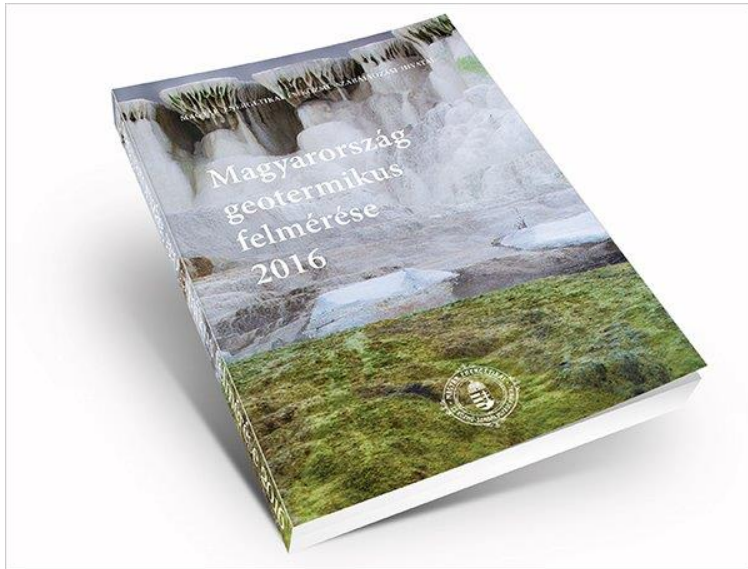
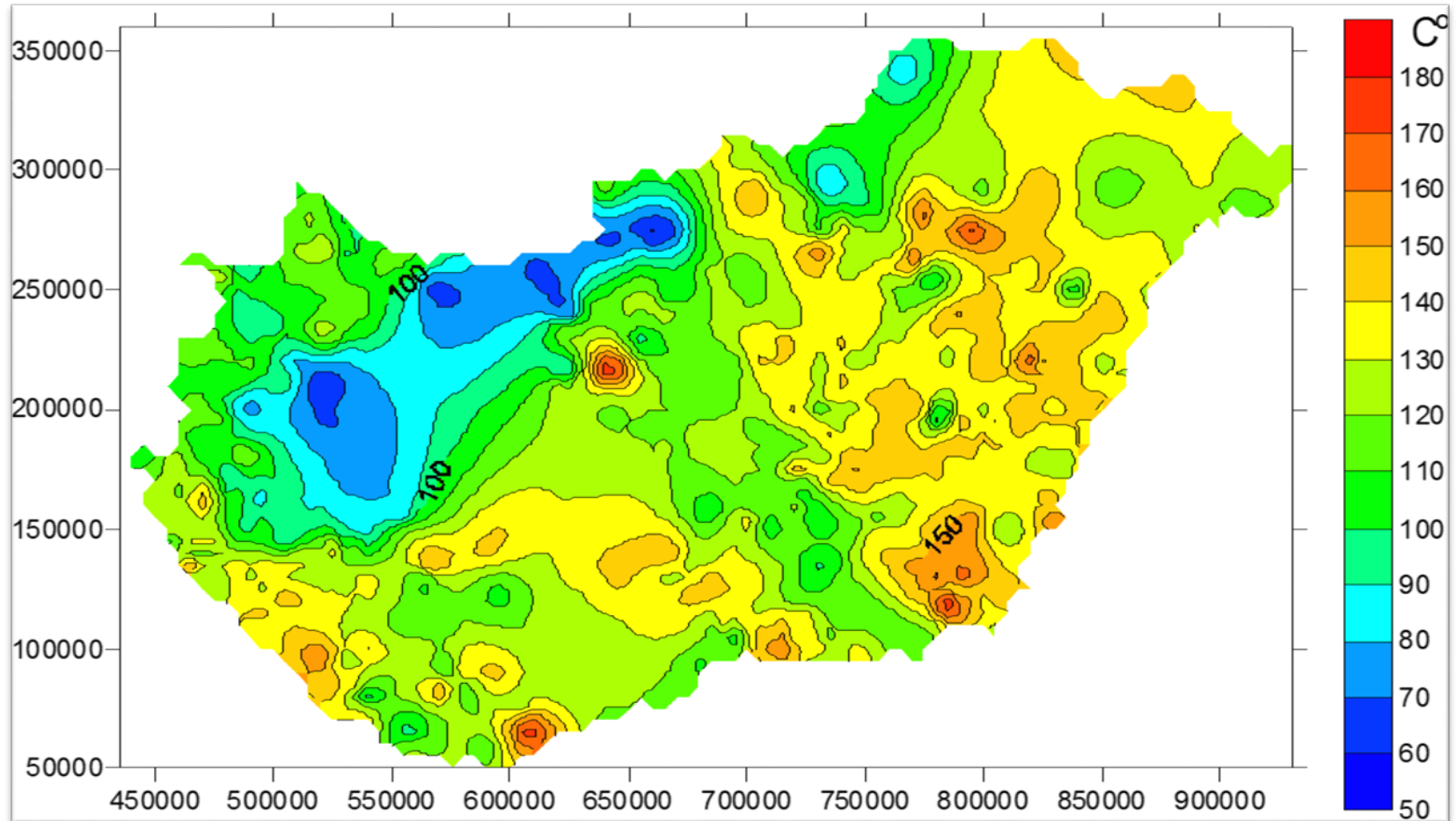


Geothermal Energy in Hungary



Dr. Attila Nyikos
Vice-President

Geothermal Potential - 1



From the geological standpoint, Hungary has been well explored



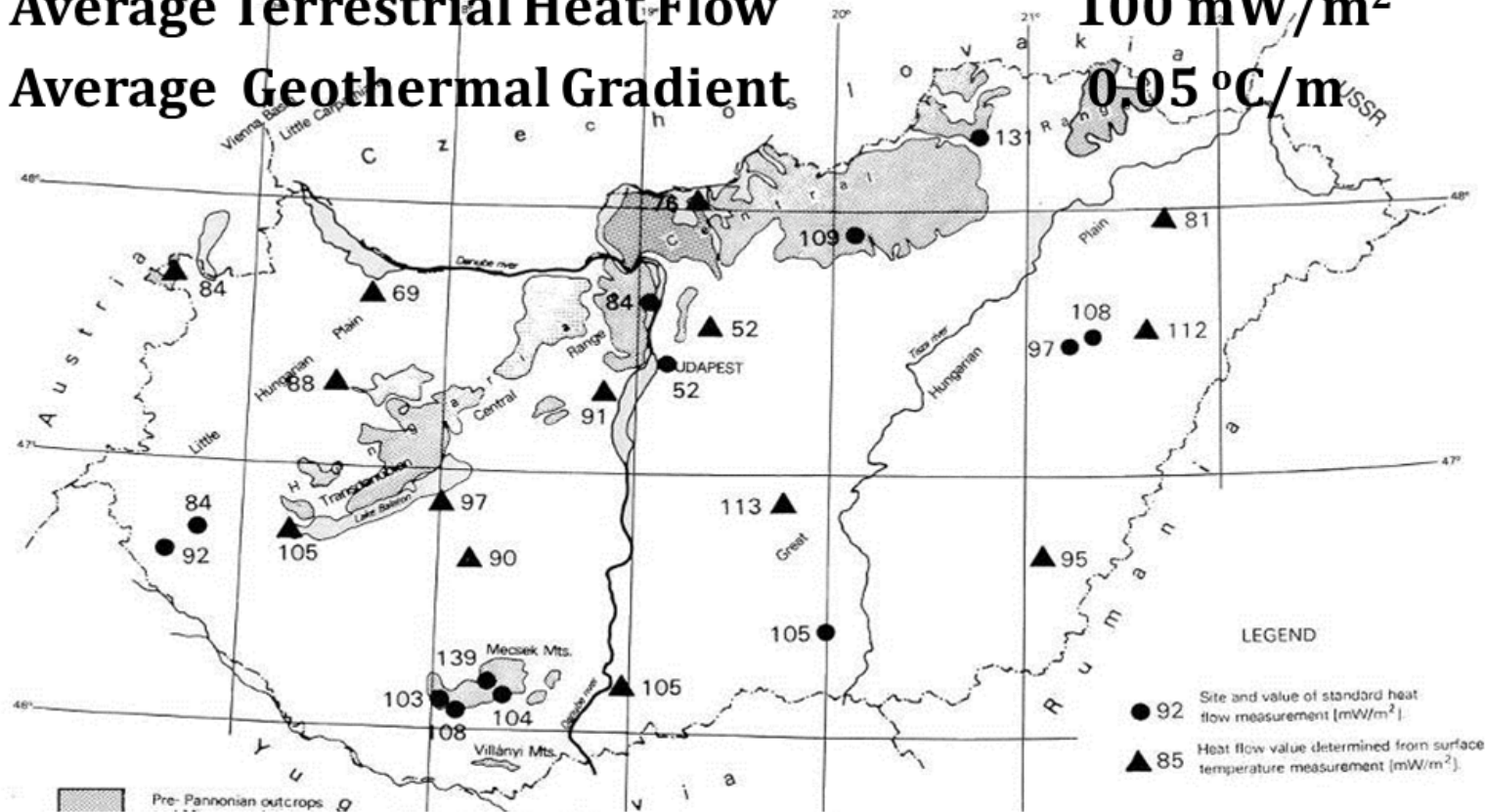
SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

Geothermal Potential-2

Average Terrestrial Heat Flow
Average Geothermal Gradient

100 mW/m²

0.05 °C/m



Porous Sandstone Aquifer Area

40,000 km²

Fractured Limestone Aquifer Area

10,000 km²



SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

Wellhead temperatures and usage

$T_{wh} [^{\circ}C]$	Bathing	Agriculture	Communa l	Industria l	Multi- Purpose	Σ
30-40	250	278	2	102	67	699
40-50	213	29	32	24	58	356
50-60	98	51	4	22	26	201
60-70	66	39	17	12	41	175
70-80	14	25	8	9	25	81
80-90	6	37	3	6	9	61
90-100	5	33	5	1	1	45
100<		1	2		1	4
Σ	652	493	73	176	228	1622



Thermal well is any well which produces at least 30 °C water.

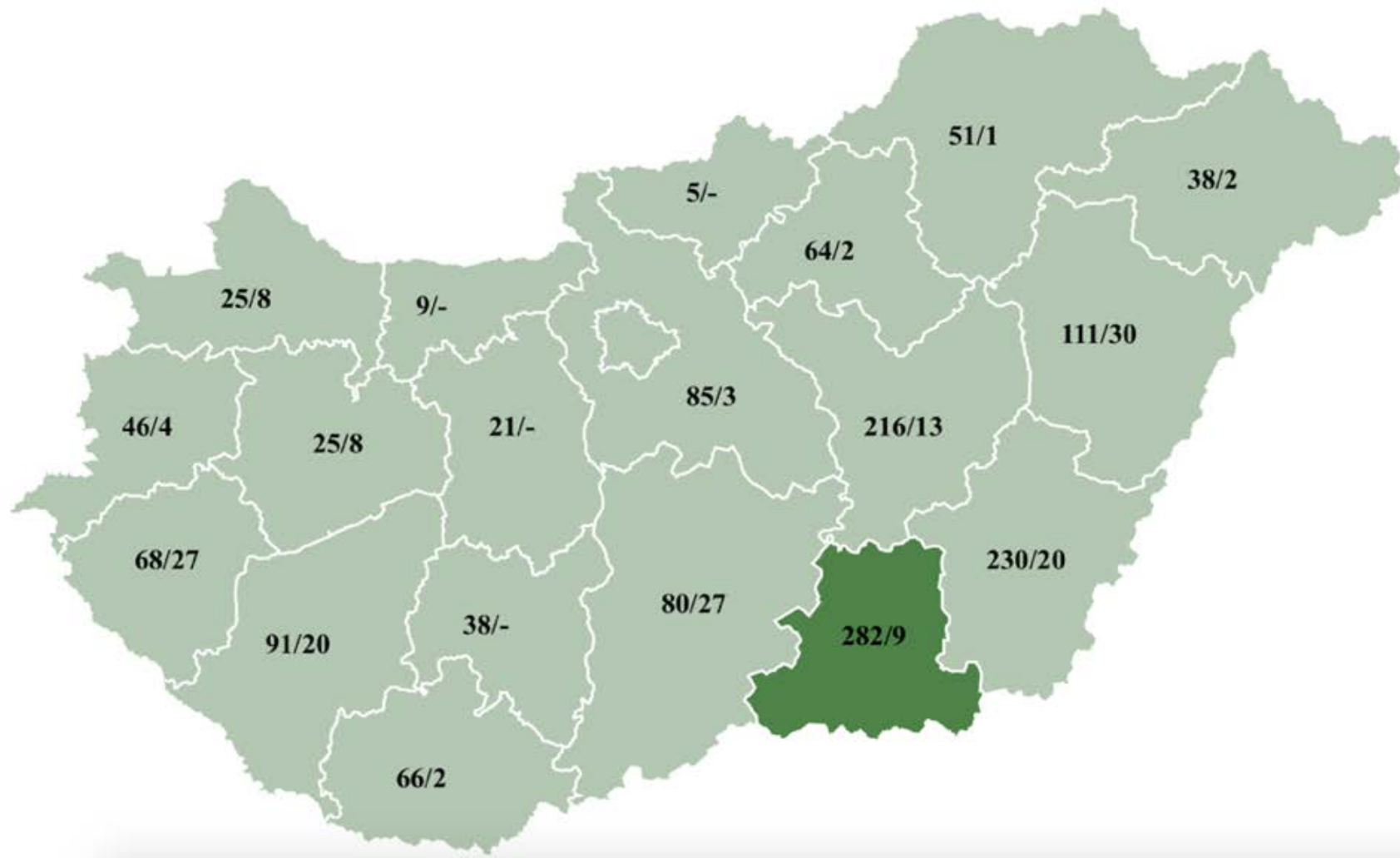
Geothermal Energy Production

Heating residences	33.1 MWt
District heating	186.6 MWt
Green house heating	271.0 MWt
Fish farms	6.0 MWt
Livestock	4.0 MWt
Agricultural drying	25.0 MWt
Industrial application	19.0 MWt
Balneology (spas)	352.0 MWt
Ground source heat pumps	42.0 MWt
Total:	938.6 MWt



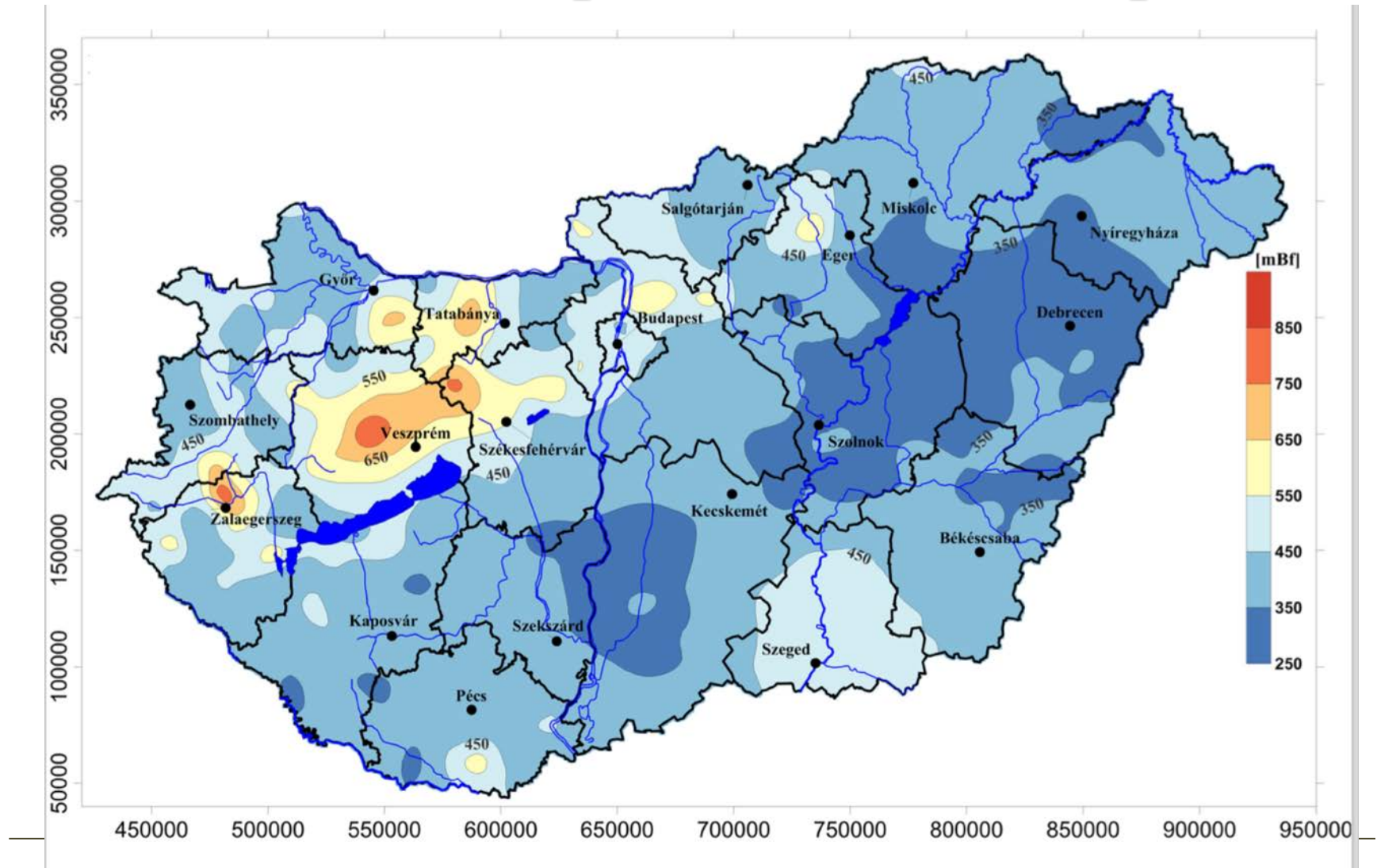
SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

1622 thermal wells/170 abandoned CH wells



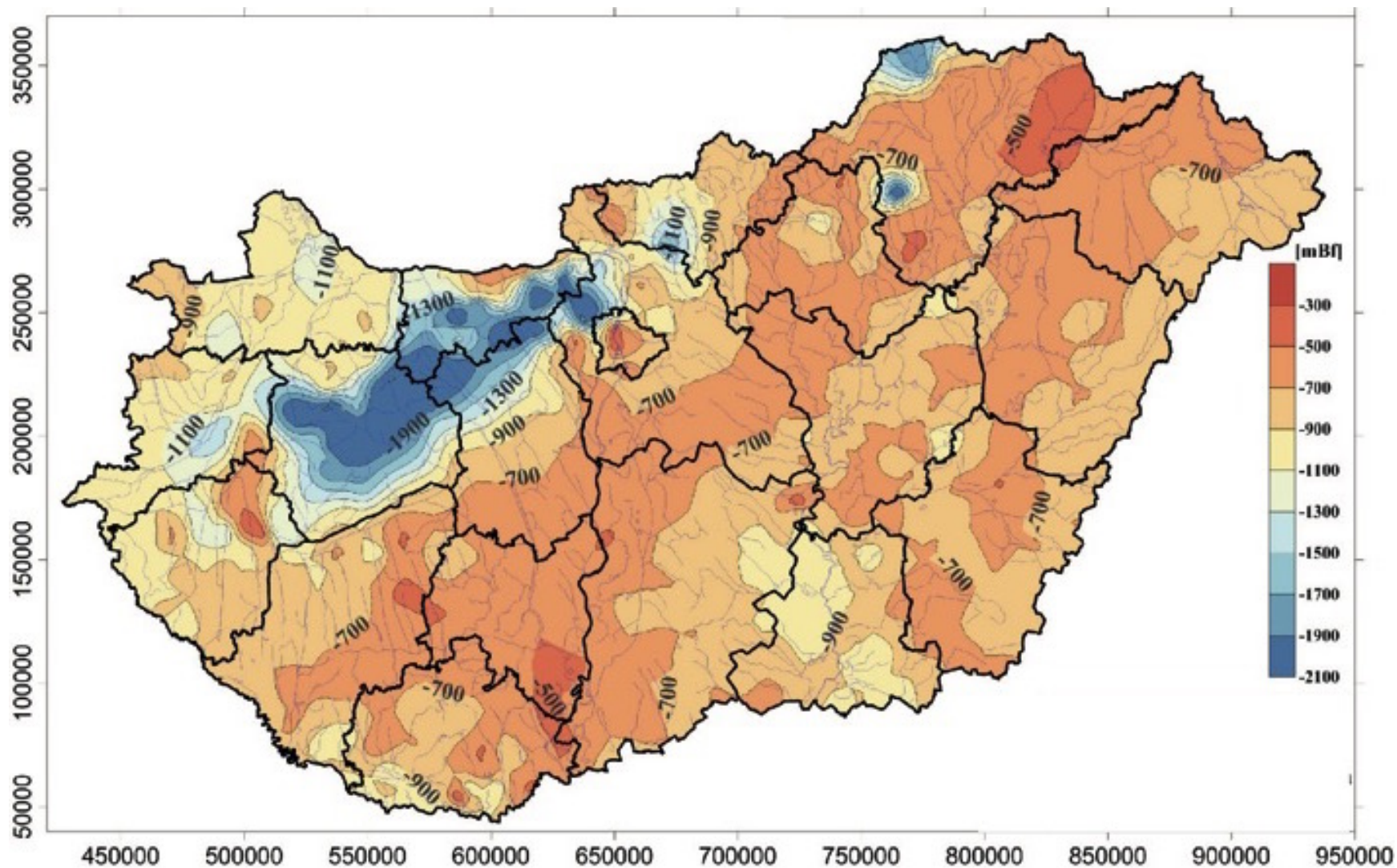
SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

Geo-isothermal Map of 30 °C rock temperature



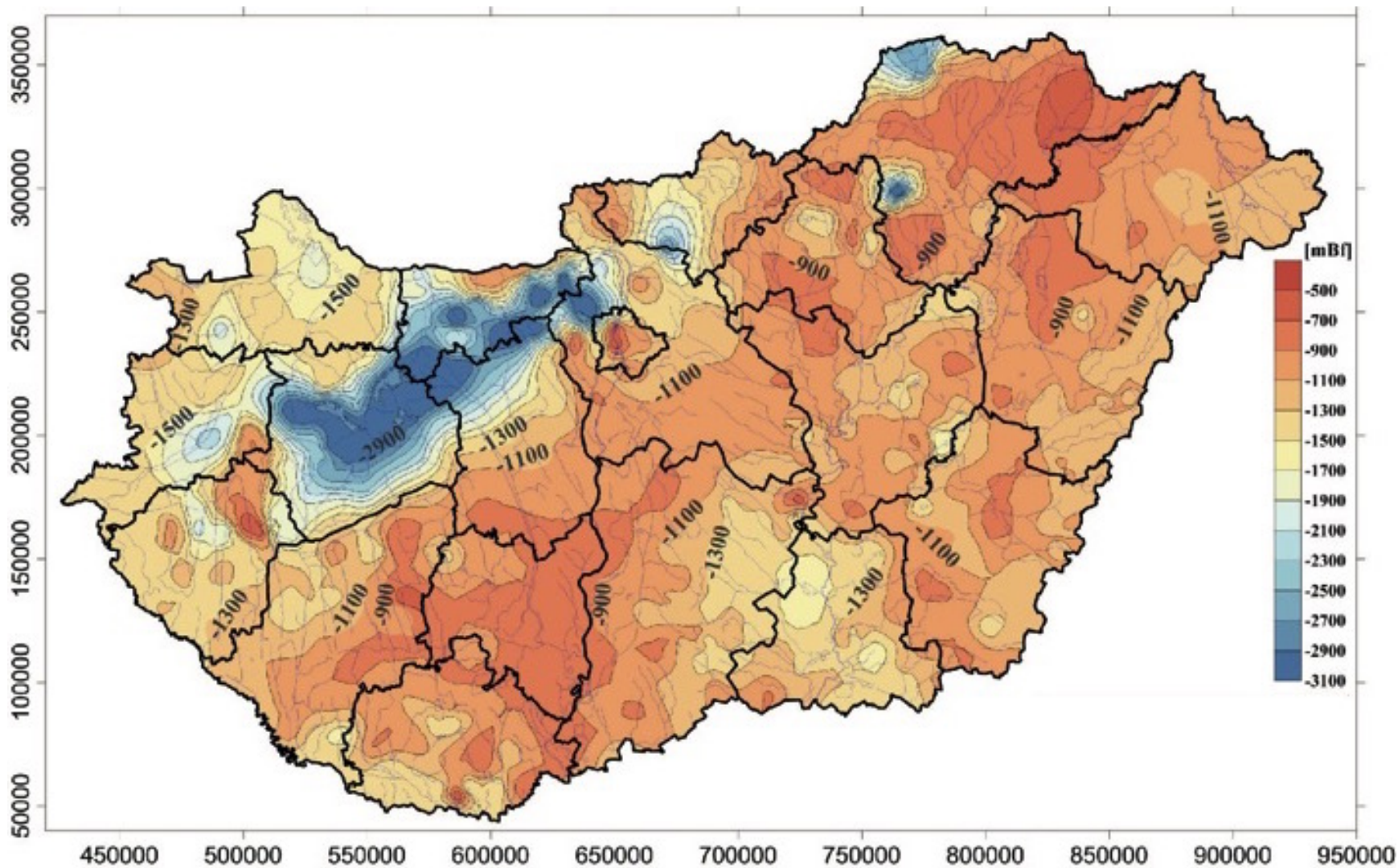
SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

Geo-isothermal map at 50 °C rock temperature



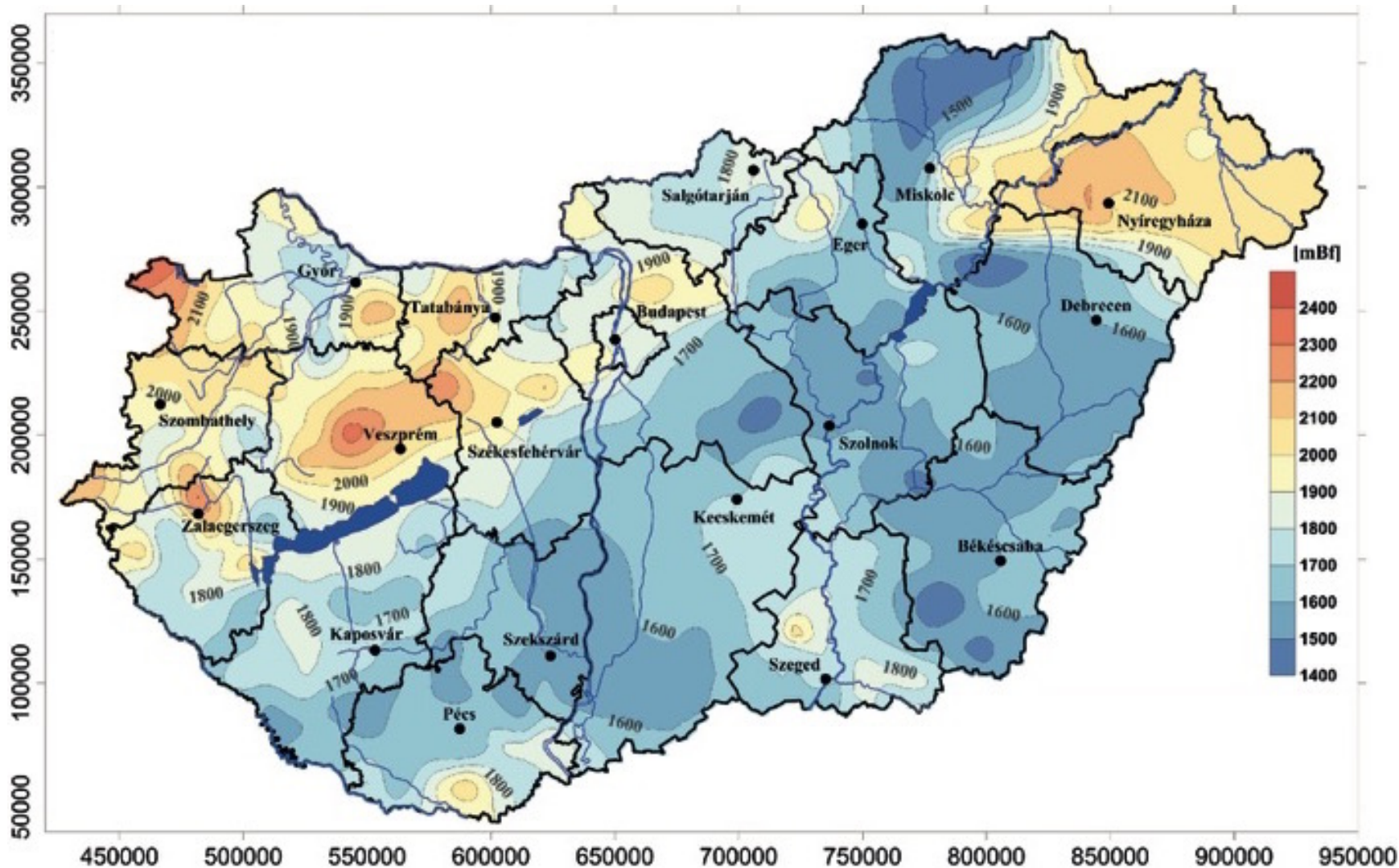
SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

Geo-isothermal map at 70 °C rock temperature



SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

Geo-isothermal Map of 90 °C rock temperature



SECURITY OF SUPPLY • AFFORDABILITY • QUALITY OF LIFE

Summary

- **Hungary has favorable natural conditions for geothermal energy production, but actual production and utilization lags behind expectation.**
- **Until now, there was no accurate, reliable and comprehensive geothermal map for the entire country.**
- **The value of this new geo-isothermal atlas is that it provides an accurate, comprehensive and useful map of Hungary's geothermal resources; it will help show all 19 Hungarian county governments how they can profit from their geothermal potential.**



**Thank you for your kind
attention!**

nkeht@mekh.hu

www.mekh.hu