Demand response mechanism as a substitution for the least demanded capacities in the energy system

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DR in Russia

Period, year	Effect for consumers, MRUR	Payments to DR aggregators, MRUR
2019	20	64
2020	299	659
2021	1 731	917
2022	1 731	1 188

- DR gives economic benefits to consumers.
- **DR can be used by the System Operator to resolve technical issues.**

Since 2019

DR expenditures – 2.9 billion rubles
(go to consumers participating in DR)

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Effect from DR at DAM – 3.8 billion rubles
(go to all consumers)

The difference between two amounts is the net effect for consumers not participating in DR - 0.95 billion rubles

Those consumers who do not participate in DR also benefit from DR market growth!

DR in the world

1. DR is a tool for system operators to deal with emergencies.

By means of DR, it is possible to promptly reduce the amount of electricity consumption in order to stabilize the energy system operating state.

2. DR is an alternative to peak generation.

DR is a low-cost alternative to the construction and operation of "expensive" peak generation.

3. Economic instrument.

DR is used to smooth out price peaks in electricity markets.

In a number of countries, DR also meets the challenge of operational/emergency load change in the energy systems. This does not mean that you need to rely entirely on DR to control the energy system in transient states, but you need to keep it in mind…

DR prospects

WM

Peak load 158 GW

Plants capacity 247 GW

Thermal power plants 163 GW
Nuclear power plants 29 GW
RES and hydro-electric power plants 54 GW

Aggregate consumption capacity **150 GW**, aggregate generating capacity which provides this consumption **240 GW**

DR capacity 0.85 GW

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PJM

Peak load 152 GW

Plants capacity 184 GW

Thermal power plants 140 GW
Nuclear power plants 33 GW
RES and hydro-electric power plants 11 GW

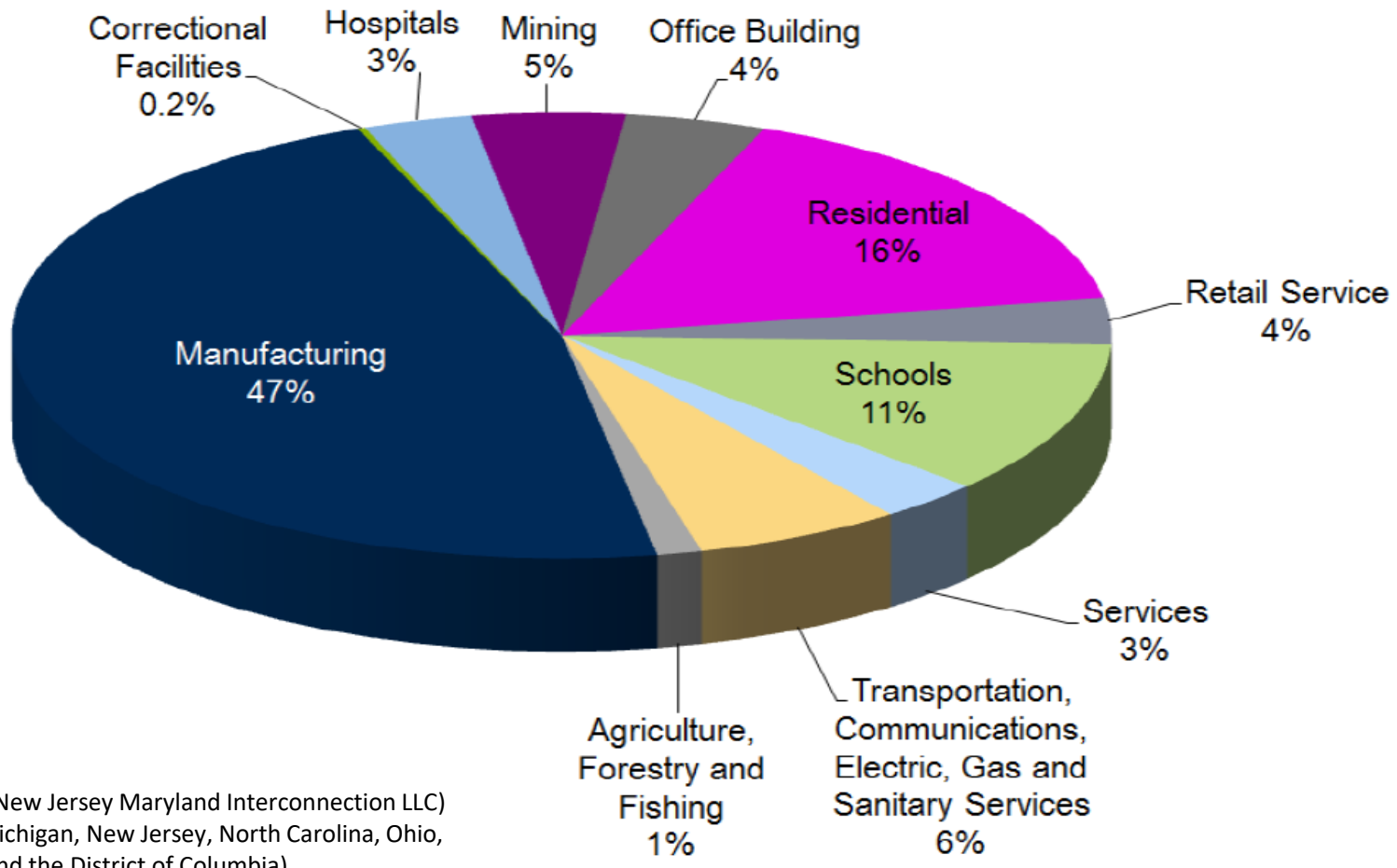
Aggregate consumption capacity **150 GW**, aggregate generating capacity which provides this consumption **180 GW**

DR capacity 10 GW

*Using the example of PJM market (Pennsylvania New Jersey Maryland Interconnection LLC) (Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia)

**Aggregate installed capacity of plants in USA is 1200 GW

DR structure



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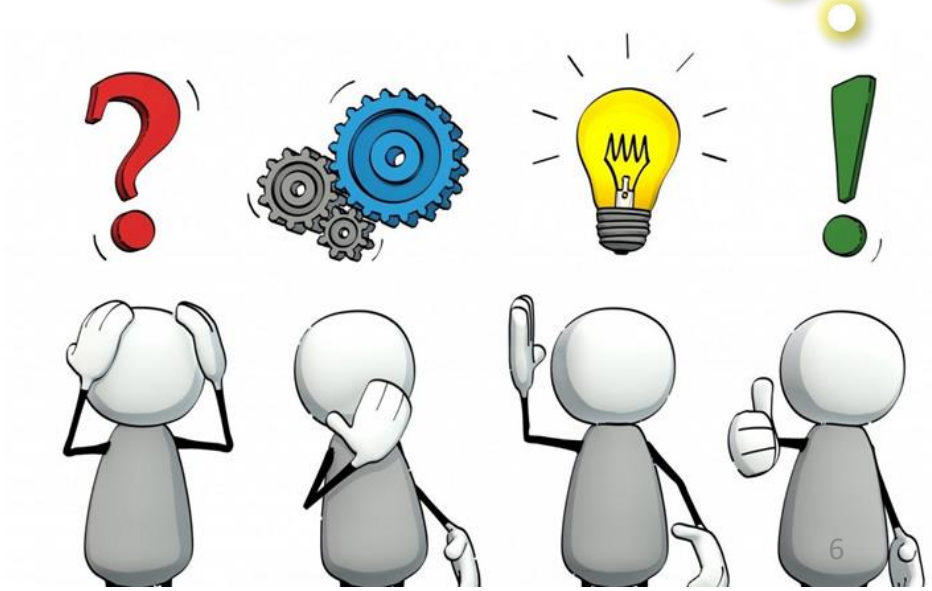
WHAT SHOULD BE DONE TO DEVELOP DR?

1. Adopt the target model in 2023
2. Complete DR integration into Wholesale market

This year it will be done in Russia



THANK YOU FOR YOUR TIME!