



**HORNONITRIANSKE BANE
PRIEVIDZA, a.s.**

Conference: Sustainability of Mineral Resources and
Environment

Coal mining in Slovakia and Environment



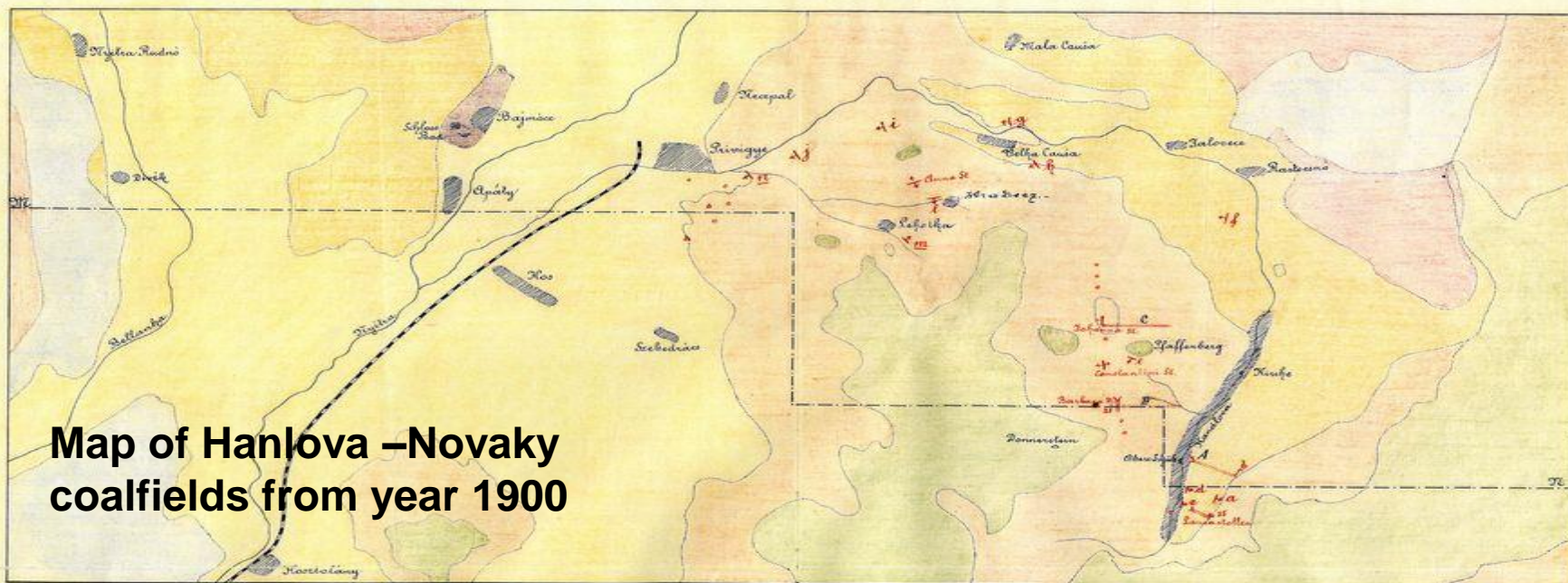


Coal Mining in Slovak Republic - history

Übersichtskarte des Bajmóc-Privigy-Handlovaer Kohlenrevieres.

Maßstab 1:75000.

1 2 3 4 5 6 7 km.



Map of Handlova –Novaky
coalfields from year 1900

Idealisiertes Profil M.-N.





Historic overview of Slovak coal production

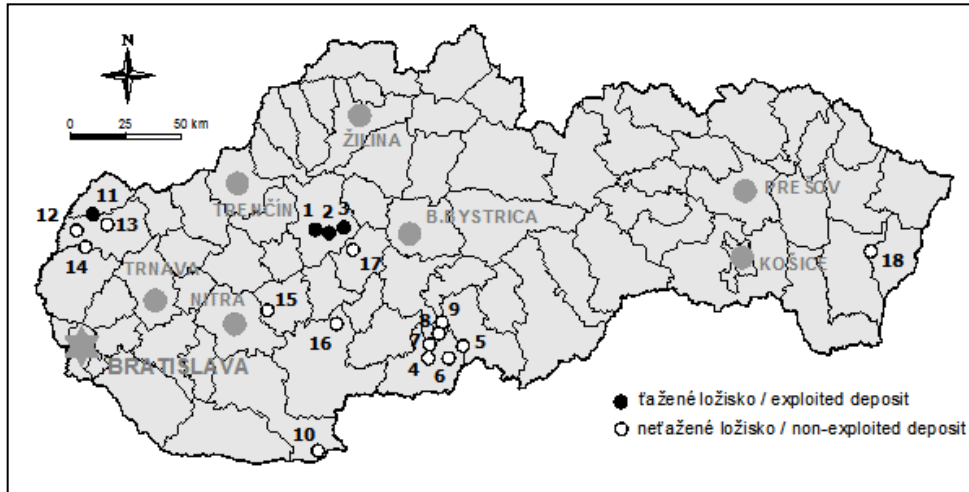
Year (metric tonnes)	Colliery Handlová	Colliery Cigeľ	Colliery Nováky	HBP, a.s. Total	Dolina mine	Záhorie/Čáry mine	Slovakia total
1907	5 984	0	0	5 984	0	0	5 984
1940	792 887	0	100	792 987	0	0	792 987
1950	672 737	0	208 500	881 237	22 278	0	903 515
1960	1 100 939	0	1 364 300	2 465 239	549 351	0	3 014 590
1970	1 393 734	1 376 300	1 633 899	4 403 933	715 700	0	5 119 633
1980	1 480 650	2 080 144	1 256 201	4 816 995	979 628	0	5 796 623
1990	1 255 000	1 354 050	1 308 819	3 917 869	847 000	1 000	4 765 869
2000	880 000	920 000	1 101 334	2 901 334	353 000	384 000	3 638 334
2005	365 200	409 400	1 538 100	2 312 700	163 000	35 000	2 510 700
2006	318 850	482 300	1 253 429	2 054 579	146 000	6 202	2 206 781
2007	361 000	415 000	1 169 000	1 945 000	146 708	22 000	2 113 708
2008	292 500	565 500	1 326 000	2 184 000	152 000	87 100	2 423 100
2009	226 000	575 000	1 476 000	2 277 000	139 700	152 300	2 569 000
2010	318 000	288 000	1 453 000	2 059 000	148 000	175 134	2 382 134
2011	252 000	583 000	1 245 000	2 080 000	172 500	123 500	2 376 000
2012	213 500	687 000	1 142 000	2 042 500	113 500	136 200	2 292 200
2013	271 500	603 500	1 210 000	2 085 000	83 000	179 000	2 347 000
2014	253 000	606 000	1 093 000	1 952 000	69 500	166 200	2 187 700

From beginning of industrial coal mining was in HBP, a.s.collieries mined in total 227,72 mil. tonnes of coal. On all fields of Slovakia was during whole history (120 years) mined around 230 million tonnes of coals.





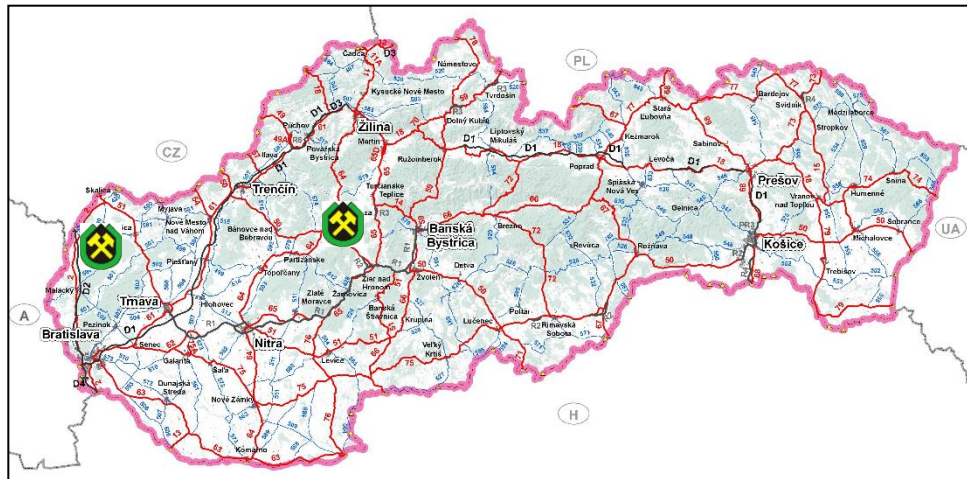
Coal Deposits in Slovak Republic



Semibituminous coal deposits : 1. Nováky, 2. Cigeľ, 3. Handlová, 4. Modrý Kameň, 5. Ľuboriečka, 6. Žihľava, 7. Horné Strháre, 8. Veľký Lom, 9. Červeňany, 10. Štúrovo

Lignite coal deposits: 11. Gbely, 12. Kúty, 13. Štefanov, 14. Lakšárska Nová Ves, 15. Beladice, 16. Pukanec, 17. Kosorín, 18. Hnojné

Coal Deposits mined out until 2WW : 15. Jedlove Kostolany, 17. Badin



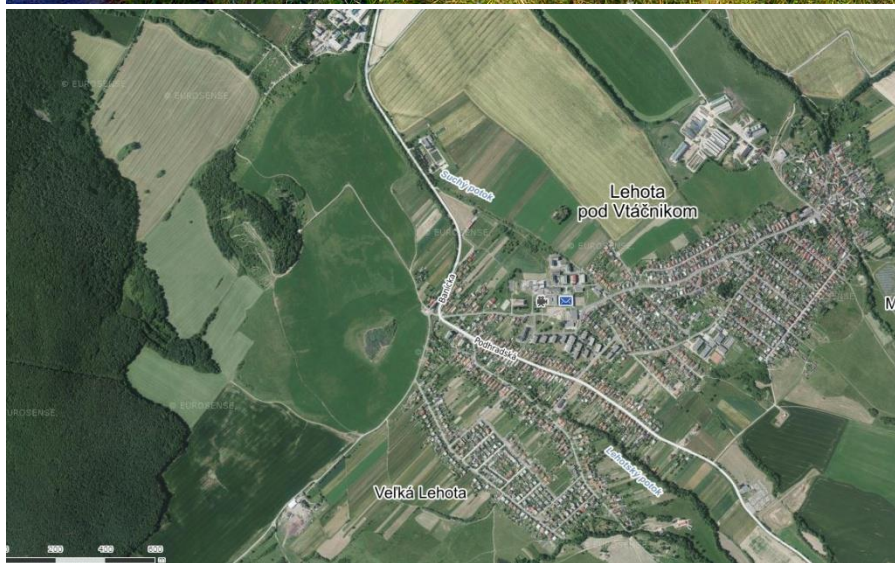
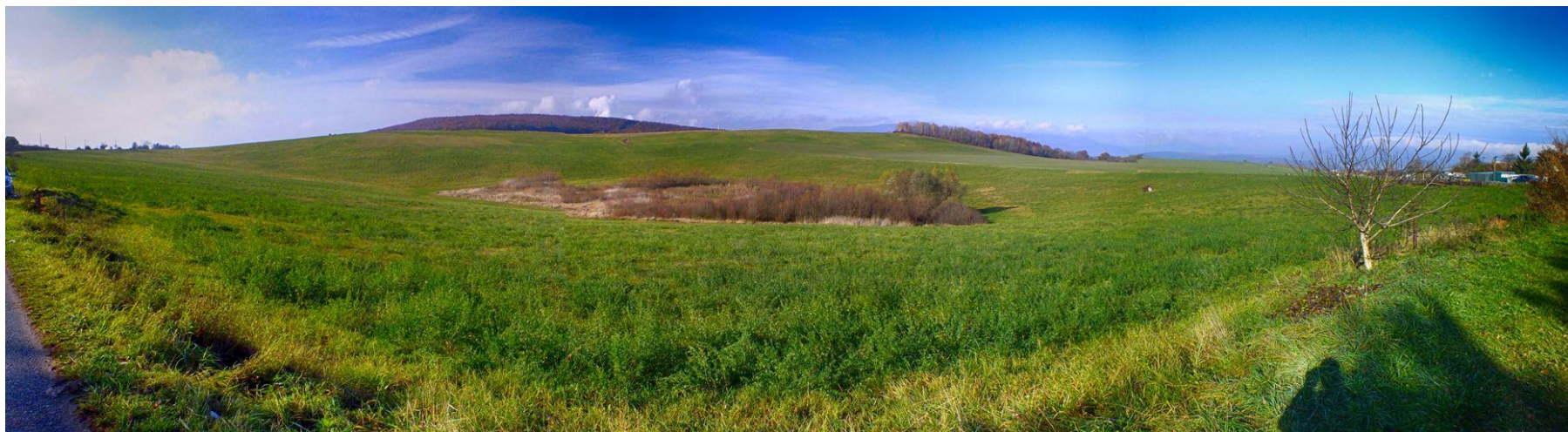
Company Baňa Dolina stopped coal excavation at Modrý 4. Kameň deposit on May 2015.

Anyway, for „next generations“ we have around 1000 million (one billion) tonnes of lignite coal reserves.





Surface (Opencast) coal mining in past



Panoramic view (up) and aerial view (left) to former opencast coal mine at Lehota pod Vtáčnikom, where was mined 2 million tonnes of coal on open pit , until 1990.

Former carrier is completely reclaimed and used as farmland.

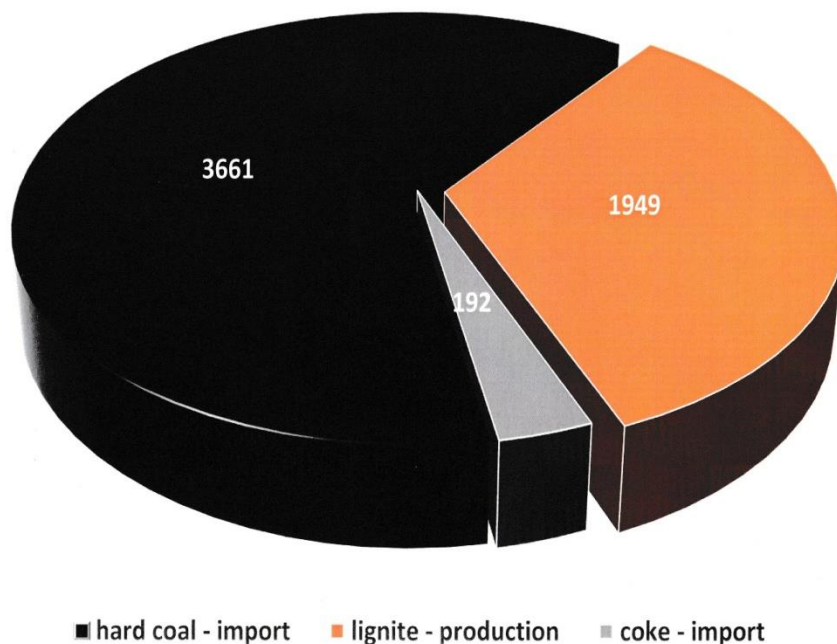
Waste rock heap on horizon is forested





Share of domestic coals as energy source in Slovakia

HBP coal share in Slovak market 2015



Slovakia has no other significant energetic fossil fuels than lignite and semibituminous coal .

Our oilfields are exhausted and domestic natural gas production is minimal – up to 86 mil. cubic metres p.a. Natural gas consumption is 6 billion cubic metres p.a.

98% of natural gas is imported, mostly from Russian Federation.

Besides lignite must be the consumption of solid fuels covered by imports.

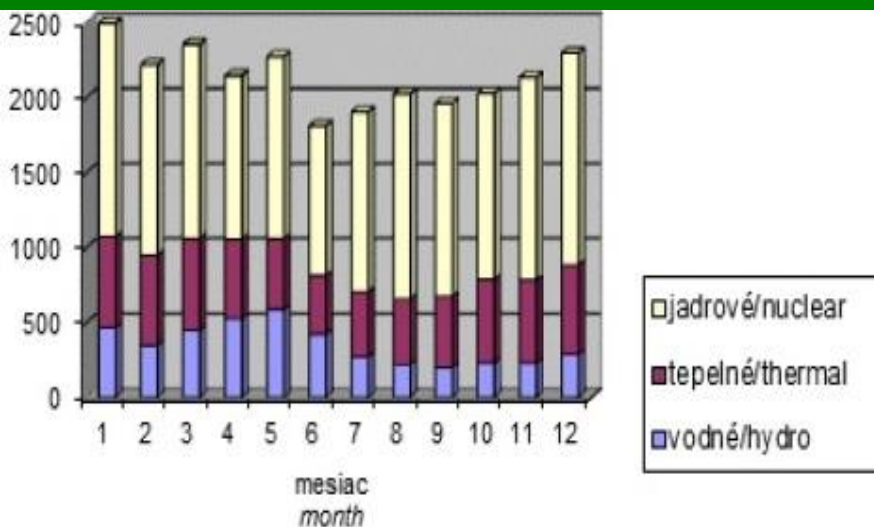
Left is the graphic expression of Slovak coal consumption in 2015 (kilotonnes). Domestic lignite production – orange colour- covers only 1/3 of Slovak annual coal consumption.

Majority of hard coal consumed annually is used for metallurgy and for home & industrial heating, mostly for private houses and in central heating stations in major towns.





Share of domestic and imported coals as energy source



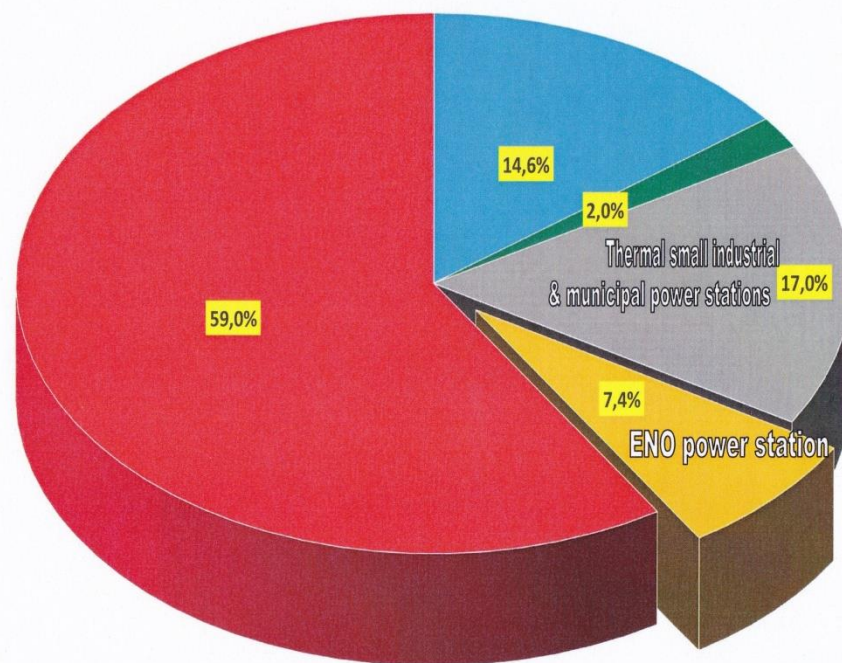
After graphic evaluation from Slovak Statistic Office data about power production (GWh) by months for year 2015 is clear, that hydro power station output (blue) having significant oscillation during year, because is heavily dependant from actual weather and rain.

Rain, sunshine and wind are unpredictable for any year. Coal mining and its use as energy source is weather independent and predictable.

From domestic coal is during year produced 15% to 20% of total Slovak power consumption.

Real electric energy production according to source of energy in 2015

Source: Slovak statistical office



■ water ■ photovoltaic ■ thermal small ■ thermal ENO ■ nuclear





Thermal Powerstation ENO modernisation 2015



At year 2015 was two blocks of ENO (both 110 MWh) completely overhauled for some pollutant capture:

- renewed desulphurisation unit captured 97% of produced sulphur oxides
- New implemented denitrification technology decreased NO_x gasses well below EU legislation
- Overhauled filtering equipment catches 98% of flying ash from boilers





Thermal energy used for central heating system



Thermal power station ENO producing per year approximately 800 000 Gigajoule of thermal energy used for two towns central heating and warm water production:

- Town Prievidza (60 000 inhabitants)
- Town Novaky (8 000 inhabitants)
- including their schools, kindergartens industrial plants , sports halls, swimming pools and culture houses
- When once will be powerplant ENO switched off , this energy must be replaced from other sources





HBP a.s. company use of geothermal energy: 10 Megawats

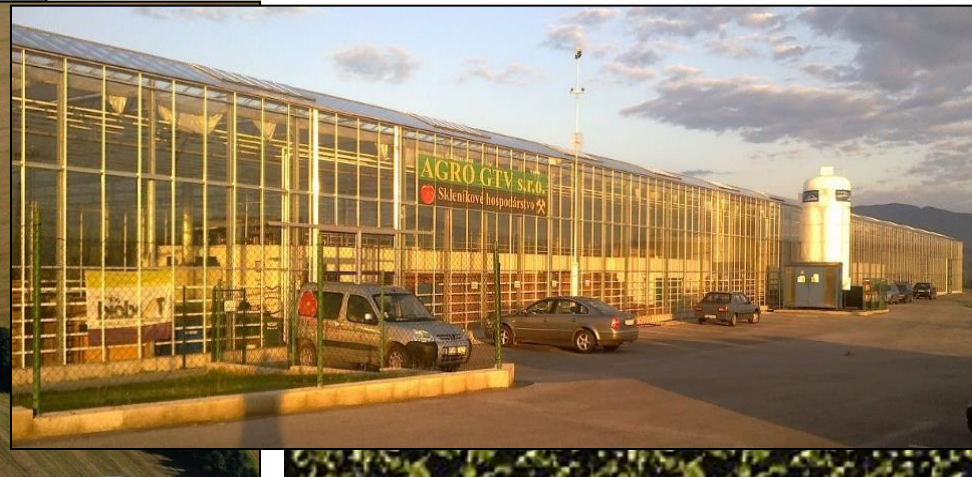




Glasshouse Novaky: 5,3 Megawats of geothermal energy

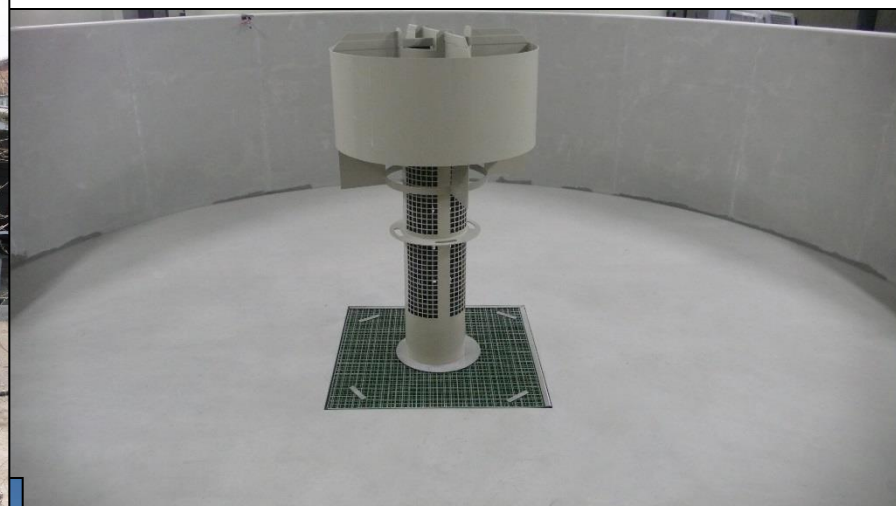


- There are 2 glasshouses
- For glasshouse heating is used energy from geothermal well and from mine water
- Total production of tomatoes is 1,47 mil. Kg per annum, what is 19,1% from domestic tomato production
- Because there is still reserve of 2,7 MW of thermal energy, we are designing another two greenhouses to be built in next years there





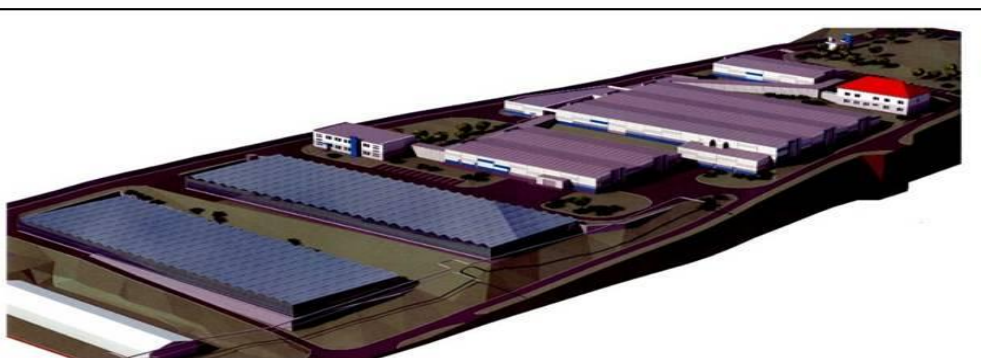
2014: Fish farm construction at Handlova colliery





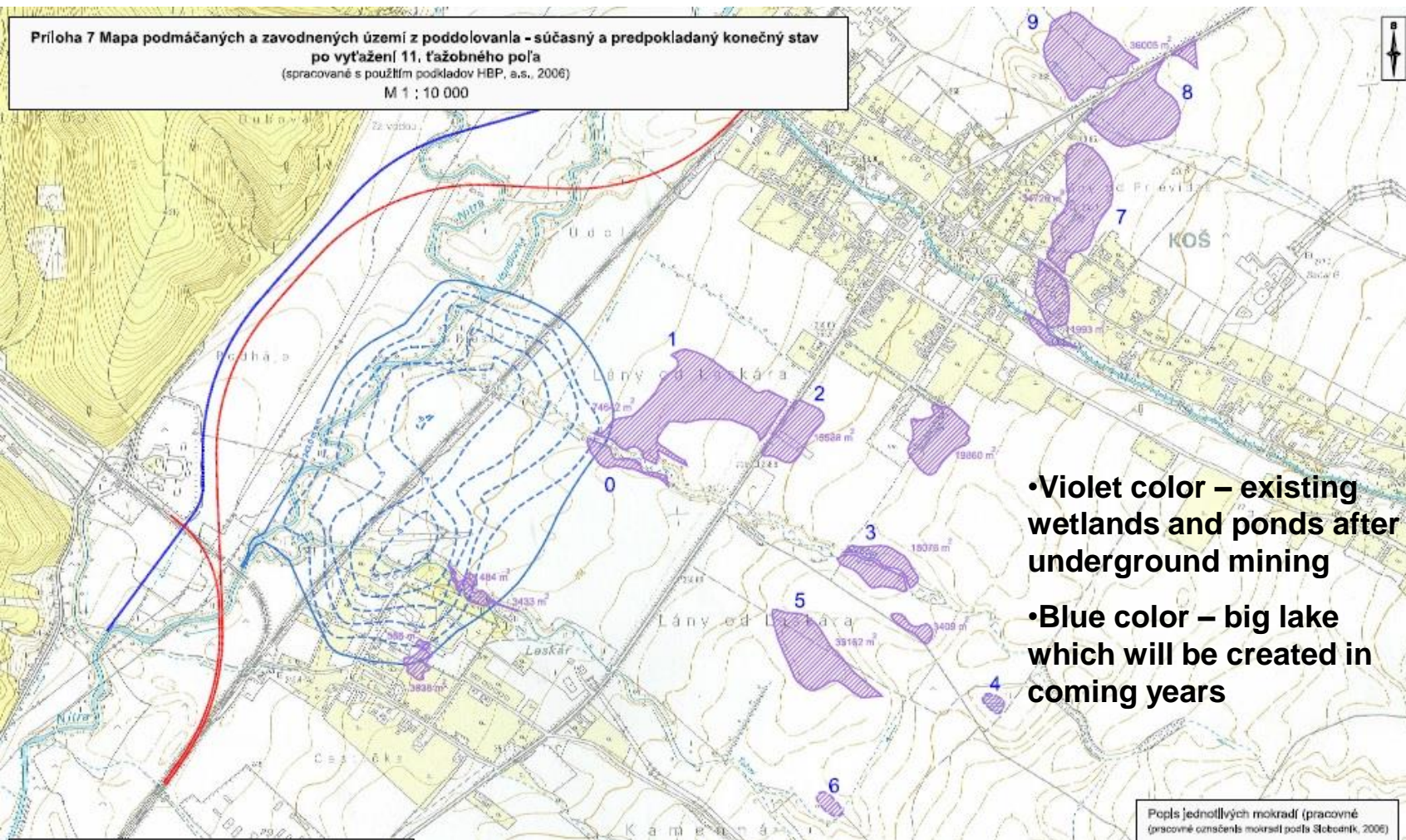
Handlová geothermal energy – fish farm and glasshouse

- project is based in african catfish (*Clarias gariepinus*) rearing, heat and water used for farm is gained from water and air from living mine
- Projected annual production capacity is 1000 tonnes of fishes





Side effect from underground coal mining wetlands & swamps





After-mining wetlands & swamps

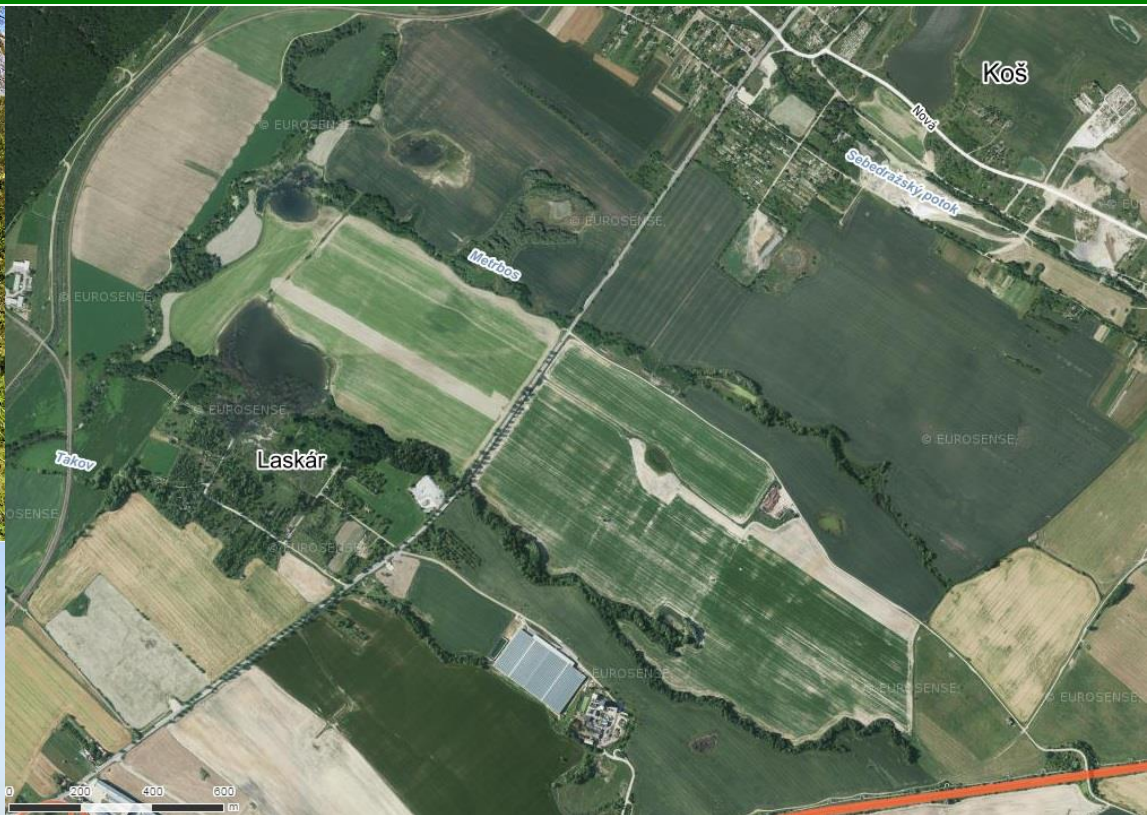


Photo source: Kromkova



Wetlands & swamps life

By EIA study for new mining fields (2006) was on our ponds and wetlands observed presence of 85 preserved animal species:

- 6 preserved amphibians
- 5 preserved reptiles
- 69 preserved birds
- 5 preserved mammals

There was found many of rare plants, and also one of that, which was previously considered as extinct in Slovakia



Schoenoplectus mucronatus (Bog bulrush)

Himantopus himantopus – on Novaky wetlands was observed the second nesting of this bird, first nesting was observed on Senne pods, which is Ramsar agreement locality





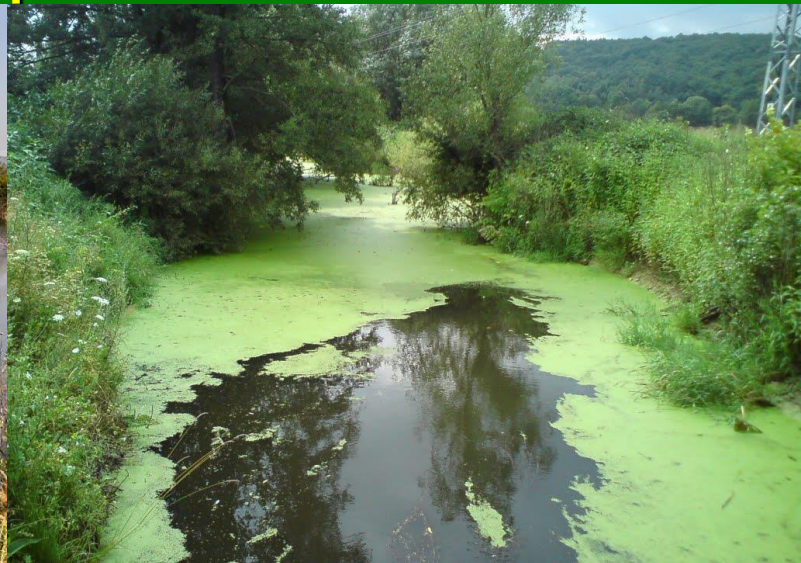
Most valuable animals living in mining wetlands and ponds



**Bull Bog, Hyla Arborea,
Sea Eagle, Marsh harrier,
Musk rat, European Beaver**



Few views to water ponds



Actually we have about 100 hectares of swamps, wetlands and waterponds over our mining fields.

On coming years will be the water covered yardage doubled or tripled





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Thank you for your attention

