НИИ АТМОСФЕРА

Ministry of natural resources and environment
of the Russian Federation

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Progress in Integrated Assessment Modelling in the Russian Federation

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Development of environmental protection policy in the Russian Federation in 2012

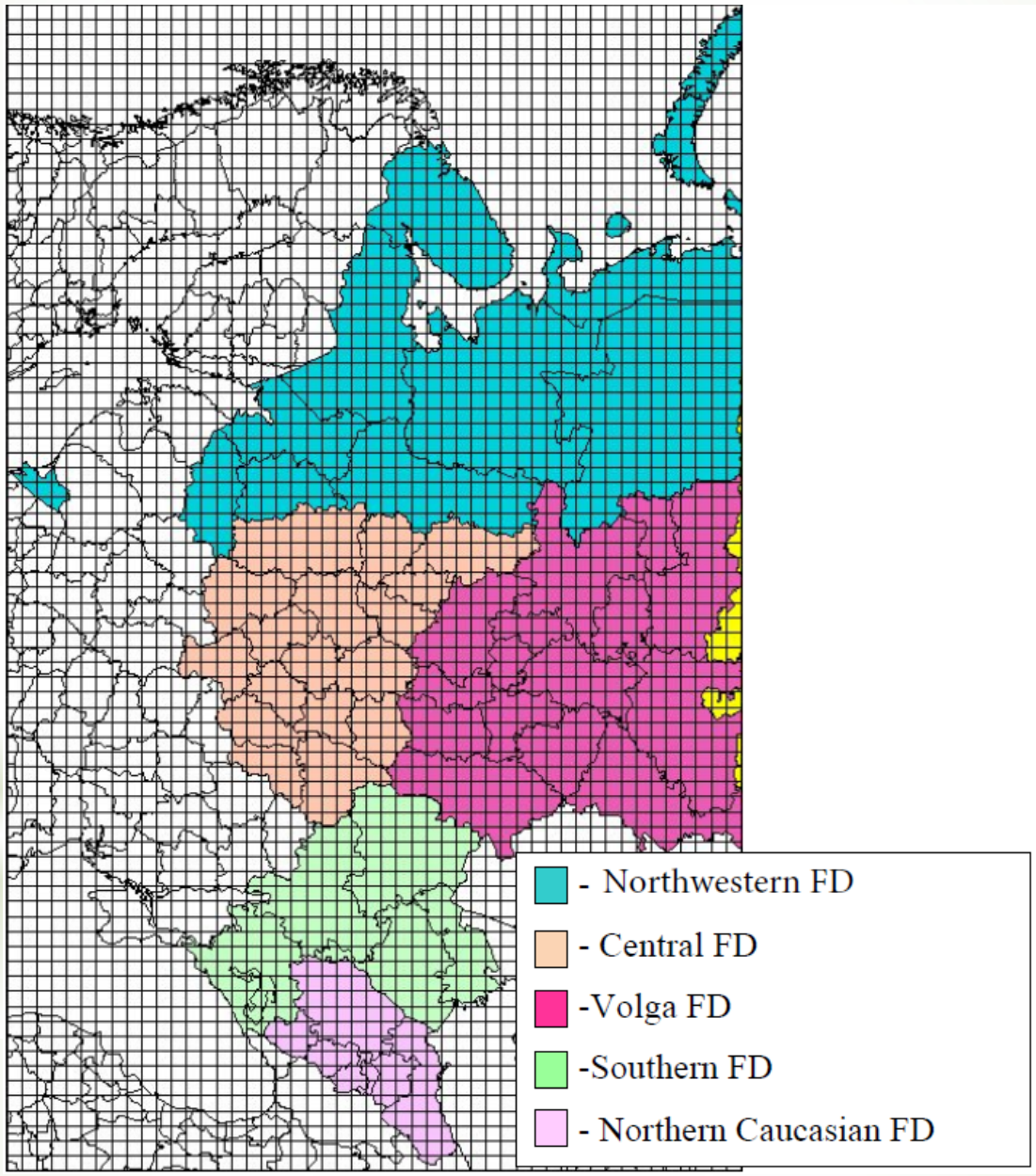
1. March 15 – issues of environmental safety and protection were discussed at the offsite meeting of the Presidential Council for Civil Society Institutions and Human Rights
2. April 19 – federal programme "Development of the water industry in the Russian Federation in 2012-2020" adopted by the Russian Government
3. April 30 – principles of the environmental state policy development in the Russian Federation until 2030 were adopted
4. August 11 – the year 2013 was declared the Year of the Environment in the Russian Federation by the President of the Russian Federation
5. October 18 – national program "Environmental protection in 2012-2020" adopted by the Russian Government
6. October 18 – resolution "Application of the legislation on liability for violations in the field of environmental protection and natural resources" adopted by the Plenum of the Supreme Court of the Russian Federation
7. November 26 – plan of activities within the 2013 Year of Environment in the Russian Federation adopted by the Russian Government

April 16, 2013 – meeting within the framework of Russian-Swedish bilateral cooperation at the Ministry of natural resources and environment of the Russian Federation.

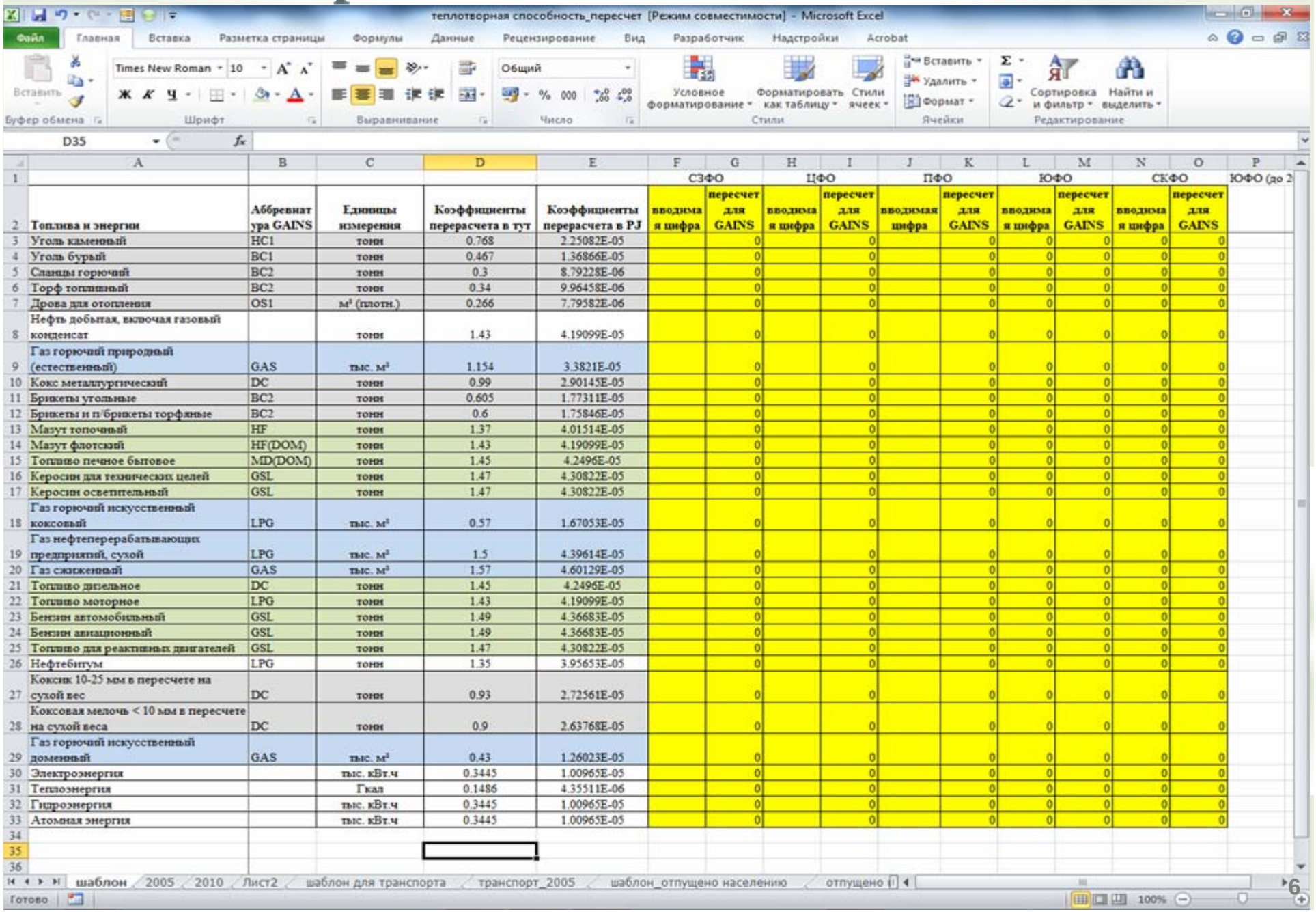
-marked the high level results of the project

- outlined prospective activities of the bilateral cooperation

Federal Districts in question



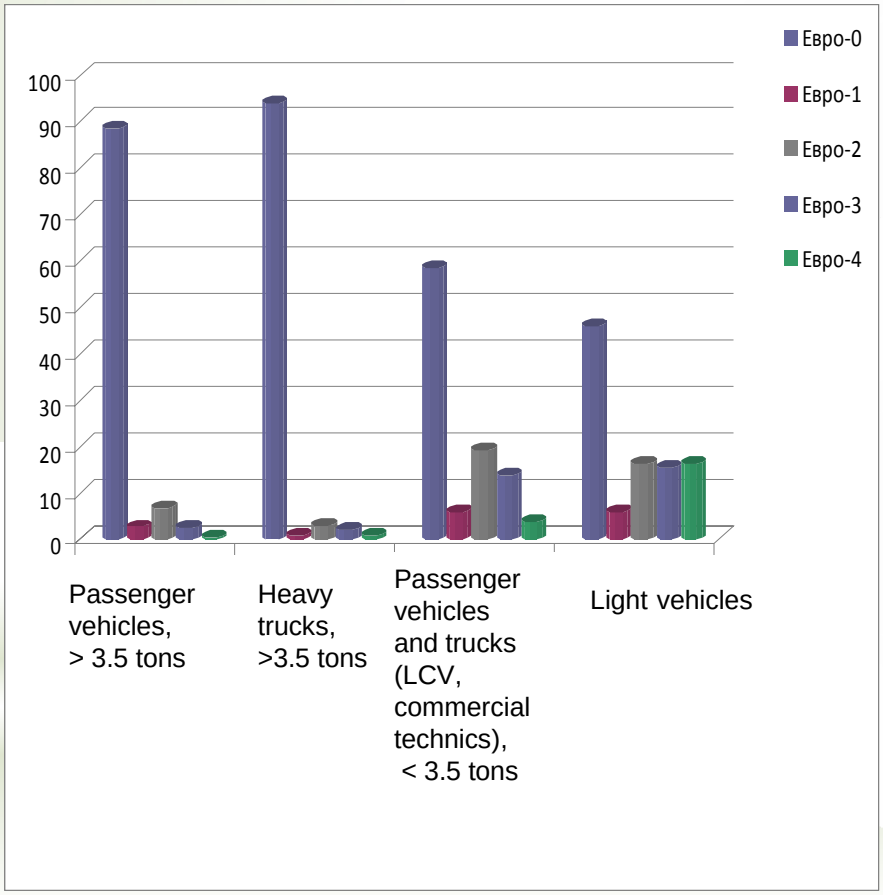
Template for fuel use recalculation


теплотворная способность_пересчет [Режим совместимости] - Microsoft Excel

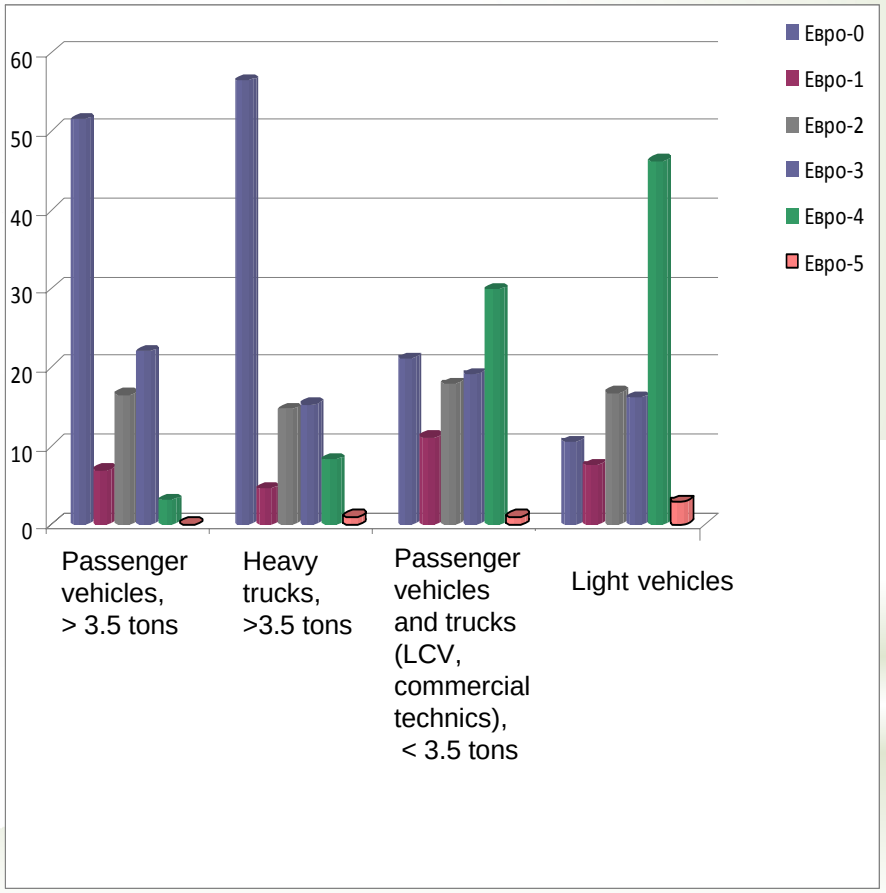
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1						СЗФО		ЦФО		ПФО		ЮФО		СКФО		ЮФО (до 2
2	Топлива и энергии	Аббревиатура GAINS	Единицы измерения	Коэффициенты перерасчета в тут	Коэффициенты перерасчета в PJ	вводимая цифра	пересчет для GAINS	вводимая цифра	пересчет для GAINS	вводимая цифра	пересчет для GAINS	вводимая цифра	пересчет для GAINS	вводимая цифра	пересчет для GAINS	
3	Уголь каменный	HC1	тонн	0.768	2.25082E-05		0		0		0	0	0	0	0	
4	Уголь бурый	BC1	тонн	0.467	1.36866E-05		0		0		0	0	0	0	0	
5	Сланцы горючий	BC2	тонн	0.3	8.79228E-06		0		0		0	0	0	0	0	
6	Торф топливный	BC2	тонн	0.34	9.96458E-06		0		0		0	0	0	0	0	
7	Дрова для отопления	OS1	м³ (плотн.)	0.266	7.79582E-06		0		0		0	0	0	0	0	
8	Нефть добытая, включая газовый конденсат		тонн	1.43	4.19099E-05		0		0		0	0	0	0	0	
9	Газ горючий природный (естественный)	GAS	тыс. м³	1.154	3.3821E-05		0		0		0	0	0	0	0	
10	Кокс металлургический	DC	тонн	0.99	2.90145E-05		0		0		0	0	0	0	0	
11	Брикеты угольные	BC2	тонн	0.605	1.77311E-05		0		0		0	0	0	0	0	
12	Брикеты и п/брикеты торфяные	BC2	тонн	0.6	1.75846E-05		0		0		0	0	0	0	0	
13	Мазут топочный	HF	тонн	1.37	4.01514E-05		0		0		0	0	0	0	0	
14	Мазут флотский	HF(DOM)	тонн	1.43	4.19099E-05		0		0		0	0	0	0	0	
15	Топливо печное бытовое	MD(DOM)	тонн	1.45	4.2496E-05		0		0		0	0	0	0	0	
16	Керосин для технических целей	GSL	тонн	1.47	4.30822E-05		0		0		0	0	0	0	0	
17	Керосин осветительный	GSL	тонн	1.47	4.30822E-05		0		0		0	0	0	0	0	
18	Газ горючий искусственный коксовый	LPG	тыс. м³	0.57	1.67053E-05		0		0		0	0	0	0	0	
19	Газ нефтеперерабатывающих предприятий, сухой	LPG	тыс. м³	1.5	4.39614E-05		0		0		0	0	0	0	0	
20	Газ сжиженный	GAS	тыс. м³	1.57	4.60129E-05		0		0		0	0	0	0	0	
21	Топливо дизельное	DC	тонн	1.45	4.2496E-05		0		0		0	0	0	0	0	
22	Топливо моторное	LPG	тонн	1.43	4.19099E-05		0		0		0	0	0	0	0	
23	Бензин автомобильный	GSL	тонн	1.49	4.36683E-05		0		0		0	0	0	0	0	
24	Бензин авиационный	GSL	тонн	1.49	4.36683E-05		0		0		0	0	0	0	0	
25	Топливо для реактивных двигателей	GSL	тонн	1.47	4.30822E-05		0		0		0	0	0	0	0	
26	Нефтебитум	LPG	тонн	1.35	3.95653E-05		0		0		0	0	0	0	0	
27	Коксик 10-25 мм в пересчете на сухой вес	DC	тонн	0.93	2.72561E-05		0		0		0	0	0	0	0	
28	Коксовая мелочь < 10 мм в пересчете на сухой веса	DC	тонн	0.9	2.63768E-05		0		0		0	0	0	0	0	
29	Газ горючий искусственный доменный	GAS	тыс. м³	0.43	1.26023E-05		0		0		0	0	0	0	0	
30	Электроэнергия		тыс. кВт.ч	0.3445	1.00965E-05		0		0		0	0	0	0	0	
31	Теплоэнергия		Гкал	0.1486	4.35511E-06		0		0		0	0	0	0	0	
32	Гидроэнергия		тыс. кВт.ч	0.3445	1.00965E-05		0		0		0	0	0	0	0	
33	Атомная энергия		тыс. кВт.ч	0.3445	1.00965E-05		0		0		0	0	0	0	0	
34																
35																
36																

Distribution of vehicles by EURO class, %

Vehicles with gasoline engines



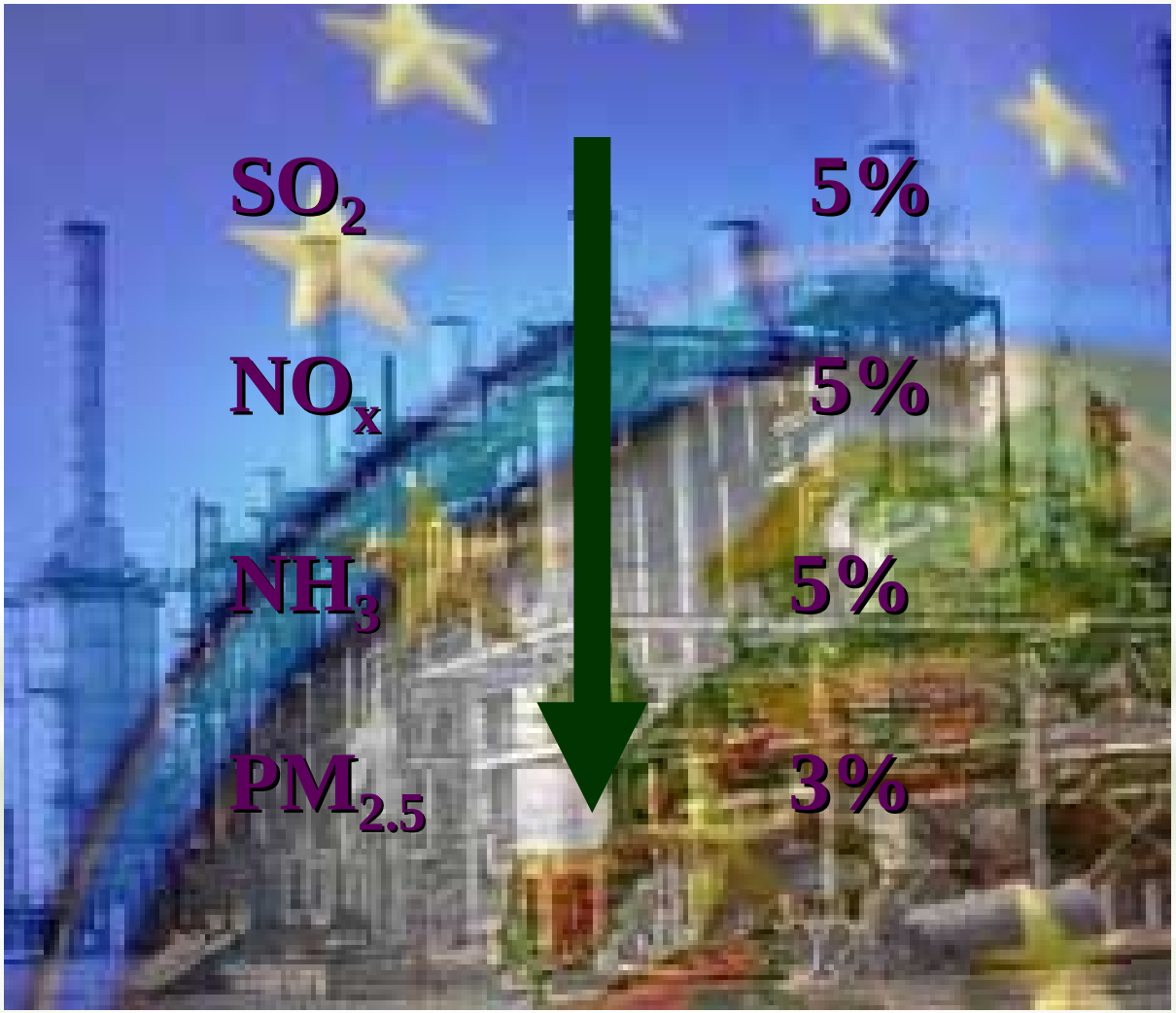
Vehicles with diesel engines



Emissions comparison, *thousand tons*

FD	Activity	2005		2010	
		National statistic	GAINS data	National statistic	GAINS data
CFD	***NOx***				
	Total	**790**	**675**	**738**	**751**
	including				
	Power industry	190	189	206	203
	Industry	62	130	70	156
	Transport	538	356	462	392
	SO_2				
	Total	**261**	**251**	**179**	**186**
	including				
	Power industry	140	147	83	84
	Industry	63	75	61	77
	Transport	58	29	35	25
	CO				
	Total	**3711**	**1778**	**3165**	**2233**
	including				
	Power industry	122	93	116	99
	Industry	460	385	451	555
	Transport	3129	1234	2598	1578
NWFD	***NOx***				
	Total	**311**	**294**	**332**	**360**
	including				
	Power industry	119	150	115	143
	Industry	52	56	49	57
	Transport	140	88	168	160
	SO_2				
	Total	**578**	**645**	**615**	**616**
	including				
	Power industry	331	458	343	372
	Industry	232	175	251	221
	Transport	15	12	21	23
	CO				
	Total	**1513**	**1304**	**1708**	**1551**
	including				
	Power industry	188	316	149	304
	Industry	470	590	655	544
	Transport	855	398	904	703

Potential emission reductions by 2020 compared to 2005 levels



Potential emission reduction measures in the Central Federal District (CFD)

Measures	Transport	Power plants	Industry
Desulfurization	-	-	13% sources using coal
Lime injection	-	25% Coal Power plants	25% industrial coal fired boilers
Improvement of combustion technologies and selective catalytic reduction	-	8% Gas Electric Power plants	20% sources using gas
Euro-V standard	78% transport	-	-

Potential emission reduction measures in the North-West Federal District (NWFD)

Measures	Transport	Power plants	Industry
Desulfurization	-	-	10% sources using heavy oil
Lime injection	-	18% Coal-fired Power plants	-
Use of low sulfur fuel	-	-	25% sources using heavy oil
Improvement of combustion technologies and selective catalytic reduction	-	8% Gas-fired Power plants	20% sources using gas
Euro-V standard	78% transport	-	-

Analysis of results of control strategies application in the CFD

Sectors with potential emissions reduction	NOx		SO2			
	Improvement of combustion technologies and selective catalytic reduction		Desulfurization of effluent gases		Lime injection	
	Reduction, %	Cost, mill. Euro	Reduction, %	Cost, mill. Euro	Reduction, %	Cost, mill. Euro
Power industry (new and exist power plants)	5%	7	-	-	5%	3
Fuel combustion in industry	5%	6,6	5%	0,9	5%	1,3

Analysis of results of control strategies application in the NWFD

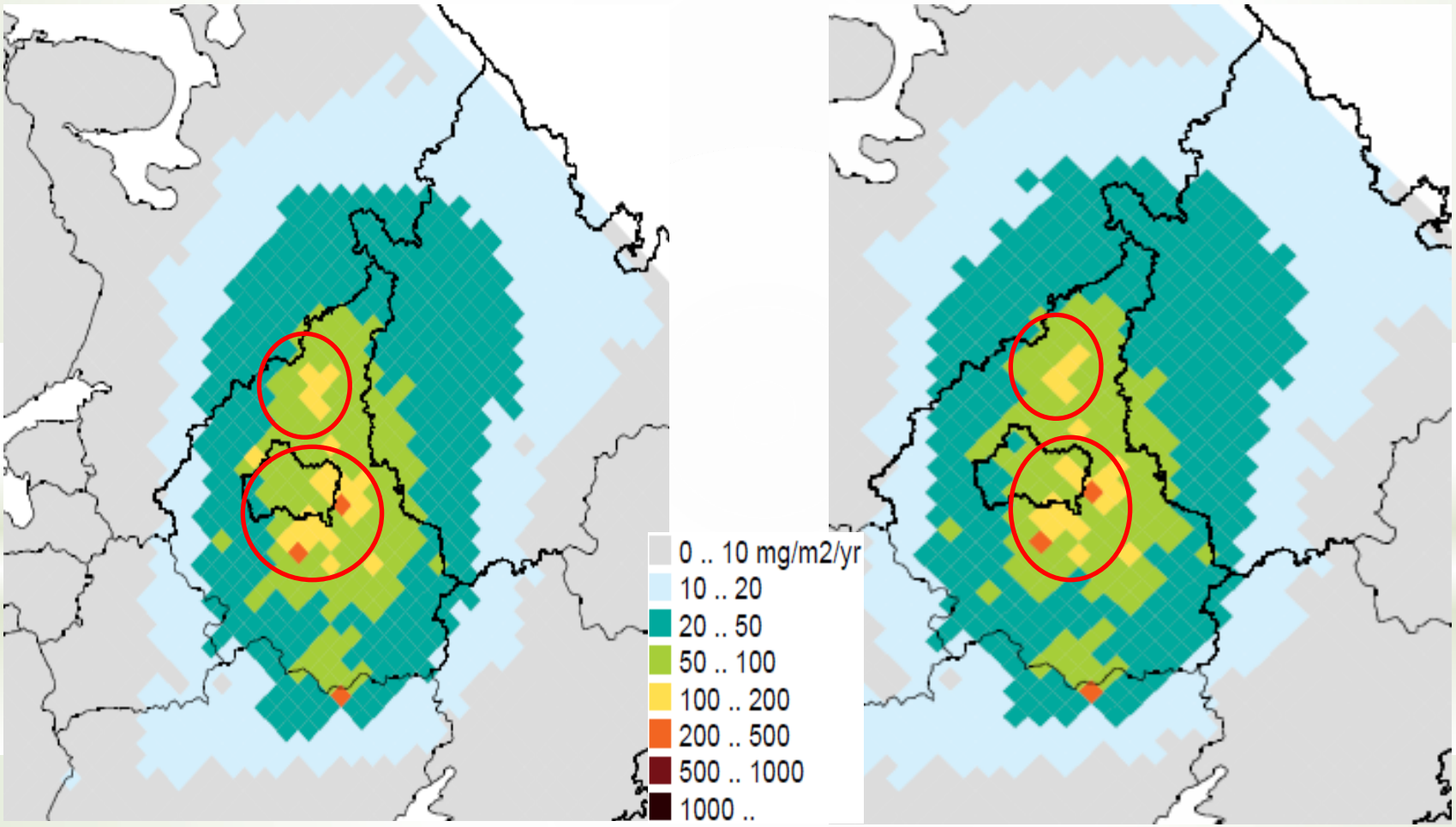
Sectors with potential emissions reduction	NOx		SO2			
	Improvement of combustion technologies and selective catalytic reduction		Desulfurization of effluent gases		Use of low sulfur fuel	
	Reduction, %	Cost, mill. Euro	Reduction, %	Cost, mill. Euro	Reduction, %	Cost, mill. Euro
Power industry (new and exist power plants)	5%	2,9	-	-	5%	
Fuel combustion in industry	5%	3,0	5%	0,9	5%	0,7

Analysis of EURO V standart application

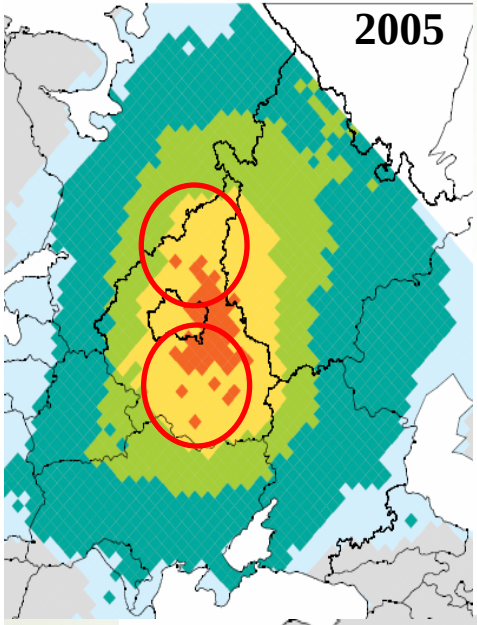
Federal District	EURO V	
	Reduction, %	Cost, mill. Euro
CFD	30%	1200
NWFD	50%	339

Sulfur deposition from sources in the CFD

2005 **2020**



Nitrogen deposition from sources in the CFD

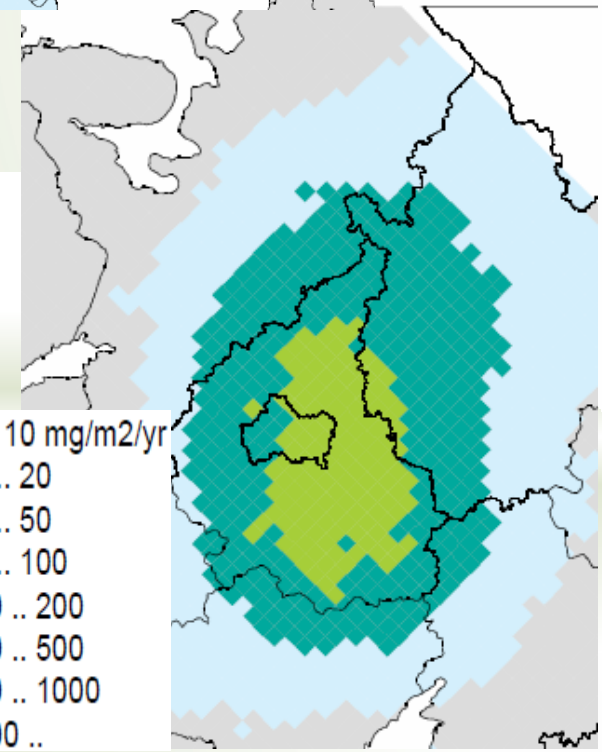


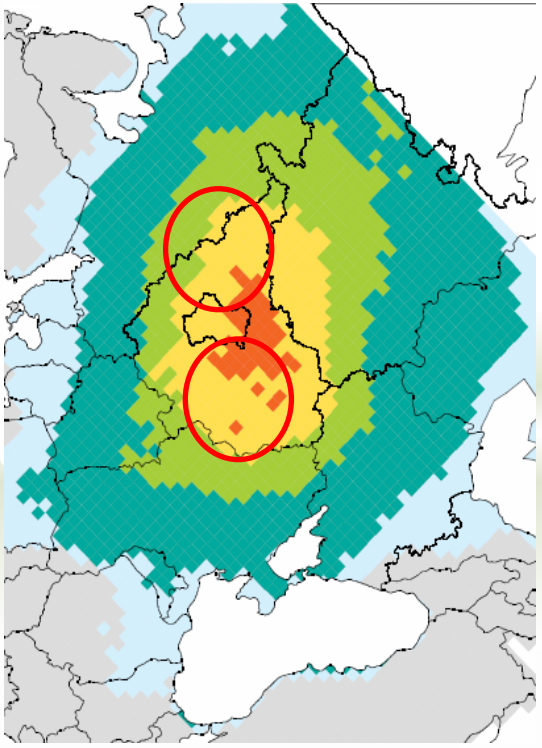
2020

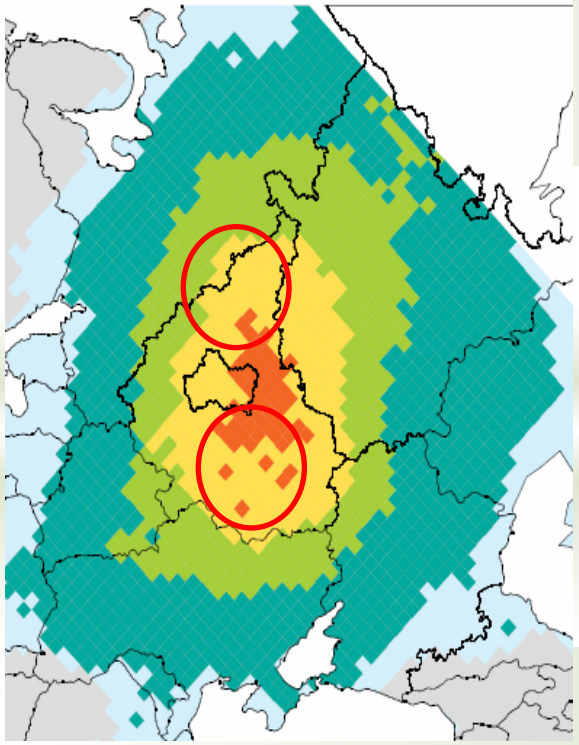
EURO V
(30% emissions reduction)

Industry
(5% emissions reduction)

Power plants
(5% emissions reduction)

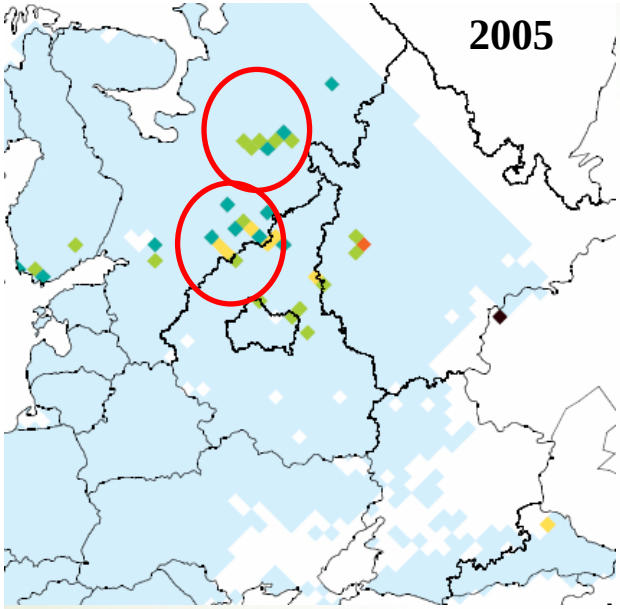






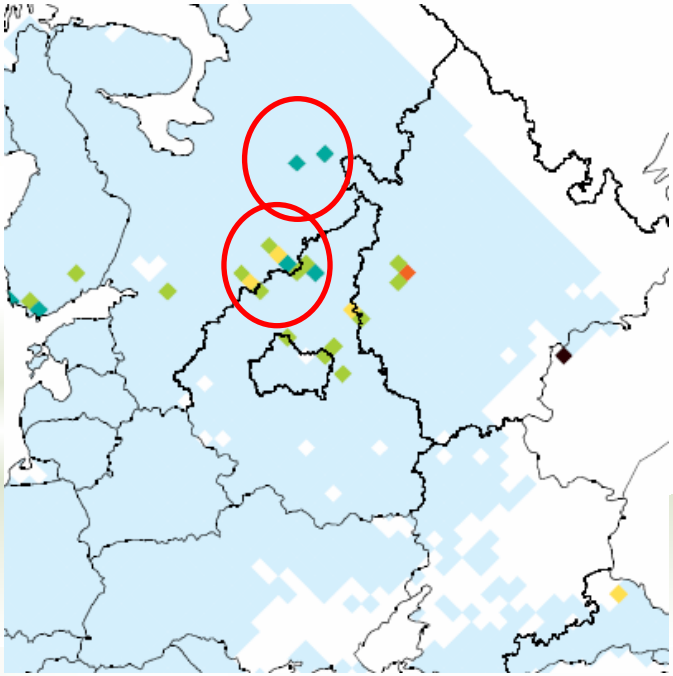
Excess of acidity 2005 and 2020

2005

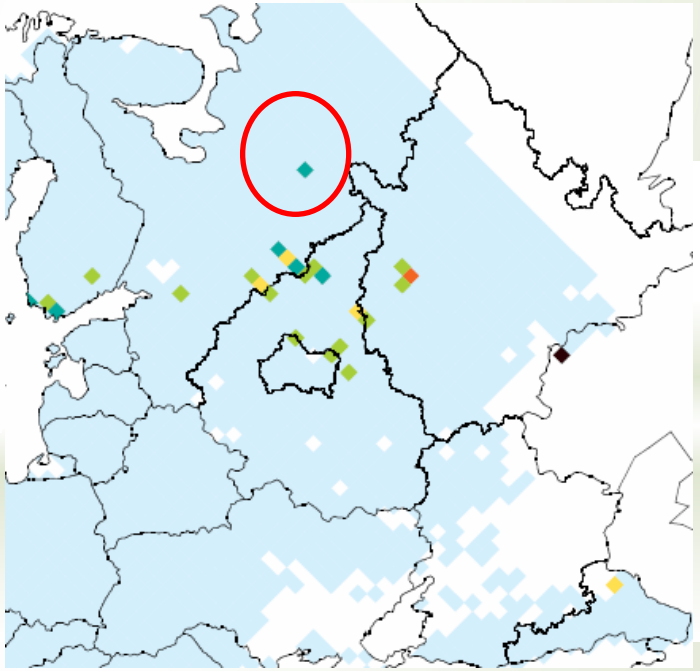


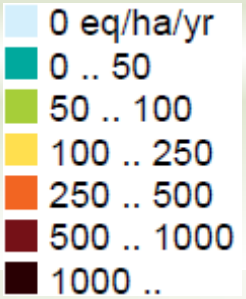
2020

Desulfurization

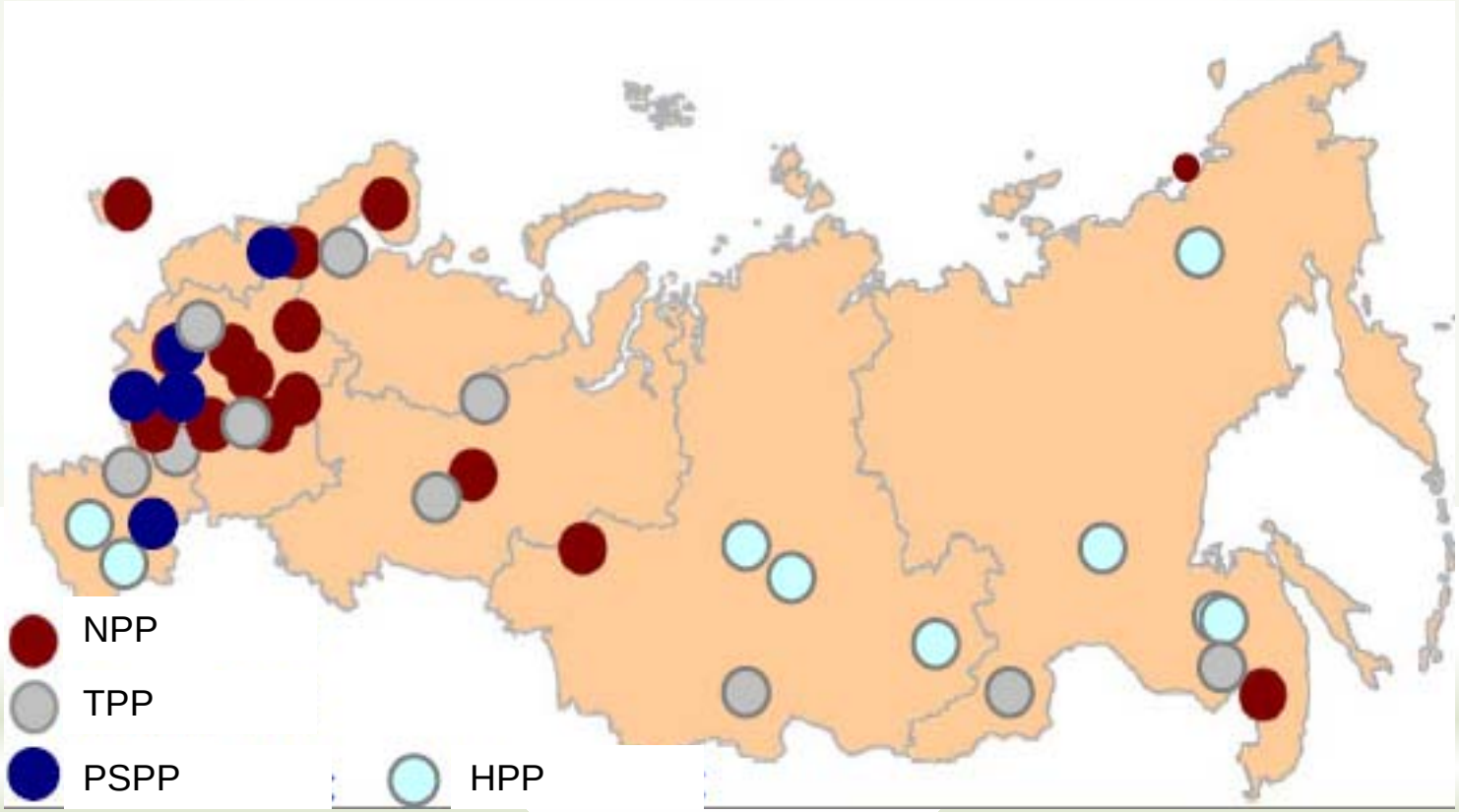


Lime injection





New stations geography



NPP – nuclear power plants;
TPP – thermal power plants;
PSPP – pumped storage power plants;
HPP – hydro power plants

Power industry in the CFD - current state

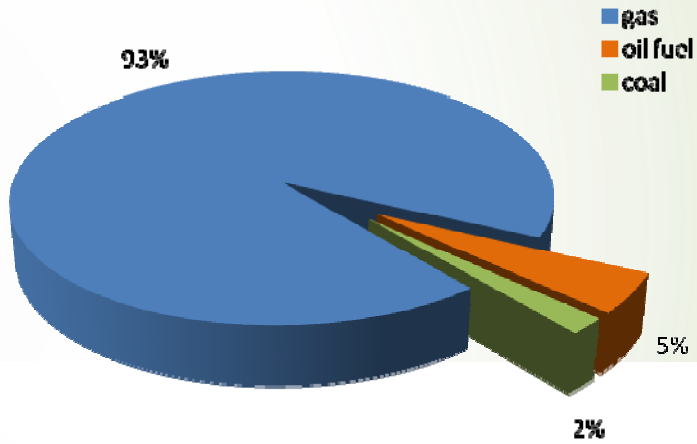
- 17 power generation systems;
- 4 nuclear power plants: Kursk, Novovoronezh, Kalinin and Smolensk;
- Capacity of all power plants in the Central Federal District;
- 50 thousand GW;
- Annual electric output – ~200 billion kilowatt-hours.

Energy development in CFO by 2020

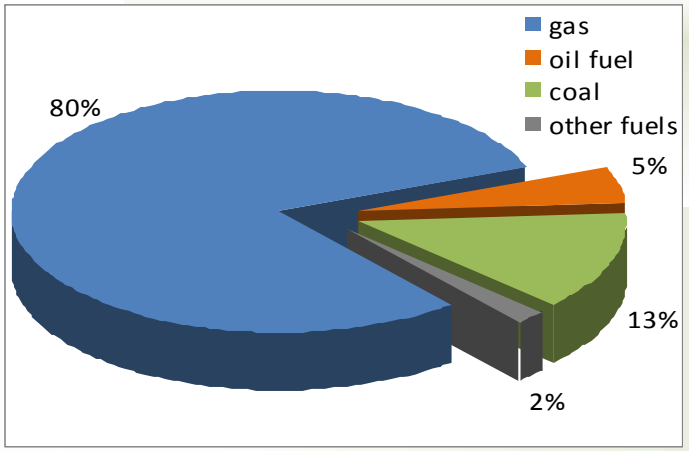
	2010 baseline	2020
Electricity production, billion kW/h	223	297,5
Heat power production, million gcal	139	155,4
Energy resources consumption by the power plants, Million tons of fuel eq.	61,1	73,8

Coal consumption will increase by 1.5 times in 2020 compared to 2010

Fuel consumption in 2010



Fuel consumption in 2020



Emissions comparison, *thousand tons*

Pollutant	Projected emission values	GAINS data	
		IIASA	SRI Atmosphere
SO2	176	353	175
NOx	209	227	204
PM_TSP	133	92	70

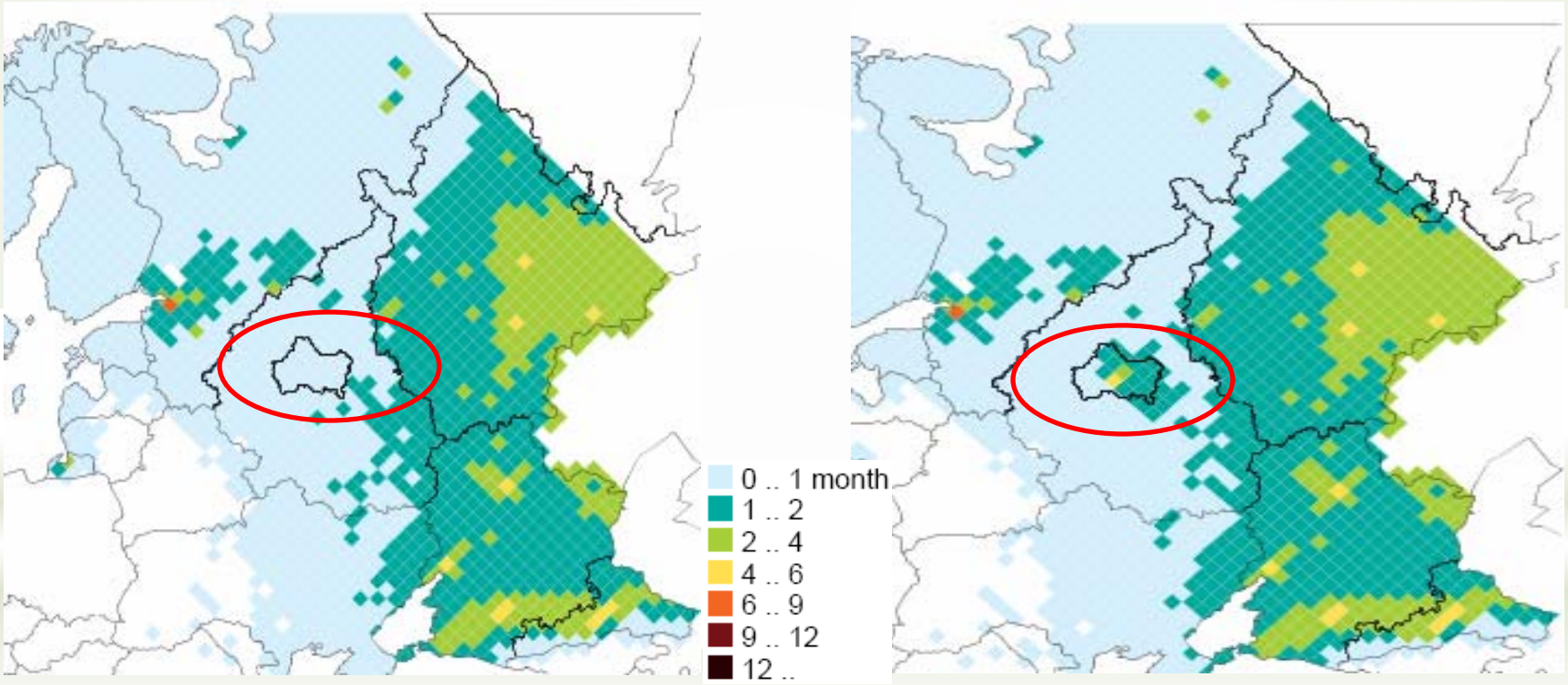
The percentage of PM sources which use coal and electrostatic precipitators for new power plants has been reduced by 3%.

PM emissions have increased up to 135 thousand tons that correlates with predicted values .

Loss of statistical life expectancy as a result of $PM_{2.5}$ impact, *months*

2010_baseline

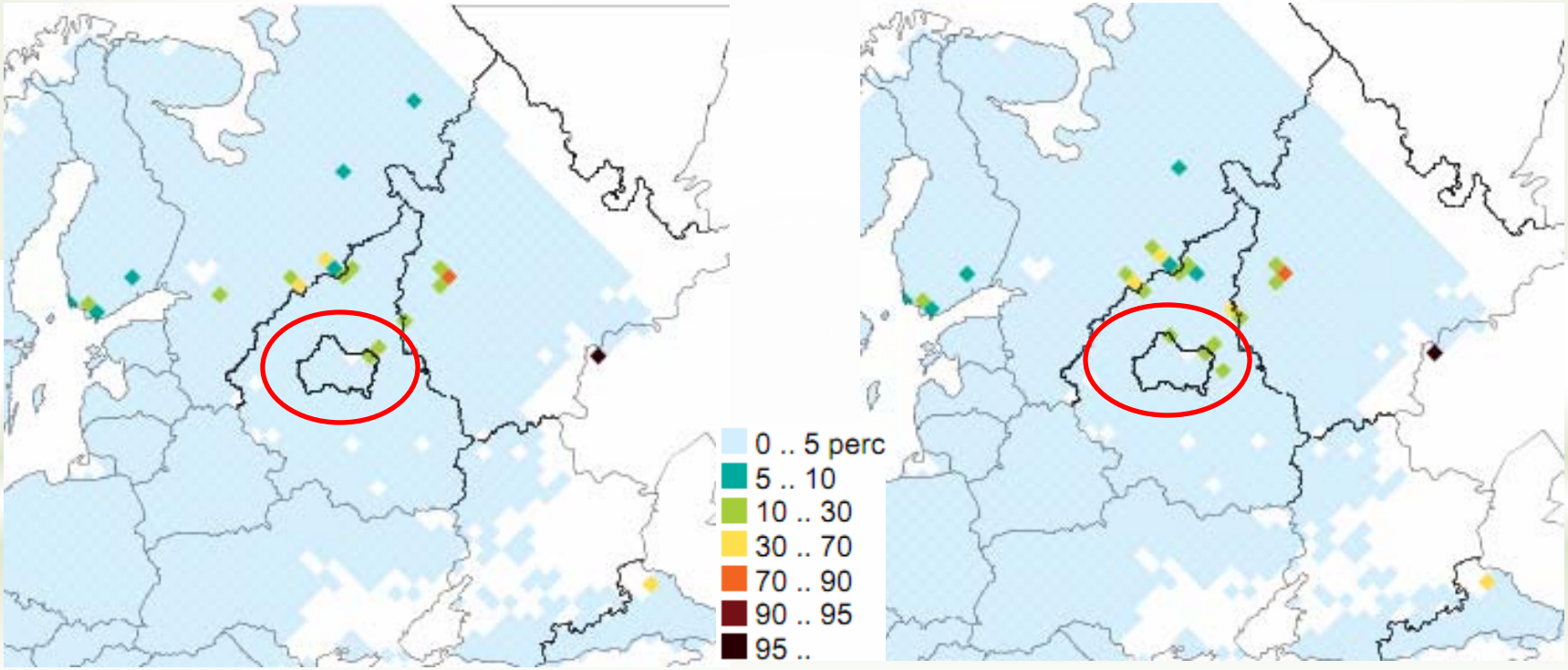
2020



Critical loads exceedances for acidity

2010_baseline

2020

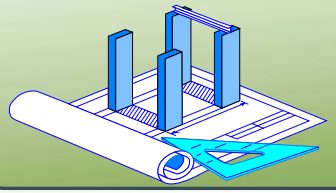


Estimated black carbon emissions, *th. tons*

Federal District	Transport		Industry		Energy		TOTAL	
	2005	2010	2005	2010	2005	2010	2005	2010
North-West FD	2,03	4,32	12,66	12,72	0,14	0,14	14,83	17,17
Central FD	7,82	9,04	1,86	1,91	0,05	0,05	9,73	10,96
Volzhskiy FD	9,04	8,72	23,86	18,88	0,21	0,16	33,11	27,75
Southern FD	4,19	4,04	10,77	8,47	0,10	0,07	15,06	12,58
North-Caucasus FD	2,87	2,77	6,83	5,25	0,07	0,05	9,77	8,07

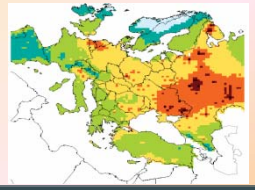
9,500 thousand tons of soot (sazha) in Central Federal District in 2010 according to Russian national inventory

Activity plan



Providing data for the model, parameters verification and clarification

Complex assessment of various economic scenarios for federal districts



Particulate matter health impact assessment

Estimation of black carbon emissions

Further disaggregation of the Russian Federation territory in GAINS-Russia to the level of federal subjects

СПАСИБО ЗА ВНИМАНИЕ!

Thank You for Your Attention!