



Swedish Civil
Contingencies
Agency

Uncertain futures

What would a more far-reaching antibiotic resistance, climate change and a rapid energy transition entail for societal security?



Uncertain futures

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Swedish Civil Contingencies Agency (MSB)

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Layout: Advant Produktionsbyrå AB

Printed by: DanagårdLiTHO

Order No. MSB747 - September 2014

ISBN: 978-91-7383-484-1

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Introduction



A safer society in a changing world.

Introduction

The Swedish Civil Contingencies Agency (MSB) has been entrusted to develop and support society's ability to prevent and manage emergencies, crises and wars. MSB's vision of a safer society in a changing world, means the agency, and other societal actors needs to work long-term and strategically to meet these challenges and utilise the opportunities that the future holds for societal security.¹

MSB has among its tasks to identify and analyse serious threats, vulnerabilities and risks in society. This publication presents the results of three different studies of future developments that may lead to different types of societal challenges: a more extensive antibiotic resistance, climate change and a rapid energy transition. The studies have been conducted within MSB's strategic foresight programme, the last study with the support of the Swedish Defence Research Agency (FOI). MSB's strategic foresight programme focuses on issues within the field of societal security with an approximate time perspective of up to twenty years.

Common for the developments in these studies is that they are system-wide. The fact that they are also dependent on numerous other developments in society makes them complex and unpredictable. This complexity does not mean that these developments will be less relevant to societal security, - rather the opposite. Furthermore, when a future perspective is added, the developments become even more difficult to interpret. It is important therefore with multidisciplinary and forward-looking analyses. Partly to capture the complexity, and partly to capture changes that may occur over time. Even though antibiotic resistance, climate change and a rapid energy transition are not the first areas most people associate with societal security, the value of exploring these issues from a security perspective is demonstrated by the three studies.

¹ Societal security refers to MSB's entire operational area that, according to the agency's instructions (2008:1002) is comprised of protection against accidents, emergency preparedness and civil defence.

How these developments advance in the future is largely uncertain, and largely determined by the actions and measures we take today. If we assume these three challenges today, many of the potential impacts presented in this report will never become reality. However, in order to successfully tackle these challenges, the whole of society needs to participate: individuals, businesses, organisations and the public sector.

Read more in English:

The full study of antibiotic resistance is available in English at www.msb.se/en/Prevention/Strategic-Foresight/ Antibiotic resistance and societal security: What would a more far-reaching antibiotic resistance mean for societal security? MSB677.


At www.msb.se/en/Prevention/Strategic-Foresight/ MSB has also published additional material in English about the agency's strategic foresight programme including five scenarios for society in 2032.

Read more in Swedish:

At www.msb.se/sv/Kunskapsbank/Utvarderingar--strategiska-analyser/Langsiktig-strategisk-analys/Fordjupningsstudier/ MSB has published two in-depth studies in their entirety Klimatförändringarnas konsekvenser för samhällsskydd och beredskap; En översikt, MSB 349; and Antibiotikaresistens ur ett säkerhetsperspektiv: vad skulle en mer omfattande resistens betyda för samhällets säkerhet? MSB619.

For the in-depth study of a rapid energy transition see Energiomställningen och dess betydelse för samhällsskydd och beredskap, FOI Memo 4572, by Per Wikman-Svahn and Henrik Carlsen at FOI, www.foi.se/sv/Var-kunskap/krisberedskap-samhallssakerhet/Miljo-energi-och-klimat/Klimatforandringar-och-sakerhet/Publikationer-inom-klimatforandringar-och-sakerhet/

**More far-reaching
antibiotic resistance**



A more far-reaching antibiotic resistance is a challenge for the whole of society. Human life and health are threatened. The problem is not restricted to the health-care sector as the risk of infections affects all sectors, including the overall work of societal security. Societal functionality may be affected when different measures to restrict the spread of bacteria are required. A more far-reaching antibiotic resistance can also hamper emergency management efforts in situations that involve mass-casualties or widespread disease.

More far-reaching antibiotic resistance

Antibiotic resistance is increasingly seen as a threat to life, health and against the medical advances made during the 1900s. If the development of resistance is not slowed, and no adequate treatment alternatives developed, we may end up in a situation where it is extremely difficult to provide modern healthcare service. MSB has conducted a study to investigate what this type of situation could mean for societal security. The study explores the potential impact of a scenario where antibiotic resistance has become much more extensive. Here follows a brief description of the result of this study. For those who would like to know more, the study *Antibiotic resistance and societal security: What would a more far-reaching antibiotic resistance mean for societal security?* MSB619 can be downloaded from the MSB website, www.msb.se.

What is antibiotic resistance?

Antibiotics are medicines used to treat bacterial infections in humans and animals. Some bacteria are naturally resistant to certain types of antibiotics. Resistance also develops when antibiotics are used. Bacteria, which through random mutations happen to carry resistant properties, can then survive the course of antibiotics and then multiply. Furthermore, resistance genes can be transferred between bacteria.

Numerous years of excessive and inappropriate use of antibiotics has accelerated the development of resistance around the world. Multi-resistant bacteria (bacteria that have developed resistance to several different antibiotics) are increasing and at the same rate of development the numbers of effective antibiotics available are falling.

Bacteria that have developed resistance can be both of the kind that are only harmful to humans and cause disease, for example tuberculosis bacteria, and of the kind that we live in symbiosis with such as intestinal bacteria. The latter kind of bacteria can make us ill, if they happen to end up in the wrong part of the body. Infections caused by resistant bacteria are more difficult to treat. Resistant bacteria develop and spread among humans, animals and the environment around us, which means that

the problem must be approached from a broad perspective that includes humans, animals and the eco-system as a whole.

The problem also concerns several different activities and areas of society and must be managed on all levels, i.e. locally, nationally and internationally. Within the healthcare sector, where the problem of antibiotic-resistant bacteria is greatest, the spread of resistant bacteria has been a recognised problem for some time. Resistant bacteria, like other bacteria, also spread in the community outside of the healthcare sector, for example, in childcare and schools and workplaces. Resistant bacteria spread across national borders with travellers, trade and the transport of animals and foodstuff.

Efforts over many years to limit the use of antibiotics have resulted in Sweden being relatively spared from resistant bacteria. Nevertheless, Sweden, as part of the world is affected by global developments and antibiotic resistance is growing here too, partly as a result of travelling. The number of detected cases of people who carry resistant bacteria of the kind that do not make us ill as long as they stay in the 'right' place in the body are steadily increasing. In this context, MRSA and ESBL producing bacteria are a major problem for healthcare in Sweden.

More far-reaching antibiotic resistance and societal security

Human life and health

More far-reaching antibiotic resistance would mean infections occur and spread more easily. Infections that today can be cured in one to two weeks can become lengthy and increasingly life threatening. Some cancer treatments and treatments that require surgery and transplants would be extremely risky to carry out without access to antibiotics. Emergency medical care in connection with e.g. major accidents would be more complicated when antibiotics are needed to treat severe injuries.

Even society's ability to withstand major flu outbreaks and pandemics would be adversely affected by more far-reaching antibiotic resistance when antibiotics are needed to treat bacterial complications, such as pneumonia. Without a satisfactory alternative to antibiotics, more far-reaching antibiotic resistance would mean that more would die of infections.

Human health and well-being will also be adversely impacted by longer and more difficult treatments. Some treatments, for example, hip and knee surgery, might need to be avoided due to the risk of infection.

Societal functionality

More far-reaching antibiotic resistance can impact on societal functionality. There would be a need to set very high standards of hygiene and powerful measures to restrict the spread of bacteria throughout society's different functions. This could make it difficult to maintain expected levels of service.

More patients and longer treatments would stretch healthcare services, while much more time would need to be placed on medical hygiene. For the food industry, more far-reaching antibiotic resistance could result in more extensive restrictions on the different stages of food production. Overtime this could affect the availability of food.

Personnel such as those working in the rescue services and paramedics may become more vulnerable to health risks with more far-reaching antibiotic resistance. More time-consuming procedures and constraints regarding deployment would possibly need to be introduced.

Without access to effective antibiotics, societal functionality would also be impacted on by higher personnel absenteeism from critical operations. Personnel may need to stay home more frequently and for longer periods due to illness or to care for dependants. It could also be difficult to recruit sufficient personnel to critical societal functions, which are more exposed to infection, such as healthcare as well as child, and elderly care.

Confidence and trust

If societal functionality fails due to widespread antibiotic resistance, it could affect public confidence in society's institutions. We expect well-functioning and equitable healthcare services that can treat everything from common infections to caring for premature babies, trauma resulting from accidents and seriously ill persons.



We also expect the treatment to be safe. If the need arises to strictly prioritize for who gets antibiotic treatment and other care this may have a negative effect on confidence in the health-care service. Furthermore, if you also live in a society where you need to protect yourselves and your loved ones more actively against infection, it is also conceivable that anxiety, fear and mistrust between people will increase. Many may start to avoid public places and contact with strangers for fear of infection.

Economic consequences

More far-reaching antibiotic resistance can result in significant economic consequences. Many studies have identified increased costs for the care of patients with resistant bacteria. Usually costs increase by about 30 per cent. In addition to the cost of healthcare and productivity losses, more far-reaching antibiotic resistance would probably also result in vast costs for measures to restrict the spread in the community as a whole. Reduced trade to limit the spread of bacteria can also have a negative effect on Sweden and the world economy.

What needs to be done?

To counteract the development of antibiotic resistance is a global social issue. All those involved, from individuals to private companies and organisations to the public sector will be affected by a worsening resistance state, and can themselves influence the occurrence of resistance. Everybody has a responsibility. A call for more responsible use of antibiotics is necessary and we need to become better at preventing the spread of bacteria through e.g. better hygiene.

Preventive measures are under development in many parts of the world. Sweden is quite far advanced in this process, which is partly based on Strama, a network of physicians and other experts that was formed as early as 1995. There is also a national strategy and the National Board of Health and Welfare has been commissioned to collaborate with the Board of Agriculture to run a national coordination function and develop an intersectoral plan of action. However, given the movement of bacteria across borders, the development of resistance prevention work in all

countries is of crucial importance for the continued development of antibiotic resistance, both globally and in Sweden. The problem requires collaboration on a global scale.

To develop new antibiotics has proven to be extremely difficult and a new antibiotic also risks rapidly losing effect in a world where we frequently use antibiotics inappropriately. It should be possible to develop alternative ways to prevent and treat infections based on new technology and medical advances, but it is uncertain whether these options will be available in time before we lose antibiotics as a medicine.

It is important that MSB follows the development of antibiotic resistance as part of the agency's assignment to analyse serious vulnerabilities, threats and risks. A more far-reaching antibiotic resistance can complicate emergency management. If antibiotic resistance becomes widespread, healthcare services will not have the same ability to treat injuries in the event of major accidents or the bacterial infections that follow an influenza pandemic.

For MSB, it is also important to continue to monitor how the development of antibiotic resistance may affect the agency's own areas of responsibility, such as municipal rescue services and international disaster and relief efforts. A society without the ability to treat infections requires more knowledge and procedures on preventative measures.

Climate change



The rapid changes in the climate that we can expect in the decades to come will affect society in many different ways. To some extent, we can adapt to the new climate. Where we actually cannot adapt, or are not able to do enough, the vulnerability of society and the risk of different types of accidents and crises will increase. Climate change makes societal security an even more important area of work.

Climate change

Climate change is one of today's greatest challenges. MSB has conducted a study that describes the impact of climate change in terms of societal security. The analysis is largely based on the results of the Swedish Commission on Climate and Vulnerability, presented in 2007². Here is a brief description of the results of this study. For those who would like to know more, the study *Klimatförändringarnas konsekvenser för samhällsskydd och beredskap; En översikt*, (*The impact of climate change on societal security; An Overview*), MSB349 can be downloaded from the MSB website, www.msb.se.

What is climate change

The climate is a complex system that has changed naturally over thousands of years. However, the climate change that will shape the world during the coming century will take place much faster than what can be attributed as natural variations. This climate change is a result of greenhouse gas emissions from human activities.

Climate change means that the average global temperature increases. The global average temperature has risen over the last hundred years or more and continues to rise rapidly. Nowadays it is considered very difficult to reach the 'two-degree' target (see page 30), which is serious as an increase of more than two degrees is expected to result in climate impacts that are even more difficult to manage. In Sweden, the expected warming will be greater than the global average. Up until 2080s, the winter temperature may increase by 7 degrees in northern Sweden.

As a result of the global increase in temperature, sea levels will rise and large areas of land will be underwater. Climate change will also affect rainfall patterns; some parts of the world will see less rainfall while other parts, such as Sweden, will see more rain. Extreme weather such as heat waves and torrential rain are expected to become commonplace. Even the intensity of tropical cyclones (hurricanes and typhoons) is expected to rise.

2 Sweden facing climate change - threats and opportunities, SOU 2007:60.

Accelerated temperature also increases the risk of tipping points in the climate. This means that a critical point in climate development has been passed and that a whole system enters a new state, resulting in major consequences for humans and ecosystems. One example is that the Greenland ice completely melts, which could contribute to a rise in sea level by several metres.

Today we do not know exactly how the climate will change and at what pace. This is because we do not know how large emissions will be in the future and that we do not have sufficient knowledge of the complex climate system.

Climate change and societal security

The degree of climate adaptation affects the vulnerability of society

Society is vulnerable to changes in the climate as it is built in and adapted to the current climate. Higher temperatures, more rain and rising sea levels cause problems in the form of different types of accidents and disruptions. At the same time climate change is not entirely unexpected and sudden, which means that there is time to gradually adapt urban planning, buildings, infrastructure, behaviours, etc. to the new climate. The degree of climate adaptation determines the extent of the impact climate change brings about with regard to societal security. To the extent we are unable to adapt society to the new climate, the vulnerability of society increases.

Accident pattern affected

Climate change in Sweden will increase the likelihood of different types of natural disasters such as flooding, erosion, landslides and forest fires. Property and infrastructure will be subjected to greater stresses and damage, and devastation will become more common. For example, in 2006 a railway embankment collapsed in Jämtland due to high water levels with subsequent erosion and landslides. This would have resulted in an accident with extensive damage and loss of lives, had a train passed the accident site at the same time. The risk of dam failure also increases with high flows. In Sweden there are about 200 power stations - dams and some tailings dams in risk class 1. Dam failure at these facilities could have a very significant impact on lives, infrastructure and environment.

Consequently, the accident pattern would be affected by climate change, but not necessarily only in a negative way. Accidents related to snow and ice would become less common on account of the milder climate.

Human life and health

Climate change could affect life and health to such degree that it affects societal security. Heat waves will become more frequent and as Sweden has so far been relatively spared from heat waves, it can be said that we are ill-equipped for these situations in terms of buildings and behaviours. Extreme heat poses health risks for vulnerable groups, particularly the elderly. The heat wave across much of Europe in the summer of 2003 is estimated to have caused between 22,000 and 45,000 more deaths in Europe than normal. The warmer climate with increased precipitation also affects human health as the risk of the spread of infection increases. Among other things, it will be easier for micro-organisms that could be harmful to grow and spread through food.

Disruptions to vital societal functions

Extreme weather and natural disasters increase the likelihood of sudden disruptions and failures in vital societal functions such as transport, electronic communications and drinking water. The critical infrastructure (for example, roads, server rooms and water supplies) that supports these functions could be damaged by, for example, floods, collapses and landslides. Climate change may also lead to increased storm damage in forests due to, among other things reduced frost. Falling trees can for example cause damage to the power grid. Multiple power outages could create serious problems on account of critical community activities' dependency on electricity. Meanwhile, disturbances caused by the cold, snow and ice become less frequent with climate change. This can be important for activities that are today susceptible to this type of weather, such as transports.

Water and food supplies

Water and food supplies can be affected by climate change. Large parts of the world will be characterised by a lack of water in the wake of climate change. Sweden is expected to continue to have a good, in some parts of the country even better, access to water, yet

the quality of the raw water may be adversely affected and may lead to increased demands on water treatment. Major problems with water supplies could occur if, as a result of sea level rise, salt water enters water supplies close to the coast, for example, the lake Mälaren. Agriculture in Sweden, and with that food production, will also be affected by changes in climate. Positive effects include longer growing seasons and increased yields while negative effects include increased likelihood of different types of plant pests, harvest losses in connection with extreme weather such as torrential rain and droughts and that vegetation fires may become more common. Globally, food supplies face a major challenge with climate change. In many parts of the world, basic conditions for agriculture will be impaired and the increase of extreme weather can make large crop losses more common. This may also affect Sweden, as the Swedish food supply today is dependent on imports from other countries.

Developments in the Arctic region

Over several decades, the temperature in the Arctic has risen twice as fast as in the rest of the world. Glaciers and sea ice is melting to a greater extent than before. The permafrost will thaw, which may have consequences for infrastructure, transport routes and oil and gas extraction. This development can in turn have implications for societal security. Increased activities in the Arctic region in the form of shipping, trade and tourism involve an increased risk of accidents, for example, the discharge of oil, and therefore the need of emergency services in the area. Another issue concerns more traditional security policy. Although the region is currently characterised by collaboration and consensus, territorial claims cannot be ruled out and these may eventually be supported by military presence. Such a development could increase the level of tension in the region and in doing so affect Swedish security.

A more troubled world?

Many parts of the world are more vulnerable to extreme weather and other types of stresses due to factors such as poverty, corruption, non-functioning political structures and conflicts. Climate change could possibly, and in combination with other trends such as population growth, densely populated major cities





and increasing global inequality, have a destabilising effect and lead to economic, social and political unrest. This type of development, may adversely affect Sweden and societal security through an increase in social unrest and organized crime. There is no simple connection concerning the link between climate change and conflict. A lack of food, water and other natural resources, can in combination with other factors lead to conflicts. Thus the impacts of climate change could reinforce existing conflict patterns.

What needs to be done?


Radical reductions in emissions and a major shift in our energy systems (more on the necessary energy transition in the following section) are required in order to curb climate change. The Swedish Environmental Protection Agency, which has a central role in climate work, has prepared a roadmap for Sweden without climate emissions by 2050. However, even if we succeeded in attaining this goal tomorrow, climate change would continue to take place for a number of years on account of the inertia in the climate system. We also need to adapt our societies to the new climate.

Adaptation to climate change is a concern for all stakeholders and sectors of society. It requires local, regional, national and international efforts and is about infrastructure, buildings and individual behavioural changes. Many central agencies work on different aspects of climate adaptation. The Swedish Meteorological and Hydrological Institute, (SMHI) is responsible on behalf of the Government for a national centre for climate adaptation. On a regional level, the county administrative boards are responsible for the work with climate adaptation.

MSB has an important supporting role, for example, gathering of knowledge, and to provide municipalities and county administrative boards with data on areas prone to flooding and landslides. It is also important to observe how society's climate adaptation work progresses in order to know how vulnerabilities that arise from climate change are managed, based on a long-term societal security perspective.

Recent research suggests that climate change may be even more extensive than previously expected. As work in the field of societal security is about being prepared for the unexpected and severe, it may be necessary to raise the bar in terms of the consequences that may result from climate change. Consequently, efforts to develop societal security may need to be based on more serious climate scenarios and include the risk of tipping points in the climate system being exceeded.

**A rapid energy
transition**

A blurred wind turbine is centered in the upper half of the image, set against a vibrant sunset sky with shades of blue, purple, and pink. The turbine's blades are in motion, creating a soft, out-of-focus effect. The lower half of the image is dominated by a white rectangular box containing text.

A transition in the world's energy systems is needed in order to curb climate change. However, major changes in technology, infrastructure and supply systems bring about new vulnerabilities. There would be less time to rectify these new vulnerabilities if it were necessary to implement the energy transition at a more rapid and forced rate. A rapid energy transition could impact on societal security. Different kinds of energy supply disruptions and negative impact for society in general could result. However, an energy transition could also mean new opportunities to increase the robustness of the energy system and thus society's resilience.

A rapid energy transition

The world is facing an immense challenge to drastically reduce greenhouse gas emissions while the demand for energy is increasing. As in many other countries, Sweden has initiated a major transformation of its energy systems to achieve climate goals. Different kinds of problems could materialise if, in the future, it becomes necessary to suddenly accelerate this transformation. In order to investigate whether a more rapid energy transition could have a negative impact on societal security, MSB has appointed the Swedish Defence Research Agency (FOI) to conduct a study. The study uses a scenario where a comprehensive energy transition must be implemented at short notice and within a short time span. To further complicate the conditions, the scenario also includes a decision to phase out nuclear power. This scenario is designed to challenge the thinking behind energy transformation. It is not a question of trying to predict how it will unfold, but is one among several possible scenarios. The fundamental assumption is that a transition that needs to be implemented quickly, without society having time to prepare, will result in a greater challenge and in doing so cause greater potential impact for societal security. Here follows a brief description of the result of this study. For more information about the study, see *Energiomställningen och dess betydelse för samhällsskydd och beredskap (Energy transition and its significance for civil contingencies)* FOI Memo 4572, by Per Wikman-Svahn and Henrik Carlsen at FOI, www.foi.se/sv/Var-kunskap/krisberedskap-samhallssakerhet/Miljo-energi-och-klimat/Klimatforandringar-och-sakerhet/Publikationer-inom-klimatforandringar-och-sakerhet/

What is an energy transition?

Major changes concerning how we produce and utilise energy are required to slow climate change. The world's energy systems need to be transformed to reduce greenhouse gases. The use of renewable energy needs to increase, dependence on fossil fuels decrease and the use of the energy produced needs to be more efficient.

Different types of targets have been set for this essential energy transition. The so-called two-degree target means that greenhouse gas emissions must be radically reduced so that global warming is limited to + 2 degrees Celsius compared to pre-industrial temperatures. In 2009 the Swedish Parliament decided on a coherent

climate and energy policy in order to meet the climate challenge and promote sustainable and resource-efficient energy supplies. A number of targets for energy transition were set out in this policy. For example by 2020 the share of renewable energy must make up at least 50% of the total energy consumption and greenhouse gas emissions must be reduced by 40% compared with 1990. By 2030, the Swedish vehicle fleet must be independent of fossil fuels.

A transition of the energy system is surrounded by a great deal of uncertainty. What technical solutions are possible? When will these solutions be realised? How will the demand for energy develop? What different instruments are relevant? Furthermore, the energy system is characterized by vast sluggishness, both technically and institutionally. All this makes it extremely uncertain whether and how our energy systems will change in 20 years.

Most energy and climate researchers agree that significant changes are needed to curb climate change, but it is only possible if you start now. The problem is that total emissions continue to rise and that the political processes to reach agreement on emissions reduction are too slow. This sluggishness may mean that, at a future date, more rapid and drastic measures are inescapable in order to avoid significant climate change.

A rapid energy transition and societal security

Society is dependent on electricity and fuel

Electricity and fuel supplies are key parts of the energy system that are facing major changes on account of the energy transition. If the transition is implemented slowly, we will be better equipped to handle these challenges. A more rapid implementation of the transition, without as much time to adapt, means that new vulnerabilities may be encountered. As virtually all critical community functions are dependent on electricity and many are dependent on fuel, disruptions to electricity and fuel supplies will quickly impact negatively on society.



Changes in electricity generation

Renewable electricity will become an even more important form of energy in the energy transition. Renewable energy sources such as wind and solar are weather dependent. With a high degree of energy production based on these sources, hydroelectric power will take on an important role as a regulating power in Sweden. Hydroelectric power will then be needed to smooth out peaks and troughs in electricity production and consumption. If hydroelectric power must be used more as a regulating power, this may lead to more varied water levels and flows in watercourses, which will contribute towards more erosion and a certain risk of accidents. It is also conceivable, especially if the energy transition has been implemented rapidly, that during certain periods there will be smaller margins in electricity production. There will be a risk of electricity shortages at low water levels. This can result in higher electricity prices and ultimately a need to introduce electricity rationing.

Swedish hydroelectric power can, in the event of a global energy transformation, become a significant regulating power for the surrounding world. Increased pressure on electricity exports to the continent could mean a higher load on the grid. If the grid is not upgraded in good time, there is a risk of increased sensitivity to disruptions.

Many small-scale energy producers

An energy transition that involves an increased share of solar and wind power may mean more small-scale energy producers. Households can supply electricity to the grid by installing solar panels on roofs. As more could produce electricity this increases system redundancy, which can safeguard the electricity supply. At the same time there is a risk that an increased share of small power plants could create a more “nervous” electrical system, through more components in the grid and in some parts less control. To the extent that there is no time to manage this new, possible vulnerability the risk of blackouts increases.

Smart power grids and IT-related disruptions

The energy transition will place new demands on the grid. It should be easier to exploit renewable electricity and reduce energy consumption through the development of so-called smart

grids. A smart grid will also contribute to increased safety and the ability to manage power outages. One possible weakness is the smart grid's dependence on IT. Smart grid uses IT to submit information about flows. This dependence can create new vulnerabilities in electricity distribution. If on account of the rapid development of smart grids there is no time to address these vulnerabilities, the possibility of technical failures and attacks against the IT systems may pose an increased risk of disruptions.

Increased use of biofuels

Energy transition involves replacing fossil fuels with among other things biofuels. An increased demand for biofuels means that agricultural land currently used for food production may be needed instead to produce energy crops. Consequently, the primary production of food in Sweden and in other countries may be reduced. In this way, the food supply is affected and food prices increase.

The production of energy crops is sensitive to extreme weather. This means that heat waves, droughts and extreme rainfall can cause crop failures and disruptions in fuel supplies. Large stocks of biofuels also mean an increased risk for fires. Under certain conditions, stocks of biofuels can self-ignite.

Changed international power relations

Compared with large parts of the rest of the world, Sweden's energy supply is already less dependent on fossil energy. Therefore the greatest impact of a radical global energy transition may not be changes within the Swedish borders but changes in the surrounding world. Reduced availability of fossil fuels, combined with a greater diversification of energy sources in the form of bioenergy, solar power, wind power and other forms of renewable energy means that the "energy map" will be redrawn. New areas in the world will become important energy producers, such as bioenergy and concentrated solar power from Africa. Some previous strategically important geographical areas will become less significant while other areas will grow in importance. Tensions could mount within international coalitions and collaboration bodies, for example, if it bilateral agreements are reached between countries in order to secure the supply of energy.

What needs to be done?

An energy transition is needed in order to curb climate change. This transition presents many opportunities to safeguard energy supplies and to contribute to a more sustainable development. A transition could also mean new opportunities to increase the robustness of the energy system and thus society's resilience. These positive effects are not the focus here.

If the energy transition must be implemented at a more forced and faster rate, it can be assumed that stakeholders have inadequate conditions to manage these changes. A rapid energy transition can result in different types of disruptions and deficiencies caused by new vulnerabilities that we fail to manage in time. The risk of disruptions to the energy supply and in society in general may therefore increase.

A transformation of the energy system requires collaboration both nationally and internationally with regard to governance, research and innovation. On a national level, the Swedish Energy Agency plays an important part in the transition process and shall, among other things, promote increased use of renewable energy and energy efficiency. The county administrative boards play an important role on a regional level through the development of regional climate and energy strategies.

As for MSB, it is relevant to monitor the energy transition work from a societal security perspective. All vital societal functions are dependent on the electricity supply. Even the fuel supply is critical for many vital societal functions, particularly transport, police, the rescue services, surveillance, security transport, waste management, medical and elderly care.

An overall conclusion is the importance of increasing the community's ability to cope with strains on the energy sector. This can be done by stimulating industry and commerce, the public sector and households to become more resilient to power outages, a lack of energy or food shortages. Measures that increase the resilience of households are beneficial for many different types of crises.

**Concluding
thoughts**

Concluding thoughts

We do not know exactly how extensive antibiotic resistance might become, how climate change might develop in a few decades, or the level of success of the energy transition. Crucial for how these future developments can actually affect our communities is also the development of society in general and to what extent we have been able to prepare and adapt.

Despite immense uncertainties about the future, we are better prepared if we start discussing these possible developments that we will face. Twisting and turning the possible impacts results in an important contribution to a more proactive and future-oriented approach to strengthen the security of society.

We will never be able to predict everything that can happen, but by promoting a more resilient society, we will be better able to withstand and manage future risks. Work to manage antibiotic resistance, climate change and transforming the energy system is already under way and needs to be conducted in a broad collaboration in the coming years, both nationally and internationally. We must all contribute as one, from the individual right through to the government agencies via civil society and the private sector, if we are to succeed in creating a safer society in a changing world.

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Order No. MSB747 - September 2014 ISBN 978-91-7383-484-1