development of **scenarios** for landslides consequences within urban limits able to identify vulnerable sites and potentially efficient **measures for terrain stabilization**;
- formulation of justified proposals to the Ministry of Regional Development and Public Works (MRDPW) for designing and developing specific **structures** and **activities** able to **counteract** landslides;
- exploring **financing options** for the construction of improved sewage systems and **drainage facilities** in risk areas;
- development of proposals for **changes the regulatory framework** for construction on sloping terrains and those prone to landslides, earth collapses and other gravitational geodynamic phenomena;
- regular inspections of **marine abrasion** and **erosion**, jointly with the State-owned enterprise "GeoProtection" Ltd.–Varna (see below);
- strict **regulatory control** in spatial planning, design and execution of **construction** works; said control may involve suspension of construction works found in violation of rules and regulations in landslide areas; failure to comply with prescribed suspensions

may lead to legal action by MRDPW and penal decrees to suspend construction;

- issuance of **building permits** after preliminary implementation of **fortification and drainage** measures, based upon analyses and recommendations of performed geological engineering studies;

- **training** of local executive authorities, response units and the population for landslide events;

- **information** campaigns and **communication** channels with citizens and land owners in landslide risk areas about the dangers of new investment and construction.

In many of the above activities, especially in monitoring and regulatory initiatives, a crucial role is played by the State owned enterprise "**GeoProtection**" Ltd.–Varna. Wholly owned and controlled by the MRDPW, it supports the efforts and upholds the regulatory standards of local and national authorities. This particular enterprise is one of three such territorial arms of professional expertise and control acting on behalf of the Ministry. The Spatial Planning Act (2001) determines state enterprises of territorial competence and according to "GeoProtection" Statutes, it performs "prevention of consequences of landslides, erosion and abrasion processes on the territory of the Republic of Bulgaria through regime studies, consulting services and technical assistance, maintenance of a landslide register [and] control and measurement systems" in **Varna, Burgas** and 4 other Districts in East Bulgaria.

The sheer scale and relevance of land erosion – particularly landslides – have important economic effects along the Black Sea coastal areas. With frequency and gravity going beyond the possibilities of mere Municipal management, State support and intervention becomes crucial in tackling the phenomenon. Whereby most processes are natural, many are aggravated by human activity, where local administration and authority monitoring should step in. The cooperation of the two dimensions is mostly seen in the bottom-down funding made available for fighting landslides. The latter are divided in 4 categories in terms of decreasing gravity and scale.

Table 6. Varna and Burgas Districts – officially registered number of landslides

District	*Category I*	*Category II*	*Category III*	*Category IV*	*Total*
Varna	53	10	22	65	**150**
Burgas	27	4	10	34	**75**

Ranging from landslide areas in need of an urgent reinforcement to those that need merely regular monitoring and inspection, these phenomena have warranted a delegated state budget to both Varna and Burgas local authorities. Over the current (and *expiring) programming period, these funds are as follows:*

Table 7. Delegated State budgets made locally available for landslide response (BGN)

District	*Category I*	*Category II*	*Category III*	*Category IV*	*Total*
Varna	110 960 000	7 300 000	102 000	135 500	**118 497 500**
Burgas	52 850 000	36 105 000	49 000	81 000	**89 085 000**

Source for both of the above tables: National Program for Landslide Prevention and Limitation, Erosion and Abrasion along the Danube and Black Sea Coastlines (2015-2020) – Bulgarian Academy of Science, MRDPW

In the Black Sea region only Dobrich District (North of Varna) has a somewhat comparable budget with 46 mln BGN. Sliven and Shumen have around 2 mln and Yambol has no dedicated budget. This gives us a further understanding of the importance of landslides to the local economy and civil safety, with substantial National support via “GeoProtection” being apparent on a daily operational basis.

Within the Municipal administration, on the other hand, there is a number of officials and departments **directly responsible** or involved in carrying out foreseen measures for landslide prevention and consequence mitigation. These are (not listed in order of importance or relevance, cit. Varna MDPP):

- Directorate "Engineering Infrastructure and Public Works" (EIPW); its Director personally;

- Directorate “Architecture, Urban and Spatial Planning” (AUSP);
- “Spatial Planning” Directorates in the various District Administrations of Varna Municipality; their Directors personally;
- Deputy Mayor in charge of Construction;
- Chief Municipal Architect;
- Chief Architects in District Municipal administrations;
- Head of Department “Municipal Infrastructure”
- Chief Expert "Landslides and Territorial Reinforcement");
- Director of “Security Management and Public Order Control” (SMPOC);
- “Public Order” Directors in District Municipalities;
- Department Head for “Civil Protection Activities”.

Quite like with earthquake consequence mitigation, **temporary accommodation** facilities are to be setup in areas with no residential or other construction: stadiums, parking lots, parks. The above dispositions are replicated for first aid points and relocation in public service buildings (Annex 6 of MDPP). The student dormitory (with 230 beds) and the 27 bungalows listed in the Earthquake section (130 beds) give us a response capacity of 360 beds under a solid roof for any potentially affected citizens. As already established, Varna Municipality provides them with food and drinking water in such circumstances.

A number of organisational and regulatory limitations enter into immediate effect for affected regions. And they regard not only construction in the medium term but also practically any kind of residence and transit activities. Public order forces which have to impose and maintain such restrictions have to work together with all citizens and legal entities in the city to be able to maintain such regimes. The latter (e.g. companies) may be summoned early on during disaster protection activities on the basis of Art. 65 of the DPL. They are added to the Emergency Group and the Volunteer formations (51 people), as listed above.

Varna can count upon 5 companies (“Hydrostroy”, “Inzhstroyinzhenering”, “Varnastroy 2012”, “Obedinenie AB” and “Zebra Varna”) with a total of 110 units of equipment and service staff involved in clean-up and restoration activities. These companies have current contracts with the Municipality which include explicitly potential emergency restoration activities.

Also external to the Municipal and City forces in terms of institutional extraction but permanently dislocated in Varna are the 87 Firefighters, Rescue Unit forces and extended Staff of the FSCP (divided into 3 Regional Offices, ROs), the five Police Precincts of the DD MoI, as well as the 8 teams of the EMCC with at least 2 paramedics and medics. These are all units and personnel able to maintain and control regulatory and operational conditions in and around affected areas.

Adverse Weather Conditions: Intense Snowfall, Storms, Drastically Low Temperatures

Municipal programs and plans take into account conditions within the extended metro area which may not present unforeseen disasters by their narrow definition but are still extreme enough to create a drastic environment with severe short term effects on population wellbeing and frequently even the local economy.

Snowfall, decisively much less intense, is also relatively rare in Varna, Burgas and generally along the Black Sea coast. Then again, winter weather in this sub-climatic zone is often accompanied by strong and persistent winds, causing icings in numerous city areas. Occasionally temperatures drop to low levels considered unsafe for regular functioning at the local temperate zones and their customary modes of socio-economic operation, even for short periods of time. Such a period could lead to “freezing and demise of people and the need to provide the population with basic necessities: food, water, medicines and services” in a regime of relative local emergency.

City archives and reports show numerous cases in the past of snowfall, persistent wind and low temperatures, leaving Varna and its surroundings in a dire situation with

interrupted transport links (both main and secondary roads and city streets). This practically always has damaging effects on logistics, support systems and social services in the extended Municipality area for days on end. Qualified as especially vulnerable, transport links to “Vladislav Varnenchik”, “Mladost”, “Vinitsa”, “Asparuhovo” and “Galata” districts have suffered similar interruptions with relative frequency, as have the suburb settlements of Kamenar, Zvezditsa, Konstantinovo, Borovets and Rakitnika. Located outside the densely populated urban zones, these areas see snow drifts of up to 20 m in length inhibiting almost transportation, provision and servicing options for the local population, including food and medical care.

Moreover, both Municipal and private company historical data show that in such conditions there is an increased power consumption. Consequently, electrical transformer stations may occasionally overload, while heavy icing leads to power lines breaking and interruption of electrical supply. The accumulated risk factors may therefore induce the interruption of water supply management systems, both for domestic and industrial use. The mentioned suburbs, villa zones and urban areas with airborne power supply lines are the ones considered most vulnerable. Their population amounts to more than 18 thousand permanent residents, with the majority potentially being left without power in severe weather conditions. Hence, what may not initially seem a disastrous event could easily turn into a calamitous situation.

Low winter temperatures and Sea moisture additionally cause ice formation in the early hours of the day. Multiple vehicle collisions may block the transport network and even disconnect some neighbourhoods and settlements. For a city with no urban rail and little alternatives to road transportation this only exacerbates the situation. The Municipal administration has identified certain critical stretches of road network, facilities and sites that pose risks under severely adverse weather conditions: **19 street (sections)** in the extended central parts of the City, 9 in the surrounding neighbourhoods and 14 in the suburb village areas such as Topoli, Konstantinovo, Kamenar and Zvezditsa. Additionally, vulnerable facilities in such conditions are the Asparuhov Bridge, most underpasses (both vehicle and pedestrian) and overhead high power lines.

Under such circumstances, at least for the most part and excluding the listed scenarios of power or water shortages, the population does not see the integrity of their residential structures being threatened. These conditions, however, pose a direct threat to any **homeless** members of society. They have the possibility to access facilities for **temporary accommodation** in the Municipal Centres for Social Support where there are a total of 36 beds for such occasions. There is also the possibility to host them in the prayer homes – after consulting their management and coordinating the number of guests. All of the above accommodations do provide warm food and drinks supplied by the Municipality. If and when needed, the District Directorate of the Bulgarian Red Cross sets up hot drink points for the public. Locations are indicated and supported by the Heads of BRC Varna and Municipal Directorate "Property Management".

As we may deduce from the above analysis, bringing back road traffic conditions and urban infrastructure to acceptable usability levels within the shortest possible times becomes a priority for the public administration in such conditions. The **responsibility for road clearing** and providing adequate traffic conditions lies with the Head of "EIPW" Directorate, the District Mayors of Varna and the Managers of the companies which have contracts with the Municipality for the winter maintenance of the municipal street network, road facilities and nearby sections of state-owned roads.

The officials directly responsible for accident elimination and recovery of public services are the Deputy Mayor for Infrastructure, the Head of "EIPW" and the Managing Director of "Water and Sewage – Varna", as well as the CEO of "Energo Pro Networks" (the main local electricity distribution company).

The above managers can count upon the below institutional structures (state-level, almost identical to what we've seen above), competent and available in handling similar situations, all based in Varna.

Table 8. State-level institutions based in Varna, available for severe weather protection

Formation	*number of people/teams*	*Institution*	*Gathering point*

Rescue Units at DD "FSCP"	4 groups	DD FSCP	Rescue unit zone
I, II and III[rd] Regional Office (RO), FSCP	4 teams	DD FSCP	RO buildings
I, II, III, IV, and V[th] District Police Precinct		DD MoI – Varna	DPP buildings
EMC Units	18	EMCC	EMCC – Varna
Traffic Police	6	DD MoI – Varna	Traffic Police building
Emergency Rescue Unit of the Navy	15	Navy HQ	Navy Base – Varna

Large and complex fires

Local Public Authorities need to also ensure a "timely and effective effort in extinguishing and emergency restoration works able to protect the life and health of the population; the environment; private, state and municipal property; and to minimize collateral damage". We must keep in mind that a number of companies, various NGO and even citizens have the free or regulated licence to use and store substances such as dyes, fuels, lubricants and other synthetic matter (most of which are toxic), as well as artificial fertilizers and chemicals (which are highly flammable). Accordingly, Varna Municipality has planned in detail how to impose requirements and establish prevention and protection measures. The latter go well beyond residential or commercial structures as a relative fire hazard depending on their daily use.

Municipal Council reports show that **important economic operators** in structurally defining industrial sectors of the economy possess the above risk factors inherent to their main economic activities. Those include "Varna Storage" (petroleum); the Ports "Odessos", "Varna East" and "Lesport"; "Bulyard Ship Industry" and the "Odessos" Shipyard; the Naval Forces Headquarters (with a Naval Base); as well as Varna Airport. Significant cultural, healthcare and sports facilities with substantial capacity are also added to the potentially vulnerable list: i.e. the Palace of Culture and Sports, the Festival complex, all the Hospitals, educational and social service buildings which frequently host

mass gatherings of citizens. And ultimately, more than 30% of Varna District territory is occupied by forests, parks and vegetation areas where high temperatures and summer droughts may cause fires with disastrous proportions, without even considering any fire safety regulation violations or simple cases of negligence.

Table 9. List of potentially hazardous industrial sites (using flammable/toxic substances)

Site/ Company	*Substance*	*Quantity (kg), if known*	*Storage method*	*Harmful essence*	*Gas suppression method*	*Type of hazard*
"Varna Storage" AD	Petroleum products	30 000	cisterns	hydrocarbons	water, foam	explosion, fire
"Nestle Bulgaria" AD	Ammonia	17 000	refrigerated tanks	nitrogen oxide ammonia vapours	water	explosion, fire
"Overgas Networks"	Natural gas		gas pipeline	hydrocarbons	water, foam	explosion, fire
"Primagas" AD	Natural gas		gas pipeline	hydrocarbons	water, foam	explosion, fire
„Veolia Energy Varna" EAD	Natural gas		gas pipeline	hydrocarbons	water, foam	explosion, fire

All of the above factors increase the importance of fire hazard standards, prevention and preparedness. Institutionally adopted measures and regulations regard mostly high risk facilities and critical infrastructure, while dispositions to citizens are largely in line with the general practice in most EU urban areas. Industrial facilities, for example, need to substantiate the fire resistance of their sites, as well as to contribute to the improvement of fire prevention awareness of their staff, clients and extended stakeholders – as part of a larger population fire-safety culture.

The local Public Administration itself has adopted certain system-level standards for CI and industrial operators on its territory. Explicitly listed in the MDPP:

- research and risk analysis on fire hazards on municipal territory, with special attention on CI;
- formulating a list of potentially hazardous sites (PHS);
- defining procedural mechanisms able to improve the interaction and coordination with state bodies: trainings, compliance with fire regulations and civil preparedness;
- joint preventive control by Municipal, District/Regional administration and FSCP units on the state of fire safety in residential buildings, large capacity (event) buildings, resort complexes, parks, villas, tourist huts, etc.;
- monitoring compliance with fire-fighting norms and regulations in design requirements, construction and operation of new and existing construction.

Should the unfortunate need arise, the Municipality has indicated the same three locations (see above) available for **temporary accommodation** of affected citizens: the dormitory and 2 recreational centres with bungalows with a total of 360 beds. In cases where such needs exceed this capacity, public service buildings of municipal property may also be used. Lastly, disastrous fires which leave an exorbitant amount of citizens without a home (most likely temporarily rather than long-term), tent camps may be erected “on free territories in villa zones and urban areas”. Any means and resources needed for the construction of such camps are expediently but procedurally required from the Minister of the Interior via the District Governor of Varna. (The MDPP has also annexed an estimate for the deployment of such a tent camp for 200 people).

As for resources available for preventing and fighting disastrous fires, some are specifically set apart, in terms of specialised units and equipment. Others include staff and facilities which are shared as part of a general disaster preparedness capacity. Inevitably the District Directorate of “Fire Safety and Civil Protection” leads the way in such capacity and expert personnel. Three Regional Offices and a Rescue Unit provide

firefighting functions with a total of 18 firefighters, a Rescue Unit of 7, along with 4 fire trucks, 2 auto-mechanical ladders, 1 car ladder and 2 specialised rescue vehicles. The FSCP supports a 24/7 duty service with 13 firefighters on rotation, all 4 fire trucks and 5 staff of the Rescue Unit with one specialised vehicle.

Dozens of experts in fire safety, prevention and firefighting are working at the State-owned Shipyard “Terem Fleet Arsenal” (out of a total 500 staff). Specifically, they provide 1 (fire) disaster response unit of 3 with a fire truck. The Naval Forces Base in Varna adds a firefighting module of 20 people and 1 fire truck, in addition to an ambulance and a water tank truck. These state-level entities ensure a more flexible and better prepared base of relevant response capacity and fire hazard preparedness.

On the other hand, there are private entities and commercial operators in Varna who contribute to expand such capacity. One contractually committed legal entity is “Emergency, Fire and Environmental Protection” which design and implementation fire safety systems (alarms, extinguishers, sprinklers, drenches, inert gas systems, smoke and heat removal systems, video surveillance, access control systems, escape and emergency systems). However, “EFEP” also provides fire and emergency support with rescue personnel and equipment, both contractually to some public agencies (along with private companies, naturally) and in times of public needs such as the potentially disastrous conditions in our analysis.

Lastly, the specialised firefighting teams of “State Forestry–Varna” and the internal municipal Staff already listed for general disaster response needs – Emergency Group (8), Inspection Group (20) and Volunteer formations registered at the Municipality (41 people) – complement the city and district preparedness capacity in times of much needed competent human resources.

Demonstrative Tabular Array of Cornerstone Facilities Supporting Disaster Response and Preparedness

Having analysed the general approach of local authorities, we also segmented their organisational and regulatory preparedness according to disaster type, if and where it requires particular expert intervention.

We also noted above, however, that the majority of structures and equipment are inevitably for general use although highly suitable for facing different types of calamities and industrial incidents.

Table 10. Available beds in medical structures on the territory of Varna Municipality.

Medical Institution		**Surgical Profile**							**Therapeutic profile**									
			Types/Wards							Types/Wards								
	GRAND TOTALS	***TOTAL***	*ALL SURGERY*	Trauma	Urology	Neurosurgery	Maxillofacial	*other*	***TOTAL***	*ALL THERAPY*	ICU	Infectious	Neurological	Psychiatric	other	OB-GYN	Pediatrics	Rehab & Physio
Varna Municipality	**1727**	**455**	295	52	36	40	6	26	**912**	420	76	87	83	150	96	160	176	24
UMHAT "St. Marina"	900	120	108		12				675	365	70	47	43	150			81	24
MHAT "St.Anna"	457	260	120	50	24	40	6	20	92	40	6		30		16	55	50	
Ophthalmology Clinic	40	40	40															
OB-GYN	140															95	45	

Hospital																	
Inter-Reg. Oncology	110	20	16					4	80						80	10		
Pneumo-Phthisiatric	40								40			40						
"Transport" Hospital	40	15	11	2				2	25	15			10					

Besides medical care, a considerable number of citizens may need a roof over their head as a result of any significant destructive disasters. Below is a representative selection of some public service buildings which are Municipal property and have the capacity to host temporarily citizens in case of such needs. The table below serves to provide the format and information contained.

Table 11. Public service buildings (excerpt) available for temporary accommodation of affected population

Site Name	*Location*	*Temporary accommodation capacity*	*Year built*
Sport Clubs "Prostor" and "Spartak"	39, Seliolu Str.	446	1968/1990
Orphan house "Gavroche"	3A, Voynishka Str.	46	1950
Ice Rink and Café	Mladost Quarter	42	2008
Municipal Hotel	37, Cap. I rank G. Kupov Str.	46	1933
Healthcare & Rehabilitation School	28 Str. (@ St. Constantine Resort)	257	1968
Municipal Dental Medical Centre	24, Saborni Blvd.	243	1970
Vacation/Resort Facility	Chernomorets/Sakama Zone	38	1979/1984
Healthcare Service building	village Kazashko, HS Building	18	1951
Primary Schools "P. Evtimii" / "S. Mihailovsky"	Vladislav Varnenchik Quarter	407	1977
Primary Schools "M. Drinov" / "Al.	Vladislav Varnenchik Quarter	296	1985

Konstantinov”			
Primary School “Chernorizets Hrabar”	1, Studentska Str.	265	1973
10th High School “Ivan Bogorov” / Primary School “A.Strashimirov”	Mladost 2 Quarter, Ivan Tserov Str.	432	1976
High School "A.S. Pushkin"	12, Prof. Derzhavin Str.	254	1962
High School "Nayden Gerov"	1, Tsarevets Str.	280	1965
High School of Humanities "Konstantin of Preslav"	20, Atanas Georgiev Str.	409	1989
Primary Schools “Hadji Dimitar” / “N. Liliev”	29, Podvis Str.	293	1974
High School "Dimcho Debelyanov"	2, Russe Str.	265	1940/ 1960
Kindergarten № 15 "Alena zvezda"	Mladost Quarter, next to Block 104	150	1971
Primary School “Otets Paisii” + gym	1, Koznitsa Str.	207	1953/ 1972
Primary School “St.’s Kiril & Metodiy”	19, Bratya Miladinovi Str.	218	1935
Logopedic Kindergarten	Saltanat Zone, 83	80	1950/ 1998
Primary School “Hristo Botev”	8, Kiril & Metodiy Str.	198	1927
Kindergarten № 43 "Sinchets"	Mladost Quarter, next to Block 110	177	1977

The above database goes on to list **57 facilities**. The complete list of structures adds up to a total capacity of **13,337**, all owned by the Municipality. Considering that these are temporary accommodation options and not long-term residential facilities, they constitute a sensibly sufficient response capacity in cases of severely affected living quarters.

As we have amply explained above, additional accommodation capacity may be temporarily constructed within a tent camp. These are last resort solutions but preparedness is key in extreme situations, therefore a preliminary calculation of needed equipment and material provisions helps speed up requests to the District Governor and relevant institutions that are able to provide them.

Table 12. An estimate of necessary material property needed for the setup of a tent camp with a capacity of 200 temporary residents.

Item name	*Quantity*
10-person tents	20
6-person tents	4
Mattresses	230
Blankets	460
10 kV – Diesel generator	2
Electric lighting network	400 (metres)
Water carrier vehicles (2.5 tonne)	4
Chemical WC	10

As noted above, Varna Municipality has close working relations with legal entities that operate CI, maintain public structures or are under public contractual obligations with the Municipality. Almost any type of disaster, relocation and accommodation plans include food and water provision, as well as initial road clearing and road network maintenance.

Table 13. List of companies and equipment involved in water supply and road clearing

Mobile equipment type	*Quantity*
"Inzhstroyinzhenering" EOOD	
Water cistern/carrier	5
Chain track bulldozer	1
Wheel loader	4
Road/Motor grader	2
"Hydrostroy" AD	
Water cistern/carrier	4
Chain track bulldozer	2
Wheel loader	4
Road/Motor grader	1
"Titan AS" OOD	
Water cistern/carrier	1
Wheel loader	1
OVERALL	
Water cistern/carriers	**10**
Chain track bulldozers	**3**

Wheel loaders	**9**
Road/Motor graders	**3**
TOTAL MOBILE EQUIPMENT UNITS	**26**

Furthermore, equipment and mobile units of companies and other legal persons which can be summoned and used for emergency recovery and restoration works are listed with their technical description, registration plates, location and essential legal entity details (VAT or Reg.ID numbers which can be used to trace and contact them via Municipal, MoI databases or the national Public Commercial Register). There are 33 pages (circa **700 units**) of engineering and construction heavy machinery and equipment, specialised vehicles and mobile units of equipment listed in Annex 23 of the MDPP of Varna.

We will complete the numerical overview of essential equipment and facilities by providing a list of vehicles at the disposal of Varna Municipality which are able to support logistics operations in disaster recovery and relief efforts. The municipality itself possesses 19 automobiles, 10 off-road vehicles and 4 light commercial-type vehicles (vans). These are mostly suitable for transporting municipal emergency response units and other registered first responders (rescue, recovery, surveillance, etc.). Larger capacity vehicles and more complex logistic operations are performed with the support of Municipal Enterprise “Urban Transport”. The company recently expanded its capacity considerably, becoming the major transport service operator and can contribute with the below mass transit vehicles:

Table 14. “Urban Transport” vehicles and their capacity

Type of bus / Brand	*Quantity*	*Seat capacity*	*Standing capacity*	*Total bus capacity*	*Total passenger capacity*
“Solo” buses					
-“Mercedes”	34	56	167	106	5 640
-“Solaris“	40	43	113	107	2 380
-“Neoplan“	4	37	105	103	1383

-“Renault“	16	31	105	102	1294
-“Tedom”	10	29	54	105	720
TOTAL for bus type	96	196	544	5230	**11 403**
“Articulated” buses					
-“Mercedes”	27	37	110	147	7 800
-“Solaris“	30	49	113	150	3 303
TOTAL for bus type	57	86	223	297	**11 103**
Total “Urban Transport” capacity	**161**	**5 928**	**16 578**	**820**	**22 506**

And finally, as coordinated and efficient intervention is largely dependent upon early detection of critical indicators (where possible, ranging from adverse weather to nuclear radiation incidents), warning and communication chains, the MDPP highlights EWS points with duty personnel which provide constant monitoring and initiate notification. Within Varna Municipality there are 4 such points (e.g. “№ 956 – within the National Institute of Hydrology and Meteorology, Varna Branch”, along with points 941, 490 and 901 according to their national registry identification). Varna District hosts other 11 monitoring and EWS points with duty personnel, mostly as part of Municipal Rescue Services located on the premises of smaller municipalities within the District (e.g. Municipalities of Avren, Devnya, Provadia, etc.)

All of the above offices with personnel on duty have explicit dispositions for procedural details such as the distribution of individual protection equipment (e.g. gas masks: location, quantity, foreseen procedure); iodine prophylaxis dispensed to the population according to National and EU Healthcare norms; the phones, e-mails and any other relevant contact means of all Varna media and press offices.

Educating the public. Civil requirements vs Recommendations.

Informing the population outside the narrow circles of experts and first responders is an

inevitable responsibility of all public administration and public service providers. Whether required by law, formalised as a training module or a gradual, systematic and comprehensive approach to preventing disaster risks at grassroots levels – these efforts are mostly coordinated by the Municipality and the District Governor (the latter as a direct Government representative).

A number of campaigns have been organised regularly by their departments and units directly responsible for a particular category of urban safety, with public information publications, media releases, physical distribution of leaflets and putting up of posters at important public gathering spots. Other approaches include top-down information releases in terms of sectoral Ordinances (Municipal, FSCP, etc.) which channel preparedness activities and information to be transmitted by field staff to important economic operators and the general population.

Some specific examples of instructional and ordinance material include the “Rules for behaviour and action in case of flooding” (Municipal safety ordinance).

“To reduce flood risk:

- Residential and agricultural buildings or other structures should not be built in unprotected river floodplains;
- Whether you are in your home, outside or in your car: turn off gas and electrical sources; move to the highest possible point near your current location”.

A standard informative leaflet (whether integrated or containing single-type disaster preparedness information) includes 3 to 5 leading advices in a typical situation the citizen may find themselves in, essential phone contacts (besides 112) and possibly a few illustrative scenarios. Leading disasters taken into consideration are fires, floods, earthquakes, landslides, terrorist threat, radiation contamination, but also heatwaves, snowstorms and frostbites, thunderstorms and even phone scams (especially relevant to the elderly with fixed landline phones).

On the other hand, we must make a clear distinction between what is recommended to

the local population and what is required of them. State, District and Municipal laws and ordinances are an obligation for all and one needs to get acquainted with such dispositions when operating or entering into contact with risk factors with any degree of disaster potential.

One of the most relevant such dispositions is the "**Public Order" Ordinance** of the Varna Municipal Council. Its current version has been voted upon initially in 2007, with the most recent amendment coming in 2017. The Ordinance regulates primarily the powers of municipal administrators in enforcing requirements and activities foreseen by all other relevant municipal and state acts – that is to say, the monitoring methods and the procedure for imposing sanctions.

On the other hand, the Ordinance has an extended claim on "**regulating public relations** with view of maintaining public order, protecting public and private property, creating conditions for peace, work and recreation of citizens, maintaining an aesthetic appearance of an environmentally friendly and clean [city], as well as protecting the health and wellbeing [of] people and domestic animals on the territory of Varna Municipality".

We will certainly not analyse the substantial part dedicated on control procedures and sanctions. Our report will, however, highlight some procedural specifics which have a direct or significant (if indirect) effect on disaster prevention and preparedness.

One such aspect of the Ordinance is the set of terms and conditions for "meetings, mass gatherings and public events". Article 49 states that organizer of such events should notify the Mayor's administration in writing at least 48 hours before their start (stating the promoter, purpose, place and time of the meeting and the estimated number of participants). Whoever organises such events must provide their own security personnel (or hire them) in order to maintain public order; as well as medical and logistic support, if and when necessary. The procedure for issuing mass event permits (e.g. sports, concerts, festivals) is established with a Mayor's order, in any case.

A much relevant aspect is the maintenance of shelters and other protective facilities. The responsibility for their management, technical condition and overall preparedness (as well as maintenance costs) lies with their owner or current user. Varna Municipal council has prohibited the use of shelters and protection facilities as “vegetable repositories, warehouses for large-size goods, toxic chemicals, friable or flammable materials, as well as for permanent dwellings”. And while basic maintenance and running costs are borne by current exploiting operators, the technical servicing of protection facilities is performed on a regular basis by a full-time technician of the Civil Protection Authorities (FSCP). Monitoring and control procedures of the current state of such facilities result in “ascertainment protocols” on the basis of which the Mayor of Varna may issue fines and penal decrees.

Another highly relevant Ordinance of the Municipal Council concerns the provision of fire safety on the territory of Varna Municipality (2006). It defines specific fire safety requirements, with all State bodies, local organizations, legal entities and citizens obliged to comply with its fire rules and norms; comply with National FSCP instructions and requirements; carry out foreseen activities that ensure (local) fire safety.

Maintaining public fire safety runs along what we have outlined above in the relevant section – building fire safety, construction requirements, potentially hazardous sites and substances. The Ordinance lists small additional requirements on the setup of temporary bazars, exhibitions, theatrical, circus and other events, as well as on repair work requirements on street water supply networks – the latter shall always take place after notifying the FSCP.

The “Fire Safety” Ordinance provides also guidelines on the work of water supply operators and waste collection companies. Managers of such entities (much like all other organizations and companies and according to specific features of their facilities) should issue additional internal regulations and instructions for fire prevention and safety.

And finally, general fire safety requirements are also explicitly listed for buildings, their electrical installations and equipment, their heating and ventilation systems, integrated alarm and firefighting support systems.

Much like with scenario-specific ordinances, there is a general “Ordinance for actions in the aftermath of disasters, accidents or adverse weather conditions”. It provides detailed guidelines on responsibilities, administrative and penal liability. Adopted in late 2005, the Ordinance regulates functions and obligations of the municipal administration, commercial companies and citizens for carrying out disaster prevention and protection.

Burgas Municipality Specifics

The Municipality of Burgas is largely subjected to identical national – and mostly even regional – principal institutional structures, legal framework and strategic planning objectives. Its territory is also subjected to the same top-down normative arrangement of “Strategy to Program to Plan”, on National, District and Local level. The Municipal Plan here also has the most specific provisions on measures, indicators, contacts, chains of command and operational interrelations needed to precisely identify a particular personnel, unit and category of responsibility in disaster preparedness. Some procedural mechanisms are similar to those in Varna (chains of command where the levels are identical), others differ (responsible local officials within Directorates or public service units; coordination process).

Our task is to highlight mostly differences in territorial availability, the variance in choices in terms of capacity building methods and alternative application mechanisms. We need to explore those which are not prescribed by national and regional normative acts or top-down operational practices within local detachments of the FSCP, the MoI, public hospitals or other territorial detachments of national executive agents or local units financed and regulated by the central Government.

Ultimately, the difference stands in the numbers of personnel, equipment, in application

procedures. Very little is found in the overall framework and the "prevention-preparedness-reaction" paradigm.

We start by analysing the overall resources available to Burgas Municipality in its "Defence and Security" item of the annual Budget. The current "D&S" amount budgeted for 2020 is BGN 5,257,635. This comes from Item Group "D" (*Civil protection, management and activities in the event of natural disasters and accidents*) at slightly over BGN 2,3 mln to which we add residue and rollover budget to bring the total up to the above amount. This is considerably more compared to current Varna funding (BGN 4.24 mln), although some considerations are due.

Burgas budgeted this item within a wide range over the past few years alone – up from BGN 8.28 mln in 2015 to only 3.03 mln in 2016, the year after. At 4.3 mln in 2018, the budget category was almost identical to current Varna funding of the item group. It is undeniable, however, that given its smaller population (219,747 permanent residents in 2015), Burgas has a proportionally larger budget for "Defence and Security" of its Municipality.

This, however, does not consider the disaster management capacity which is provided by Healthcare facilities, to name only one. Burgas has BGN 5.02 mln available (2020) to support healthcare and paramedical activities where the Municipality finances its own structures or contributes to the support of existing facilities. At the same time, Varna funds this sector with 23.7 mln and enjoys probably a greater first response and mitigation capacity in terms of medical and continuous care. That being said, Burgas health care services are more dependent on private medical structures thus the integral support of this sector adds up to a proportionate provision and availability.

Other aspects which are not immediately evident when analysing financial capacity in ensuring disaster preparedness are the items budgeted for "Housing, public works, infrastructure strengthening and reorganization" which undoubtedly contribute to a greater safety, prevention and preparedness in terms of disaster risks. In this respect

Burgas has made significant progress and invested a lot in recent years: one example is the Construction of a buffer tank in Sarafovo district ensuring a better flood risk prevention.

Burgas Municipality annually develops projects, typically receives national support and carries out repairs and rehabilitations of road infrastructure at emergency and risk sites. Below is a list of recent or current infrastructure maintenance projects which have a direct or significant enough influence on risk reduction and infrastructural preparedness.

Table 15. A list of infrastructural maintenance projects with an effect on risk reduction and preparedness.

Monitored site	Measures taken
Reconstruction of Overpass "Vl.Pavlov"	Project Completed
Structural Reinforcement of I. Vazov Blvd.	Project Completed
Road junction Burgas - Sredets - Sozopol	Implementation upcoming
Intersection of N.Petkov Str. and D.Dimov Str.	Working project
Overpass at the freight train station	Stage 1 in progress
Drainage of Dry Port “Somat”	Working project
Municipal road network	Partial work projects
Bridges, other Overpasses	Monitored, no pre-emergencies

All in all, the vision and ambition of the two municipalities is **largely comparable**. To reiterate, some national standards are (almost) identical – e.g. nationally regulated and imposed fire safety standards; territorial DD FSCP functional relations with Municipal offices and other local executive entities. Furthermore, other standards and regulations share regional and thematic priorities as well as operational similarities with Varna. Some institutions even offer overlapping jurisdiction and expertise: the common coverage “Black Sea” Basin Water Directorate, as well as the “GeoProtection – Varna” Agency, with both is determined by the Government (and the DML) as controlling local public geodefense operators.

To reveal substantial and measurable differences between the two Municipalities in terms of their overall disaster preparedness capacity, we need to look at specific

indicators in the current Municipal Program and Plan for the city of Burgas.

Municipal Regulatory Framework: Disaster Risk Reduction Program and Disaster Protection Plan of Burgas

The MDRRP is one of the main documents which outline the Burgas Municipality "agenda" in pursuing disaster preparedness and building up its capacity in prevention and response mechanisms. The current version is valid for the period 2017-2020 and has been developed in accordance with Art.6d of the Disaster Protection Law. Its aim is to meet the objectives of the District DRRP in reducing risks specifically identified within the Municipal Disaster Protection Plan (MDPP) of Burgas.

The MDRRP has its own operational objectives and a series of activities for the achievement of the former. They are channelled mostly through experts and operational staff of the Municipal Directorate "Crisis Management, Public Order and Security" (CMPOS). Staffed at a total of 41 people, it performs the following main functions:

- Crisis Management: develops the MDPP jointly with representatives of agencies and legal entities involved in disaster protection on the territory of Burgas municipality; coordinates and implements prevention measures to reduce the probability and mitigate the effects of disasters;

- Public Order: monitors compliance with Municipal Ordinances on public order on the territory of Burgas; controls parking, pedestrian traffic and overall vehicle security; imposes administrative relocations of improperly parked vehicles (in accordance with the Road Traffic Act).

The former function is more closely related to disaster prevention and mitigation, as it is clearly evident from the definition of its scope. Measures and activities in that respect are implemented by the Department of "General Functional Control" (GFC) and the Department of "Crisis Management, Defence Mobilisation and Training" (CMDMT).

As it has been pointed out before in our analysis, the actual and most detailed document which helps us elaborate on local disaster preparedness (planning and implementation) is the Municipal Disaster Protection Plan. Approved by the Municipal Council of Burgas in 2008, with a few amendments afterwards, it offers measures for preventing and mitigating disaster effects, analyses risk factors and determines responsible staff and available equipment and structures that serve to perform such functions.

Flood Prevention and Preparedness

First and foremost in line of importance and incidence are the flood prevention measures. The MDPP explores firstly the risk factors which contribute to potential floods and require suitable responses from the local and national authorities.

Geological particularities of Burgas and its surrounding District reveal a coastline and urban agglomeration which are both vulnerable to floods and intense sea waves. Burgas Municipality is rising very little from Sea level, and as a result suffers significant disturbances in public and economic life on its territory caused by occasional floods.

Moreover, Burgas is surrounded by several lakes and salt marshes. Torrential or prolonged rainfall and heavy snowmelt (sometimes even occurring together) represent high-risk factors in early spring, along with its regularly anticipated rains. Such a chain of events leads to floodings in a number of neighbourhoods, suburbs and villages of Burgas Municipality. A region which is particularly difficult to manage is the area between “Lozovo”, “Dolno Ezerovo” and the E-87 ring road along Lake Vaya.

Additionally, the sea waves alone are sufficient to flood facilities and urban areas: residential neighbourhoods and important social or economic infrastructure in vital parts of Burgas. Even recently, the Black sea waters have flooded completely the municipal road from the Sea Garden to the low-lying salt evaporation ponds of “Black Sea Salt Works”. The road ends up covered in sand and sediment, making it impossible to move upon or clean easily. City workers have had to perform emergency restoration of existing sand ditches in 20 specifically identified points which the high waves destroyed, in order

to be able to stop the flooding from extending to adjacent terrain.

Moreover, a considerable number of companies from the rest of the country tend to purchase and loading alkalis and sea salt from the landfills of “Black Sea Salt Works”. But soluble salts are not the only reason the Municipality has deemed crucial the definition of facilities and structures which need to receive priority in reconstruction of upgrade efforts.

The BSB Directorate analyses define three specific flood-prone areas: along the Aitoska, Chukarska and Dermendere rivers. Consequently, increased risk factors within those catchment areas influence prevention and protection planning for certain Burgas neighbourhoods, as well as the Ravnets and Cherno More suburban villa zones. Roughly 73 linear kilometres of river catchment areas within Burgas District are identified as flood-susceptible. Risk factors are analysed by accounting for surrounding relief, ground distance to settlements, as well as the presence of nearby larger water bodies leading to the Black Sea. The latter include primarily the three larger: Atanasovsko, Mandrensko-Poda and Burgas Lake. Those practically frame the metropolitan area with water on almost all sides.

Burgas District includes a total of 27 dams and open-air reservoirs in 11 municipal settlement zones. These water bodies all have significant local importance, with all dams monitored the Mayor of the specific settlement, as per the Water Act. Despite a relatively simple system of delegated responsibilities, there are objective difficulties for the optimal exploitation of most of the dams. Their beds and inside walls are often partially or completely covered in sediment; some dam walls and water slopes are poorly maintained; their shallow overflows tend to overgrow with shrub and/or tree vegetation; some overflows are even partially destroyed, with their exterior concrete lining stripped at the bottom; others have clogged water outlets or damaged shut-off devices.

With the city practically confined on all sides by water, some dams end up lying higher

than the urban centre itself, as well as nearby suburbs. This presents further risks for potential flood damages. All tenants and operators of municipally owned dams and other water bodies are subjected to mandatorily enforced requirements to prevent water overflows and dam breaks. Keeping in mind the list of potential and actual deficiencies that these present, along with the substantial funding needed in most cases to drastically improve their safety, we may conclude that prompt and expert interventions need to be established and foreseen when monitoring programs raise an early-warning flag.

One particular dam requires constant monitoring – the Mandra Dam. Notoriously, it is used for industrial water supply by its owner, “Lukoil-Neftochim-Burgas”, the above-mentioned largest refinery and leading national petroleum product operator. Local authorities have implemented annual technical expert check-ups, with regular detailed reports on its condition which determine the dam’s operating regime on an annual basis and never beyond.

The directly responsible municipal units and administration officials that need to exercise control and ensure the implementation of dam monitoring are the Deputy Mayor for Spatial Planning and Construction (his administration’s office and the experts on Water and Sewage facilities), the specialist staff at the District Directorate of the FSCP (Burgas) and the “Black Sea” Basin Directorate personnel in Burgas. They identify critical and potentially hazardous sites requiring expert monitoring or intervention, assess and categorise all other hydro-technical sites. To ensure compatibility of evaluation categories and results, a four-point scale is adopted for potentially hazardous sites for all hydro-technical facilities: insignificant, serious, high and catastrophic.

More specifically, the current condition of dam facilities and protective dikes is periodically ascertained by an Expert Council, which is held twice a year. Detailed visual observations complement geodetic measurements of walls (for potential deformation), as well as filtration measuring with piezometers which is just as regularly carried out.

A complete picture of flood consequences and measures to be taken is adequately represented by the development and (virtual) simulation of possible flood scenarios for surrounding river basin and lake catchment areas within the Municipality. Based on thus

developed scenarios, the local authorities may acquire a better understanding of potential floodplains, affected population, endangered infrastructure and the environment. We emphasise “may”, since what was valid for Varna District applies here as well – the Basin Directorates have elaborated a more detailed flood mapping for the major river catchment areas while the sea shore and its proximities are secondary to such analysis. An improved mapping would allow Burgas authorities and locally represented national agencies of relevance to develop and implement more efficient measures and build additional facilities needed to strengthen flood resilience, monitoring and surveillance systems and Early Warning and alert systems which are vital for the optimal mobilisation of available resources (both human and material) for a better flood preparedness.

The municipally owned dams are a total of 8 and presented in a table format in City Council documents, with their basic data (location, logistics, registration and technical parameters), ownership status and current state of maintenance and operation. The privately owned dams are 2 in total, including the “Mandra” Dam previously illustrated as an industrial water source for the CI operator “Lukoil-Neftochim-Burgas”.

As we can see, the above risk factors define flooding as a leading disaster type for Burgas by probability, impact and overall potential (especially given a chain of meteorological and structural events). With the above elements and technical characteristics in mind, the MDPP foresees three sectors of strategic and operational influence it should aim to achieve by mobilising public and private efforts. The first type of risk prevention is represented by maintaining adequate natural water retention volumes. Subsequently, retention is followed by storage and drainage. Structural defence, therefore, is foreseen in terms of protective facilities as an important element of prevention and mitigation strategy with direct impacts on population health, property and public resources. Ultimately, risk reduction is performed by pragmatic actions (the use of floodplains for agricultural needs, forecasting and EW systems), as well as strategic planning and financial engineering of interventions, including mass insurance

as an important factor in reducing financial risk for citizens, businesses and the public services infrastructure.

Integrated Flood Risk Management Information System and Video Surveillance Centre

Despite substantial flooding risks – even deriving from intense rainfall consequences – up until quite recently the Municipal administration did not have adequate equipment to provide timely and accurate data on water levels and rainfall on its territory. The City needed a system that could analyse and represent relevant information, thus facilitating local risk prevention Stakeholders in the process of making swift and adequate decisions. Fortunately the administration has been able to implement the project “Integrated Flood Risk Management in Burgas Municipality” (co-financed by the Financial Mechanism of EEA 2009-2014, program BG02 Integrated Maritime and Inland Water Management). This has allowed the development of a water management information system with up-to-date information on water levels of rivers, dams and rainfall. With the help of some specialised equipment for continuous measurement of water level (including the Black Sea) and a 24-hour video surveillance of all water basins, the Municipality has been able to create predictive flood models allowing timely preventive and mitigation action. All in all, the Municipal decision makers have been able to improve the MDPP and the specific flood action plan.

In particular, the new system includes a series of monitoring facilities: 22 measuring stations which indicate water levels, with further sensors for rainfall and wind (direction and speed), air humidity, temperature, atmospheric pressure and much more. Thus, the Water Management Information System (WMIS) in its essence employs modern EW and preventive approaches as an essential disaster protection support mechanism, effectively eliminating difficulties related to lacks of accurate and timely flood risk information. Municipal staff is able to receive real-time updates on all river, dam and sea levels and expected trends, both weather related and collateral effect simulations. Software visualisation is also available for stakeholders with less technical expertise to

facilitate their participation in taking informed decisions. Automation in risk management does not lead to an underestimate of potential risks, it merely positions the actual situation within preset risk thresholds and channels possible reaction along more efficient courses of action.

Beyond the latest numerical measurements of all indicators (every 15 minutes), the monitoring stations also send photos (30 minutes). Two employees manage the monitoring station network and the related flood risk MIS – they perform system administration, monitoring and (largely automated) analysis of received data. Crucially, they inform responsible public officials in the event of critical or near critical indicator levels of any kind. Said staff is located in the **Video Surveillance Centre** of Burgas Municipality, which houses a 24-hour monitoring service for the entire territory of Burgas Municipality. Naturally, the Centre is extensively used for other related risk prevention and management needs.

What goes above and beyond the municipal vision of flood prevention and preparedness is the wide social commitment that is needed to reduce disaster risks in general. The MDPP itself contains claims that a healthy dose of “solidarity and personal responsibility” can go a long way in improving EWS and response mechanisms. On the other hand, EWS requires efficient flood forecasting with improved links between national and local systems. Flood forecasting is express responsibility of state (NIMH) or district/regional environmental and water services. The Burgas branches of the NIMH and the Hydro-Meteorological Services play a significant role by providing data on river conditions, levels and dynamic weather forecasts.

We will complete the review of flood preparedness with an outline of the algorithm foreseen in case such an unfortunate phenomenon arises. The sequence is identical with the one applicable in the event of a landslide (as per MDPP regulations).

- Determining evacuation routes for affected population;
- Strengthening or demolishing of unstable and dangerous structures;

- Designation of locations for deployment of temporary medical assistance centres;
- Equipment of water supply points for distressed citizens;
- Designation of locations for food outlets within functioning retail centres;
- Ensuring public order;
- Designation of shelters and temporary accommodation buildings or tent camps.

The components of a coordinated response mechanism cannot objectively differ much between the two Municipalities given the nature of such calamitous events, the characteristics of the two urban regional centres and the scope of legally available actions and resources that the local authorities can employ.

Some similarities in the approach of the two Municipalities still need to be outlined, if anything, to emphasise the differences. Most importantly, the coordination (between different authorities) of disaster protection interventions depends on the modes of institutional and operational interaction between the central executive agencies and the regional and local disaster response structures.

A recently established Operational and Communication Information Centre (OCIC) within the premises of the DD FSCP-Burgas has taken over almost all coordination between the Executive and local public and private operators. Moreover, all management of actions by local disaster protection entities and units is entrusted to a District Security Council (DSC), established by an Order of the Mayor in 2012.

In a similar fashion to Varna's cascading expansion of **available forces and resources** for disaster preparedness and response, Burgas has some internal and some external bodies and units generally available for such interventions. The Municipal units and means of disaster response are based upon resources that are part of Municipal Directorate "Crisis Management, Public Order and Security" (CMPOS) and the "Inspectorate for Public Order Protection" with total staff of 30 uniformed personnel. In addition, the Municipal register lists the Volunteer formations and their composition

(Annex 2 of the MDPP; more details on volunteering in Burgas are also presented below).

Significant response capacity is associated with external forces and resources, mostly belonging to state agencies and institutions permanently located on the territory of Burgas Municipality. These are, most notably, the Emergency Rescue Unit (FSCP) with 39 staff, 30 vehicles and specialised equipment; the Sea Rescue Unit totalling 54 people and 36 pieces of specialised equipment.

Similarly, any additional forces and response units (including from outside territories) may be summoned and can join Municipal operations according to coordinated plans with the Ministry of Defence, Border Police and the District Directorate of the Ministry of Interior–Burgas, including their Specialized Police units stationed on the territory of the Municipality. Assistance is ordinarily provided by the Bulgarian Red Cross–Burgas, as well as by coordinated participation of Specialised Police Units, neighbouring municipal forces and their volunteer formations.

Early Warning and Notification System

Burgas has a total of 49 siren devices that are integral parts of its warning and notification system – a city-wide notification signal of a “continuous 3-minute siren wail with frequency hopping every 4 seconds and a range between 700 and 1,000 Hz. There are, moreover, 15 electric sirens in the surrounding villages and 9 mobile and landline loudspeaker devices. System maintenance and announcements are the responsibility of the OCIC of FSCP.

The Municipal Security Council has officials on duty who are responsible for actually sending EW and notification messages to response units and the population. They rely on instructions by the Head of “Crisis Management, Defence Mobilisation and Training” (CMDMT). Any such EW for disasters, accidents or catastrophes are immediately transmitted to the Mayor of Burgas, the DSC members, the OCIC members and its officials on duty.

The entire chain of notifications is carried out according to an internal communication

algorithm (Annex 3 of MDPP). After CMDMT on duty staff receives an early warning, first they transmit the message to the Mayor (being the Head of the DSC), the Head of "Crisis Management, Public Order and Security" (CMPOS) Directorate, the DSC secretary, the territorial directors and settlement mayors for monitoring the water bodies in their districts, as well as the heads of emergency units. Finally, they inform the managers of sites and companies which are located in flood-risk zones. Mostly, the above communication is established via (mobile) telephone links.

The official on duty prepares next a report to the duty officer on the DSC for the actual flood progress according to established report forms. The local mayors and company managers alert their subordinates and prepare all equipment and logistics needed for an adequate emergency response to the situation (according to established charts). Following a Mayor's decision, the official on duty notifies duty officers at the DD FSCP, the DD of the MoI and the EMCC duty staff, so that they can prepare their personnel and resources according to coordinated action plans between these entities.

The population is notified via the above-mentioned EW siren system, which is followed by brief clarifying information on predicted event parameters. Communication channels are established via radio and TV, mobile Police Precinct units and DD FSCP teams. There is a pertinent Municipal Radio, as well as an urgent message press-release mechanism executed by the Municipal Press office and the Head of "Culture, Marketing and PR" Directorate.

Surrounding villages are informed via local loudspeaker devices. The same way is used for quick informative messages to affected population in disaster zones, food supply points, casualty collection and evacuation points, as well as any other locations where there might be a mass gathering of citizens. What has proven crucial in the past for effective and efficient emergency rescue and restoration works is the initial information provided to the population regarding the evacuation methods and locations, possibly tent camps for affected population and the points for food and water provision.

Burgas Municipality also established sectors where casualties, injured and other affected persons may receive first aid and emergency medical assistance. By no means

carrying the complete efficiency of the EMCC capacity, it is integral to an adequate and effective response to disastrous phenomena. The Municipality also sets up locations for Police posts which restore and maintain public order and prevent looting. Both the municipal and police staff relay safety instructions to the local population.

There is an established order for attracting Volunteer working groups able to support the emergency actions, under the supervision of staff members of the MoI, FSCP and healthcare professionals.

A sequence of activities is put in place for “operational protection” in should there be flood risks, in particular (e.g. prolonged or intense rainfall). Territorial Directors, District/Settlement Mayors, their deputies and Chief Experts responsible for gully drainage and dam monitoring intensify their controls. They transmit relevant information to duty officials at the central administration and justify emergency actions related to hydraulic or engineering facilities – e.g. opening or closing of outlets, deepening of overflows, clearing of bridge foundations, main drains, over- and under-passes, etc. Additionally, certain upgrade of dykes or the building of temporary new ones may be needed (via modular elements, bags of aggregate or direct accumulation of aggregate material). When flood advancement and water flows endanger residential and commercial buildings along the drainage catchment of gullies, the population is duly warned and prepared.

There are 3 notable levels of readiness according to Burgas district standards: “High-risk”, “24/7 Duty” and “Standby” [responsiveness]. Whether response units have had the chance to be alerted and brought to the latter levels or not, a critical situation evokes the “notification-evacuation-accommodation-provision” mechanisms. The full provision of the population with temporary facilities and necessities includes food and water, clothes, bed linen and medicines, as well as their actual distribution – mostly by FSCP and Bulgarian Red Cross staff and volunteers. Transportation and any complex logistics may be facilitated by off-road vehicles by the MoI, the FSCP and even the Army, considering access difficulties in flooded areas. Lastly, those areas need to also be disinfected after clean-up and water withdrawal.

Besides the direct (and mostly formal) responsibility of the Mayor of Burgas to perform and control most of the above activities, the Municipal officials responsible for evacuation and provision of affected population are the Deputy Mayor for “Healthcare and Social Affairs”, the Municipal Secretary, the Director of CMPOS and an inspector on behalf of the DD FSCP.

Temporary accommodation locations and structures are determined by the Municipality among a list of public service buildings – sports halls, community centres and schools; whenever possible, in private hotels, holiday homes, family houses; ultimately, should such needs outnumber available capacity, the placement of tent camps is foreseen on suitable terrains. Appendix 4 of the MDPP identifies and schematically depicts the potential location of the latter within residential complexes and Burgas neighbourhoods. The Municipality **evaluates** its related **available equipment** as “in good condition, [although] the same kind can be obtained from FSCP warehouses. Deficient property and equipment is provided by the BRC or purchased through the commercial network”.

The Directors for “Economics and Business Activities” and “Social Activities and Employment” are the responsible municipal officials for conducting a needs analysis regarding food, water, medical products and other provisions; while the latter Director coordinates their procurement and distribution.

Disaster area cleaning is entrusted to the Deputy Mayor for “Spatial Planning and Construction”, along with the Director for “Environmental Protection”. Companies that provide contractual services to the Municipality in maintenance of road infrastructure, cleaning and waste collection assist such activities within their ability and capacity, upon being summoned by the same Deputy Mayor.

Overall coordination responsibility lies with the Director of CMPOS Directorate, the Heads of CMDMT, and “General Functional Control” departments and the FSCP

Inspector for Burgas Municipality.

Available communication facilities and resources include telephone links to Municipal Security official on duty, “TAB 77” and VHF links to DSC and EWS complex. Municipal first responders are in contact via mobile phones, radio-links (VHF), e-mail and virtual messengers. The Municipality maintains an updated and detailed contact register in the Duty reception of the Municipal Crisis Management and Security Council. All disaster-related communications are also supervised by CMPOS and CMDMT Heads.

Officially responsible for public order maintenance are the District Directorates of the Interior Ministry in Burgas, the “Specialized Police” Directorate and Border Police. They are supported by Traffic Police and the municipal CMPOS Director. The latter Directorate coordinates common efforts and shared activities of specialized Executive bodies and municipal officials responsible for public order and legality.

Transport means and operators are somewhat more fragmented than logistics support systems we saw in Varna. Four companies which provide public transportation means in the event of a disaster: Burgasbus SMLLC.; Burgas Volan 95 Ltd.; Comfort Ltd. and Mini Bus Express Ltd. Additional specialized transport equipment may be requested from companies included as adjunct emergency and rescue resources (Annex 21 of MDPP).

Healthcare services in Burgas are extensive albeit fragmented between 2 Public Multi-disciplinary Hospitals, several separate Public clinics (Oncology, Pulmonology, Ophthalmology and a rehabilitation Sanatorium) and more than a dozen private hospitals and clinics (including 2 larger structures). Burgas District has an additional 5 public hospitals in the smaller settlements and towns within functional reach which expand somewhat the overall response capacity in terms of medical care and emergency first aid.

The main hospital structure in the City is the MHAT "Burgas" which maintains established and expert medical teams with proven capacity for emergency response. MHAT Burgas alone can provide a number of response teams in traumatology (2 units); general surgery (2 units); neurosurgery (1); thermal injuries (1); ophthalmology (1); otolaryngology (2); anaesthesiology and intensive care (2); and blood collection teams (2). The two larger private hospitals are Medical Centres "Sveta Sofia" and "Deva Maria". They offer smaller specialised wards but have a wide array of specialist practitioners from close to 20 different fields of medicine.

The total inpatient capacity of Burgas hospitals is slightly above 1000 beds, with MHAT "Burgas" leading the way with circa 640. Both MHAT "Burgas" and MC "Deva Maria" have working conventions with Varna Medical University in offering training opportunities to medical students and future nurses. Specifically equipped and trained for **emergency medical care** are the Regional Health Inspectorate, the EMCC-Burgas and some private healthcare facilities.

The Deputy Mayor for "Healthcare and Social Affairs" coordinates larger scale medical interventions and needs. All available equipment at designated healthcare facilities, their units and emergency response capacity (medicine stocks, devices, staff) are registered in the Municipal and District disaster protection plans.

Next in line in terms of urgency and importance is the restoration of public services and infrastructure. Coordinated by DD FSCP and according to the MDPP, the local Armed Forces units may be requested to participate and facilitate necessary interventions. The MoI maintains public order all along, while Municipal formations and private companies contribute with heavy engineering, construction and special equipment. Responsible officials define zonal and structural priorities, possible interventions and reconstruction activities – Deputy Mayor for "Spatial Planning and Construction", the Heads of "Spatial Planning" and "Construction" Directorates, along with an appositely designated official for maintaining coordination, administrative aspects, QA, financial and legal aspects.

What comes after and beyond any immediate concerns and population needs for daily provisions and health aspects is the sustained relief effort in terms of restoration and functional recovery of buildings and socio-economic links. A longer-term response mechanism, it is based on a specifically created Municipal Commission for developing and supervising actions deemed necessary.

Landslides: Related and Extended Response Capacity

What we have seen above is the basic framework of Burgas Municipality response mechanisms and resource distribution in the event of disaster recovery. Those are specifically defined above and beyond what we have seen as valid for all national, regional and local authorities, legal and institutional ordinances that influence all municipalities in Bulgaria – especially in relation to comparable response capacity and mechanisms that we have seen present in Varna disaster management.

We will continue our presentation of Burgas disaster prevention and response capabilities with what has been already identified as a highly relevant potential danger for sea coast areas – landslides. Municipal documents quote the main risk factors that contribute:

- Natural: (under)groundwater, rainfall, marine abrasion, sea waves, etc.
- Anthropogenic: “construction loads, illegal construction, absence of a sewerage network and/or a water supply system, improper coastal defence construction, etc.

Clearly, human activity aggravates natural risk factors and creates conditions that favour the formation of large-scale landslides. Only some of the identified (and considered active) landslides are fortified. For some there are no implemented monitoring systems or activities. Even when fortification measures are carried out, they cannot be extended to satisfactory volumes and are insufficiently effective. These shortcomings stimulate landslide reactivation and expansion.

Burgas Municipality emphasises the shoreline construction and fortification works that have already been carried out or are currently in implementation stages. Chosen

technical solutions are already in place for a considerable part of the Burgas sea coast. A notable example, mentioned also above, is the completed landfill of the landslide east of Sarafovo. The landslide area northeast of the Casino is in its projection stages. A significant portion of the Sea Garden – from the entrance of the Central Beach to the Summer Theatre – is reported with upcoming fortification of the (terrace) retaining wall, a process which will restore compromised retaining capacity in the section between the Bunker and the Summer Theatre. Within the same park, to the south-east of the Teohar Bakardzhiev monument, the Municipality has carried out an emergency reinforcement with “passive construction of reinforced concrete elements” with a total length of 30.1 m.

The Municipality has been able to finance these interventions out of its own budgeted resources, and to plan for 2 more urban and several road-affecting landslides. As we have pointed out, financial sources are mainly municipal budget items from the state delegated/subsidised function "Defence and security" (Item 284 "Preventive action for reducing the harmful effects of crises, disasters, accidents" and item 285 "Disaster relief, accidents and catastrophes"). Any unforeseen and large funding needs along the lines of such interventions may be requested to the JCRR (as disaster relief and recovery) or to the central State budget (via the Council of Ministers) upon convincing safety and investment arguments.

Relevant financial support and investment plans are also given in an apposite Annex of the MDPP. Since Burgas Municipality has provided an extensive list of detailed Annexes which explore further individual disaster preparedness and response capacity arguments, we will quote herewith the full list of annexes to outline the scope of organisational and resource substantiation of the Administration’s plans:

- A list of Dams on the territory of Burgas Municipality (with exploitation characteristics);
- Voluntary formations registered at the Municipality;
- Public Authority Notification Scheme (EWS and emergency regime);

- Designated locations for temporary accommodation of affected population; a complete reference of public buildings (gyms, educational establishments) with the capacity to offer temporary accommodation to affected citizens;
- Estimate of needs of food and water for three days; Estimate of needs of medical devices, medicines and the like;
- Available Municipal vehicles and their location;
- Financial provision of preparedness capacity and related resources;
- Technical characteristics of the “Mandra” Dam – property of “Lukoil Neftochim” Ltd.
- Landslides on the territory of Burgas Municipality.
- Information on cleaning and deepening of drainage channels by persons detained in Burgas Prison and, if necessary, mechanized cleaning and extension.
- Expert opinion on an updated landslide status: Burgas – Sarafovo Quarter.
- Information on coastal reinforcement of landslides on the territory of Burgas municipality.
- Satellite images of landslides in Burgas Municipality.
- Problematic gullies in Burgas Municipality regulated settlements;
- Bed capacity of Healthcare structures;
- Overview information on Municipal schools;
- Potentially dangerous Dams on the territory of Burgas Municipality and sites under threat;
- List of Mayors and acting Mayors in the Municipality of Burgas.
- List of land plots with dams, gullies and protective dikes within Burgas Municipality settlements;
- List of available property for providing assistance to affected population (stored at a DD FSCP Burgas warehouse);
- Forces and resources available for flood and landslide response;
- Dams on the territory of Burgas Municipality – current status and satellite images;
- Underground drinking water sources (within river floodplains);
- Satellite images problematic gullies in neighbourhoods and settlements of Burgas Municipality

All of the above reports, lists and visual aids are supplied, maintained and updated by the Municipal Directorate “Crisis Management, Public Order and Security”.

Industrial Incidents and Toxic Substances

Prevention measures, risk reduction and consequence mitigation in case of industrial accidents are aspects which shape largely the overall response capacity of a contemporary city. That is especially true for Burgas, given its relative regional and national importance in the petroleum product synthesis sector.

Despite the predominant paradigm of “prevention first”, the MDPP admittedly explores mostly the recovery and reconstruction of affected and related facilities as the core of its industrial incident response. “The protection of the population, the environment, sites and companies (both private and public) in the event of industrial accidents involving poisonous chemicals and toxic substances should be done in a timely manner – by creating task forces and setting the means for the immediate rescue and disaster recovery works”.

The municipal regulations point out that the Disaster Protection Law explicitly defines the obligations of any legal entities that have public responsibility in contributing to disaster prevention and protection. For example, there are several types of construction categories (according to the Spatial Planning Act) and the first three types represent structures at high risk of causing or being exposed to disasters. The owners and operators of such publicly relevant buildings and premises have the obligation to develop an Emergency Plan of their facility. The EP should contain at least:

- possible consequences for personnel, population and the environment from any accidents on site;
- steps to limit and mitigate identified accident effects;
- staff protection measures;

- allocation of responsibility (persons and units) for the implementation of such measures;
- resources available (or needed) to implement such standards;
- response times, structures and personnel;
- a local notification system and procedures for informing the authorities.

Moreover, any such legal entities need to update their EP and hold annual dedicated staff trainings. Finally, they need to present a report to the Mayor of Burgas with any publicly relevant information which may serve the Authorities to prepare the MDPP:

- risk sources tied to their commercial or industrial activity;
- probable consequences and mitigation methods;
- possible effects on population and environment;
- activities, staff and resources available for rescue and emergency recovery works at the site.

Given the impossibility to prevent an incident, the same operators and owners should:

(a) immediately report the accident to the local FSCP operational centre and the Mayor's administration;

(b) commence without delay the identified emergency rescue and restoration activities;

(c) provide a detailed report on explosive substances, hazardous chemicals, sources of radiation and any other knowledge of hazards to human life and health to members of the URS;

(d) cooperate in any other way with URS teams and disaster relief efforts;

(e) ensure the safe disposal of waste resulting from the accident;

The above steps and requirements would ensure that the legal entity is able to create, prepare and maintain disaster response units and resources with the capacity to protect their own staff. Similarly, and even more relevantly perhaps, the obligation to adhere to

said requirements – relevant primarily for legal persons and commercial entities operating in industrial or public service buildings – must establish reciprocal measures in a plan to protect all those residing or working within the same building.

Burgas Municipality enforces monitoring and control functions related to such obligations via a horizontal distribution of competent municipal administration offices, namely those of respective sectoral Deputy Mayors of “Spatial Planning and Construction”, “Euro integration and Ecology”, “Healthcare and social affairs”, “Culture and Education” and “Budget, finances, economy and economic activity”; as well as the territorial Directors and district Mayors.

Lukoil–Neftochim and Other High-Risk Operators

“Lukoil-Neftochim-Burgas” AD is a major chemical industry operator of national significance, located within Burgas municipal territory. The company's main function consists of refining petroleum products and its manufacturing, operation and transportation products and processes include highly toxic, flammable and explosive chemical products that need to be kept under continuous control.

Lukoil-Neftochim-Burgas (LNB) performs therefore a profound risk analysis and implements systemic risk prevention and disaster preparedness mechanisms of its own. Multiple verification procedures (both automated measurements and physical checks) maintain potentially structures within acceptable potential risk levels. The main potential source of industrial accidents with significant chemical contamination (of various type, degree and impact) are the manufactured and stored chemicals themselves. Accidents with production or storage facilities may bring about the loss of human lives, apart from direct material value.

LNB is not the only company and industrial structure which presents a fire and industrial incident hazard. Burgas Municipality also hosts other critical infrastructure and disaster risk-related facilities:

- “Rosenets” Cargo Port (owned by LNB);

- Production site of “Toplofikatsiya-Burgas” EAD, a district Central (Thermal) Heating company;
- “BMF Port Burgas” EAD, “Burgas East-2” Port Terminal, liquid fuel “Buffer storage” facility
- “Andesit” Ltd. (industrial-purpose explosives storage facility);
- Fuels and lubricants Warehouse and a Steam power plant at Burgas Airport
- Warehouse facility of “Despred” AD – Sofia (owner) located in Dolno Ezerovo quarter of Burgas, storing packaged ammunition and pyrotechnic articles;
- Warehouse facility storing explosive materials, 3 km southwest of Gorno Ezerovo Quarter, Burgas

Moreover, bulk cargo transferred and stored temporarily at the Port of Burgas (e.g. sulphur dust, ammonium nitrate, superphosphate, ferrosilicon, etc.) may, under certain conditions, present a higher potential disaster risk. Companies which work with ammonia include Lukoil-Neftochim-Burgas, the Refrigeration Facility of the Burgas Port and “Buldjac” AD (the latter with facilities both within city limits and in the outskirts).

Finally, significant disaster risks are posed by potential incidents in the process of manufacturing, use, storage or transportation of any other highly flammable liquids besides diesel and gasoline fuels. Various liquefied gases, toxic, explosive or fire-hazardous substances (plastics, synthetic fibres, chemical-based adhesives, etc.) are produced and handled by companies such as “Kronospan-Bules-Bulgaria”, “Tecom-Unimat” (facility in village Cherno more), "Burgas Airport", "Nafteks-Petrol", "Toplivo", “Koh-i-Noor Hemus-Mark”, “Transvagon Holding”, along with various gas stations and sensitive sites listed in an apposite thematic MDPP annex.

These legal entities and operators have the legal obligation to develop and upgrade internal monitoring, early warning and alert systems. An automated EW station is implemented over the entire territory of LNB, for example. On the other hand, municipal staff – namely the CMDMT Department Head – have certain control and monitoring powers besides those of FSCP and MoI units (territorial Inspector FSCP). Together, they

prescribe warning systems and monitoring requirements and implement operational control for all activities which have a direct effect on the health and wellbeing of the population of Burgas.

Specifically addressing local authority staff preparedness, CMPOS Directors and CMDMT Heads collaborate with FSCP experts in developing and coordinating **training campaigns** for the administrative staff, volunteer units and any civil groups which might want to require optional training and information material.

Such a collaboration, however, runs on many levels and is characteristic of Burgas Municipality standing preparedness capacity for any kind of disaster or emergency situation. The OCIC centres at the FSCP actively coordinates strategic and operational interactions between executive bodies and local authorities. OCIC #1 is reachable via phone, mail (okic-bs@cp.e-gov.bg) or through the mobile response unit of the Municipality (by contacting the official on duty). OCIC #2 is an alternative communications unit – it serves the EW system dedicated to links with the central executive and the URS, as well as the city-wide EW and notification system (the “sirens”). It is reachable by phone or by contacting the official on duty.

Management of actual actions of disaster protection units in the field is coordinated by the Municipal Security Council (MSC) created by an Order of the Mayor. Any municipal participation it authorises are channelled first and foremost through FSCP staff and municipal personnel of the “CMPOS” Directorate (Public Order Inspectorate), with 30 uniformed service officers. Even more relevant are the resources and expert units of State structures permanently stationed on Burgas municipal territory that we are already familiar with. The Rescue Unit of the Burgas FSCP employs 39 rescue workers and 30 pieces of specialised equipment and vehicles. The sea emergency and rescue unit has been prepared with 54 experts and 36 pieces of specialised equipment. The above algorithm for requesting additional forces located outside the territory of the Burgas municipality is valid for practically any type of distress. Potential full-scale coordination of significant interventions requires the operative support of the Ministry of Defence (MD),

Border Police, DD of the MoI, the (municipal) Bulgarian Red Cross, special units of neighbouring municipalities and the Burgas volunteer forces.

Replication of Efficient Foundations

Burgas Municipality, just as Varna, is bound to replicate the emergency preparedness resources as a preset mechanism for an adequate response to disasters. A coordinated strategic and operational effort between local and national institutions has led the authorities to believe that certain efficiency is achieved in planning and managing a flexible use of these resources.

Similarities can be noted within the EWS and notification protocols, for example, for different types of pre-critical and alarming environmental situations – whether it's industrial pollution, radiation or expected adverse weather conditions. The algorithm prescribes that, for example, if data from the mobile municipal air quality monitoring station shows concerning levels (real time) or potential risk (worsening) of excessive atmospheric air pollution, automatic reports are transmitted to information boards placed at the central Municipality building, as well as in district Municipal offices in Dolno Ezerovo, Osvobozhdenie and Vazrazhdane. Following such automatic indications, the Director of the Regional Inspectorate of Environment and Water alerts the MSC duty officer who, in turn, notifies the Mayor of Burgas, the MSC Secretary and the Head of the Crisis Management Headquarters. The entire chain of notifications and alerts has to be completed within 15 minutes. In the next quarter of an hour after that, remaining public authority officials have to be notified in turn: i.e. district and settlement mayors, Territorial Directorates' Heads, the duty officer at the DD FSCP.

Many disaster scenarios create conditions that bring about similar deficiencies and needs to the wellbeing of the population. **Measures** to tackle adverse conditions and impending needs also have to be flexible yet **replicable and scalable**. This holds true for many of the explicitly assigned responsibilities of public officials, the prescribed actions in disaster scenarios and the main operative units and resources which are

foreseen to mitigate and eliminate any potential consequences.

The Municipal official who has the power to order temporary evacuation – in any situation and emergency type – is the Mayor of Burgas (or an official authorized by them). In turn, the Municipal administration staff responsible for the actual evacuation and care citizens in need of special assistance (e.g. children or disadvantaged people if their usual care givers are unavailable) are the Deputy Mayor for Health and Social Affairs and their administrative staff. Furthermore, in any distress situation, conditions for facing immediate civil protection and safe relocation activities are ensured by the Secretary of the Municipality, the territorial Directors, the District Mayors, the CMPOS Director and the Head of CMDMT and the chief Inspector of FSCP in Burgas.

Burgas Municipality does report certain recurring supplies, equipment and personnel availability in its flexible disaster preparedness and planning. Such resources are the temporary accommodation supplies that are based in the warehouse of the FSCP in Meden Rudnik neighbourhood:

511 individual tents (with more available at request to the District Governor and national FSCP management), 500 mats, 518 blankets, 45 pillows, 45 mattresses, 940 bed sheets, 510 foldable beds.

Naturally, a tent camp is set up in situation when temporary accommodation facilities – hotels, holiday homes, family homes or public service buildings (e.g. dormitories, gyms, community centres and schools) are insufficient or currently unavailable for any reason. The complete list of foreseen facilities and their location can be found on the website of the Municipality.

Any further emergency needs in terms of food and water supplies, clearing and restoration activities, support facilities and equipment, management chains and communication channels are planned for in a similar fashion, given the perceivable resource availability, as well as the objective spatial and temporal limitations for a more efficient reaction. Burgas officials and responsible public entities proceed to replicate

this approach by analysing reasons, trends, statistical probability and foreseen consequences. Detailed and updated reports put into perspective the municipal and regional strategic goals that are achievable via standard procedures already established (and listed above) for floods, landslides and industrial incidents.

Worth noting for Burgas is the somewhat stronger **Volunteer** presence in its plans and readiness. Compared to the currently registered official 41 volunteers in Varna, there have been anywhere between 86 and **120** registered Burgas citizens who have declared readiness to assist in emergencies over the past several years, with their number on the rise if anything else. This puts the Burgas volunteering movement at the forefront nationally.

Common Traits of Both Municipal Response Systems

There are some further similarities in the approach and implementation of systematic preparedness and existing mechanisms which are valid for both Varna and Burgas Municipalities. Some are objectively inevitable, others are simply commendable.

In establishing certain rules for behaviour and recommended actions of the population, the Municipalities also take into account some territorial specifics but mostly regulatory standards (National and EU) and common sense. They prepare and publish awareness posters, distribute leaflets and instruction manuals – frequently in more than one language: English, Russian, some in German or other less frequent EU languages but all directly related to increasing tourist flows, (e.g. Romanian, recently). This is specific for the importance that tourism has for both cities but also simply a general good practice merely extended in its variety. Naturally, local and regional institutions publish relevant information on their websites. The latter are inconsistent in their approach on updating such contents, thus we are not making a gross judgement on related organisational capacity.

Both Municipalities have a Municipal Crisis Headquarters (or Coordinations Office) established on a standby basis and operating actively in times of need. The Headquarters is an auxiliary body to the Municipal Security Council (MSC) in both cases. The purpose of the latter is to coordinate emergency preparedness and emergency disaster relief work (pre- and post-event decisions and actions) with adequate timing. While the former is directly engaged in operational disaster response efforts (mostly concurrent with the critical events).

Notably, Burgas and Varna are also important regional hubs with their FSCP regional operations centres.

Considering current trends of understaffing and lack of equipment in many of Bulgaria's hospitals, we still have to emphasise the importance of Varna and Burgas as regional **healthcare hubs**. Varna has the slight upper edge in equipment and specialist services provision but both cities have a significant capacity in offering healthcare services and social stability to their citizens and the entire North-East and South-East regions of the country. While for both cities the most relevant hospital structures are State or privately owned and managed, Burgas relies on private facilities to a larger extent, while Varna's "St. Marina" is both a professional and educational centre of healthcare gravity. Ultimately, State owned structures and decision makers determine the coordination and flexibility in emergency medical resource planning, paramedical staff training and related civil functions.

Ultimately, the main feature that characterises both urban centres and their disaster preparedness capacity is their essential flexibility based on substantial **reliance upon National institutions**, their executive organs and territorial agents (amply detailed above). This is arguably true for all Bulgarian cities, and the smaller they are the more dependent they get. Considering the regional importance of Varna and Burgas in any social and economic terms, they have still a strong and structurally determining support from state-level public entities with strict prerogatives or at least certain levels of competence related to public safety, security and social integrity. This systematic

approach is most likely a remnant of centralised economic and political setup which was officially the legal order until at least 1990, and one of the relevant current shortcomings of urban systems which aspire to a better local preparedness, greater self-sufficiency in territorial resilience.

Nevertheless, we must emphasise that the mere replication of **good practices** – from national examples to EU-level recommendations and requirements – have already brought considerable benefits to the decentralisation of these urban risk management systems, especially after the accession of Bulgaria to the EU.

Ultimately, Varna and Burgas are comparable urban realities in almost any terms – their size, geographical location (seaside) but mostly socio-economic development, the sustainability challenges it presents (including urban risks factors) and the governance paradigms that the synergy of local civil society evolution and public administrations choices have led the cities to adopt.

"Auxiliary Bodies" Operating on the Territories of Varna and Burgas

While not exactly directly related to disaster response mechanisms and resources, the entities that we have called "auxiliary" are able to uphold, enhance and expand the risk management capacity of local public and private stakeholders and the entire system.

These are first and foremost the Universities and other professional training institutions which prepare specialists and support the actual creation of human capacity in managing and responding to different risk factors.

The Medical University "Prof. Dr. Paraskev Stoyanov" is located in Varna. The institution prepares students and future experts in many directly related fields, not the least of which are the specific undergraduate Majors in "Disaster Medicine" and "Medical and Sanitary Protection". As for "field" training and practical links with healthcare structures, we have already emphasised the working conventions that MHAT "St. Marina" in Varna, MHAT "Burgas" and MC "Deva Maria" have with Varna Medical University in offering training opportunities to medical professionals. After the unfortunate incident in 2012 at

Sarafovo Airport in Burgas, many EC and NATO officials and strategic stakeholders have visited or evaluated the efforts and capacity which the Bulgarian medical establishments have demonstrated as a response to the emergency situation. Particularly favourable considerations have been given namely to the two medical Majors indicated above by participating military and civil medical experts.

Recently the Council of Ministers has approved the creation of a Medical Faculty at “Burgas Free University” which will expand local education and training options in the field.

Looking beyond healthcare capacity, the Technical University of Varna offers a Degree in “Protection of the population in the event of disasters and accidents”; while Varna Free University has an undergraduate Major in "Fire Safety and Civil Protection". The latter trains engineers in the field of fire safety and emergency rescue, fireproof and fire-safe design of buildings and facilities, experts in safety related investment and supervisory services. VFU offers the courses in both Bulgarian and English.

As for Early Warning and notification systems, the National EW and alert network has two control units: the National Control Unit in Sofia and the Alternative Control Unit in Burgas. This raises the importance of the City within the national notification and prevention ecosystem.

An important opportunity to explore, for both Municipalities, is the chance to improve cooperation between provinces and the metropolitan administration. This is valid especially for those districts and municipalities which share risks, e.g. a common river basin of comparable seashore issues. The National Association of Municipalities could play a positive role in promoting cooperation and coordination between municipalities and both Varna and Burgas have proactive representatives in that forum.

We have to also consider active projects and potential opportunities for cross-border cooperation between Municipalities and Regions in neighbouring countries (Romania and Turkey in our case) that share the same risks. A number of EU projects have already

been implemented, especially under Interreg, the Romania-Bulgaria and even Greece-Bulgaria Cross-Border Cooperation Programmes. Still, the results in most cases involve human resource capacity building and knowledge exchange such as mapping and analysis techniques, virtual scenario building and coordination mechanisms. These results have been verified to a large extent by local strategic and operative units and do not warrant a special consideration, since their final state of utility has been verified and the outputs adopted where necessary.

There is an important **Centre for Qualification and Professional Training** (CQPT) in Fire Safety and Civil Protection located in Varna. Part of the Interior Ministry, the Centre provides initial professional training, qualification and requalification for all types of FSCP employees and any possible volunteers. Training at the Centre is carried out by 15 teachers and 31 service and support staff.

CQPT facilities include a hotel for 126 people, offices; 7 training halls, dining facilities for 80 people, specially equipped garages and storage rooms. The educational process is supported by 2 all-purpose fire fighting vehicles (AC 30/130 and CAS-25); an emergency response vehicle (GAZ-66); a car ladder (AL-30/131); an ambulance; a bus; motor pumps and engines. Two training towers for height rescue and an adjacent training ground for fire-fighting and psycho-physical training support the practical side of FSCP training. A further training ground (technically called a “Psycho polygon”) is available for fire-fighting practice on the territory of adjacent Devnya Municipality.

Since its inception the CQPT has trained more than 15 000 FSCP officers of the MoI. Annually, an average of 200 employees pass their initial vocational training there, while about 300 employees access advanced vocational retraining.

A dedicated website of GD “Fire Safety and Civil Protection” (http://pojarna.com, national-level HQ) provides essential information to the population, main and auxiliary response structures, reach out points and procedures, including volunteer and optional training programmes and opportunities.

Much more rarely employed units are the Army infantry divisions in both cities and the Naval Forces in Varna. The Army has several such detachments in both districts. The Navy maintains a Marine base and the “Chayka” Naval Air Base, both in Varna. The Infantry detachments have heavy and chain vehicles with renowned off-road mobility capacity, while the Naval Air Base maintains 6 helicopters (2 Eurocopter AS565 Panther, 1 AS 365N3 Dauphin and 3 Mi-14).

Although ever since 2012 the Air Base carries out a 24-hour on-call duty in service of any search, rescue and relief operations (primarily related to distressed ships and aircraft), both the Army and the Naval Forces bases and detachments are rarely called upon. Notable exceptions are periods of severe and adverse weather conditions, mostly in the winter and with prolonged duration and intensity – Army Infantry division can and have performed rescue operations, clearing of roads and structural support functions whenever civil and MoI units don’t have the capacity or the manpower to overcome the distress factors.

Definitive Outlook and Conclusions

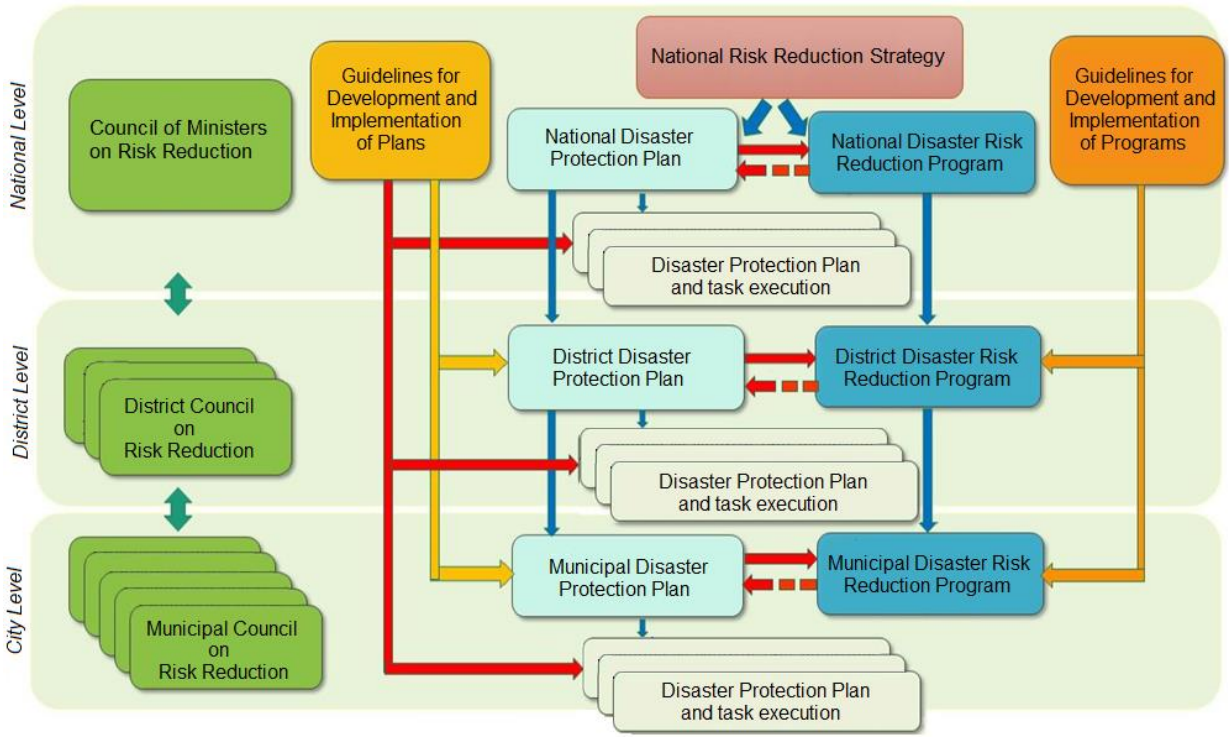
Most strategic documents at any level – national, regional or local – stress the importance of sustainable system development as a foundation of disaster risk reduction. An active involvement of society is essential: governance structures, non-profit organizations, the private sector and the scientific community. Disaster risk reduction, prevention and response platforms are not considered a separate element but an integrated stage of territorial development policy, since disasters and their impacts frequently turn out to be an indicator of poor planning, unsustainable economic and social processes or simply a poorly prepared and insufficiently aware population. Significant natural disasters are the notable exception to this line of reasoning but even those are greatly mitigated by efficient socio-economic systems.

The Bulgarian legal framework – the Disaster Protection Law, the Spatial Planning Act, the Water Act, the Environmental Protection Act, the Safe Nuclear Energy Act, the Forest

Act and the Regional Development Law – are all of key importance in facing and managing natural and man-made risk, provided the complex and substantiated ecosystem of prescriptions that they have established in relation to urban and natural risk factors. The DPL stipulates that prevention activities should be based on top-down risk reduction planning – a Disaster Risk Reduction Strategy, a DRR programme and a DRR Plan. Those are replicated with due consideration and detailed specifics at Regional (sometimes Sector-particular) and Municipal levels, with the MDPP representing the most direct and functionally practicable basis for risk preparedness at any level.

The current National strategic outlook (2018-2030) defines a common vision, typifies expected results, sets strategic goals and priority areas for the whole ecosystem below. National (and often Regional and Municipal) DRR programs span 5 years, while Regional DRR Programs providing the link between national target implementation and the factual reality of local risks (even when shared) which are identified in Municipal Disaster Protection Plans.

Fig 1. Linking Strategic documents and specific territorial Plans for disaster risk protection



Our research has shown that at a City level the Mayors organise and manage the actual disaster protection of all citizens, although extensively assisted in their decisions and supported with research and reporting by various Council bodies – a Municipal Disaster Risk Reduction Council, a Municipal Security Council, a District Security Council, in addition to standing disaster Coordinations Offices or Headquarters.

Not only the municipal administration and the above expert assemblies are under the direct supervision and authority of the Mayors. Volunteer formations – an integral part of the URS – are established and registered at Municipal level, and under the direct authority of the Mayor. Both Varna and Burgas maintain registered volunteer formations (with Burgas standing out numerically).

While risk assessments are a mandatory part of any MDPP, district and city implementation has to be inevitably coordinated with local territorial Directorates of the FSCP. Through official and unofficial channels (including the media), these URS cornerstones interact, hold meetings and discussions with different stakeholders and target groups – not only during and after a calamitous event but also before and mostly

on a regular basis. Both the Municipality and the FSCP provide trainings, instructional and information material with the overall aim of raising public awareness and creating more favourable conditions for better urban resilience and a more efficient disaster response system. One particular example is provided by the annual risk awareness training at schools and even kindergartens.

What Varna and Burgas have implemented as local systemic responses reflects largely strategic goals and priorities in terms of approach and coordination. Socio-economic resilience to disasters is based upon local administrative capacity for managing risk and disasters; horizontal (policy, e.g. climate effects, resource management, economic considerations) and vertical (e.g. FSCP, District Governor, MoI) coordination of methodology and interventions; and an inevitable sound financial management and financial engineering of chosen long-term solutions.

Many of the Guidelines for the development of Municipal Disaster Protection Plans and the preparedness for their execution reveal aspects which are critical to an efficient systemic response to risk-prevention and response needs. The Guidelines are developed by the Council of Ministers on Disaster Risk Reduction in 2017 and is based on DPL prescriptions. Considering that most national, regional and local Councils have to develop a similar framework of preparedness (documents), these program documents and action plans have to at least work under a common matrix of priorities and approaches.

A coordinated risk management system and an efficient response structure passes through the elaboration of a meaningful **analysis, evaluation and mapping of pertinent risks**. A missing or incomplete component exposes the system to unforeseen risks. Both for Varna and Burgas (as is the case on a national level) some **more mapping** tools and representational resources would facilitate cross-level planning and support inter-institutional **decision making**.

Additionally, some special emphasis on capacity building programmes for municipal staff

and a more active citizenship would improve situational and behavioural awareness, hence overall urban resilience. One possible aspect to be considered in this direction is the inclusion of more risk concepts in university courses (e.g. engineering and natural sciences).

All of the above lines of reasoning justify the importance of a consistent bottom-up approach in prevention practices, including a situational analysis, a distribution of resources according to data-based risks and probabilities, as well as a "healthy" proportion of planned efforts and activities between prevention, protection and recovery. This approach has enabled many European cities and their surrounding rural areas to build vital resilience to dynamic challenges to their sustainability, an example of which challenges are namely disasters and incidents.

Since we have determined good practices to be an important training mechanisms for local authorities, an important source of these external lessons is Bulgaria's active participation – mostly on a national level – in various EU cooperation platforms on civil protection. The Disaster Preparedness and Prevention Initiative for Southeast Europe (DPPI SEE) is a strategic agreement and coordination platform, primarily on a strategic planning level. More relevantly, technical working groups and transnational training initiatives provide prime examples of practical involvement with direct added value. Additionally, there are a number of bilateral agreements with neighbouring countries, with particularly relevant trans-regional links with Romania for Varna and Turkey and Greece for Burgas).

There is a specific Agreement between the Governments of Bulgaria and all other neighbouring countries "on cooperation in the field of prevention for mitigation and reduction of the consequences from industrial incidents, accidents and disasters and elimination of their consequences", signed duly in 1995 and in force to this day, with valid strategic intentions albeit with a number of recommendations to update.

Under the Union Civil Protection Mechanism (UCPM), the **FSCP** General Directorate participates in the transnational consortium which conducts assessment missions and training courses. A Lead Partner in the "Seminar for Mechanism Experts" in Sofia, the

FSCP provides regular contribution to the development of modular exercises. The GD in Sofia reports more than 60 FSCP experts that have passed instructional courses under the UCPM training programme.

Moreover, GD FSCP has always taken an active part in international projects such as ROBG-351, INTERREF-IPA CBC Bulgaria-Serbia and Bulgaria-Turkey, EMERSIS I and EMERSIS II. A consultative overview of the National Disaster Management System was carried out in 2019 by EC experts with the active cooperation of GD FSCP, as it continues to plan further improvements in its system.

Apart from such partner engagements, Bulgaria has always done its part in developing host nation support plans according to EU and NATO guidelines as a prerequisite of any significant international events on its territory.

It goes without saying that the Emergency Number (112) is actively maintained. Calls are answered in decent English besides Bulgarian. For Varna and Burgas in particular, given the importance of tourism and the external EU border that they administer, there is frequently the possibility to converse in French or German. Recently there have been operators added with Serbian, Romanian, Greek, Turkish, Italian, Spanish and Russian, although not nation-wide. Russian and Romanian linguistic abilities, however, are on the rise as importance, including due to an exemplary cooperation with Romanian police officers patrolling Bulgarian resorts together with their local colleagues.

What we have seen in our detailed exploration of the two urban realities confirms the importance of their Municipal Disaster Management Plan as principal and most elaborate source for information: coordination measures, capacity estimates and direct operational outreach mechanisms. With all its upwards relations to strategic and program documents, as well as international collaborations and good practice networks, the Municipalities of Varna and Burgas confirm their **essentially effective capacity** in disaster risk prevention, disaster protection and consequence mitigation.

The **deficiencies** are few, mostly systemic and relatively easy to point out: the

overreliance of local systems on national support is an objective disadvantage; shortages in resource provision and personnel could be overcome via innovative practices (e.g. digitalisation); the transformation of the local organisational paradigm would be slow and any systemic innovations are held back by centralised (national) management decisions.

With regards to digital interconnectedness, recent critical events have once more emphasised the need for e-government, better access and improved connectedness of services and socially useful applications. A reference to such upcoming changes are mostly missing in the majority of national or local programs, or are not explicitly planned and incentivised.

The 2020 pandemic (COVID-19) caused by an initially underestimated virus being spread on a global level (SARS-CoV-2) has only reaffirmed the importance of urban resilience and socio-economic flexibility. The Bulgarian scenario offers more of its central decision making and local implementation as a standard solution. However, it only proves that Bulgarian cities (Varna and Burgas in particular) are not ready to stand on their own feet in many situations and critical scenarios. This is not necessarily a critical flaw of their disaster response systems – for many such occasions in the future these urban realities would need to still copy best practices, whether national, international or globally established. However, when a situational limitation cuts off national support both cities might encounter difficulties in public order maintenance, healthcare provision or even simpler social systems' support – e.g. efficient e-administration or other public services. Private companies have proven to adapt their services better and quicker. Supply chains and markets have already proven to be more integrated and flexible than commonly appreciated.

Applying national strategic goals and top-down decisions means that the rest is left to public order enforcement, medical and social care systems to provide relief in cases of unforeseen disasters. This approach still cuts off the Municipality out of substantiated and shared decision making processes. And while some policies and measures (e.g.

"shelter-in-place") may be relatively straightforward to implement, others (e.g. contact-tracing technologies and advanced e-governance systems) are objectively much harder to be deployed by administrations that have not built sufficient expert and resource capacity of their own. And by considering response capacity alone, we tend to exclude economic spillovers of potential disasters in the medium term.

Some of the lessons that we continue learning with each critical situation are in front of us. Big data applications are an unexplored territory for local and national public administrations. They are a tricky area, with personal and GDPR considerations a sensitive and demanding subject. But they are a good example nonetheless. If a system records mass movement trends, their zonal distribution and other relevant characteristics of population vulnerability – anonymous but through grouped data and feedback – we might have an access to better local (e-)administration applications, mass communications and two-way connectedness platforms.

Another lesson learned is the perceived fatigue of entire social groups if disaster conditions turn out to be prolonged and difficult to manage or suppress. "Disaster fatigue" describe the exhaustion and irritation caused by incessant "bad news" and the negative effects of deprivations in terms of contemporary urban commodities and services. This should only remind local (and national) authorities that they should do their best to mitigate and resolve disaster consequences in the shortest possible time (even at slightly elevated costs) to avoid unnecessary spillovers (whether health-related, e.g. epizootic; economic; or simply social, e.g. citizen rebellion to measures and limitations imposed).

We should point out, moreover, that neither terrorist threats are treated sufficiently in Varna and Burgas plans and preparedness reports, nor epidemics, or even less, mass/serial violations of digital security. These omissions do not impede us to judge the

overall disaster response capacity. They merely remind us that any solutions and local actions would predominantly follow national guidelines and international standards. Ultimately, medical and public order capacity remain essential in any and all critical situations. And of we consider general readiness levels satisfactory for both cities – including civil society engagement and a strong volunteering support that we have actually seen in recent crises – we might conclude that Varna and Burgas might not be alone in their need to find innovative solutions and advanced disaster response algorithms. Such approaches, structures and collaboration mechanisms would have to be explored both by Bulgarian and European public authorities.

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