Geoanalytics with E.ON

How to apply Data Science in the energy sector

AGENDA

WHO we are and **WHAT** we do

Our first steps in the world of **Data Science @ E.ON**

Geoanalytics in the Energy sector. How to solve a business problem

Q&A Session

> **925.000** *customers*

> **60 billion €** *of TURNOVER**

> **23.500** *energy solutions sold***

Segments: **Residentials, Business and PA**

400 **employees and** *146 teams of installers*

*Milano**: italian headquarter*

(*) Turnover @2020
(**) Data YTD 2021 @August

We are one of the main energy operators on the market, with an offer of innovative and efficient solutions, to consume less and better

# WHO

Customer Value Management

Build a **customer centric culture** to better understand the satisfaction of our customers.

Knowing their (dis)likes/needs allows us to better build our products around them and remove points of friction.

Customer Analytics

Advanced Analytics area act as a **coordinator** and **facilitator**,

leveraging data to generate insight and to support business strategy
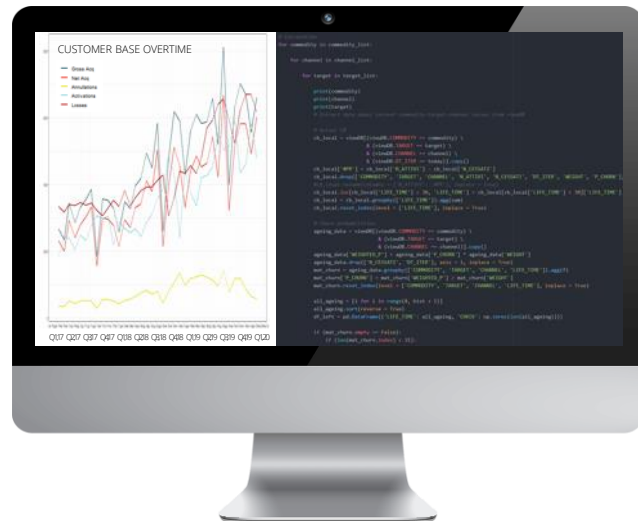
WHAT

Main categories of activities.

CORE

Advanced Analytics & Machine Learning modeling

to deep understand customer behavior

to predict potential cross/up selling

to prevent churn

SUPPORT

A bunch of activities like

web scraping
dashboarding
setup web services (API)
automatize process

to support our colleagues in their daily work

GEOSPATIAL

A new perspective of data interaction enables us

to detect localized problems

to seize new territorial opportunities

to discover trends...

SMART METER

Electricity consumption analysis

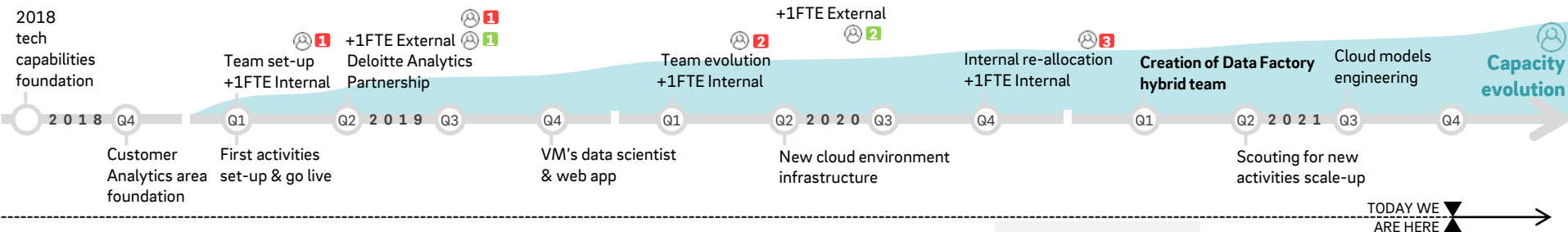to discover the lifestyle of our customers
to give tips on reducing or shifting loads
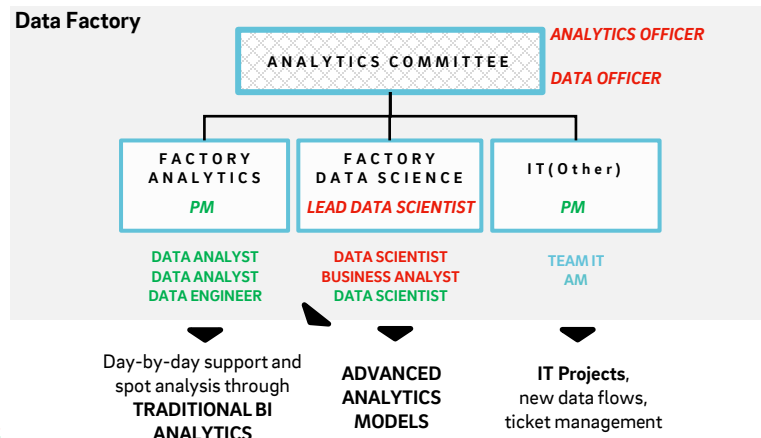to optimize and tailor our offers

Our first steps in the world of Data Science @ E.ON

The CVM Customer Analytics area officially started in January 2019.

2018 tech capabilities foundation

2018 Q4 | **Q1** | **Q2 2019 Q3** | **Q4** | **Q1** | **Q2 2020 Q3** | **Q4** | **Q1** | **Q2 2021 Q3** | **Q4**

Team set-up
+1FTE Internal

+1FTE External
Deloitte Analytics
Partnership

Team evolution
+1FTE Internal

+1FTE External

Internal re-allocation
+1FTE Internal

Creation of Data Factory hybrid team

Cloud models engineering

Capacity evolution

Customer Analytics area foundation

First activities set-up & go live

VM's data scientist & web app

New cloud environment infrastructure

Scouting for new activities scale-up

TODAY WE ARE HERE

PMO/FOCAL POINT

Data Factory

ANALYTICS COMMITTEE — *ANALYTICS OFFICER* / *DATA OFFICER*

| FACTORY ANALYTICS *PM* | FACTORY DATA SCIENCE *LEAD DATA SCIENTIST* | IT(Other) *PM* |

DATA ANALYST
DATA ANALYST
DATA ENGINEER

DATA SCIENTIST
BUSINESS ANALYST
DATA SCIENTIST

TEAM IT
AM

Data.ON was built in 2017 to be E.ON's Data Science & AI center of excellence with a clear goal of implementing high-impact projects to advance the digitalization of the company and harness substantial value from various strategic pools.

Day-by-day support and spot analysis through
TRADITIONAL BI ANALYTICS

ADVANCED ANALYTICS MODELS

IT Projects, new data flows, ticket management

Structuring a territorial strategy

geographical information

a 360° view of the area

a socio-demographic layer on top of a geospatial analysis

interesting prospect areas
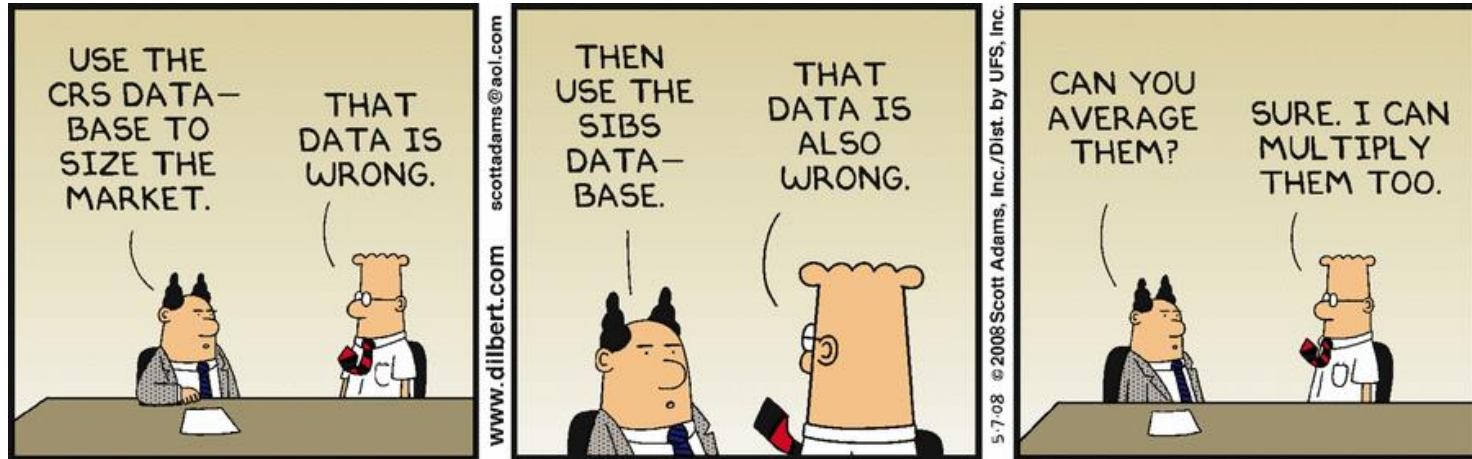
what about the competitors?

how do we decide to open a store?

customized communication
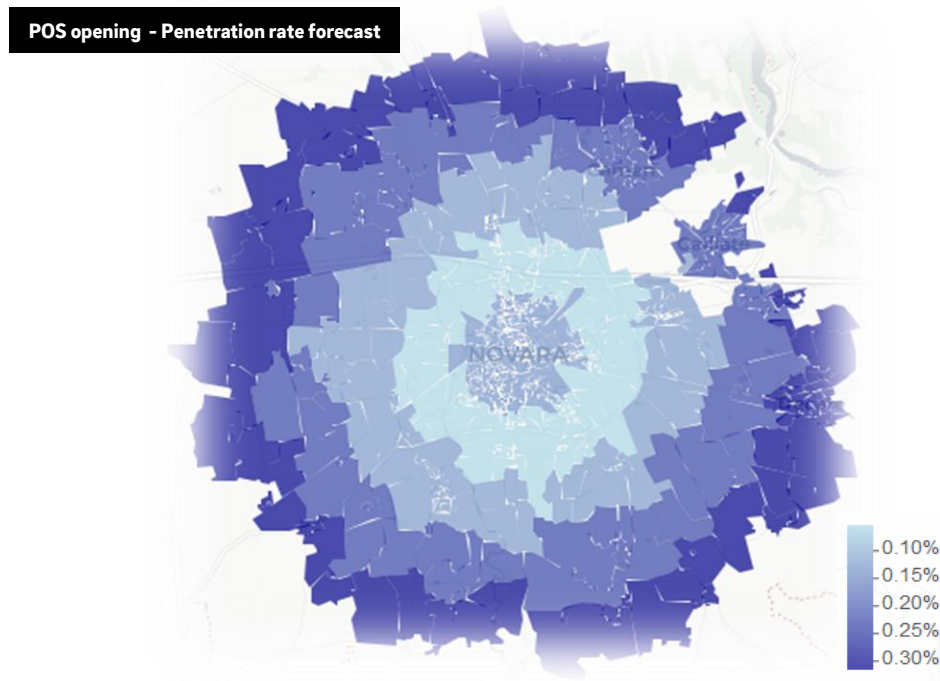
sun exposure of the roofs

Clear Demand

CRS – Creditor Reporting System
SIBS – Social Impact Bond System

Keep calm and … Analyse the problem

Need to understand customers around a store or, more generally, in a specific area

POS opening – Penetration rate forecast

NOVARA

- 0.10%
- 0.15%
- 0.20%
- 0.25%
- 0.30%

TERRITORIAL STRATEGY SUPPORT

Where to open a new POS?

Where to actuate field marketing interventions?

Are there any areas with high potential but low penetration?

Are there clusters of claims in particular territorial areas?

Can we support targeted campaigns for events around POS?

Find the resources

Using internal data of our customers and external data, it is possible to obtain a socio-demographic picture and the distribution of customers in the area in a short time.

DATA SOURCES

CRM
- Personal Info
- Contract Info

Internal Data
- Geographical info
- Consumption
- Loyalty
- Interaction (in/outbound)

OpenData
- Istat
- e-Charging Stations
- CENED + Curit (Lombardia)
- OpenStreetMap (POIs)

Other External Data
- Socio-Demographic Data
- Behavioural Data

Solution

An automated tool that provides summary KPIs about the potential of a location or the performance of a store.

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- Behavioural Data

TOOL PACKAGES

- Clustering for analyse recurring patterns
- Tool to compare the different areas
- AA and data visualization

TERRTORIAL STRATEGY SUPPORT

- Where to open a new POS?
- Where to actuate field marketing interventions?
- Are there any areas with high potential but low penetration?
- Are there clusters of claims in particular territorial areas?
- Can we support targeted campaigns for events around POS?

Geoanalytics Tool Structure

		0	**1**	**2**	**3**
TOOL STRUCTURE	**CASES**				
	DESCRIPTION	**Mapping** E.ON customers to closest POS (or other POIs): • Distance by car and on foot • Road-path from starting point to destination	Local points **screening**: • Residential population KPIs • Customers' description • Influence radius of POS identification • Territorial distribution of competitors and charging stations	**Prediction of performances** for a new potential POS: • Decrease of requests to call center • Increase of E.ON penetration in the influence area • # acquisitions • # cross-selling • # visits to the new POS	Prospects/customers **clustering** to identify interesting new areas for initiatives • Identification of **optimal location** based on potentiality KPIs
	APPLICATIONS	Riparti con Energia Drive to Store	Evaluation of the area in South Padova, Gessate and Uggiate Trevano	Evalutation of new POS opening in Gessate or Uggiate Trevano, for Custome Care support	

2020 Q3 Q4 2021 Q1 Q2

Case 0   Case 1   Case 2   Case 3

TODAY WE ARE HERE

Drive to Store

DESCRIPTION

We are able to map our customers and associate them the closest POS.

We provide for each address two kind of data:

Distance:

- by car
- on foot

Timing

- by car
- on foot

Since this information is associated to the addresses, we can relate it to our customers both for their supplies and for their residence.

ENABLER

We can now send personalized DEM and campaigns to our customers, to promote services or to suggest the closest POS to have support.

1 SCREENING
Territorial Description

DESCRIPTION

Given a particular location, we collect different kinds of information about the territory. We distinguish into three main categories:

Characteristics of the residential population in terms of:

- Cluster Polis distribution
- average age

Description of the local customers:

- single commodity vs. dual
- churn tax
- solutions sold
- calls to CC
- visits to POS

Additional information:

- competitors' POS
- charging stations

ENABLER

With few inputs needed, we can obtain a detailed picture of an area of interest, useful when designing new territorial strategies.

6.680 # customers

7.832 # calls to CC
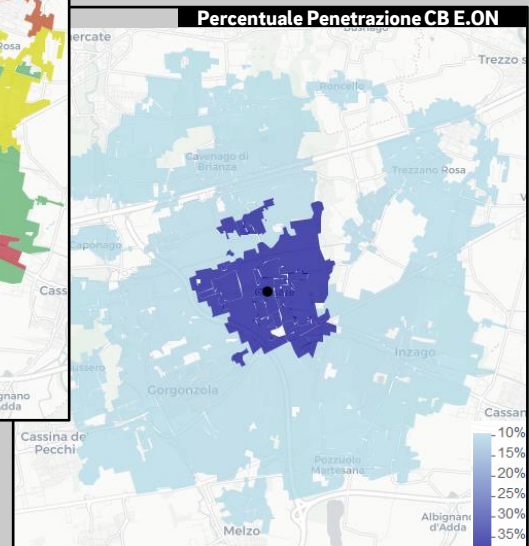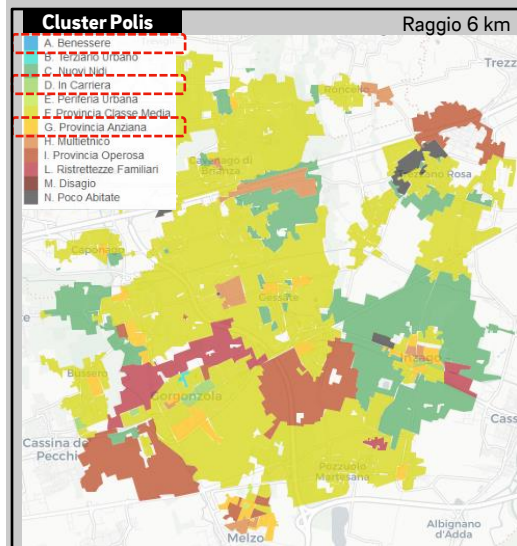
10,18% Churn (YoY)

559 activations (YoY)
12,86% E.ON penetration

Cluster Polis — Raggio 6 km

A. Benessere
B. Terziario Urbano
C. Nuovi Nidi
D. In Carriera
E. Periferia Urbana
F. Provincia Classe Media
G. Provincia Anziana
H. Multietnico
I. Provincia Operosa
L. Ristrettezze Familiari
M. Disagio
N. Poco Abitate

Percentuale Penetrazione CB E.ON

-10%
-15%
-20%
-25%
-30%
-35%

2 PREDICTIONS
New POS Opening

DESCRIPTION

In the case of a new POS opening, we provide performance predictions, based on the past performances of actual POSs, similar to the new one for dimensions, population and goals (support and/or acquisitions).

Predictions are focused on:

- calls to CC, detecting if a decrease can be expected after the POS opening
- visits
- acquisitions and thus market penetration
- acquisitions through cross-selling
- leads

ENABLER

Through this tool we can evaluate the possible scenarios that a new POS opening could lead to, in order to provide the territorial strategy a detailed picture of the area *as-is* today and *can be* in the future.

How much would sales increase in the area?

- ~ +1,2% market penetration thanks to POS acquisitions
- ~ 115 customers with cross selling actions (~ 150 PR)
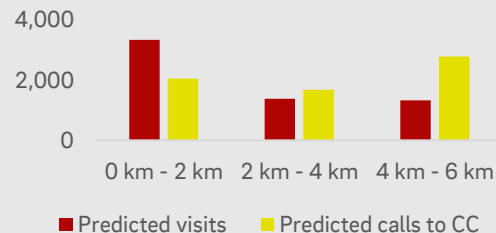- ~ 200 customers generate leads (~ 290 leads)

How many visits and acquisitions can we expect?

- ~7 k visits
- ~1 k POS acquisitions (~ 650 customers)

How many calls to CC will we receive after the POS opening?

- ~6,5 k calls per year
- ~ 17% decrease over total calls
- ~1,04 calls per customer (vs. 1,17)

Calls to CC and POS visits per year

Legend: ■ Predicted visits   ■ Predicted calls to CC

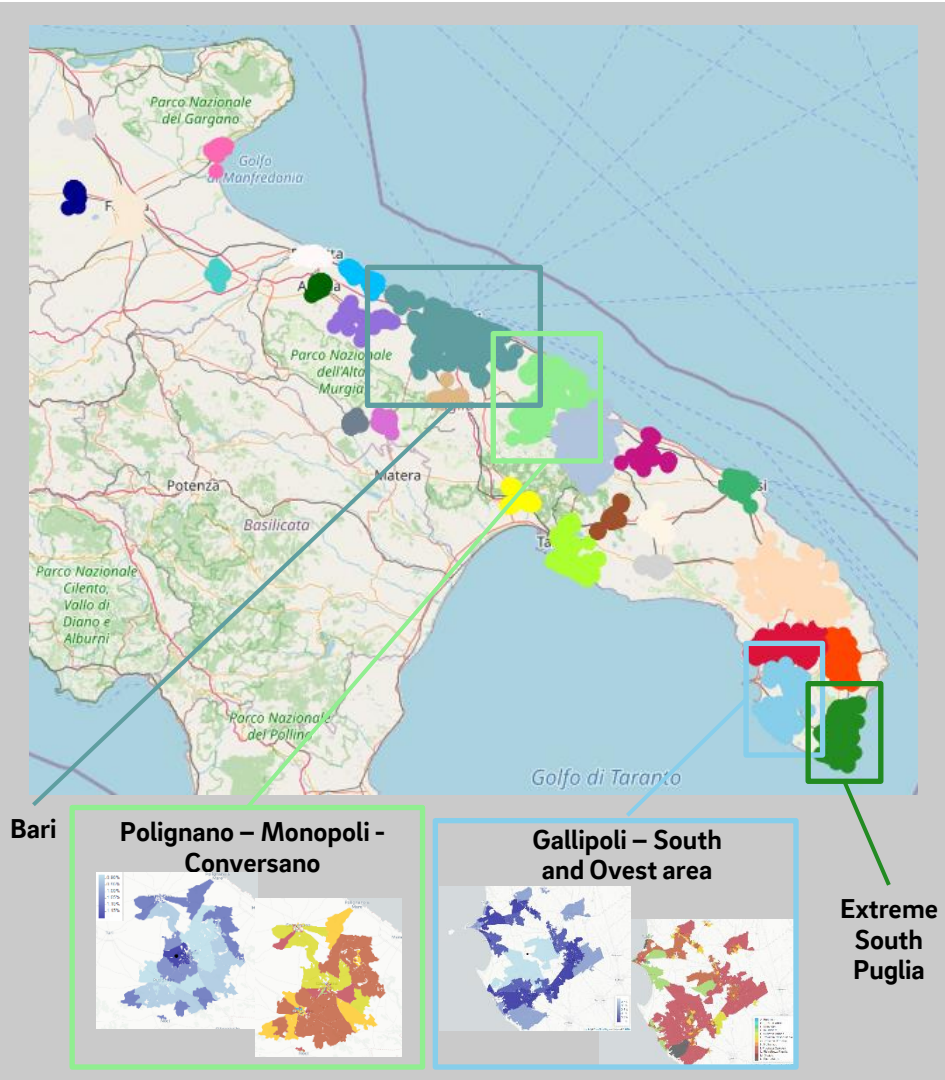# 3 OPTIMIZATION
Field Strategy

DESCRIPTION

If the Business is considering new territorial strategies, *advanced analytics* tools can help to determine which locations can be more suitable, provided some potentiality KPIs to be optimized.

Starting from a clustering of our customers (or prospects), we obtain several locations, analyzed deeply through the evaluation of **potentiality KPIs,** the central point for the optimization method. Examples of KPIs are:

- most frequent Cluster Polis
- # of customers
- # of prospects
- # of single commodity customers
- # of PV target buildings

NEXT STEPS

After defining the potentiality KPIs, it is possible to develop the extension of the tool to answer the question **Where should we apply a new territorial strategy?**

Bari

Polignano – Monopoli - Conversano

Gallipoli – South and Ovest area

Extreme South Puglia

...what else?

Our Success Stories

Churn Propensity Model 2.0

___

DESCRIPTION

Starting from the model developed last year (residential power) we built the complementary one for the gas commodity. Furthermore, we investigated the possibility to manage, instead of two general models, 12 specific models: one for each couple commodity-acquisition channel. Nevertheless, the result of this accurate analysis convinced us the general models are the best: they have comparable performances and with a general approach it is possible to compare results from different channels.

A new and high-performance explainer was adopted: it will be possible to study what are the factors that lead customers to stay with us or abandoned.

GOAL

Understand WHO is about to leave E.ON and what are the reasons
Understand variability of churners' behaviour by acquisition channels

ENABLER

This tool enable us to realize customized prevention/retention actions on high value customers.

TAKE AWAY & EVIDENCES

- Distribution of the churn propensity scores is different depending on the acquisition channel
- Choose the best threshold in order to do prevention/retention actions is all but easy

NEXT STEPS

Build a completely automatic pipeline with a custom dashboard to monitor performances
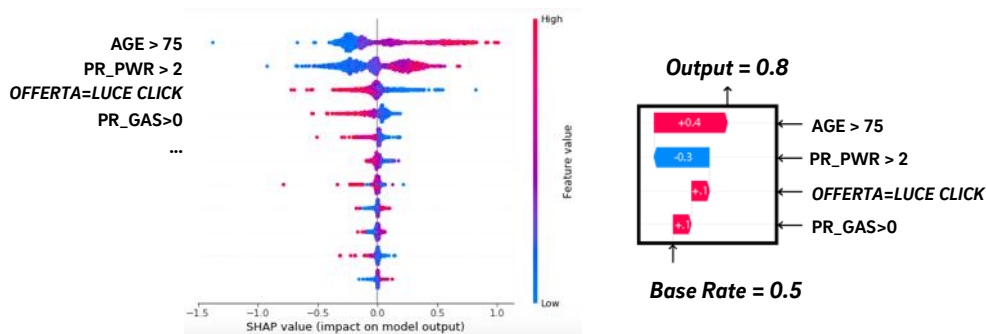
Focus on | Performance and NBA

CHURN PROPENSITY SCORE DISTRIBUTION BY CHANNEL
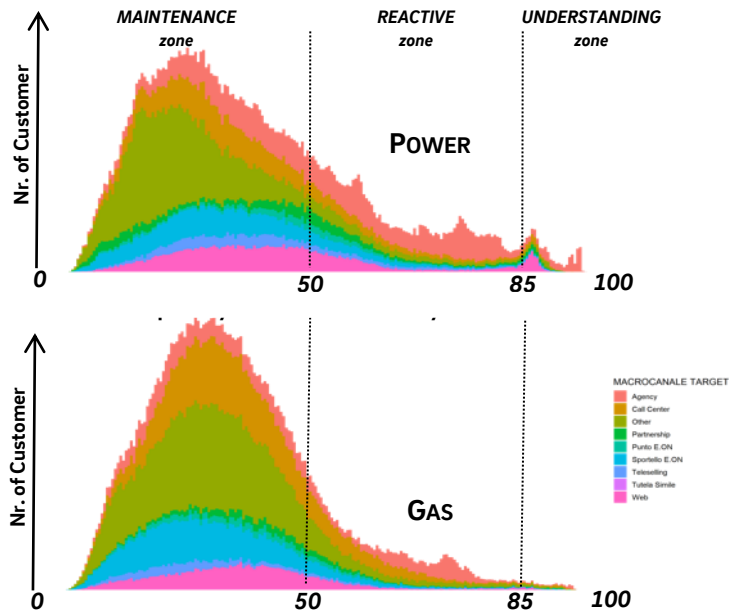
"Web Power" and "Agency Gas & Power" are to be kept under control as they present a significant part of customers above a threshold of attention.

An integrated explainer will enable us to deep understand customers motivations and react with a proper tailored campaign [test in progress...].

It is now possible
- **to take preventive actions** on a specific channel based on business needs
- **to deep dive on customer behaviour** (why he or she stays/leaves)

— CORE CATEGORY

SUCCESS STORIES #3

I-Renew 2.0

DESCRIPTION

Last November the ML model behind the I-Renew 2.0 project was released. In these last two months we are looking at the effect: how does the new strategy perform using the power of AI targeting our customer into different clusters according to their price sensitivity?

In order to monitor this effect we are developing a dashboard which is able to extract useful insights from the behaviour of our customer in the period between the receipt of the renewal communication and the first bill after the renewal of the offer.

Is the churn/renegotiation phenomenon across renewal moment reduced?

GOAL

Support colleagues in renewal process customizing renewal communications for each detected clusters.

ENABLER

Gross Margin optimisation and churn/renegotiation rate decrease and increase of iRenew NPS & sNPS

TAKE AWAY & EVIDENCES

- Renewal moment of customer journey is a particularly important moment (price sensitivity related)
- Risk of waking up sleeping customers? Maybe it is not a such worrying phenomenon

NEXT STEPS

Monitor the results of I-Renew 2.0 and tune the model according to the new insights in order to improve the clustering.

CMO CFO CSO

NPS: Sentiment & Topic Analysis

DESCRIPTION

We developed a machine learning model that is able to analyze the NPS feedbacks, providing as result the sentiment associated to the comments and the main topics our customers talk about.

The challenge behind this work was the correct management and study of Italian language, which needs a strong process to extract the words that are useful in detecting the sentiment of the person or to identify the topics related.

With this advanced tool, the labeling process is now automatic and we are able to examine deeply the ideas of our customers, to understand how they move from a contents point of view or for their change in opinions.

GOAL

The goal was speeds up the NPS analysis, manually performed in the past, implying high human effort. Furthermore, human judgement about sentiment could lead to conflicts if more people are involved on the task, while automatic processes are safer.

ENABLER

With all the information provided, the different KPIs can be monitored over time, and analyzed simultaneously to get new insights.

TAKE AWAY & EVIDENCES

In April 2020, the NPS score decreased, whereas the sentiment of our customers did not show the same trend.
Moreover, the global satisfaction topic became the most frequent. The analysis of the two factors lead to an interesting insight: the problem of this period is the mood of the customers, not the service we provide them.

NEXT STEP

Support to the reporting of Customer Journeys, creating dashboards and measures that take advantage of the sentiment and topic analysis.
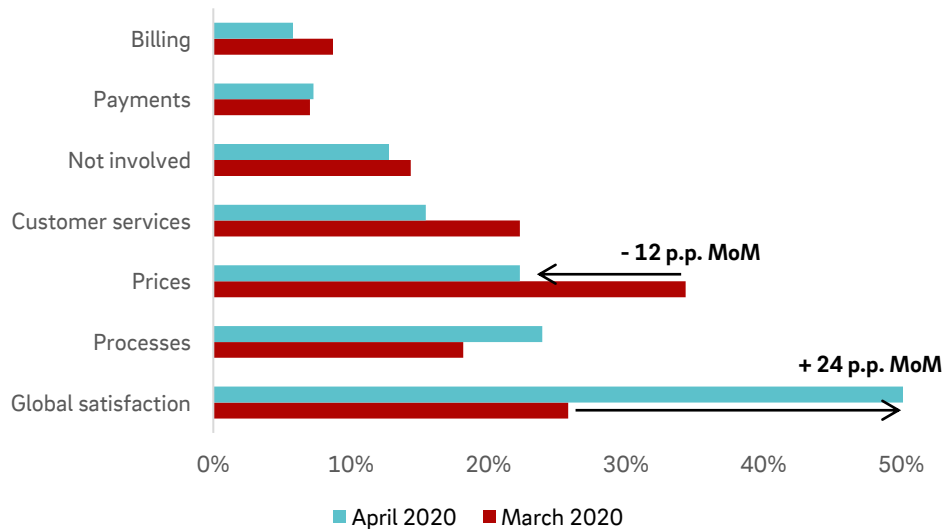
NPS: Sentiment & Topic Analysis

Focus on | Comparison March 2020 and April 2020

PERCENTAGE OF COMMENTS ASSOCIATED TO AT LEAST ONE TOPIC

SENTIMENT

Power BI

Dashboard developed & implemented by CVM Advanced Analytics Team

- 12 p.p. MoM

+ 24 p.p. MoM

■ April 2020 ■ March 2020

+ 46 % MoM

NPS score   **25**   - 32 % MoM
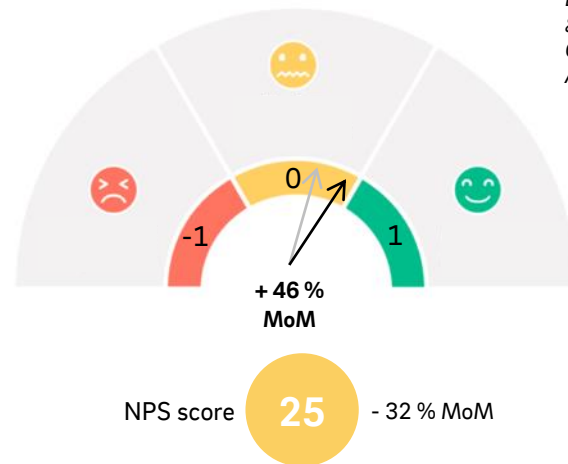
In April 2020, **Covid-19 mood made customers stick to the 7-8 rates** without being really dissatisfied. This is reflected by the most quoted topic, **global satisfaction**, and by **the average sentiment**, which increased of 46% with respect to March.

CORE CATEGORY

SUCCESS STORIES #5
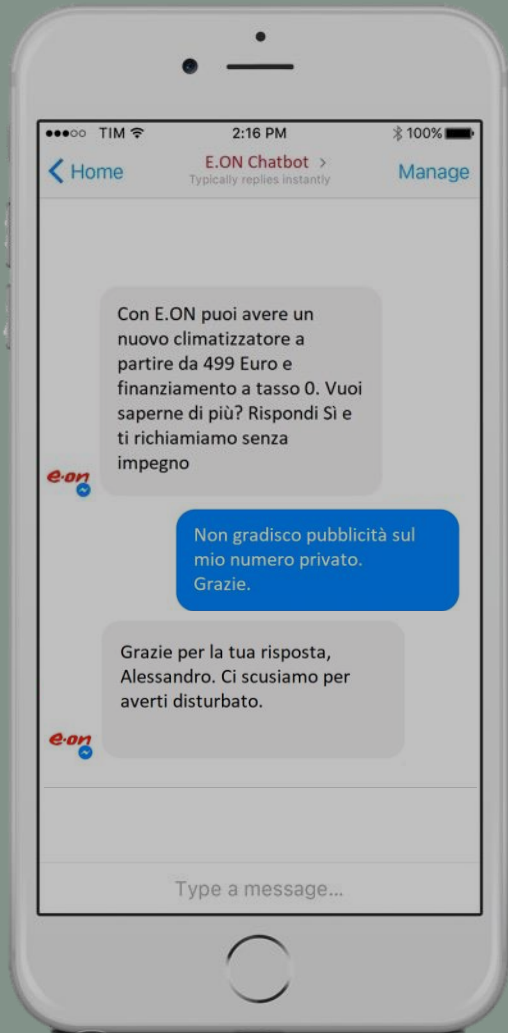
Chatbot for Campaign Support

DESCRIPTION

When customers reply to sms campaigns it is not always possible to understand automatically what they mean.

Until last year, simple rules had been implemented to identify "Yes" and "No" on the basis of some keywords. These simple rules are very often enough but, however, it did happen that a number of interested customers were instead classified as not interested.

In order to maximize the percentage of interested customers, using AI and ML technologies, a small bot has been developed. This bot is able to understand what the customer intends to say even when the answer is much more complex than a simple "Yes" or "No".

GOAL

Minimize the FALSE NEGATIVE in order to increase the number of leads
Minimize the FALSE POSITIVE in order to not anger customers

ENABLER

Allows us to customize the response messages according to the situation and the customer's reaction
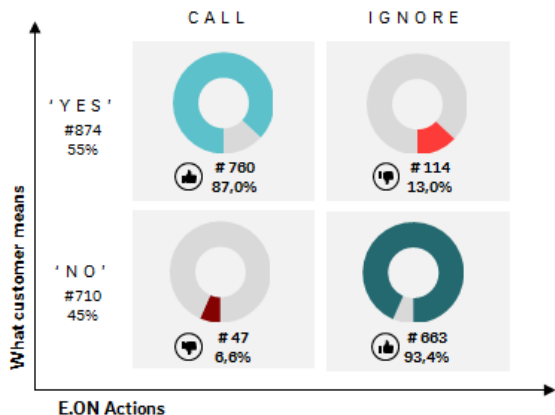
TAKE AWAY & EVIDENCES

• This bot need a training as often as possible in order to perform well
• Good results in these first months

NEXT STEP

Add the ability to intercept needs outside the specific campaign and re-direct the customer to the CC or to the website according to the requirement.
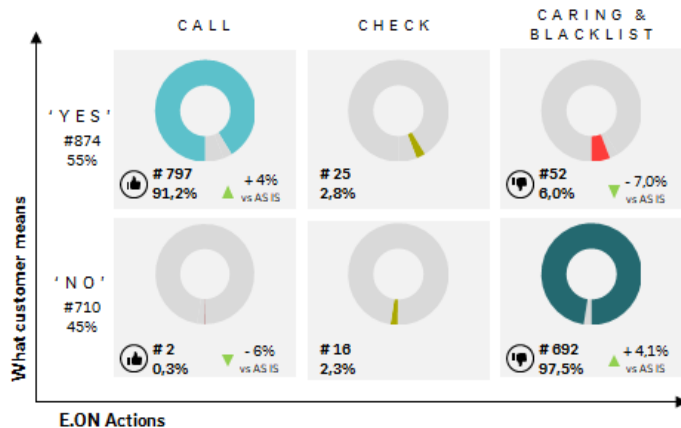
Focus on | How does it perform?

PERFORMANCE BEFORE AI CHATBOT

What customer means

CALL IGNORE

'YES'
#874
55%

👍 # 760   👎 # 114
87,0%   13,0%

'NO'
#710
45%

👎 # 47   👍 # 663
6,6%   93,4%

E.ON Actions

Accuracy = 89.7%

PERFORMANCE AFTER AI CHATBOT

What customer means

CALL CHECK CARING & BLACKLIST

'YES'
#874
55%

👍 # 797   +4%   # 25   👎 # 52   - 7,0%
91,2%   vs AS IS 2,8%   6,0%   vs AS IS

'NO'
#710
45%

👍 # 2   - 6%   # 16   👎 # 692   +4,1%
0,3%   vs AS IS 2,3%   97,5%   vs AS IS

E.ON Actions

Accuracy = 95% ▲ **+5.3%**

Bots like this one could help E.ON **to personalize the customer experience** and to be present **WHEN** and **WHERE the customer need our services.**

CMO CFO CSO

Forecasting Model for Business Controlling

DESCRIPTION

The forecasting activities have the important role of making predictions about acquisitions, activations and losses for each commodity, target and channel combination.

Evaluating the trend of the past and giving greater importance to the recent months, we estimate the probabilities to cancel and to churn, analysing the story of our CB splitted not only by activation court but also by ageing.

These statistical measures are applied to the expected acquisitions, which represent our ambitions, provided by the Business Controlling team, to predict activations and losses that we would have in the same conditions of the recent past. Moreover, through the model we get also the evolution of the CB for the next months.

GOAL

The aim is to provide a tool for supporting to the Business Controlling team in the forecasting activities, to have a statistical representation of the CB evolution without considering external factors that the Business Controlling team can include a posteriori.

ENABLER

Through the graphical representation of the model results, we get insights about the predicted CB evolution, to determine for instance which ageing category presents a higher probability to churn.

TAKE AWAY & EVIDENCES

FC2 June 20 - Dec 20:
- The Web channel is highly affected by deactivations due to the renewals
- As today, early churn cannot be investigated due to the predicted low acquisitions
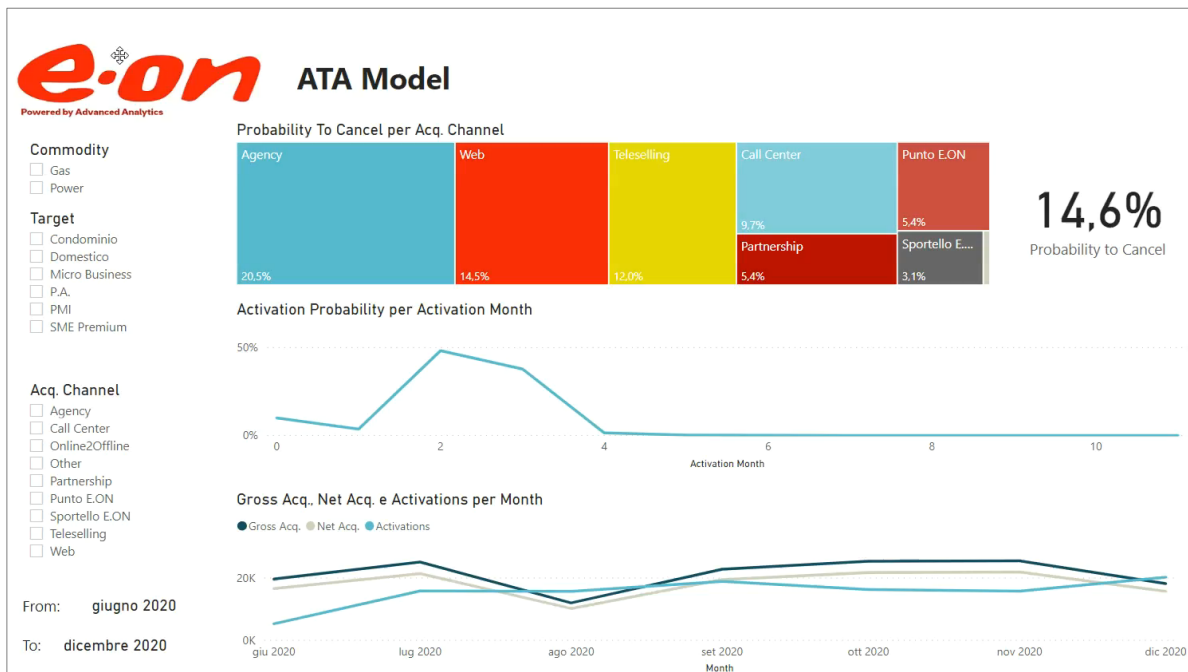
NEXT STEP

The idea is to provide a graphical representation of the CB evolution of the past, to analyse how some phenomenon of particular periods affected our activations and losses.
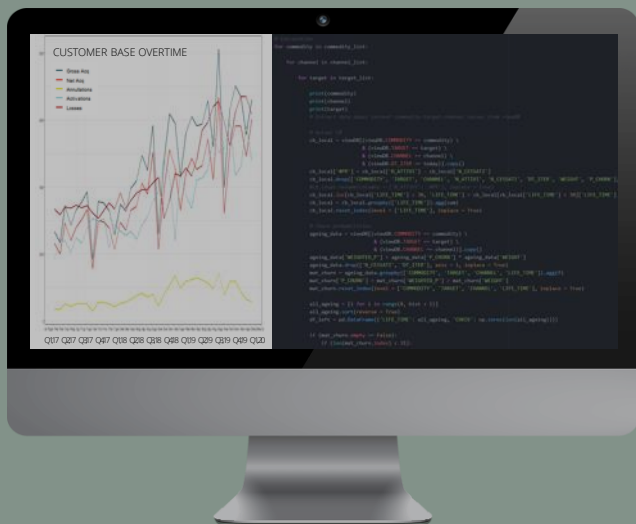
Focus on | FC2 2020: Power – Residential - Web

Power BI

Dashboard developed & implemented by CVM Advanced Analytics Team

In the following months, the CB activated through the Web channel is going to grow, implying an increase of lost supplies. But the 13% of the total predicted lost, 4.8K, is given by supplies with an ageing of 10-12 months, i.e., supplies close to the first renewal.

CMO CFO CSO

S U C C E S S   S T O R I E S   # 7

Best Offer Finder

DESCRIPTION

We are analysing the consumption of the entire CB power in order to understand if the offer they chose (one-band or two-band tariff) fits well with their real consumption per bands.

We will do a deep dive for the customer with a smart meter 2G analysing not only by classic bands (F1-F2-F3) but with a resolution of 15 minutes. In this way it will be possible to understand the customer lifestyle, how and when he/she uses some appliances. This kind of analysis opens the doors to a new world full of opportunities to be seized.
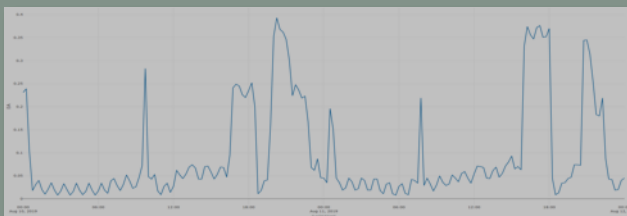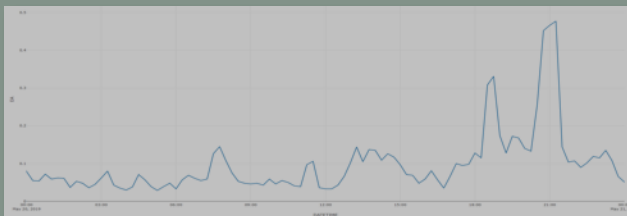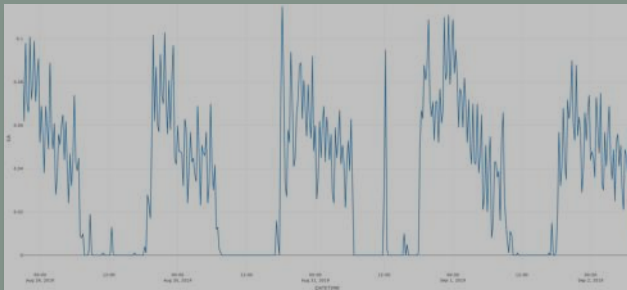
GOAL

Discover the customers' lifestyle and help them to optimize their energy related journeys.

ENABLER

Sending DEM with tips on energy usage related to their offer type (two bands), creating tailored offer for customers' clusters according to their needs

TAKE AWAY & EVIDENCES

- Considering the fix-price offers, most of our CB has a one-band offer (>90%)
- Many of our customers should switch from one-band to two-band offer to fit their energy consumption
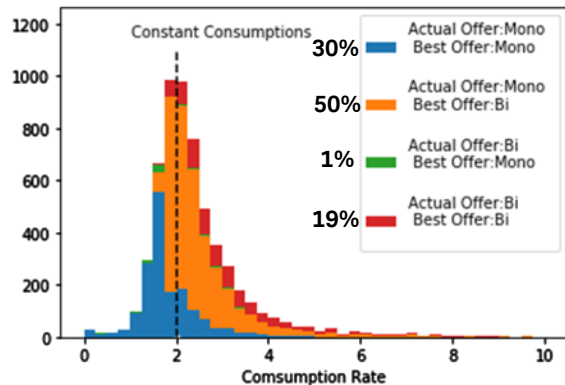
NEXT STEP

Investigate smart meter 2G consumptions evaluating the possibility to create multi-band offers

Focus on | What about our CB?
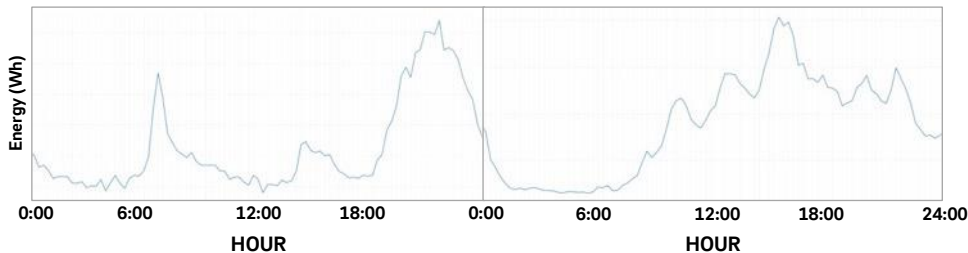
5890 PR - A REPRESENTATIVE SUBSET

Customers whose offers start on January '19 (first offers and renewals) and with at least three months consumption data

Offers which have both one-band and two-band tariffs

TWO-BAND OFFER	ONE-BAND OFFER
945 (16%)	4945 (84%)

The most of our CB has a one-band offer but **they should have a two-band offer to fit their household consumption**

CMO   CFO   CSO

USE CASE #1

Blackouts Minimizer & Power Management

DESCRIPTION

The analysis of the consumption curves of our customers allows us to understand their routines, and to check if their current offers are suitable or needs to be changed.

It is not uncommon to notice that for some supplies the contractual power limit is too low, and this can cause blackouts. Providing some statistics about the number of times in few months a customer exceeded the contractual power limit can make them understand better what is going on with the appliances they use.

This can result in a more accurate customer care.

GOAL

The aim is to identify the PODs that exceed or that reach frequently the contractual power limit, to suggest more suitable contracts.

ENABLER

Caring campaign to make customers aware of their consumption and how to improve power management to avoid inconveniences such as blackouts.