

Interreg

CENTRAL EUROPE



European Union
European Regional
Development Fund

PROSPECT2030

TAKING
COOPERATION
FORWARD



Online meeting
4th of March 2021



Peer to Peer learning on energy monitoring systems



PROSPECT2030 | Piemonte Region | Silvio De Nigris

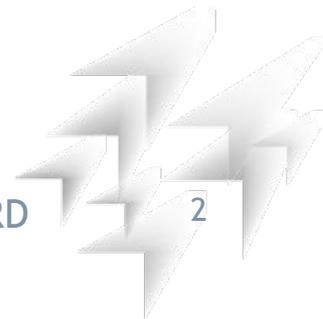
ENERGY DATASETS FOR LOCAL AUTHORITIES IN PIEMONTE - PIEMONTE REGION

The concept
and outputs of
the Regional
Energy
Observatory in
Piemonte

The schemes
for data
provision to
Municipalities

Workload and
availability of
data

Information
about the
processing
methods - by
Polytechnics of
Torino



THE REGIONAL ENERGY OBSERVATORY

Concept and goals

REGIONAL ENERGY OBSERVATORY



Rapporto Statistico sull'Energia in Piemonte

Anno 2020

Direzione Ambiente, Energia, Territorio
Settore Sviluppo Energetico Sostenibile

SCOPES:

1. TO SUPPORT THE ENERGY PLANNING ACTIVITIES
2. TO MONITOR THE ENERGY TARGETS SET OR ENVISAGED TO SUPPORT MUNICIPALITIES IN THEIR ENERGY RELATED PLANNING ACTIVITIES

OUTPUTS:

1. NO SPECIFIC
2. REGIONAL ENERGY REPORT
3. FEED UP ONLINE PLATFORMS

3. Le fonti rinnovabili termiche ed elettriche

Successivamente all'approvazione del Decreto Sberling - DM 11/3/2012 - con Decreto 11/05/2013 del Ministero dello Sviluppo Economico, è stato affidato al GSE il compito di mettere a disposizione delle Regioni i "dati che consentono una verifica del grado di raggiungimento degli obiettivi regionali di consumo di energia da fonti rinnovabili" (art. 6, comma 4). Questo rapporto vertice pertanto i dati GSE ed è finalizzato principalmente alla valutazione della produzione energetica da fonti rinnovabili sul territorio regionale.

Complessivamente i consumi finali di energia sono coperti per circa il 18% da fonti rinnovabili quota rimasta sostanzialmente stabile, con qualche oscillazione annua, a partire dal 2014. In particolare l'apporto energetico delle rinnovabili è passato tra i 1.825 TWh e i 1.949 TWh. È necessaria di sommare in valore assoluto e in termini relativi al fine di raggiungere gli obiettivi definiti per il 2050.

	2012	2013	2014	2015	2016	20
Consumo finale lordo (CFL)	10.303	10.709	10.121	10.605	10.763	20
Fonti rinnovabili elettriche (FRE-E)	788	860	806	930	921	
Fonti rinnovabili termiche (FRE-T)	867	896	927	958	1.022	
Fonti rinnovabili Totali (FRE)	1.655	1.846	1.825	1.888	1.943	
Incremento % FRE GSE	18,0%	12,2%	12,2%	22,8%	18,1%	

Tabella 3.2 - Consumi Finali Lordi e contributo delle fonti rinnovabili in Piemonte - dati in

Consumi finali di energia - Ripartizione per vettori

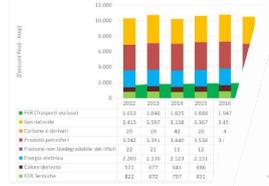


Figure 3.1 - Consumi Finali Lordi e contributo delle fonti rinnovabili in

	2012	2013	2014	2015	2016	20
2013	0,00	0,00	0,00	0,00	0,00	0,00
2014	0,00	0,00	0,00	0,00	0,00	0,00
2015	0,00	0,00	0,00	0,00	0,00	0,00
2016	0,00	0,00	0,00	0,00	0,00	0,00
2017	0,00	0,00	0,00	0,00	0,00	0,00
2018	0,00	0,00	0,00	0,00	0,00	0,00
2019	0,00	0,00	0,00	0,00	0,00	0,00
2020	0,00	0,00	0,00	0,00	0,00	0,00
2021	0,00	0,00	0,00	0,00	0,00	0,00
2022	0,00	0,00	0,00	0,00	0,00	0,00
2023	0,00	0,00	0,00	0,00	0,00	0,00
2024	0,00	0,00	0,00	0,00	0,00	0,00
2025	0,00	0,00	0,00	0,00	0,00	0,00
2026	0,00	0,00	0,00	0,00	0,00	0,00
2027	0,00	0,00	0,00	0,00	0,00	0,00
2028	0,00	0,00	0,00	0,00	0,00	0,00
2029	0,00	0,00	0,00	0,00	0,00	0,00
2030	0,00	0,00	0,00	0,00	0,00	0,00

Tabella 3.2 - Produzione netta in Piemonte (Fonte: GSE)



Figure 3.2 - Andamento della produzione netta (Fonte: GSE)

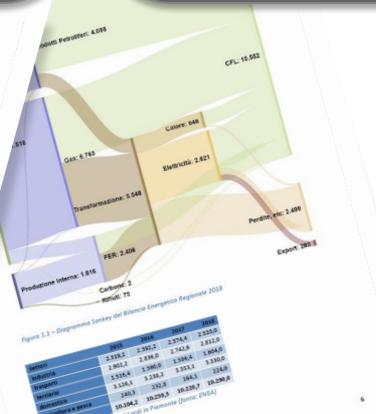
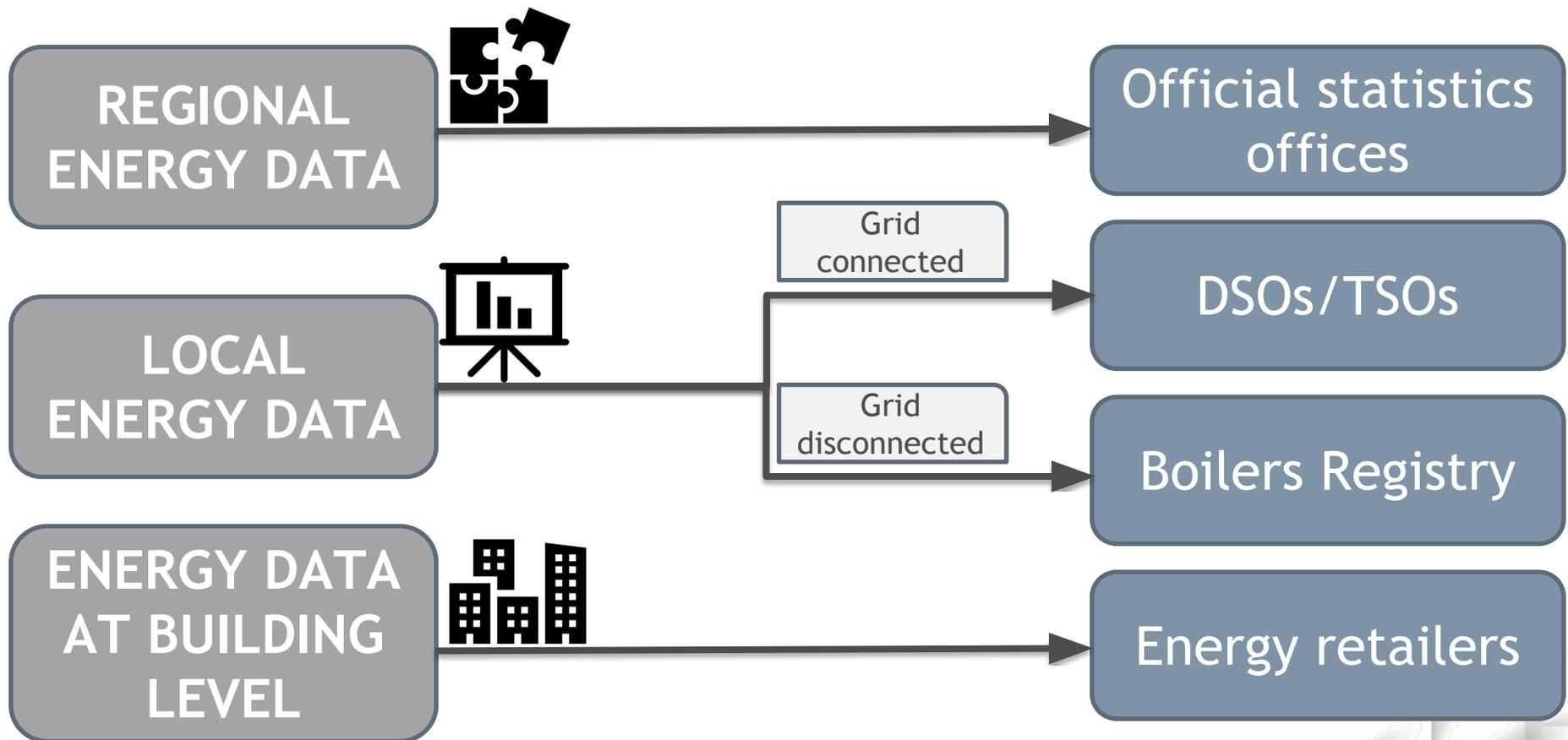


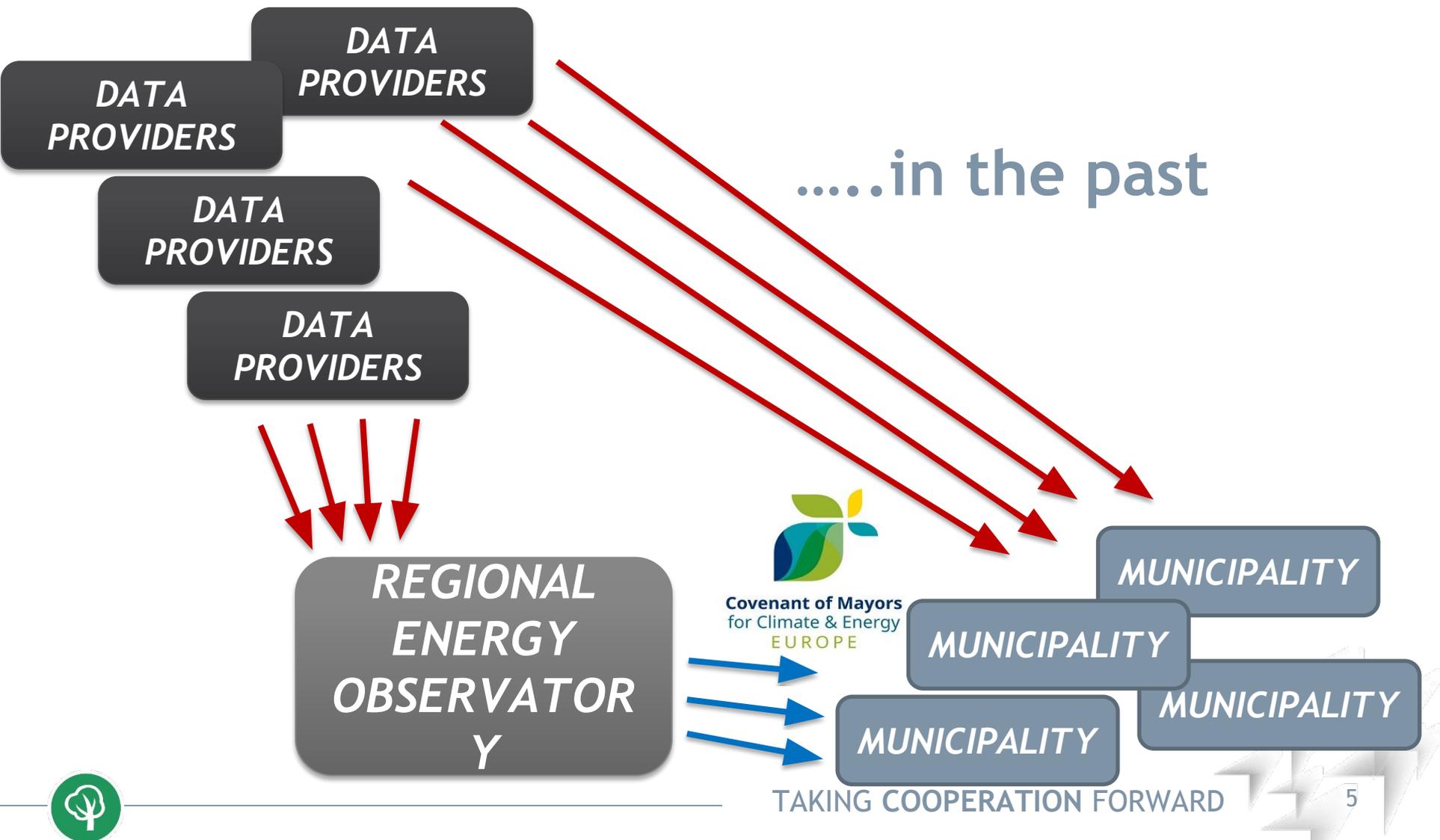
Figure 3.3 - Diagramma Sankey del Bilancio Energetico Regione Piemonte



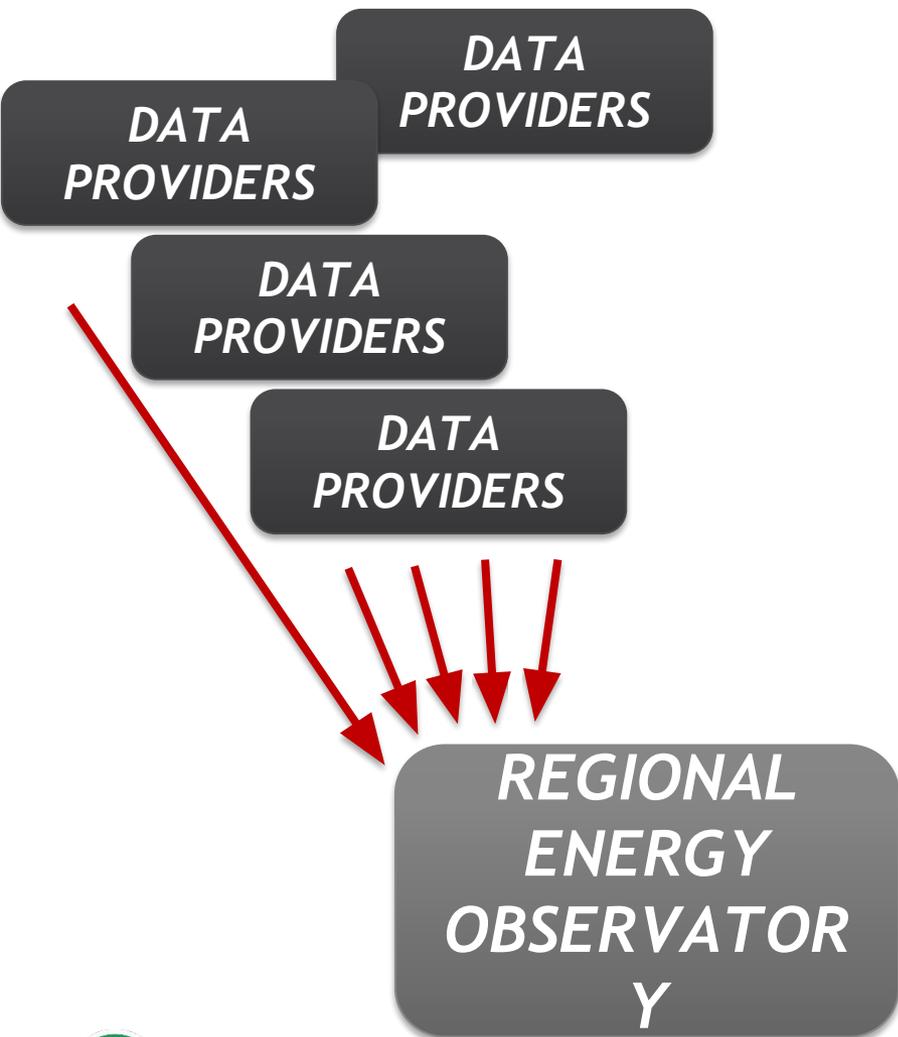
Data collection process



NO COORDINATED PROCESS

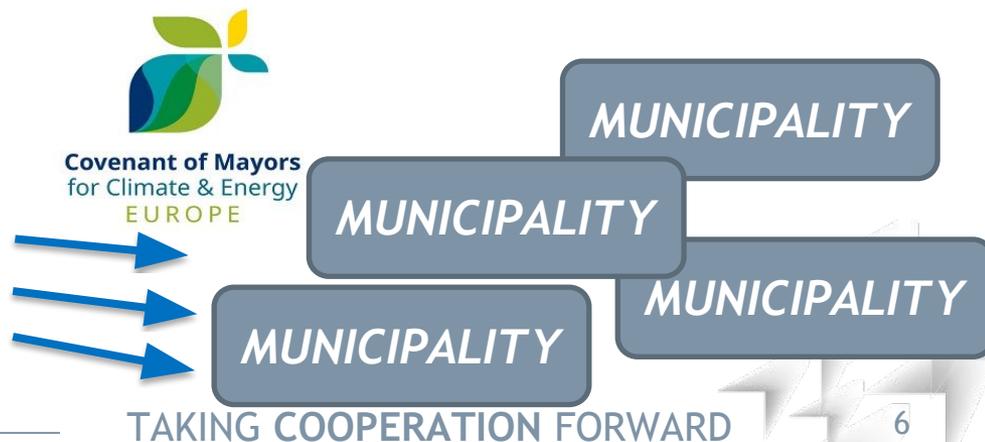


COORDINATED PROCESS

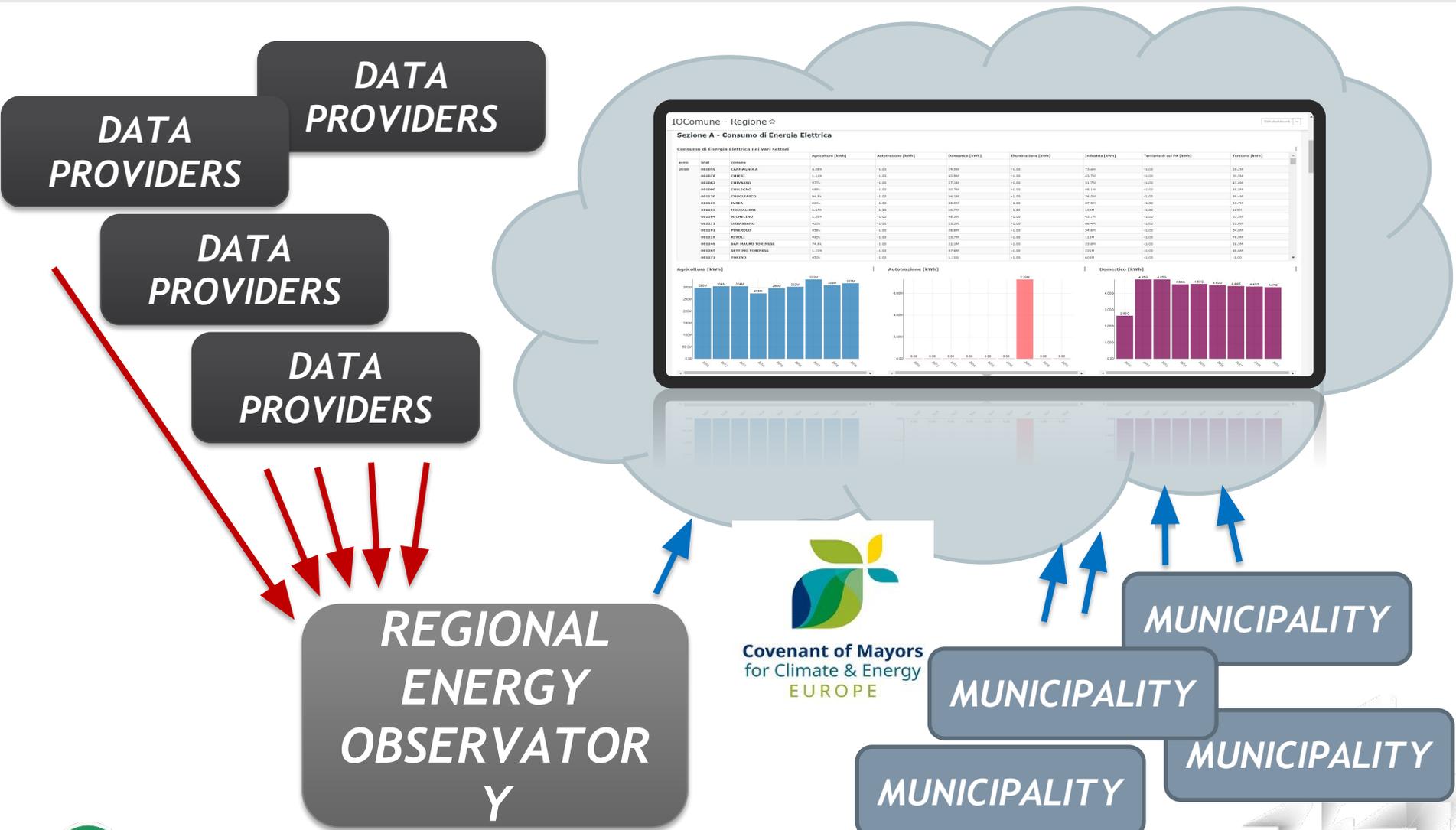


....from 2017

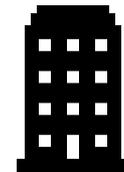
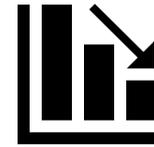
DATA ACTION



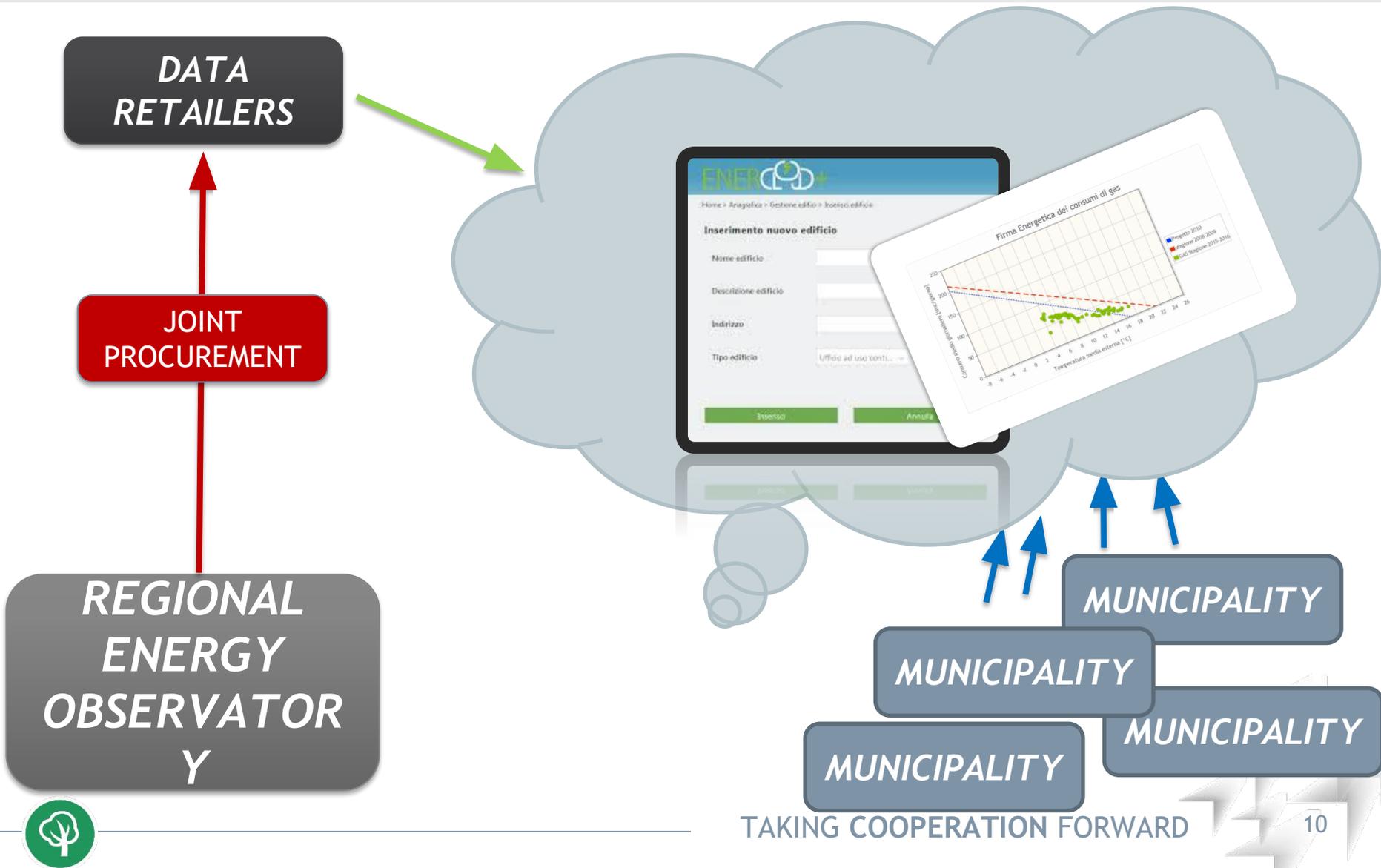
COORDINATED CLOUD PROCESS



- Joint procurement procedure for the selection of the energy retailers for the public administration
- Standardization of the obligation of providing energy information for each point of delivery
- The awarded energy retailers are obliged to upload the data in a cloud platform
- This is based on benchmarking approach and provides data processed results (e.g. energy signature, etc...)
- Each Municipality can access its own data/results



MONTHLY DATA AT BUILDING LEVEL



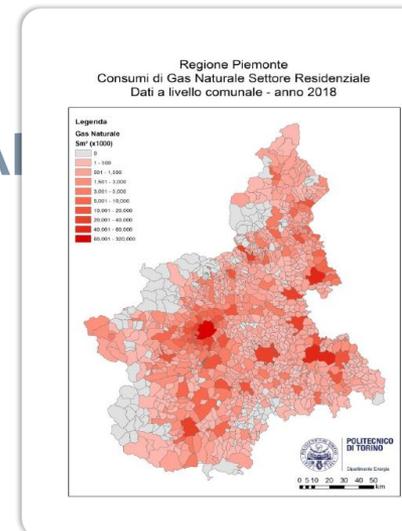
NOWADAYS WE PROVIDE A DETAILED DATASET AT MUNICIPAL LEVEL BROKEN DOWN INTO SECTOR FOR:

- **NATURAL GAS - ALL SECTORS: 2018, 2019**
- **ELECTRICITY - ALL SECTORS: 2010-2019**
- **OIL PRODUCTS - RESIDENTIAL AND TERTIARY SECTORS: 2015-2019**
- **THERMAL SOLAR: 2015-2019**
- **ENERGY PERFORMANCE CERTIFICATES: 2020 ONWARDS**

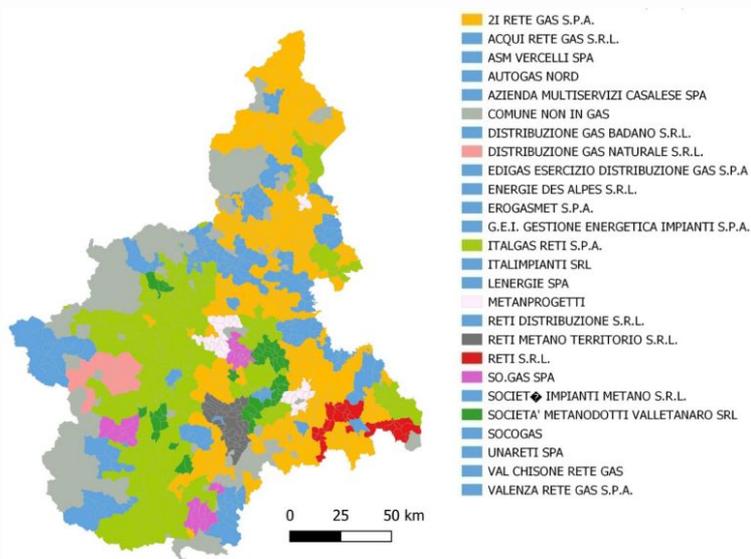
UNDER CONSTRUCTION:

- *DERIVED HEAT FROM DHS: 2015-2019*
- *PHOTOVOLTAIC: 2010-2020*

.....DATA UPDATES WILL COME IN AUTUMN THE LATEST

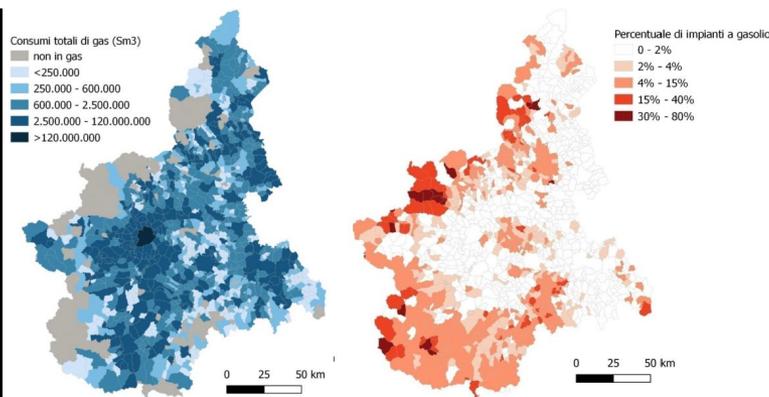


THE WORKLOAD



1. More than 50 sources of information contacted,
2. Several datasets processed
3. 1200 municipalities

Usual timeframe: 6 month, starting from April to October every year



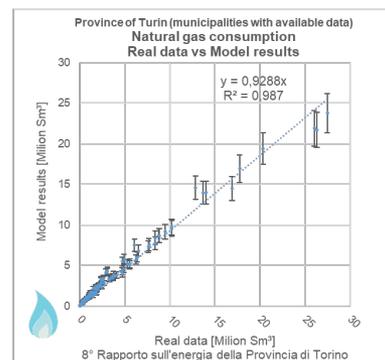
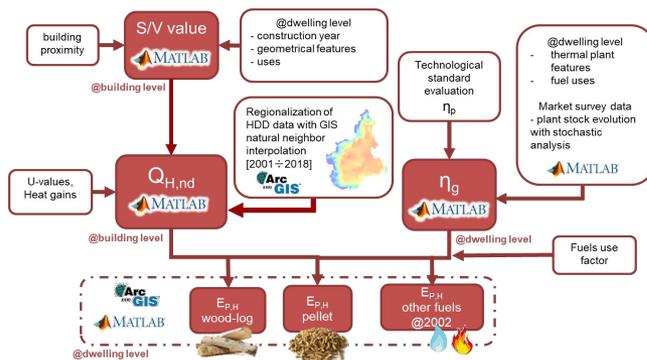
Covenant of Mayors
for Climate & Energy
EUROPE



THE PROCESSING METHODS

1. EVALUATE AVAILABLE DATA
 - collect them all
 - analyse it
 - validate it
2. DEFINE THE MODEL SCOPE AND USES
3. DEFINE THE MODEL COMPLEXITY

Regione Piemonte PRQA Model. Complex model for scenario assessment and evaluation of residential sector pollutants emissions at regional level | Detailed data on houses and thermal plants for about 2 million houses and local daily temperatures.



PROS

- good for planning and policy making

CONS

- estimated consumption
- it needs real dataset to be validated



NATURAL GAS | DATA COLLECTION

- GOAL | NATURAL GAS FOR SECTOR AT MUNICIPALITY LEVEL
- DATA OWNER | 26 NATURAL GAS DISTRIBUTORS
- DATA DETAIL | MUNICIPALITY LEVEL
- DATA AVAILABILITY AND QUALITY | NOT OMOGENEOUS

USES	SECTORS	USERS
cooking	residential (A)	houses (a)
heating		apartment block (b)
cooling	tertiary (B+C)	public services (c)
tech.	industry (D+E+F)	other (e)

55% NATURAL GAS Sm³
275 MUNICIPALITIES

MISSING DATA

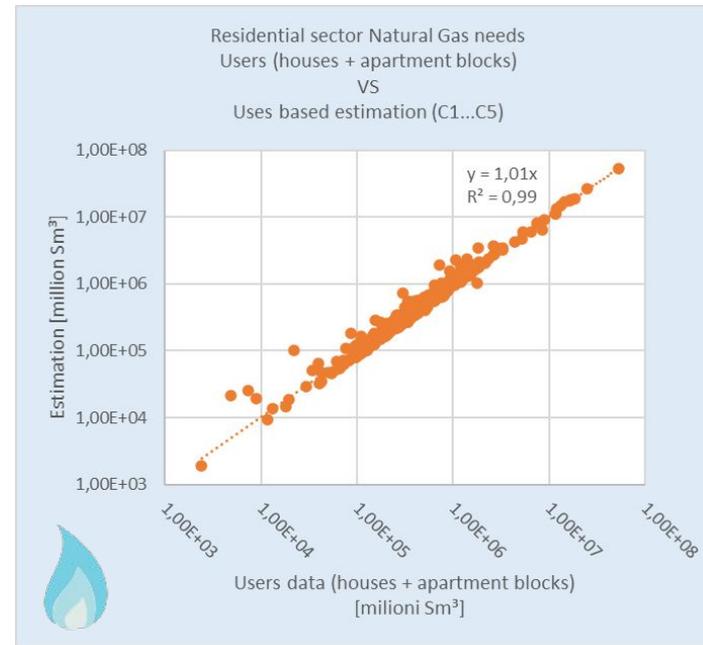
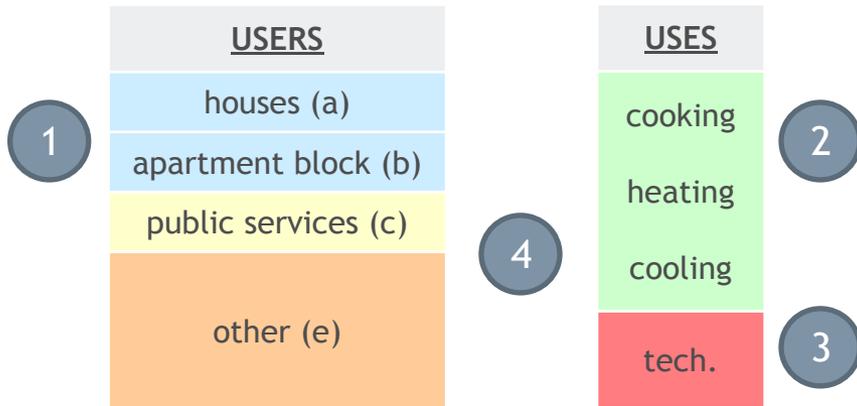
DISTR. ID	2019		
	SECTOR	USERS	USES
#01			X
#02	X	X	X
#03	X	X	X
#04	X	X	X
#05	X	X	X
#06		X	X
#07	X	X	X
#08	X	X	X
#09			X
#10		X	X
#11		X	X
#12			X
#13			X
#14	X	X	X
#15			X
#16		X	X
#17	X	X	X
#18	X	X	X
#19	X	X	X
#20		X	X
#21			
#22			X
#23	X	X	X
#24		X	X
#25	X	X	X
#26	X	X	X



NATURAL GAS | ANALYSIS AND METHOD

- THE DATA BY SECTOR WERE NOT CONFIDENT WITH DATA BY USES AND USERS
- THE DATA BY SECTOR PRESENTED MANY CRITICALITIES AND ERRORS

1. RESIDENTIAL DATA FROM USERS WHERE AIVALABLE
2. RESIDENTIAL ESTIMATION MODEL FROM USES BASED ON % OF SECTOR SHARE AND INHABITANTS
3. INDUSTRY NEEDS BASED ON TECH USES VALUE
4. TERTIARY ESTIMATION



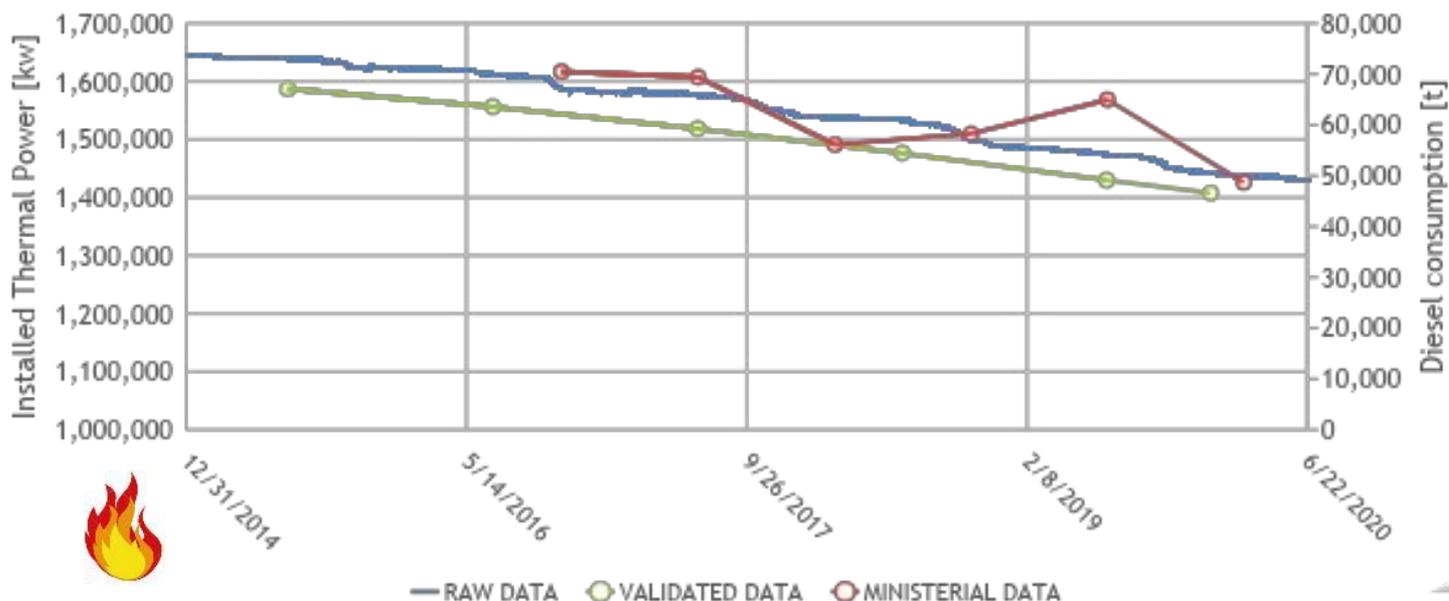
DIESEL AND LPG | DATA ANALYSIS

- GOAL | DIESEL USES FOR CIVIL SECTOR AT MUNICIPALITY LEVEL
- DIESEL DATA OWNER | MINISTERIAL DATA
- DIESEL DATA DETAIL | ANNUAL @ REGIONAL LEVEL

MODEL DATA INPUT

- CADASTRE OF THERMAL PLANTS - OWNER | REGION
- CADASTRE OF THERMAL PLANTS - DATA DETAIL | SINGLE PLANT

PIEMONTE REGION
DIESEL INSTALLED THERMAL POWER [kW] AND DIESEL CONSUMPTION [t]



— RAW DATA ● VALIDATED DATA ○ MINISTERIAL DATA



DIESEL AND LPG | PROCESSING METHOD

1. ANNUAL REGIONAL CONSUMPTION
2. INSTALLED DIESEL THERMAL POWER @ MUNICIPALITY LEVEL (ITP)
3. DEFINITION OF DIESEL CONSUMPTION (DC) PROXY BASED ON:

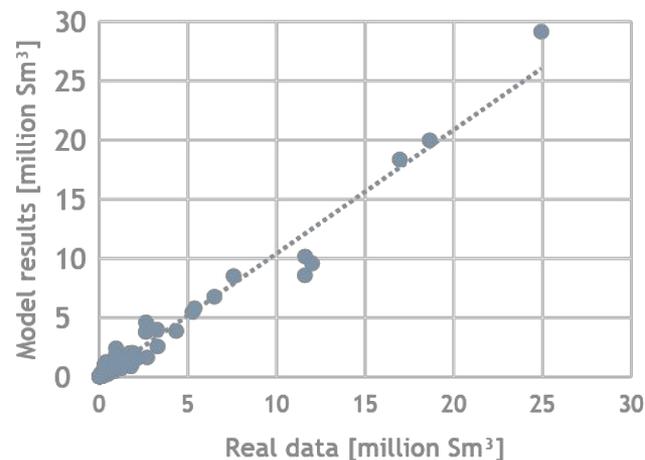
- Design External Temperature (DET)
- Degree Day (DD)

ITP depends on DET and houses energy efficiency (EP) $ITP \approx (20 - DET) * EP$
DC depends on DD and houses energy efficiency $DC \approx DD * EP$

- Proxy: $(ITP / DET) * DD$

4. MODEL VALIDATION WITH NATURAL GAS DATA
5. MODEL APPLICATION [2015 to 2019]

Natural Gas Model Estimation
Million Sm³



1. THERMAL PLANT CADASTRE WITH INSTALLED SINGLE SOLAR THERMAL PLANT «AREA»
2. DEEP DATA CLEANING PROCESS
 - 28.400 SOLAR THERMAL PLANT
 - ~ 1.000 WRONG DATA
 - 50% OF ORIGINAL GROSS AREA

Installed Solar Thermal Area [m²]

