
MODELING SCENARIOS: LOMBARDY AND TRENTINO PROVINCE CASE STUDIES



01.12.2020 | Project Meeting

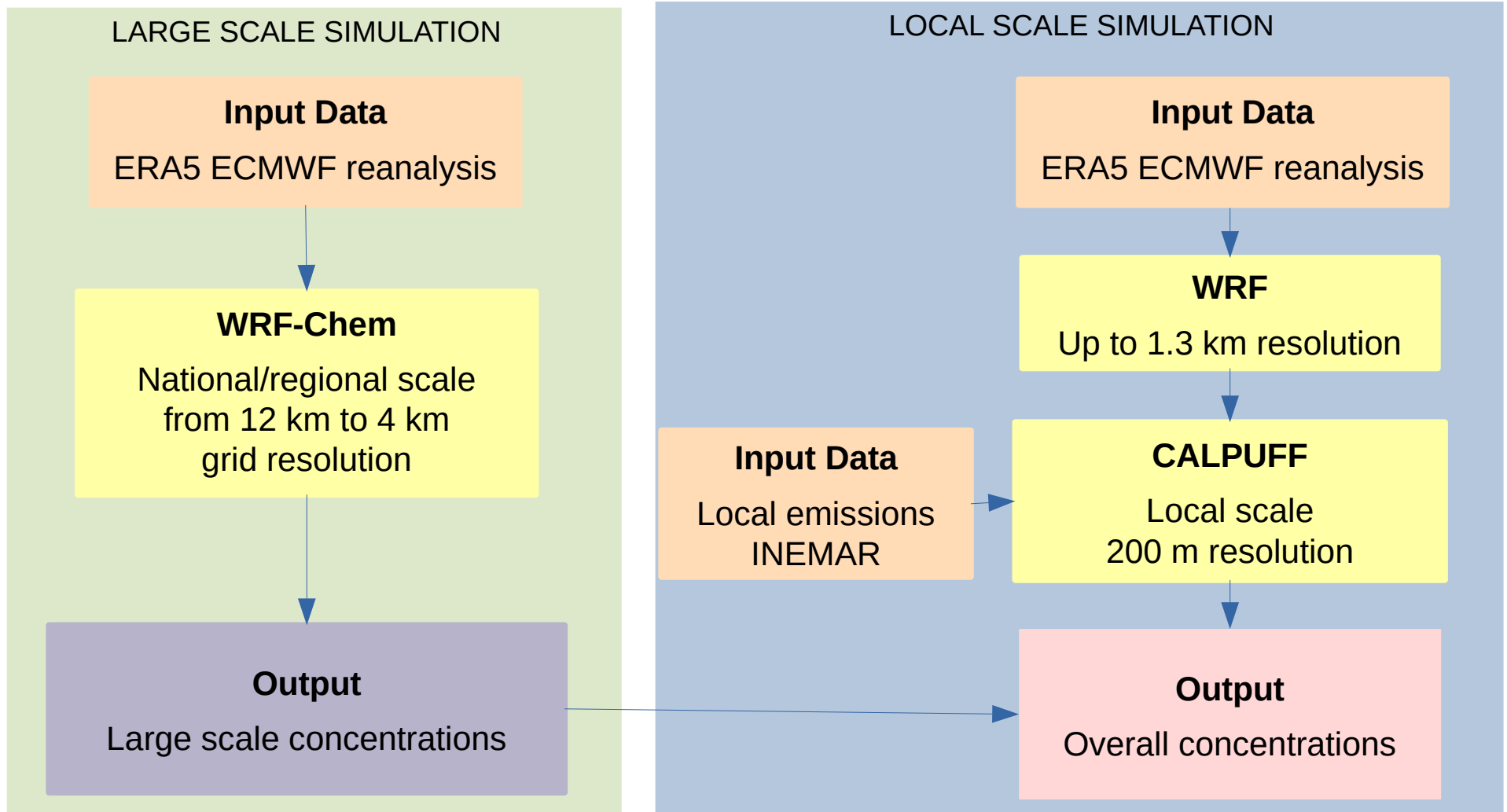


WPT5 modeling simulations



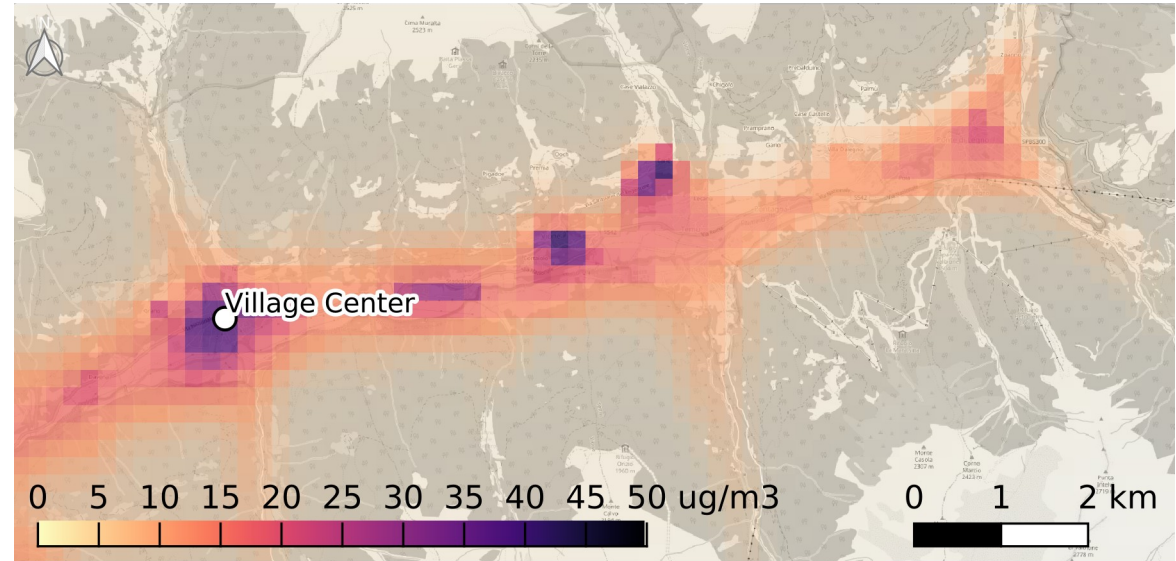
BB-CLEAN | CISMA srl – Elena Tomasi, PhD

BB-CLEAN WRF-Chem/CALPUFF Modeling Chain

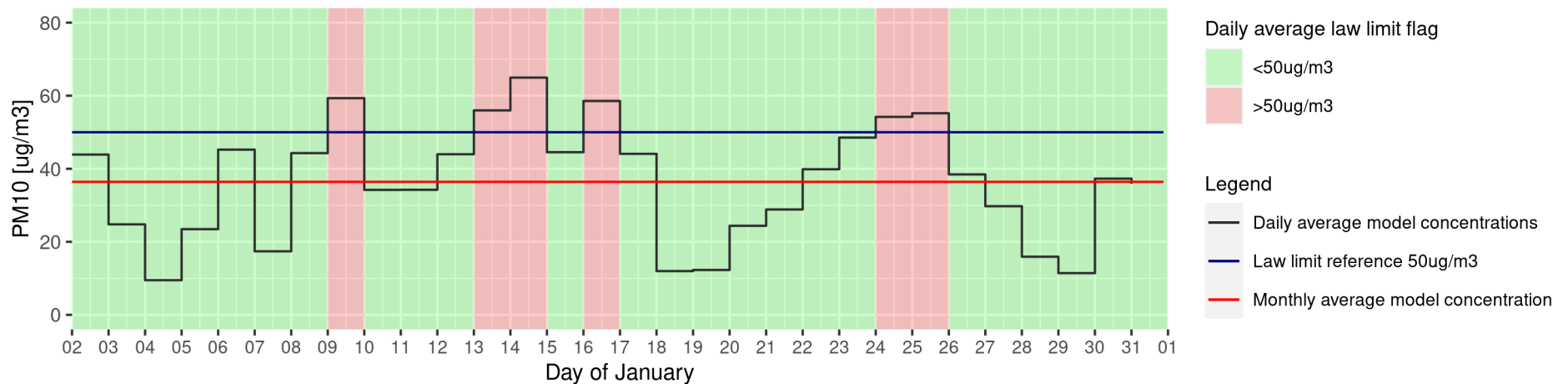


Veza d'Oglio Case Study: Status quo

Monthly PM10 average concentration on January 2020

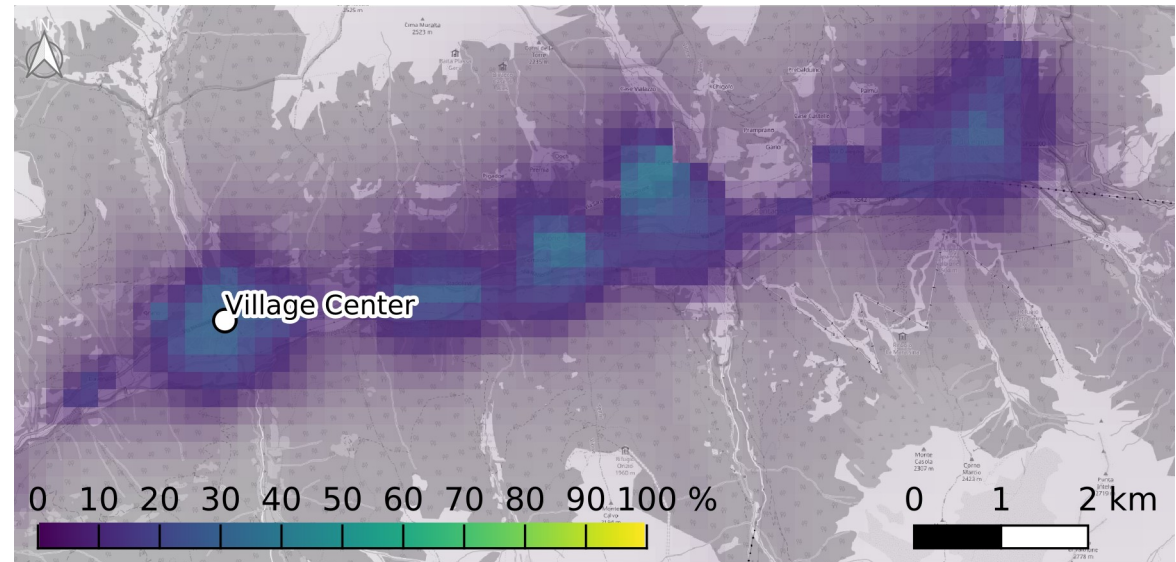


Daily PM10 average concentrations on January 2020

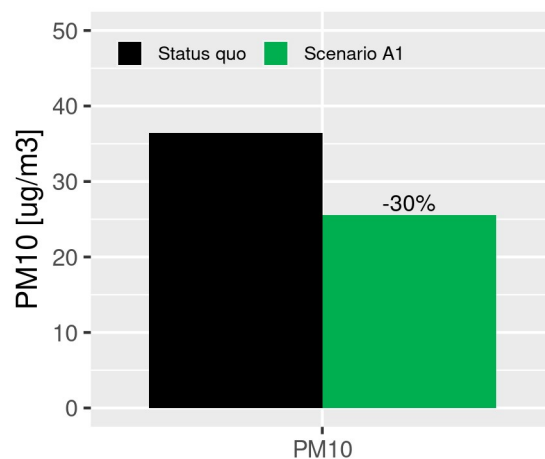


Scenario A1
 Replacement of 50% of old wood burning stoves/boilers with latest pellet stoves/boilers

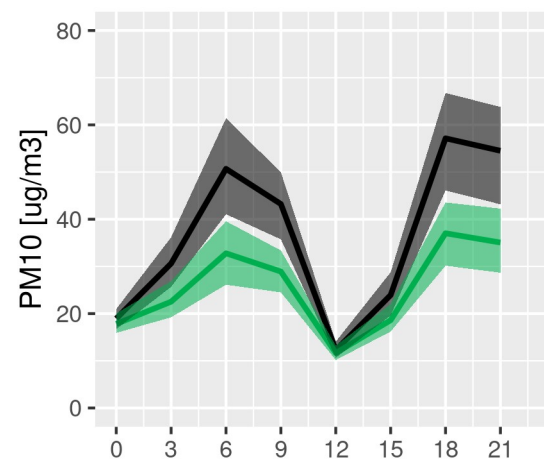
Percentage variation of average PM10 concentration



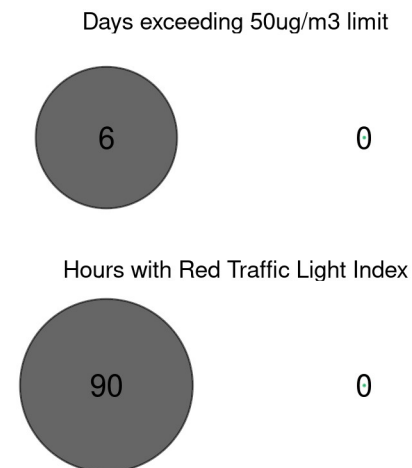
Average concentration



3-hourly daily cycle



Critical events

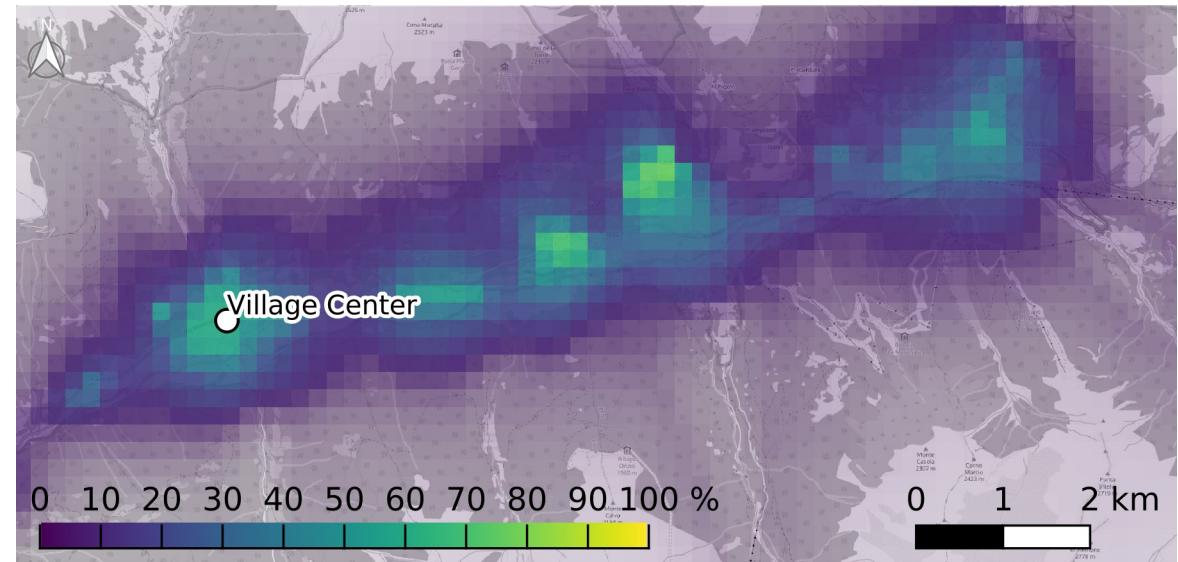


CO2 flux (domain)

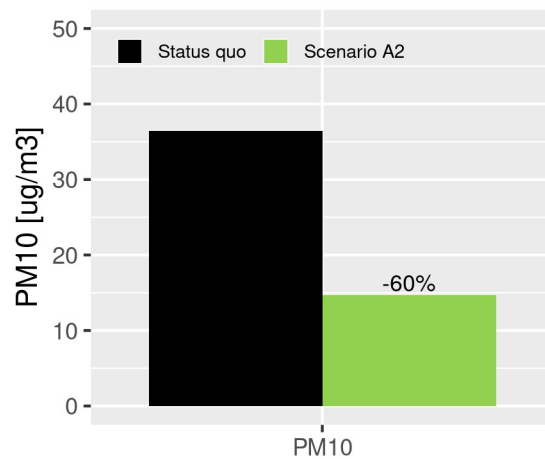
neutral

Scenario A2
 Replacement of 100% of old wood burning stoves/boilers with latest pellet stoves/boilers

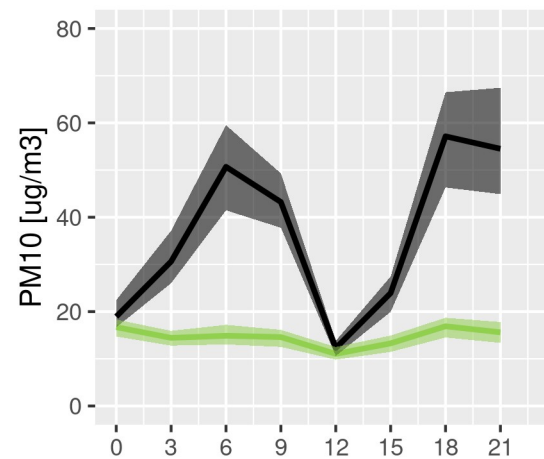
Percentage variation of average PM10 concentration



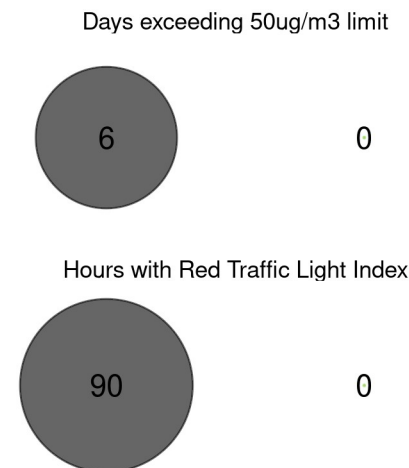
Average concentration



3-hourly daily cycle



Critical events

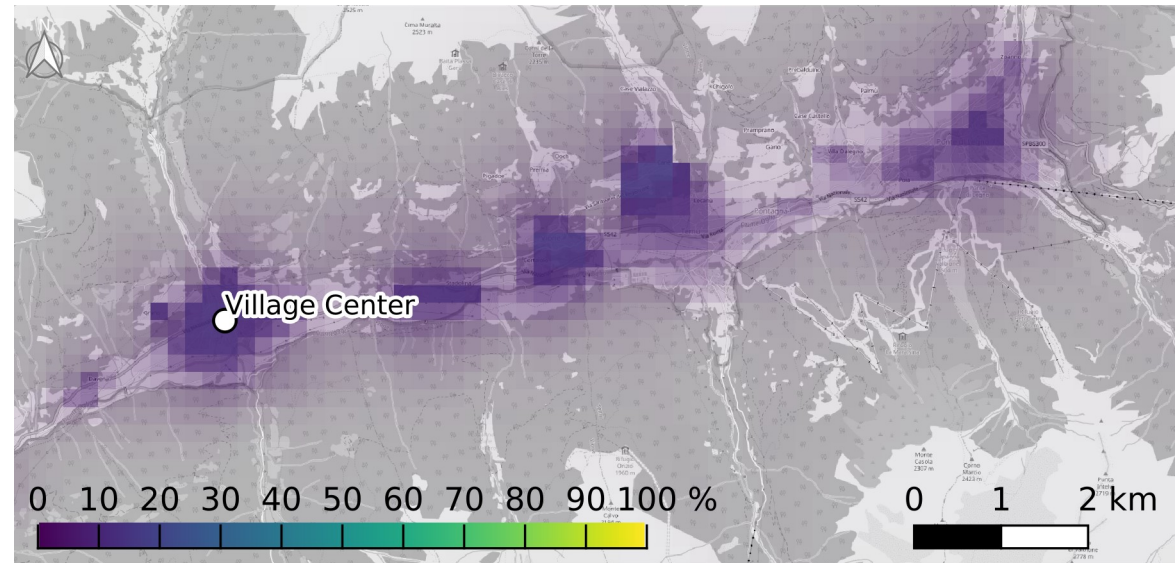


CO2 flux (domain)

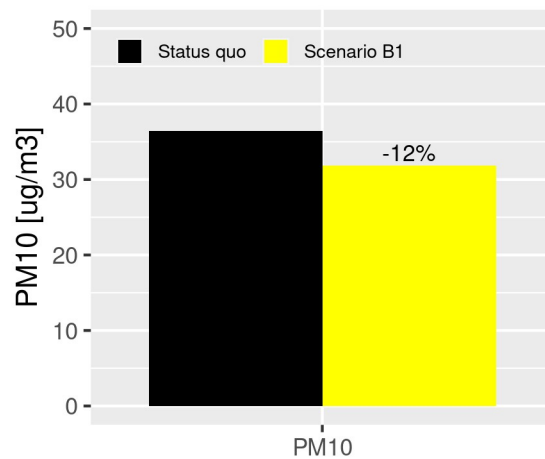
neutral

Scenario B1
 Best practices for domestic BB
 causes 20% drop in emissions
 from all wood biomass
 appliances

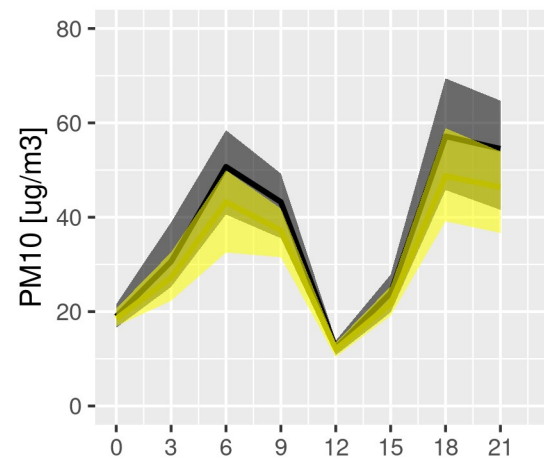
Percentage variation of average PM10 concentration



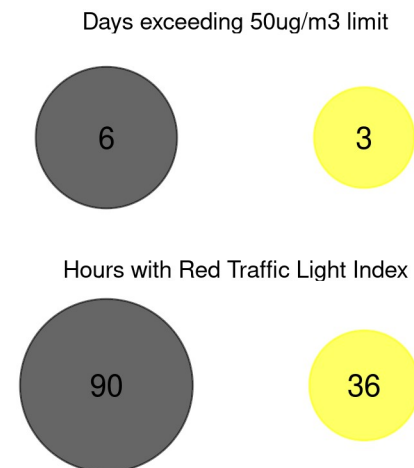
Average concentration



3-hourly daily cycle



Critical events

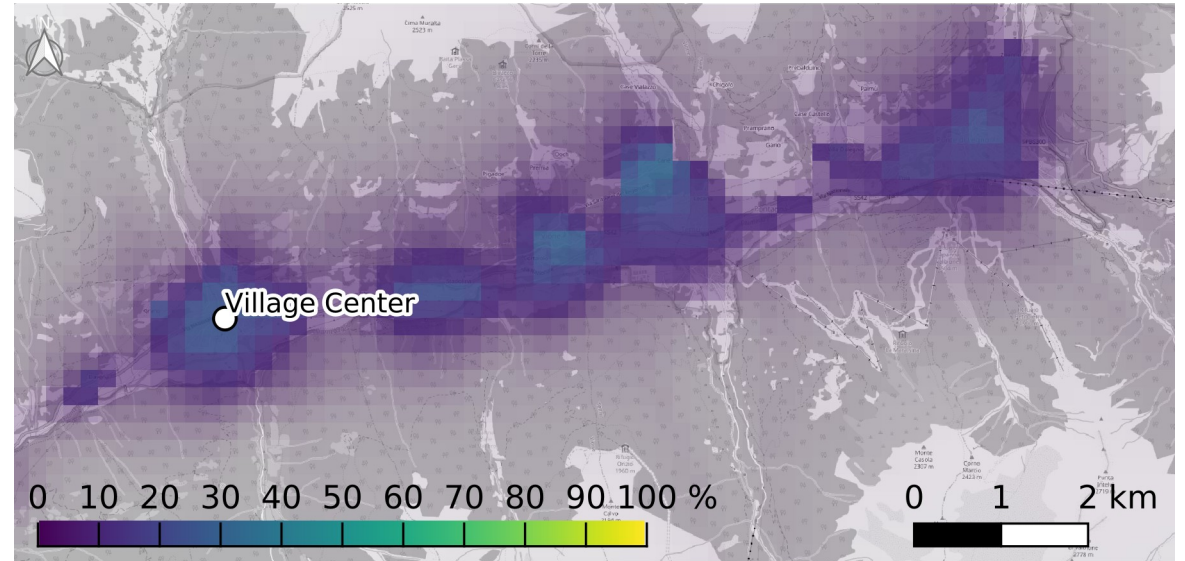


CO2 flux (domain)

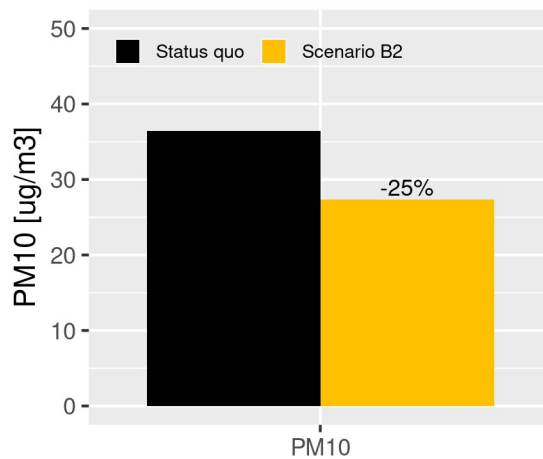
neutral

Scenario B2
 Best practices for domestic BB
 causes 40% drop in emissions
 from all wood biomass
 appliances

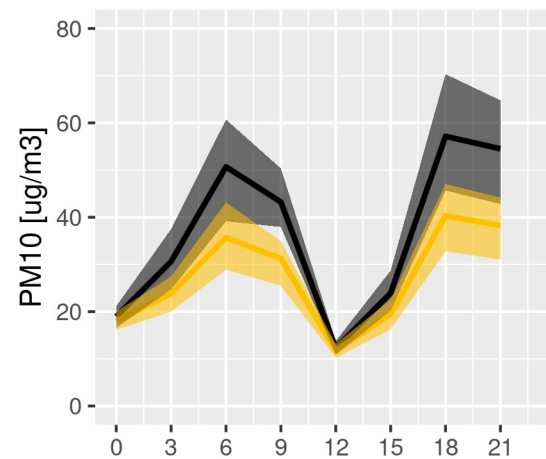
Percentage variation of average PM10 concentration



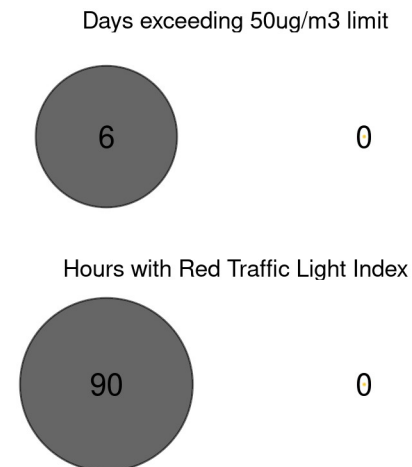
Average concentration



3-hourly daily cycle



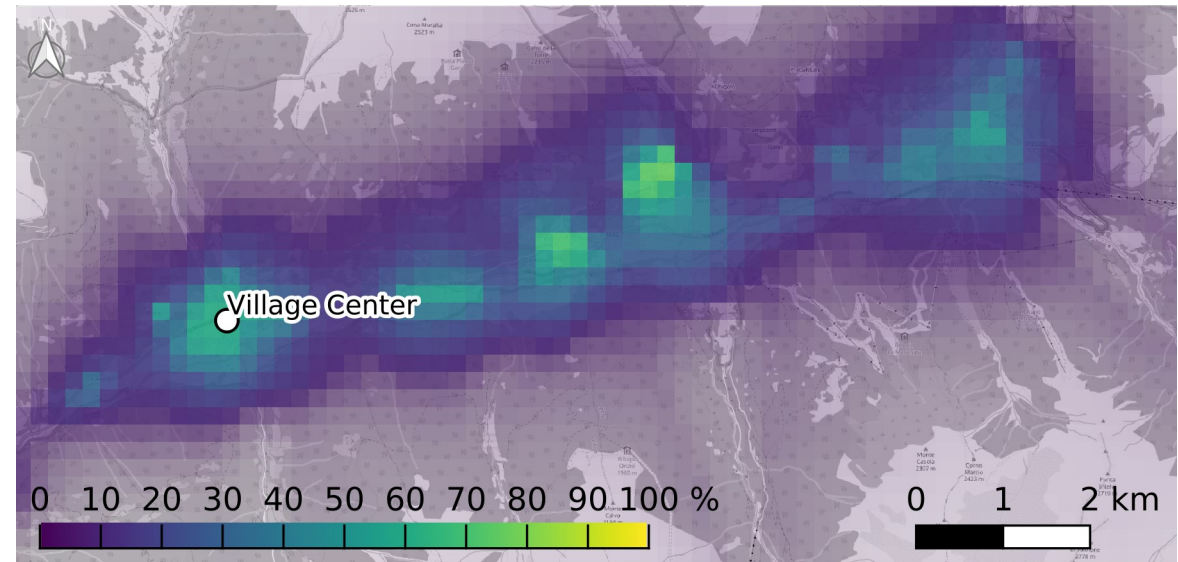
Critical events



CO2 flux (domain)

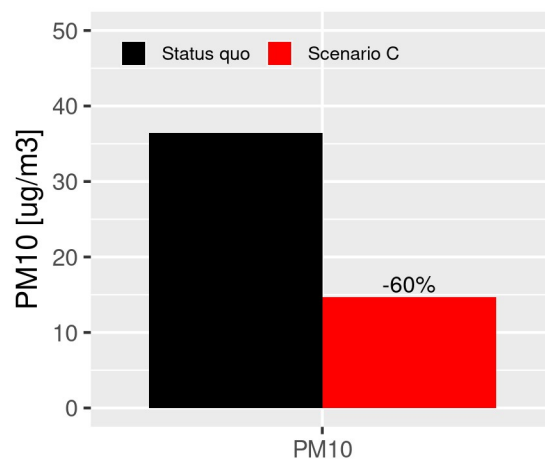
neutral

Percentage variation of average PM10 concentration

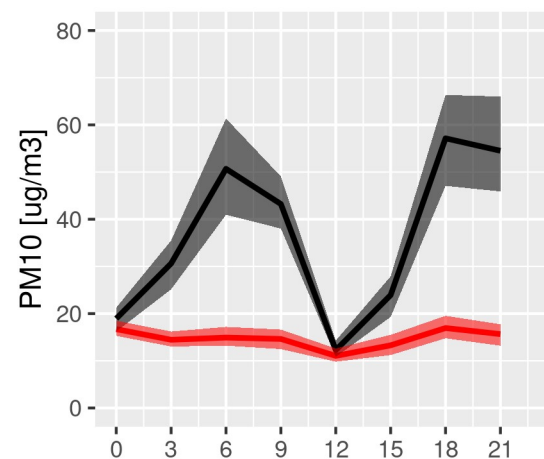


Scenario C
 Replacement of 100% of old primary wood burning heating systems with latest pellet boilers with ESP

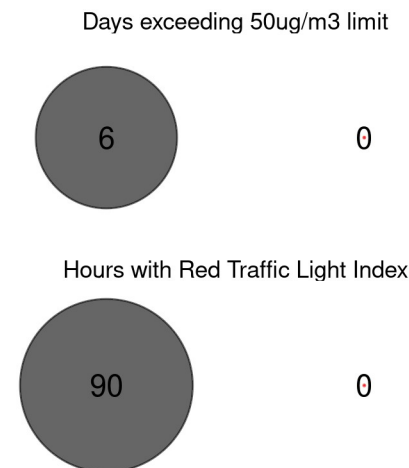
Average concentration



3-hourly daily cycle



Critical events



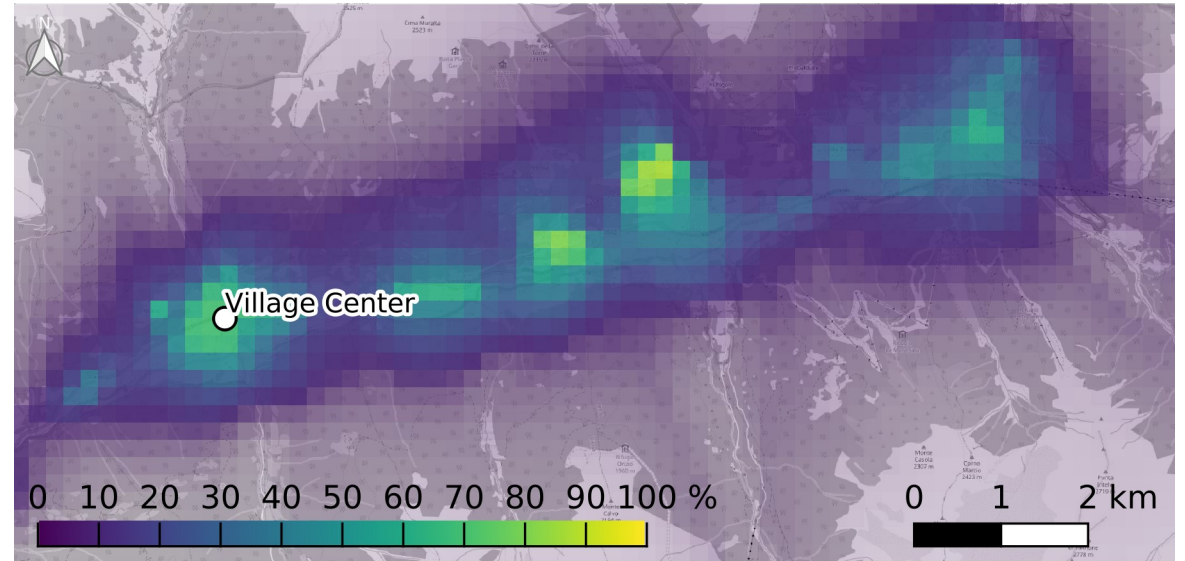
CO2 flux (domain)

neutral

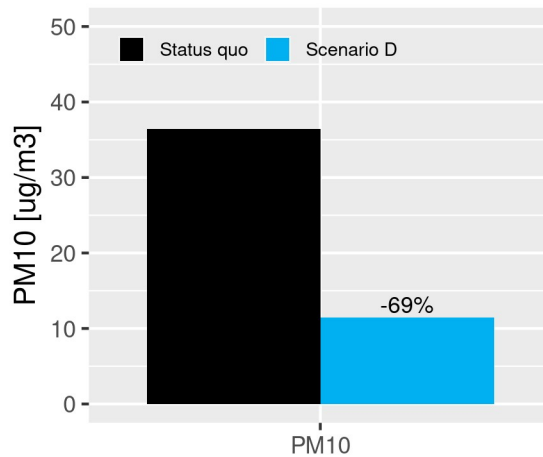
Scenario D

Transition of all wood biomass appliances to natural gas boilers

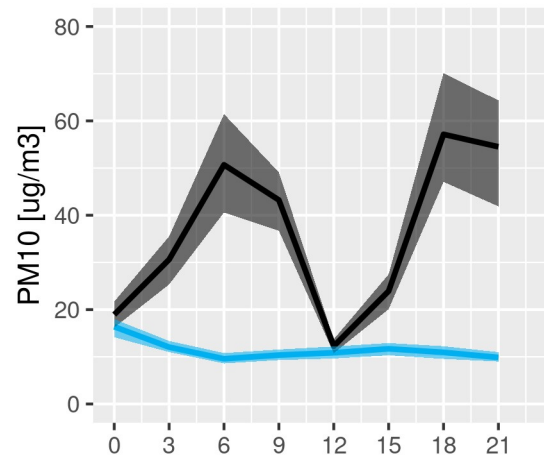
Percentage variation of average PM10 concentration



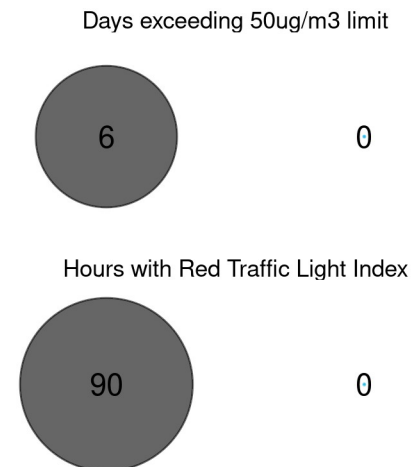
Average concentration



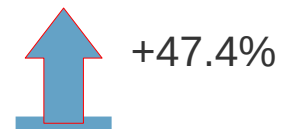
3-hourly daily cycle



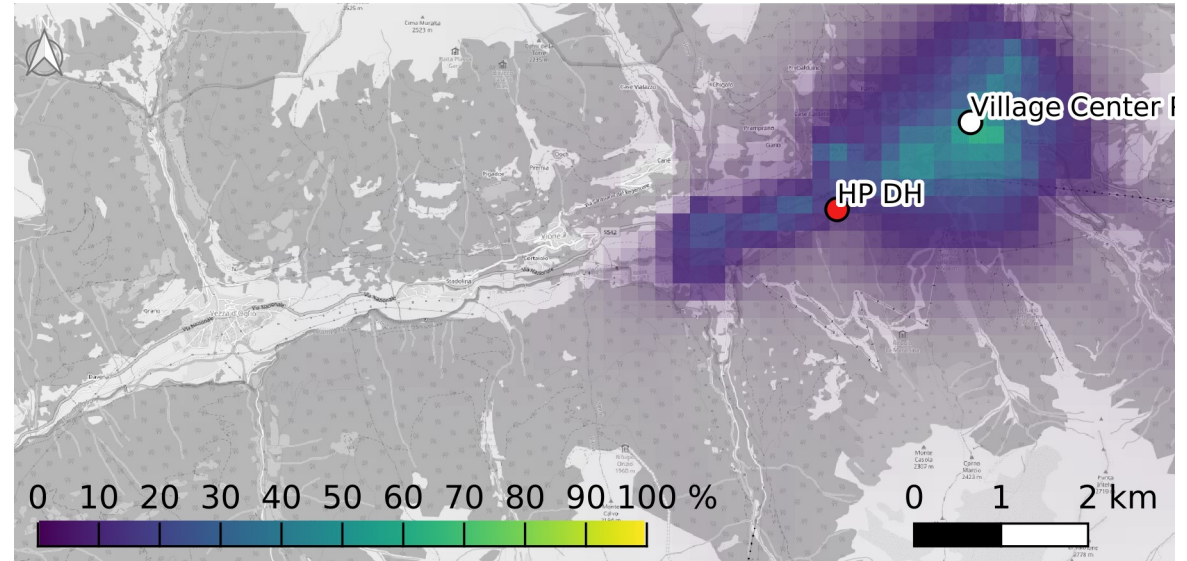
Critical events



CO2 flux (domain)

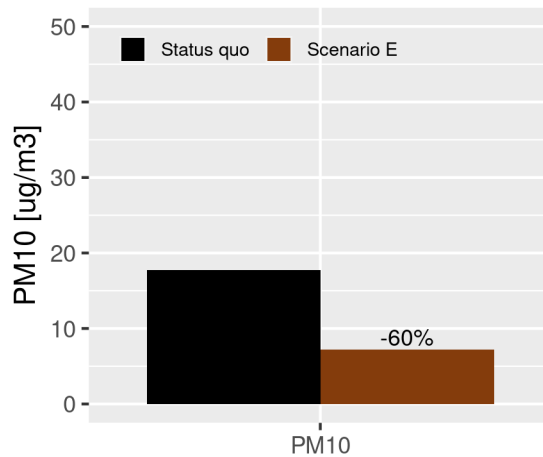


Percentage variation of average PM10 concentration

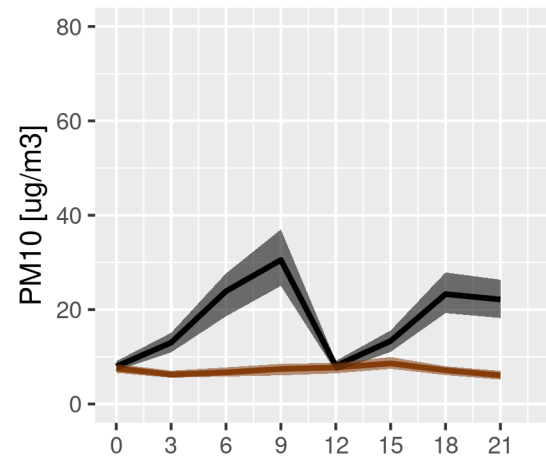


Scenario E
 Realization of a centralized biomass plant district heating

Average concentration



3-hourly daily cycle



Critical events

Days exceeding 50ug/m3 limit

0 0

Hours with Red Traffic Light Index

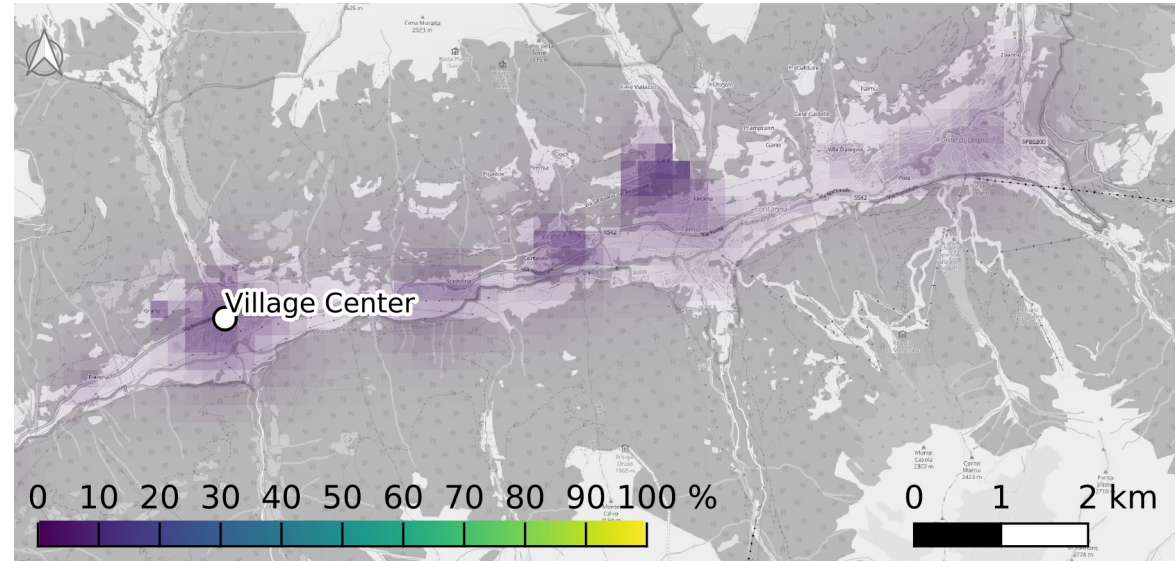
0 0

CO2 flux (domain)

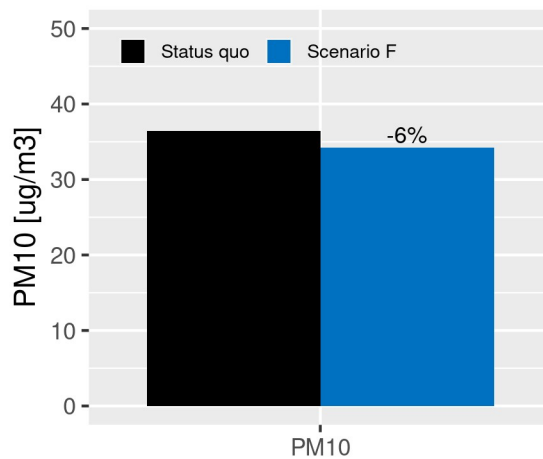
neutral
 ↓
 -44%

Scenario F
 30% of people with secondary heating systems follows the BB-CLEAN mobile app indications

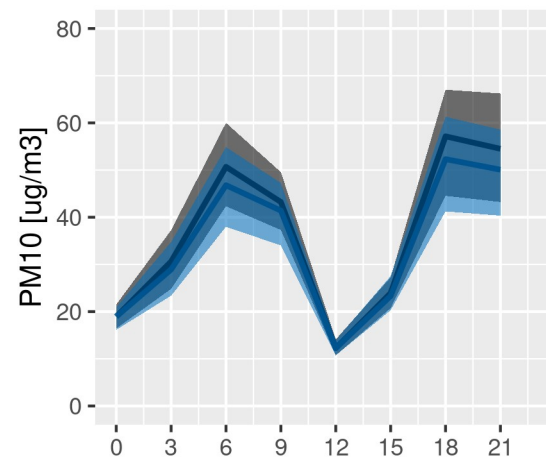
Percentage variation of average PM10 concentration



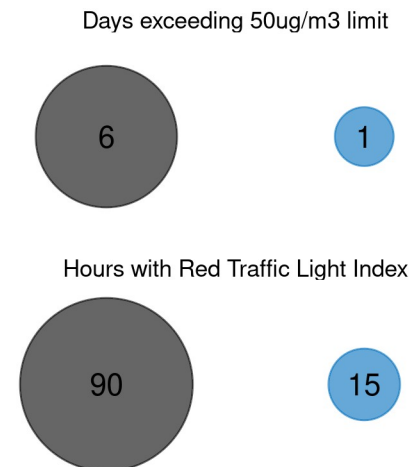
Average concentration



3-hourly daily cycle



Critical events



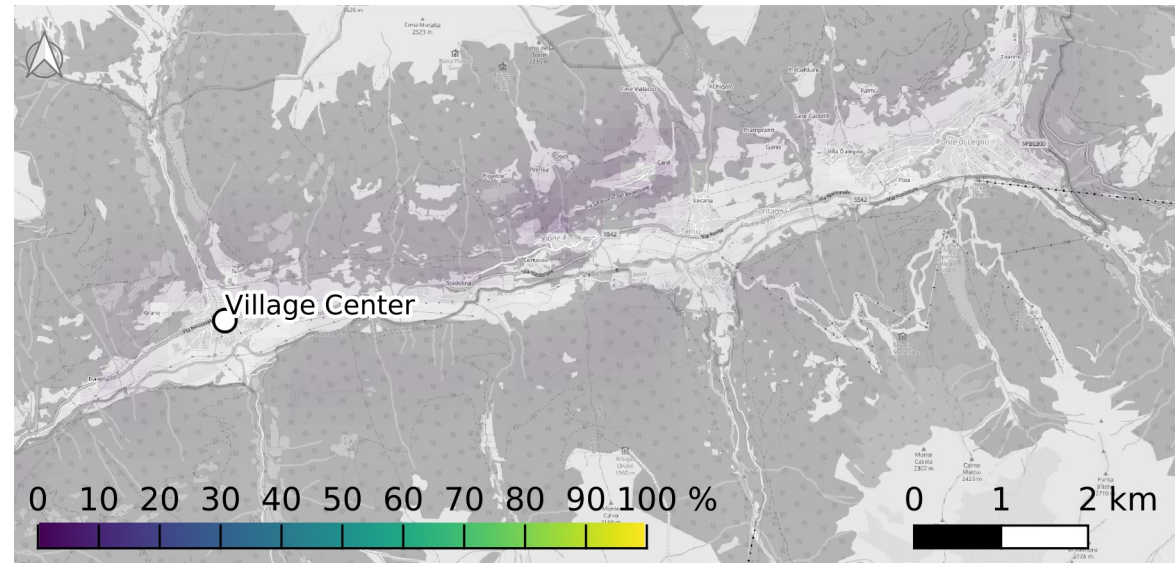
CO2 flux (domain)

neutral

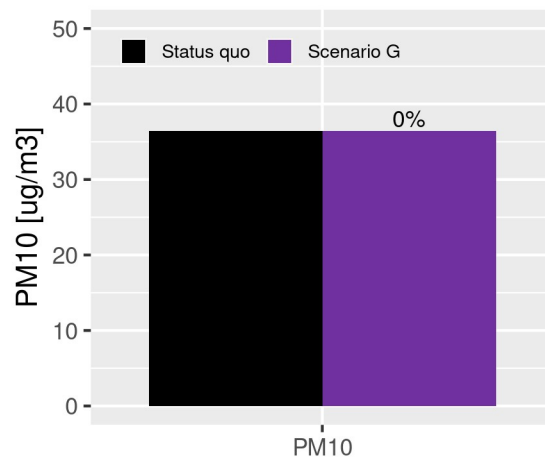
Scenario G

Change of the operational hours of biomass appliances with heat storage systems

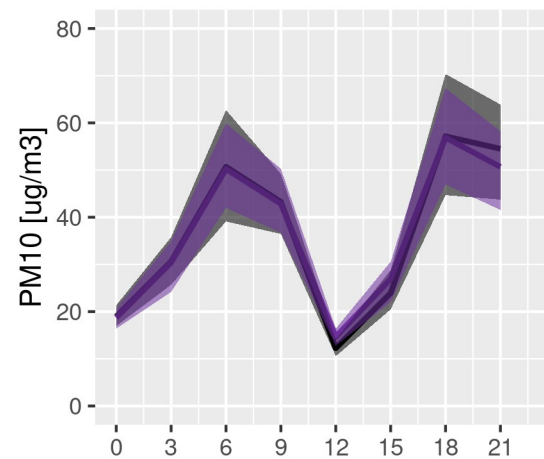
Percentage variation of average PM10 concentration



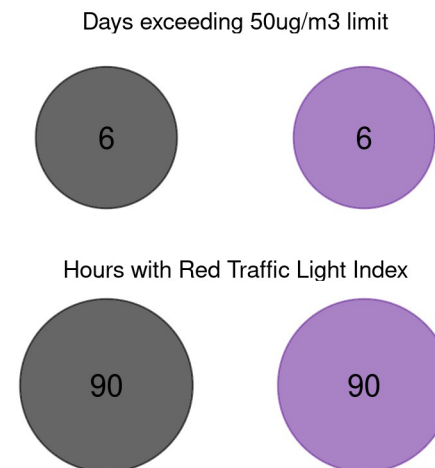
Average concentration



3-hourly daily cycle



Critical events

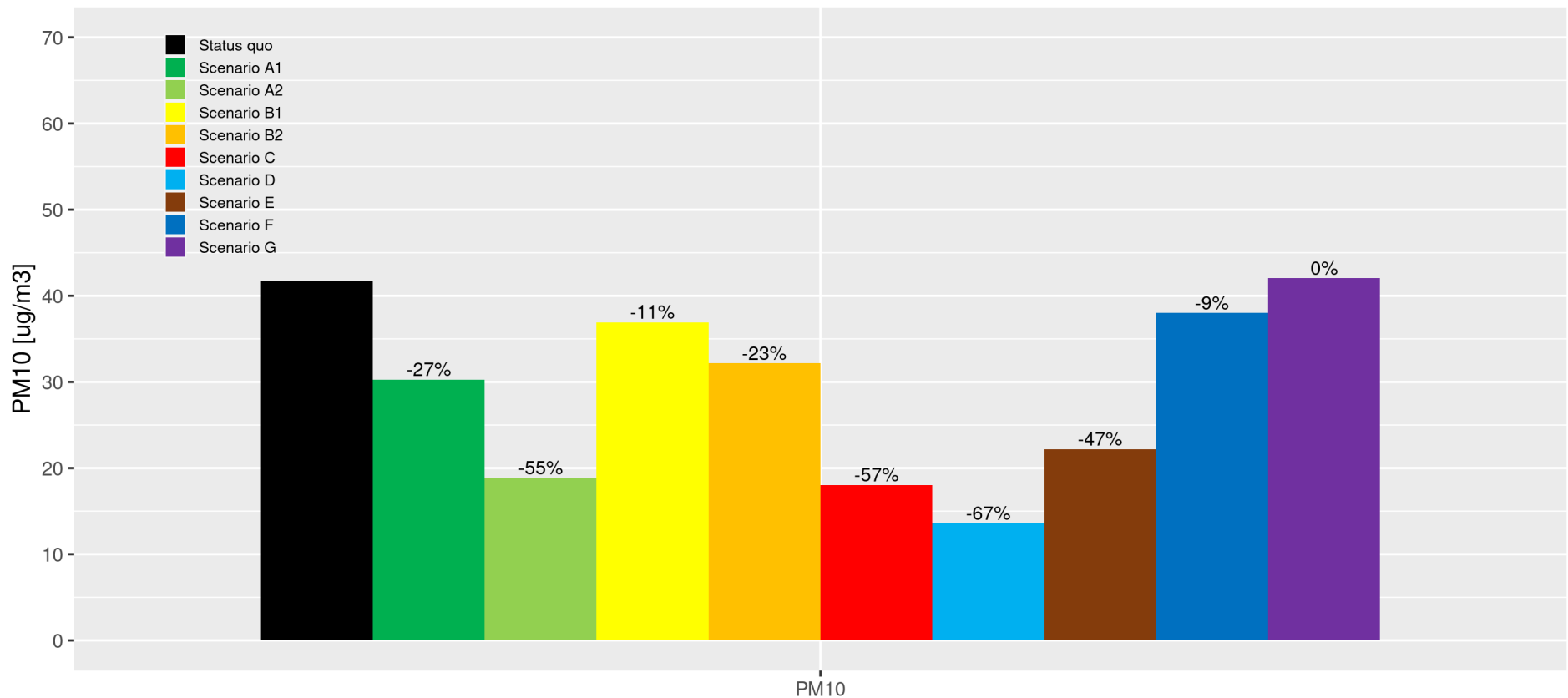


CO2 flux (domain)

— neutral

Storo Case Study: Scenario Summary

Comparison of model concentrations in Storo Village Center





Elena Tomasi
elena.tomasi@cisma.it

f facebook.com/BBCLEAN.AS

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