

National Action Plan for Smart Grids (NAP SG)

Workshop with Taiwanese delegation
Ministry of Industry and Trade, Prague

04.09.2015

Martin Písecký

pisecky@mpo.cz



MINISTRY OF
INDUSTRY AND TRADE



Why National Action Plan?

- European Commission Communication „Making the internal energy market work“, issued on 15. November 2012 in Annex requires Member States of processing NAP SG
- The State Energy Concept of the Czech Republic (SEC) also formulates task for MIT: „To develop National Action Plan for the implementation of smart grids“

Why National Action Plan?

Previous two points form a political - legislative framework for a set of measures that ensure future reliable and efficient operation of the electricity system and meet also following objectives:

- Integrating the growing volume of electricity from intermittent sources and small decentralized sources connected to the distribution network
- The development of the electricity market and involvement of active consumers into the market through smart grid technologies

Why National Action Plan?

- Providing support for consumers to increase the efficiency of energy use
- Ensure technological support for modern concepts of smart cities, electromobility, accumulation ..
- Consequently to contribute (through intelligent technologies) to meet defined emission targets

National Action Plan - Development

- The National Action Plan is the elaboration of specific steps and measures to achieve these goals, both in the administrative and technical point of view.
- In the years 2013 - 2014 the analysis and preparation of documents carried out (expert team led by MIT)
- The three main areas - legislation, tariffs, technology

National Action Plan - Development

- Experience from the operation of the transmission system, distribution systems and pilot projects

- According to previous steps, at the end of 2014, National Action Plan for Smart Grids was elaborated

National Action Plan - Development

- Comment procedure has followed - internal in the MIT and interdepartmental (Ministries, professional associations etc.)
- Document was submitted to the Government after settlement of comments, approved March 4, 2015
- It becomes obligatory for public authorities

National Action Plan - Development

- In June, 2015 the **Coordination Committee for National Action Plan** was established
- **Chairman** – deputy minister for energy Mr. Pavel Šolc
- **Members** – top management of the TSO / DSOs, other important players in Czech energy sector, state administration.
- **Meetings** – at least 4 times per year
- **Main tasks** – monitoring and coordination of fulfilling of the National Action Plan, recommendations for corrective measures

What is included in the National Action Plan?

- It deals mainly with the electricity system
- It defines measures within a time horizon of years 2015 - 2020, with an outlook to 2040
- It presumes a gradual introduction of smart grids and other measures in several stages
- The way and speed of deployment of smart grids are tailored to benefits for consumers, so that the progress is cost-optimal and costs correspond with benefits

Smart Grids definition

- The electricity networks that can efficiently integrate the behaviour and actions of all users connected to it — generators, consumers and those that do both — in order to ensure an economically efficient, sustainable power system with low losses and high quality and security of supply and safety.

More detailed view on the content

- Expected development of the energy sector
(time cuts for the years 2019/2024/2029/2040)
- Environment and conditions for SG solutions in the Czech Republic
- An implementation plan of SG in the Czech Republic, including List of measures
(time cuts for the years 2019/2024/2029/2040)
- Summary from the analytical data created by the working groups during the preparatory phase

Preconditions

By the year 2019:

- Balance surplus of electricity
- By 2016, introduction of a simplified connection of small power sources
- Central Registry of Intake point at OTE
- Market model is shaped by the EU energy-climate policy, network codes, measures addressing the lack of a stable production capacity
- The possibility of installing a smart meter at the customer request (for payment of additional costs)
- The issue of privacy protection of the transferred data is solved
- Installed capacity of distributed generation approx. 4800MW is not a problem for the system
- Completion and evaluation of pilot projects, ongoing evaluation of NAP SG 12/2017, updating of implementation plan SG 12/2019

Preconditions

By the year 2024:

- Balance surplus of electricity
- Deploying of smart meters within the regular change (new-old meter) has been started
- Installed capacity of distributed generation approx. 5700MW can still be solved by traditional means
- At the end of the period – development of accumulation of the electricity from intermittent sources
- Significant expansion of electromobility (in accordance with NAP CM)
- Providing information on commodity price using SG
- Development and renewal of DS - in line with the NAP SG: A new generation of protection, remote-controlled transformers and distance (section) switches and WAMS technology

Preconditions

By the year 2029:

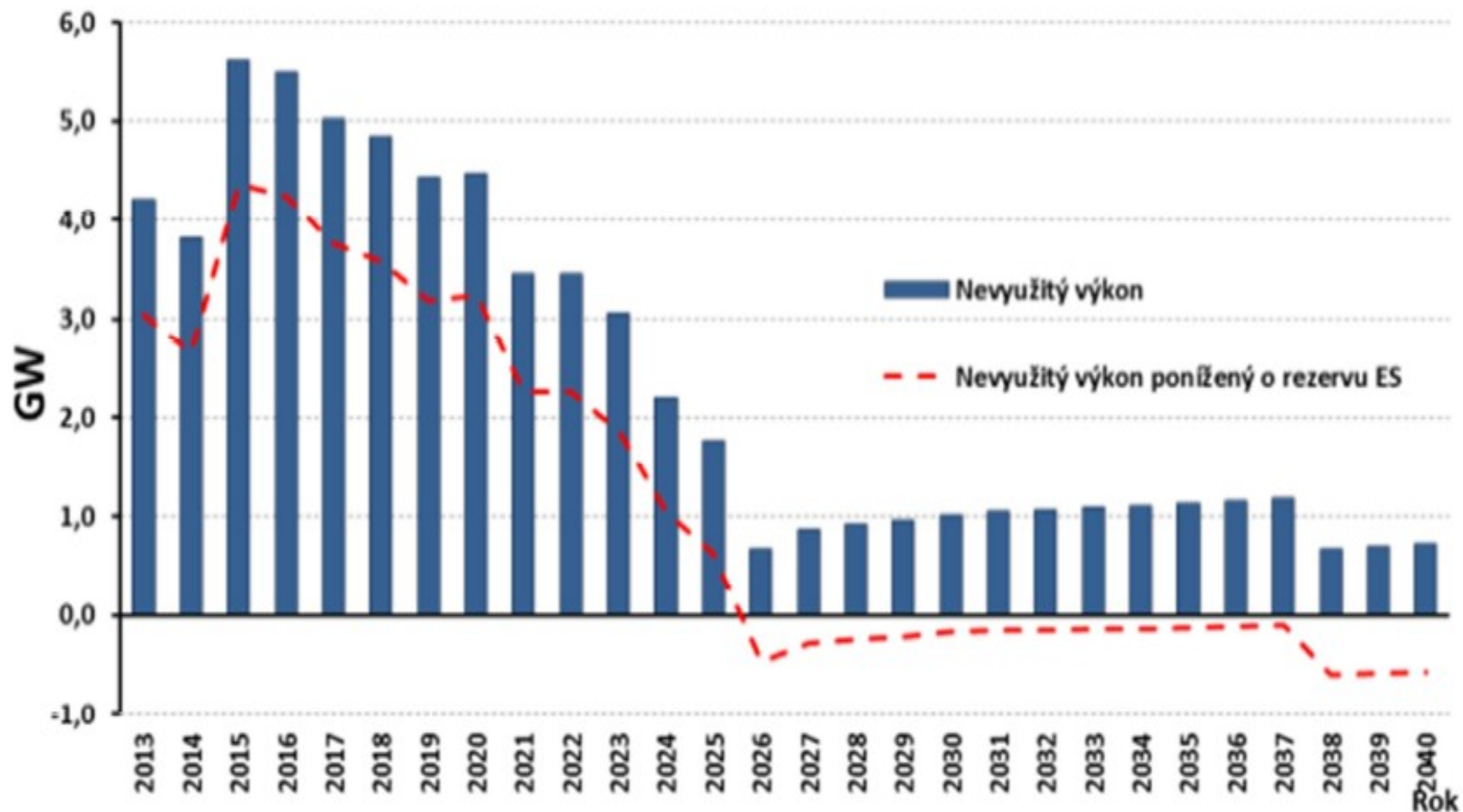
- Balance surplus of electricity may change at deficient, depending on the commissioning of new production capacities
- The global deployment of smart meters within the regular change (new – old meter) has been finished
- Installed capacity of distributed generation approx. 6600MW already requires higher "intelligence" of the network
- Cheaper RES technologies and accumulation and thus the possibility of their adoption into the market without subsidies and the creation of a new market segment
- Relatively developed electromobility (in accordance with NAP CM), hundreds of thousands of vehicles - charging power to hundreds of MW

Preconditions

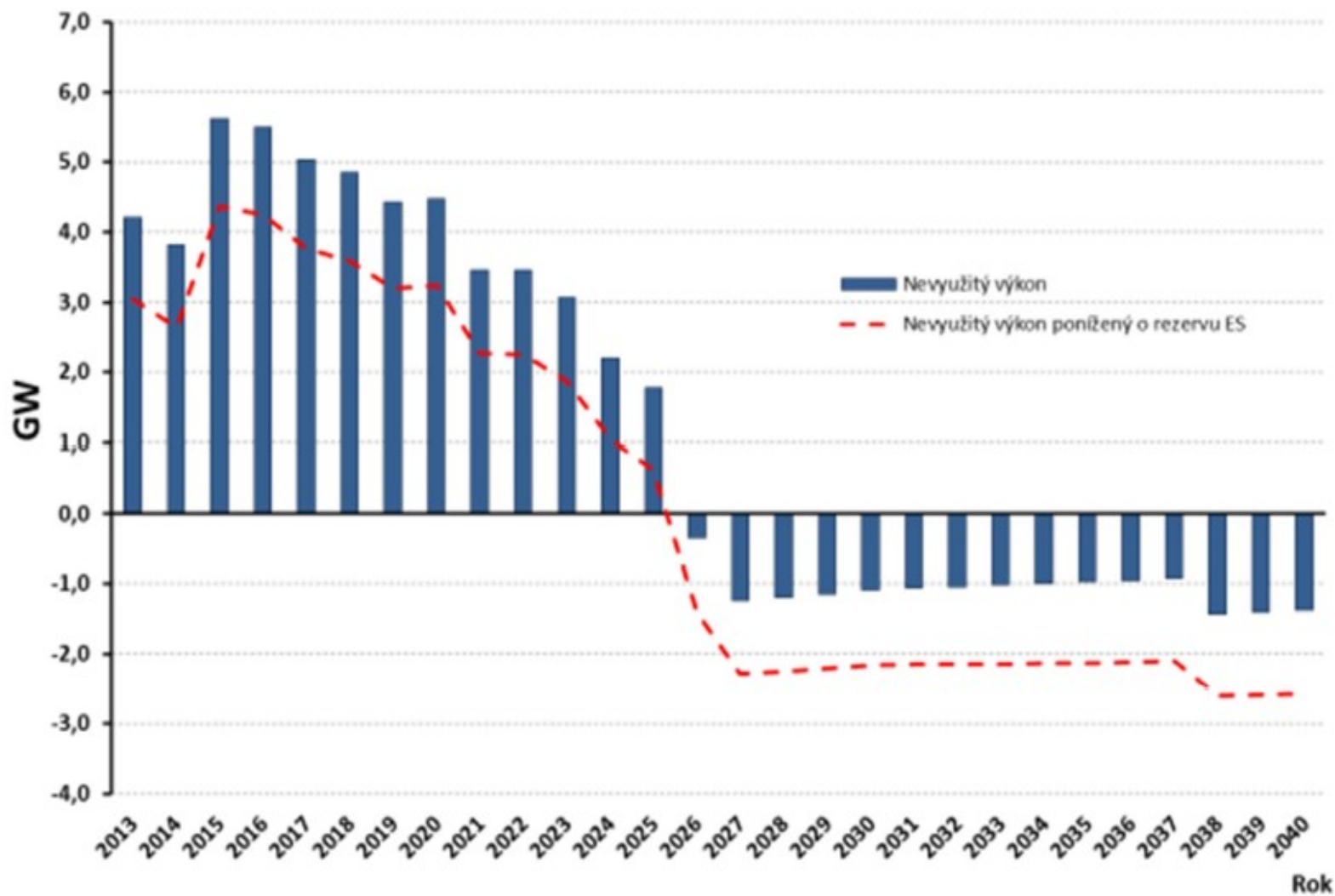
By the year 2040:

- Deficit balance may persist, moreover, due to the higher proportion of intermittent sources - problematic provision of classic Ancillary Services (AnS), need to use Demand Side Response (DSR)
- Finished global deployment of smart meters within the regular change (new – old meter)
- Installed capacity of distributed generation approx. 9700MW necessarily requires the use of SG in the DS and TS, integration of distributed generation and consumption in SG management
- Market model and the operation of the electricity system has been changed, the need for the automatic reactions to the generation from renewable energy sources - an indicator is the price on the spot market (dynamic tariff system)

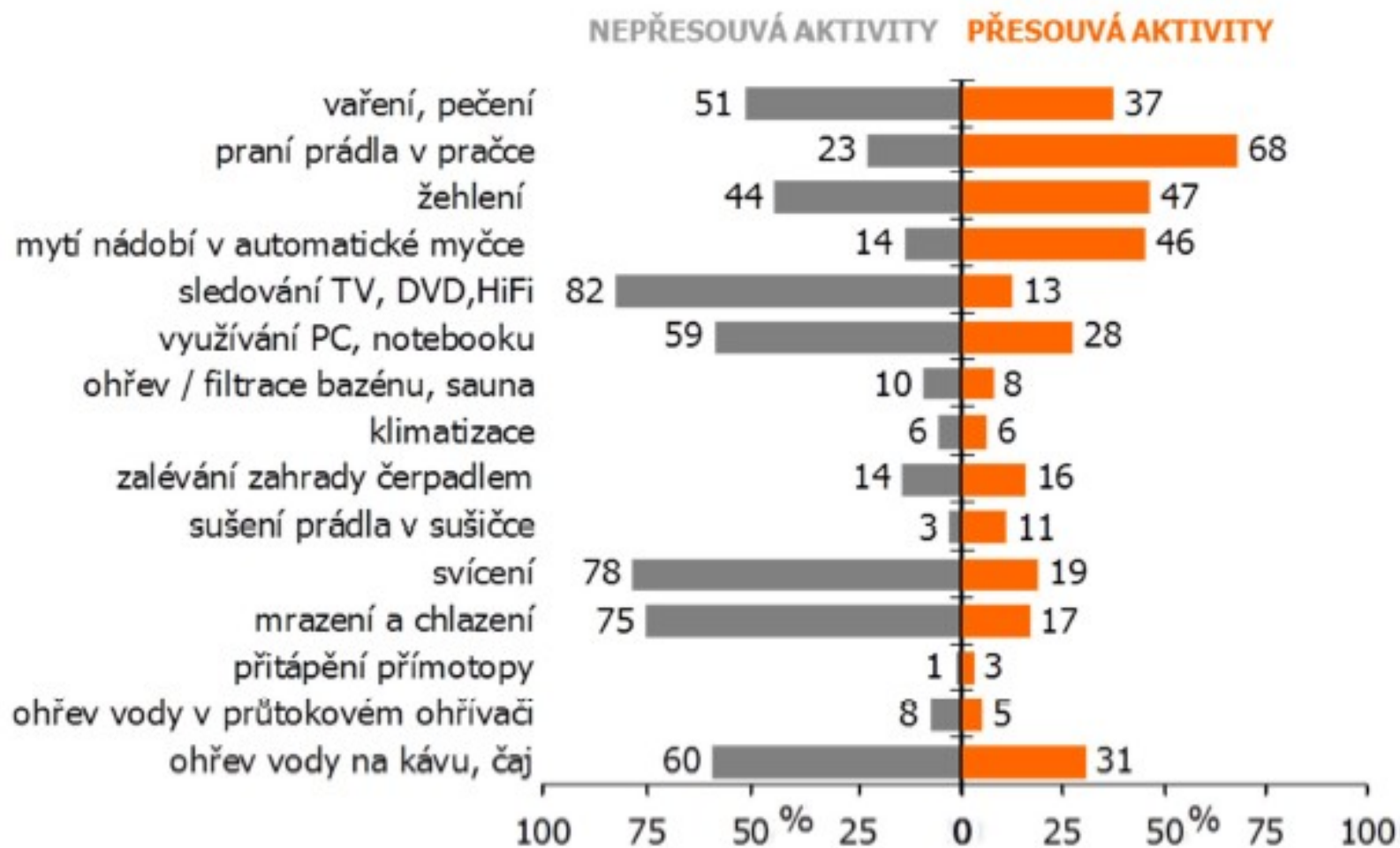
Balance with the operation of 2 Nuclear Power Plants



Balance with the operation of 1 Nuclear Power Plant



Example of DSR - willingness to move consumption



Preconditions

Costs:

→ Within NAP SG, implementation costs have been divided into 4 groups:

- development and renewal of networks for integrating distributed generation
- ensuring the necessary network properties and automatic remote control system
- electromobility
- implementation of AMM

→ Implementation costs are expressed as the additional costs beyond the common development and regeneration

→ The estimated costs are 155 billion CZK in 2040

→ Possible reduction of costs through optimization from the experience of partial implementation and from decreasing prices of technologies, resp. a suitable combination of common and "smart" technologies

Preconditions

Financing:

- The main part of the costs will be borne by regulated entities -> financing primarily through tariffs
- When implementing measures the possibility of EU funding will always be considered -> reduce the burden on customers
- Schedule, which is part of NAP SG, is a comprehensive proposal of measures to ensure the preparation and implementation of the necessary changes in a cost-optimal manner

Measures

Lists of measures are divided into two groups:

- **Action measures** - specific operational, technical and legal measures for implementation of SG in electricity network in the Czech Republic
- **Supporting measures** - analysis of the development, research and development, links to other related plans in the Czech Republic
- Each list contains measure, its description, responsible and cooperative entities and realization date

Table of measures

| Číslo opatření | Opatření | Primární odpovědnost | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|----------------|---|----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| A 1 | Licence na akumulaci | MPO | | | | | | | | | | | | | | | | | |
| A 2 | Zajištění legislativních úprav pro jednoznačné odlišení off-grid systémů | MPO | | | | | | | | | | | | | | | | | |
| A 3 | Úprava/změna tarifního systému | ERÚ | | | | | | | | | | | | | | | | | |
| A 4 | Měření OPM s výrobou v návaznosti na zjednodušený přístup k malým zdrojům | ERÚ | | | | | | | | | | | | | | | | | |
| A 5 | Nastavení plynárenských tarifů | ERÚ | | | | | | | | | | | | | | | | | |
| A 6 | Řešení problematiky energetické chudoby | MPO, ERÚ, MPSV | | | | | | | | | | | | | | | | | |
| A 7 | Soubor opatření k zabezpečení podpůrných služeb a regulačních výkonů v ES ČR | MPO | | | | | | | | | | | | | | | | | |
| A 8 | Dispečerské řízení v novém prostředí SG | MPO | | | | | | | | | | | | | | | | | |
| A 9 | Návrh a přijetí opatření pro integraci vysokého podílu distribuované výroby do ES ČR | MPO | | | | | | | | | | | | | | | | | |
| A 10 | Tvorba a implementace „Síťových kodexů ENTSO-E“ | MPO | | | | | | | | | | | | | | | | | |
| A 11 | Podmínky provozu a rozvoje ES ČR s distribuovanou výrobou v prostředí SG | MPO | | | | | | | | | | | | | | | | | |
| A 12 | Využití DECE, spotřeby vč. elektromobility pro řízení ES ČR v prostředí SG | MPO | | | | | | | | | | | | | | | | | |
| A 13 | Úpravy zařízení a výpočty investiční náročnosti v ES ČR | MPO | | | | | | | | | | | | | | | | | |
| A 14 | Posouzení shody zařízení uváděných na český trh | MPO | | | | | | | | | | | | | | | | | |
| A 15 | Zpětné vlivy výroben elektřiny a spotřebičů na ES ČR | MPO | | | | | | | | | | | | | | | | | |
| A 16 | Měření Q a účinník u MOP | MPO/ERU | | | | | | | | | | | | | | | | | |
| A 17 | Měření dodávky a odběru MOO a příprava pro AMM | MPO | | | | | | | | | | | | | | | | | |
| A 18 | Měřidlo AMM/AMR s GPRS přenosem | MPO | | | | | | | | | | | | | | | | | |
| A 19 | Zrušení předchozího oznámení změny časů přepínání tarifů | ERU | | | | | | | | | | | | | | | | | |
| A 20 | ASDŘ a chránění v ES ČR | MPO | | | | | | | | | | | | | | | | | |
| A 21 | Bezpečnost v ostrovních provozech | MPO | | | | | | | | | | | | | | | | | |
| A 22 | Informační bezpečnost a zákon o kybernetické bezpečnosti | MPO | | | | | | | | | | | | | | | | | |
| A 23 | Fyzická bezpečnost | MPO | | | | | | | | | | | | | | | | | |
| A 24 | Akumulace | MPO | | | | | | | | | | | | | | | | | |
| A 25 | Integrace elektromobilů do DS | MPO | | | | | | | | | | | | | | | | | |
| A 26 | Vyhodnocení efektivnosti tarifního systému zavedeného od 1. 1. 2016 a zvýšení jeho dynamičnosti | ERÚ, MPO | | | | | | | | | | | | | | | | | |
| A 27 | Implementace Rámce politiky v oblasti klimatu a energetiky do roku 2030 | MPO | | | | | | | | | | | | | | | | | |

Sample of the List of measures

| A 8 Dispečerské řízení v novém prostředí SG | |
|---|---|
| Cíl opatření | Navrhnout a postupně realizovat nový model dispečerského řízení odpovídající změnám ES ČR (např. integrace DECE) a plně využívající vlastnosti SG. |
| Popis opatření | <p>Očekávané změny způsobu provozování ES ČR dané zejména rozvojem DECE a požadavkem na zapojení DECE a spotřeby do řízení rovnováhy vyvolají bezpochyby potřebu úpravy procesu dispečerského řízení, redefinici rolí PPS a PDS v této oblasti a s tím související řešení HW a SW vybavení.</p> <p>V rámci tohoto opatření bude navržen koncept postupného zavedení bilancí uzlové oblasti 110 kV s využitím regulace toku v předacím místě mezi PS a DS ES ČR včetně využití bilancí uzlové oblasti 110 kV pro potřeby integrace decentrální výroby do distribučních sítí a ovlivňování dopadů vysokého rozvoje decentrální výroby na PS ČR.</p> <p>Podle současného programu rozvoje SG by zahájení realizace nového SG řešení dispečerského řízení mělo proběhnout v období 2020-24 (v tomto období by také mělo být zahájeno nasazování AMM). Přípravnou fází a vypracování finálního projektu je tedy potřeba provést v období do roku 2019.</p> <ul style="list-style-type: none"> • Dispečerské řízení a regulace distribuované výroby, akumulace a DSR v ES ČR s vysokým podílem distribuované výroby • Definice a využití vlastností SG pro potřeby dispečerského řízení • Role PPS a PDS • Bilancování uzlových oblastí • Požadavky na oblast telekomunikací, DŘS a ochrany dat • Požadavky na HW a SW vybavení • Využití Smart Grids pro potřeby řízení ES ČR • Potřebné legislativní úpravy |
| Odpovědnost | MPO |
| Spolupráce | PPS, PDS |
| Termín | 2015 - 2016 návrh a schválení modelu a projektu řešení |

Conclusion

- Given the long-term outlook for which action plan is processed, its continuous updating is assumed in the light of market developments, conditions of operation and technology.
- For a thorough introduction to the issue it is recommended to read also the analytical part
- **The entire document to download (in Czech only):**
<http://www.mpo.cz/dokument156514.html>
- **Abstract of the NAP SG (in English):**
<http://www.mpo.cz/dokument158711.html>

Thank you for your attention



MINISTRY OF
INDUSTRY AND TRADE

