

Potential of Green Walls in Reducing Temperature, Fine dust, NO_x and CO₂ Assimilation in Cities

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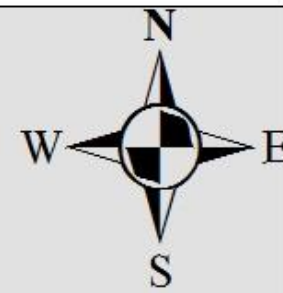
Supervised by: **Prof. Dr. Hans G. Edelmann**

Department of Biology and Its Didactic



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Stadt Köln Repräsentative Konzentrationspfade (RCP 2.6)








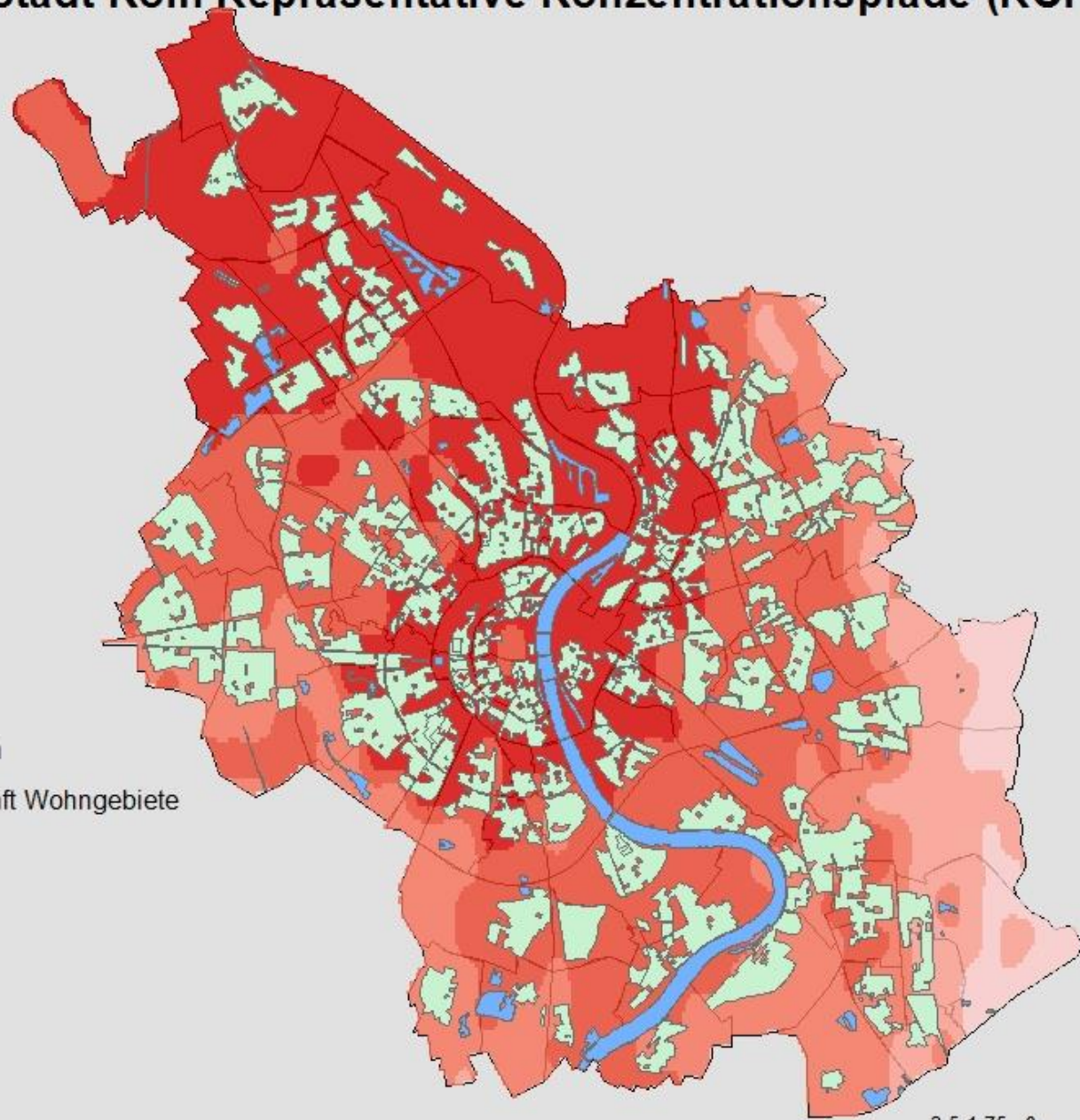
Legend

-  Wasserflächen
-  Aktuell/ Zukunft Wohngebiete

RCP2.6

Temp. °C

-  25.9 - 26.3
-  26.3 - 26.4
-  26.4 - 26.5
-  26.5 - 26.6
-  26.6 - 26.8



3.5 1.75 0 3.5 7 10.5 14 Kilometers

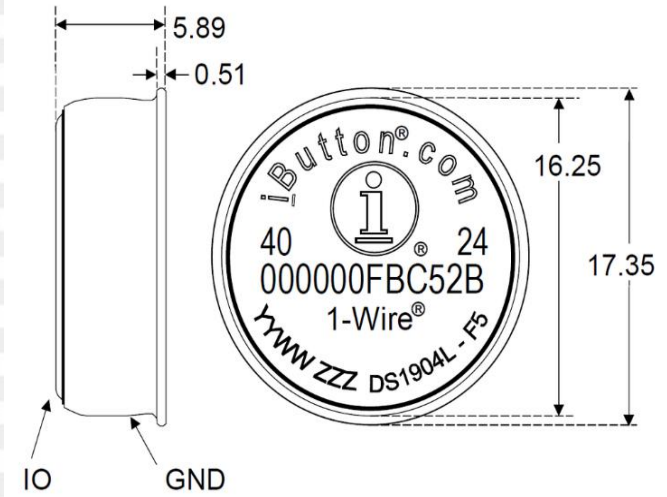


1770 ©2017

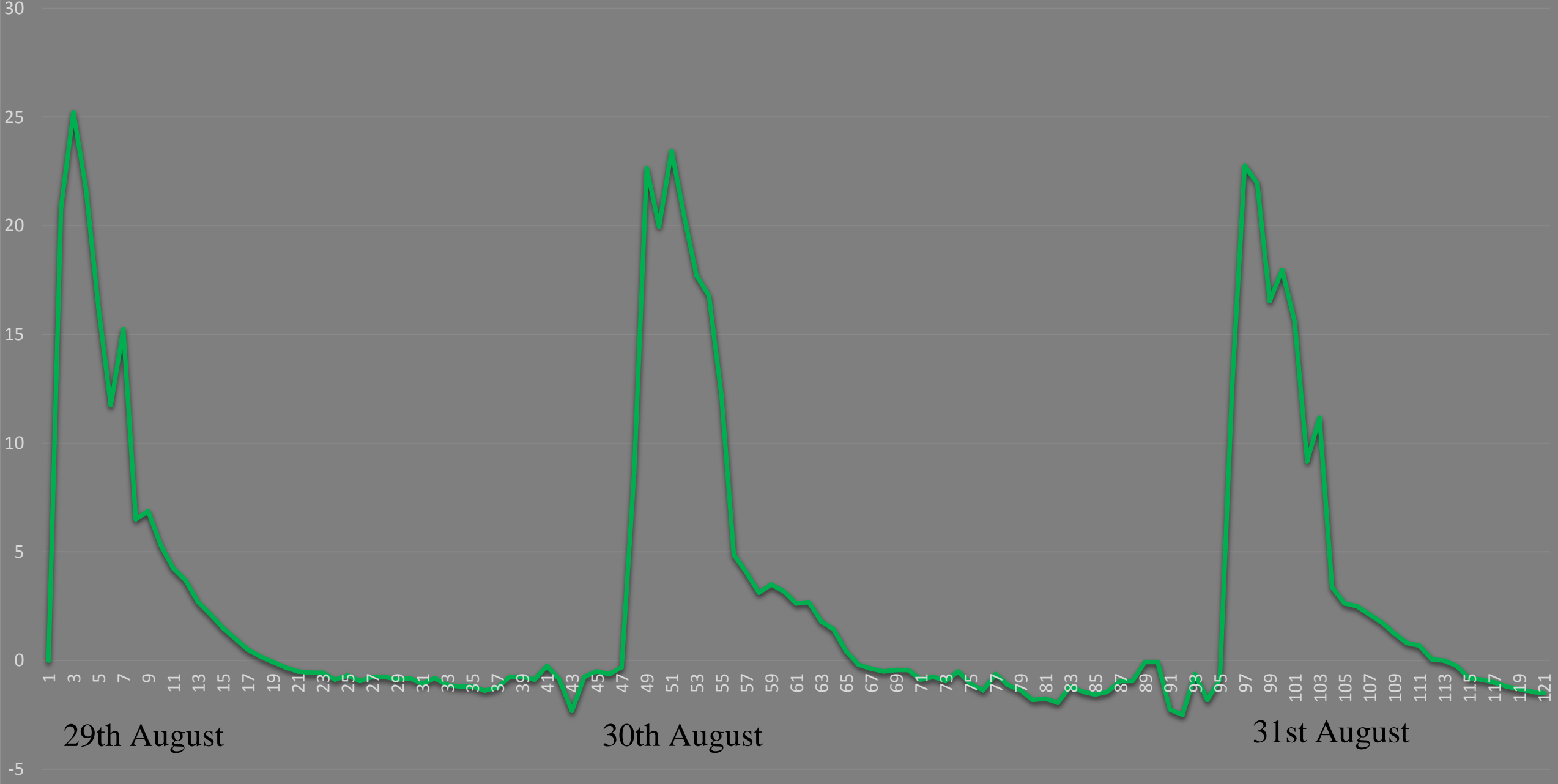
64 m eye alt 326 m



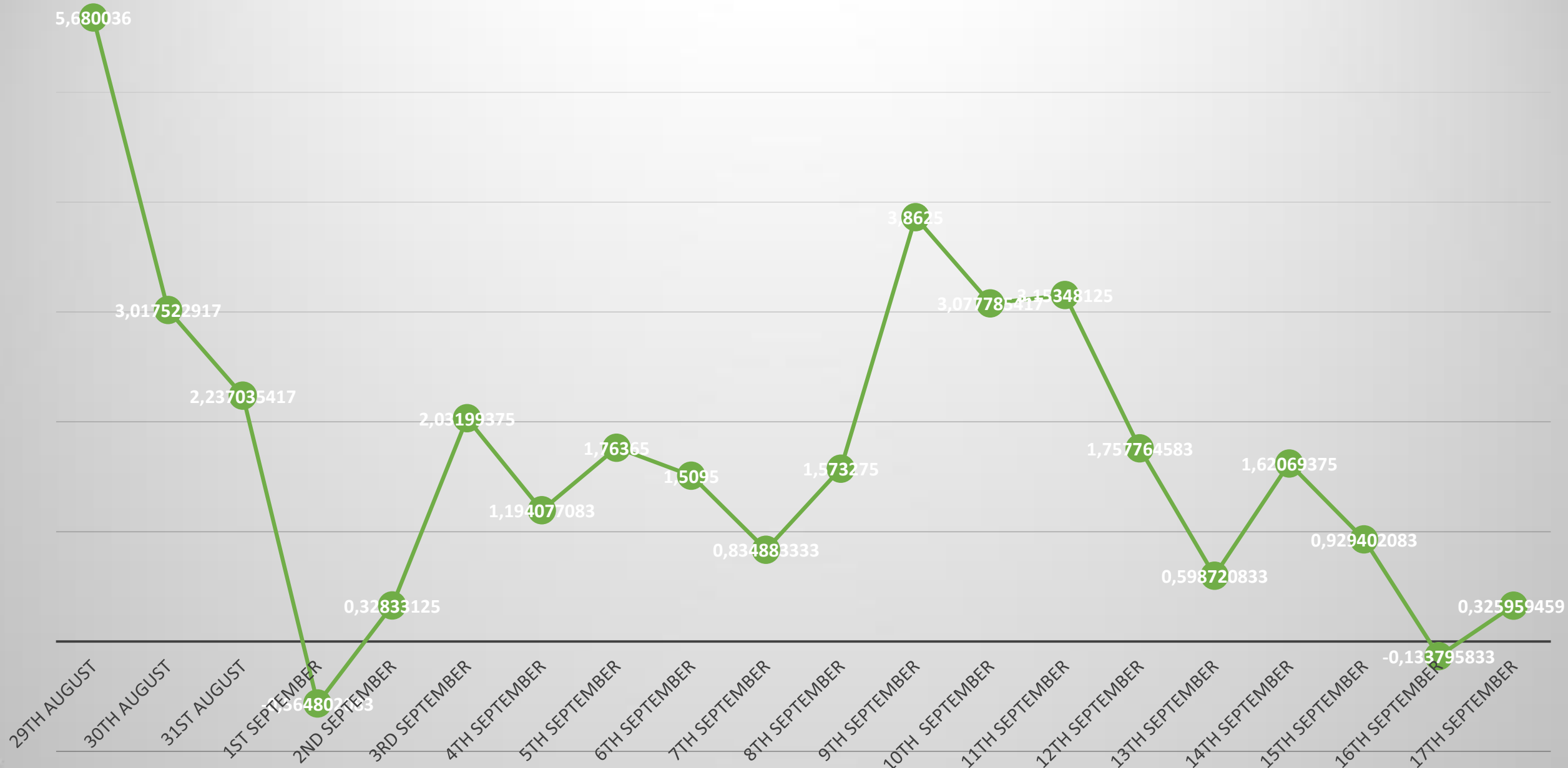
F5 MicroCan™



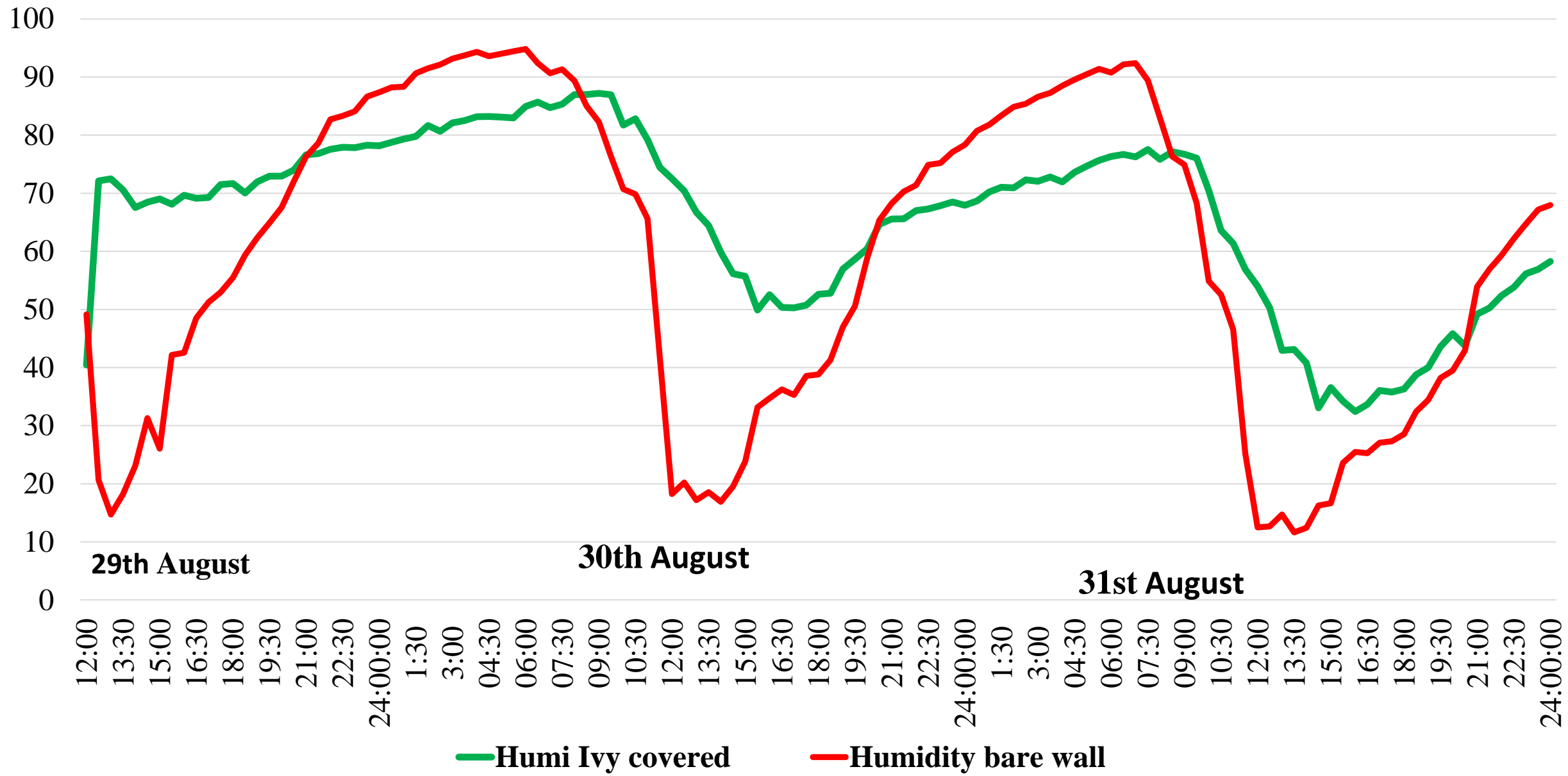
Difference in Temperatures (ivy covered - bare wall)



Average daily cooling and insulation



Humidity Profile on a warm day



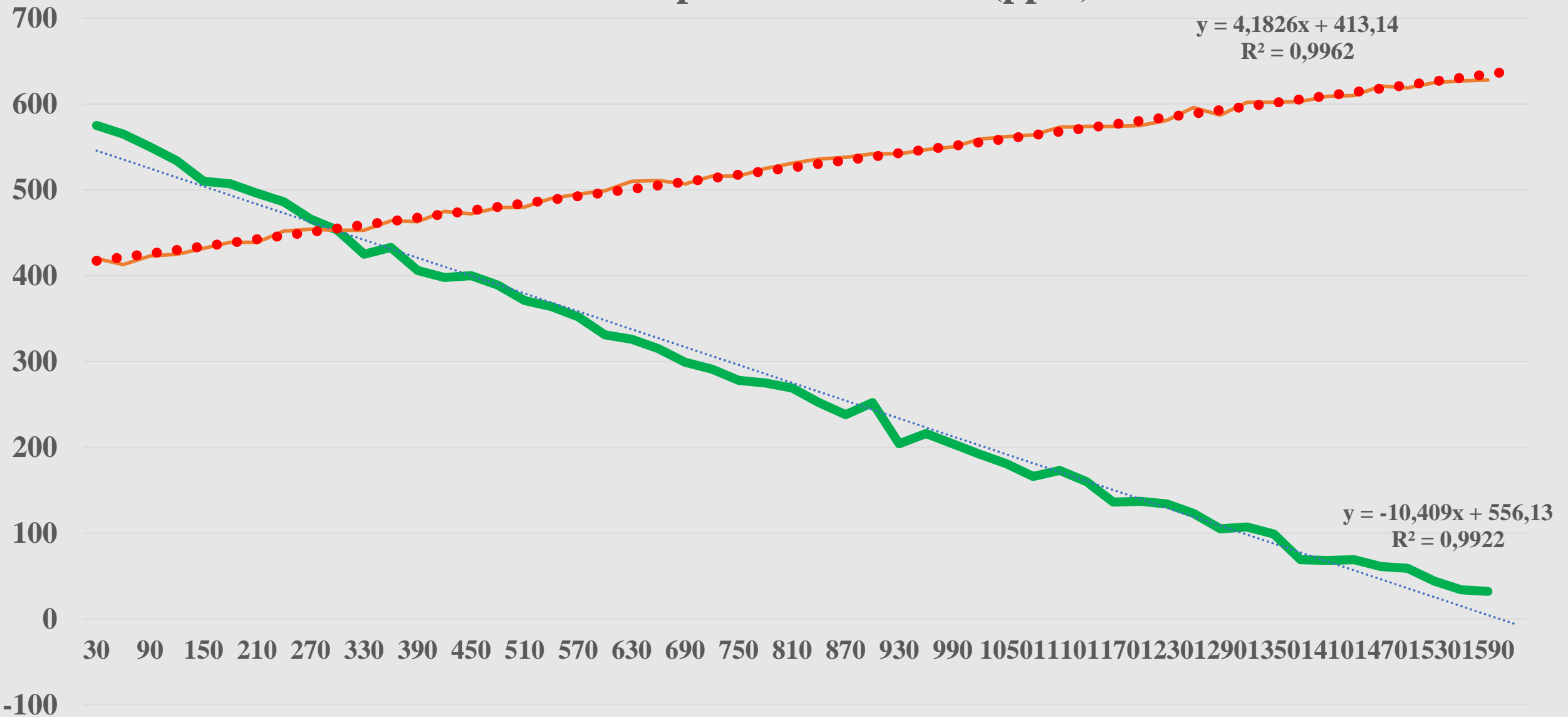
Absorption of NO_x by Ivy Plants

	Theoretical Time (Minutes)	Empty Chamber (Minutes) CONTROL	Parafilm Covered Soil (Minutes) + IVY	Uncovered Soil (Minutes) + IVY
NO _x Absorption	30	27.7	21.2	6
		25	18.8	15.8

- Starting Concentration = 170 ppb NO_x (170 parts per billion = 340 microgram/cubic meter)
- Potential to absorb of 215 µg/m³ in six (6) minutes; Equivalent to 5 mg per day for a surface area of 50 square meters

	Theoretical time in minutes	Empty Chamber (minutes)	Parafilm Covered Soil (minutes)	Uncovered Soil (minutes)
PM 2.5 adsorption in Minutes	30	24.39	16.66	8.9285
		26.315	12.658	4.7846
starting concentrations of about 999 $\mu\text{g}/\text{m}^3$				

CO2 Absorption and Release (ppm)



— CO2 Absorption under light (ppm)

— CO2 Release in Darkness (ppm)

..... Linear (CO2 Absorption under light (ppm))

••••• Linear (CO2 Release in Darkness (ppm))



es Lafayette – Berlin

iving walls in Atlanta

Conclusion

- **Plenty of unused surface area**
- **Potential benefits – ranging from the above- mentioned, sound reduction.....**
- **Rain water retention in external areas thereby reducing the strain on drainage systems.**
- **Enhancement of Biodiversity in the City landscape**



THANK YOU
for your time