



Exploring Energy Use in Fashion Stores: A Field Experiment

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INDITEX

Stock information: Inditex 22/02/2019 17:35 CEST

Last: 25.53 €

Change: +0.10 (+0.39 %)

High/Low: 25.64/25.37

Yearly High/Low: 25.89/21.85

Volume: 2,252,792

Market cap: 79.57 bn

Today 1 mo. 3 mo. 6 mo. 1 yr 2 yr 5 yr All



INDITEX

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7,475

Stores

96

Markets

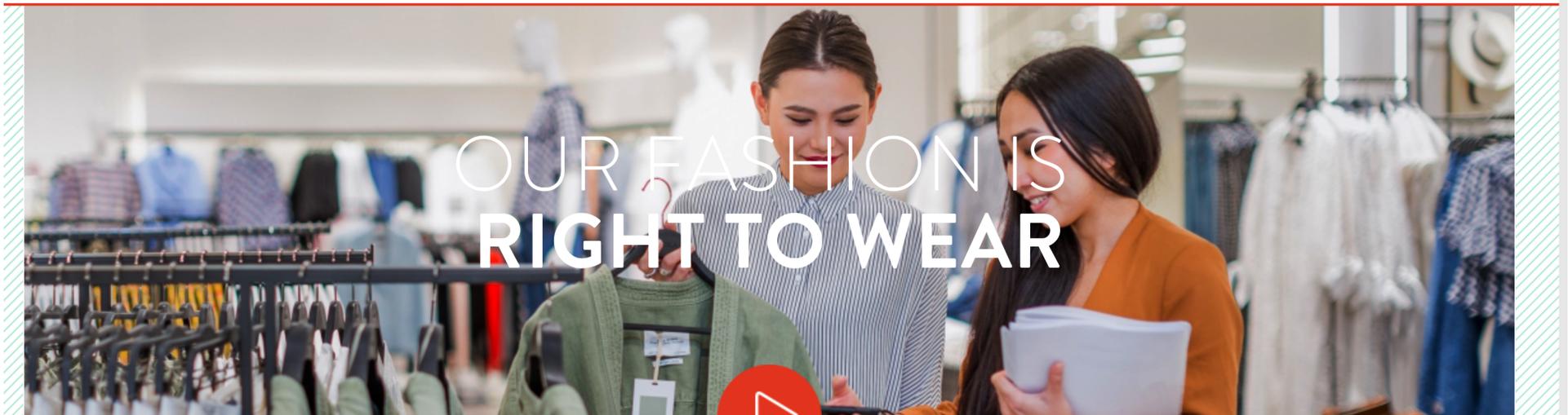
49

Online Markets

[Media](#)

[Careers](#)

[Contact](#)

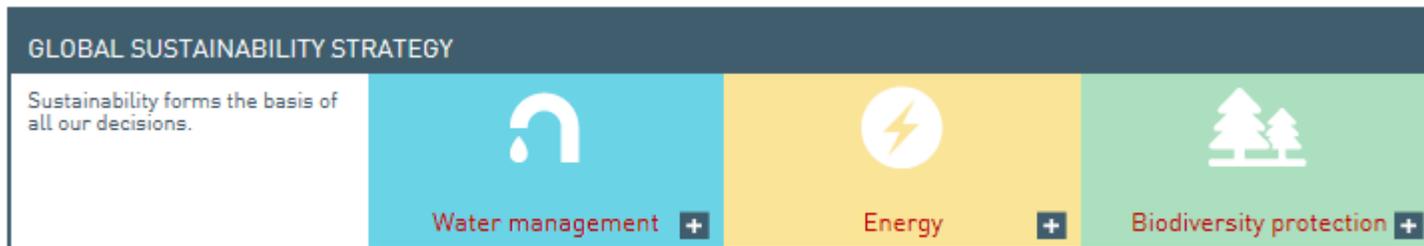


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Experiment in 3 EU countries:
Spain, Italy, Germany



Sustainability in their global strategy



- Global Strategy to reduce emissions. It belongs to the Sustainable Apparel Coalition (SAC).
- It is expected that for 2020 will reduce emissions by 15% in the production process with respect to 2012, and a 10% in stores.

“The smart store” (tienda viva)

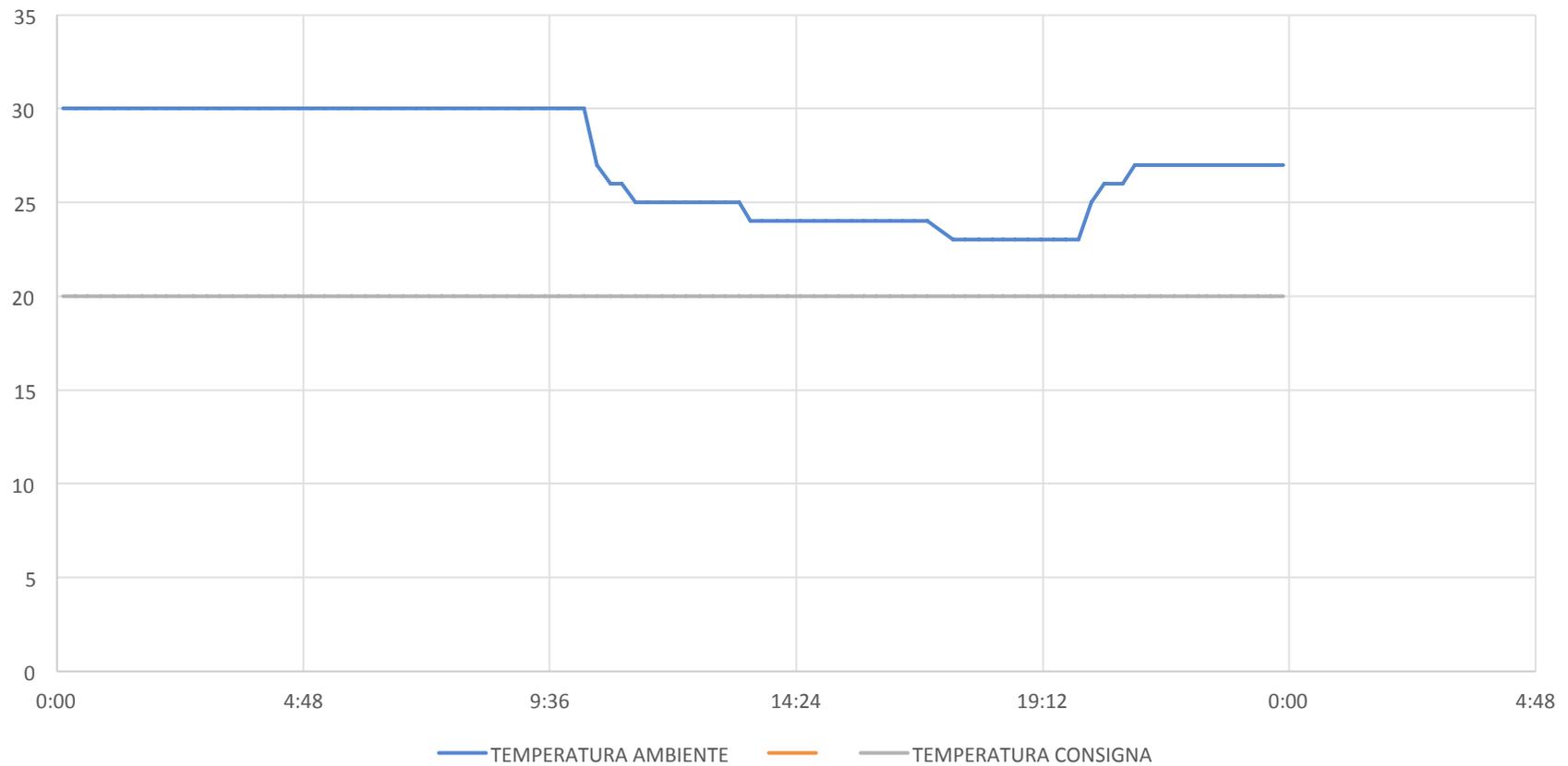
- Intensive updating and remodeling in stores
 - Eco-design
 - Light bulbs
 - Heating and cooling systems
- Sensors of movement, humidity, air temperature and air quality
- Automatized process

Heating and Coling Systems

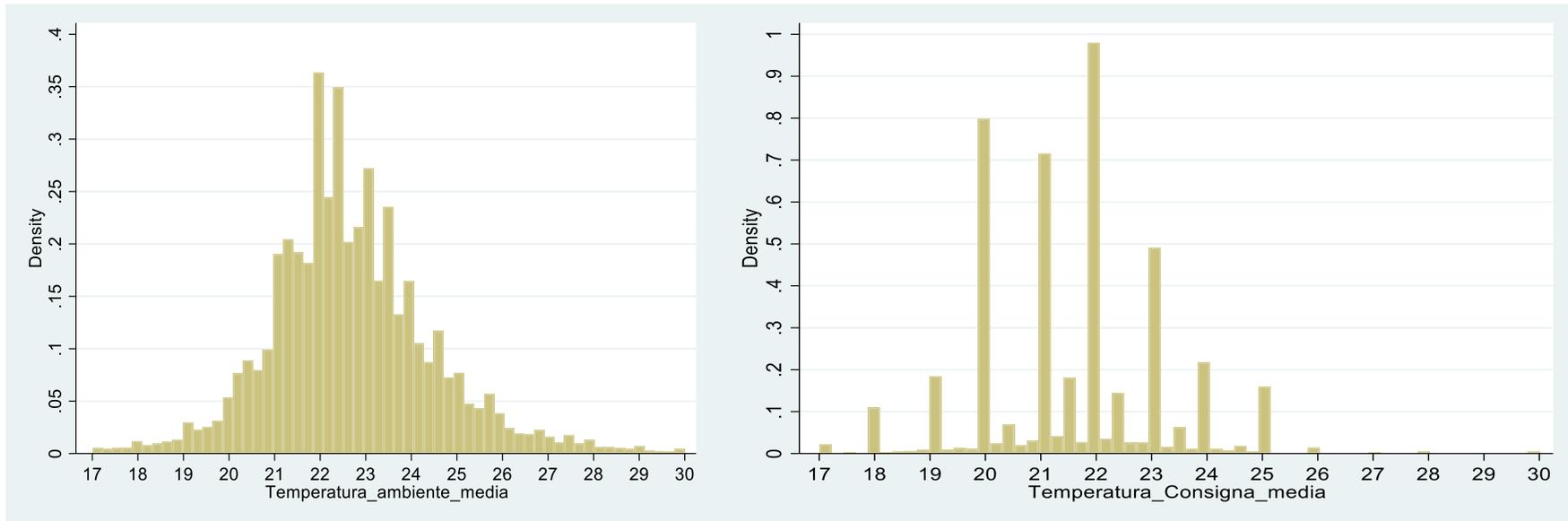
- Temperature is a key control variable
- Allow to set up a thresthhold temperature:
 - Thresthhold temperatures are established between 21-24 degree Celsius.
 - Thresthhold temperatures can be changed automatically by managers
 - Energy efficiency issue: Establishement of indoor temperatures closed to external temperatures.

Some descriptive results: Venice (14/06/2015)

In-store Temperature and "Objective" Temperature



Average temperatures and threshold temperatures



Alta variabilidad de temperaturas de consigna y temperatura media interna

Mean temperature per month

Month	Media	Std. Dev.
1	21.984	12.394
2	22.229	14.834
3	21.778	11.232
4	21.720	10.720
5	21.380	12.431
6	21.304	13.036
7	20.859	14.477
8	21.016	17.114
9	21.412	15.655
10	21.563	13.232
11	21.600	13.060
12	21.835	11.534

Objective

- To assess the impact of information about environmental impacts of energy consumption in the retail sector in an international fast fashion group with a field experiment
 - Experimental subjects: retail managers
- To contribute to the literature in the business sector: A wide variety of field experiments in private households but quite novel in the context of retail sector

Energy efficiency gap in the retail sector: why?

- A significant energy efficiency gap may be present in the retail sector due to:
- Information asymmetries or lack of information (Howarth et al., 2000; Schleich & Gruber, 2008, Schlomann & Schleich, 2015)
 - Old infrastructures and buildings (Eichholtz, Kok and Quigley, 2013)
 - Other reasons (lack of incentives, etc) (Timilsina et al. (2016))
- Policy evaluation of intervention in Canada: Adams et al. (2011)



Data collection: Three brands in three countries: Zara, Pull & Bear, Oysho

Three countries: Spain, Germany and Italy

- Different demand elasticities
- Different socio-cultural elements and shopping habits

The experiment (RCT)

- Letter sent to store managers on February 3rd
- Information displayed during a week as “important message” in inbox
- Letter signed by the General Sustainability Director of the Inditex Group
- Content of this letter discussed by store managers and employees

The treatment: a letter

Dear manager,

Since some months ago we have been updating our stores with systems of measurement and management of energy in order to optimize energy consumption related to heating and cooling.

You should know that energy saving is crucial within the environmental objectives of our group INDITEX.

*In particular, the cost of **deviating 1 degree Celsius above or below the optimal inside temperatura, increases emissions in 4% caused due to a larger usage of electricity.***

*Please be aware that in order to contribute to **energy savings with the usage of the systems established, you can avoid the selection of an inside temperatura far away from the external temperature.***

Thank you for your consideration!

- *Sincerely,
Antonio Álvarez*
- *Director, Departament of Sustainability*

Message notification

The screenshot displays a web-based email notification system. At the top, it shows the user's location: "igt - Terminal de Gestión de Tienda - 500 - Señora - Encargado/a" and their email address: "Correo Señora: 3635 Caballero: 5258 Niño: 1".

The main interface is divided into several sections:

- Avisos:** A sidebar on the left with a dropdown menu and a calendar for February 2016. The calendar highlights the 3rd of the month.
- Mensajería A1:** A central panel showing a list of messages. The subject is "RSC_WICHTIGE INFORMATIONEN". A red arrow points from this message to the detailed view below.
- Detalle del mensaje:** A larger window showing the full content of the email. The sender is "Sustainability <correoigt@app.inditex.com>". The subject is "RSC_WICHTIGE INFORMATIONEN". The date is "Wed Feb 03 18:45:14 CET 2016".

The detailed email content is in German and discusses a new climate control system installed in stores to improve energy efficiency and reduce CO2 emissions. It is signed by Antonio Álvarez, Head of Environmental Sustainability at INDITEX.

At the bottom of the interface, there are navigation options: "Sección", "HUMANOS", "DOCUMENTACIÓN", "DISTRIBUCIÓN", and "Perfil".

Message notification

The screenshot displays a retail management system interface with the following components:

- Header:** "tgt - Terminal de Gestión de Tienda - 500 - Señora - Dependiente/a" and "Correo Señora: 3628 Caballero: 5251 Niños: 1".
- Avisos (Notifications):** A list of notifications including "Coordinación: Fotos" (dated 02 mar) and "Aviso TGT". A notification titled "RSC_INFORMAZIONE IMPORTANTE" (dated Hoy) is highlighted with a red arrow pointing to the "Consultar Mensaje" window.
- Consultar Mensaje (View Message) Window:** A modal window showing message details for "2016-02-03". The subject is "RSC_INFORMAZIONE IMPORTANTE" and the message content is "VEDI ALLEGATO". A red arrow points from the "Fichero adjunto" field (containing "222448983") to the message content area.
- Message Content:** A detailed message in Italian regarding the installation of an automatic air conditioning control system. The text discusses energy savings and environmental benefits. It is signed by Antonio Álvarez, Head of Environmental Sustainability at INDITEX.
- Calendar:** A calendar for February 2016 with the 3rd of the month highlighted in red.
- Footer:** A navigation bar with sections: "Sección", "RECURSOS HUMANOS", "COMUNICACIONES Y DOCUMENTACIÓN", and "OPERACIONES Y DISTRIBUCIÓN".

The experiment

- Selecting treatment and control groups:
- They are all at street level and have a history of 1 year with the Eco-tool platform.
- We selected in Spain 20 Oysho, 20 Pull & Bear y 65 Zara stores, while an identical number are being used as control stores.

15' data frequency

INDITEX Welcome Mario Español English **Options**

ENERGY EFFICIENCY PLATFORM

MAP All Facilities Weather Mapa Satellite

ALARMS

- Correct
- Alarm
- Important alarm
- Communication not available

SEARCH **PROFILE**

FACILITIES AVAILABLE 199

RANDOM 5336
Galería Krakowska, Krakow, Poland
PULL&BEAR

FACILITIES VISITED

- 697 CC Marinada City, A Coruña, Spain (Pull And Bear)
- 705 Calle Santiago 11, Valladolid, Spain (Pull And Bear)
- 746 C.C. Los Fresnos, Gijón, Spain (Pull And Bear)

Options menu items: Start, Search, Profile, Incidents, Alarms, Energy analysis, **Help**, Logout

Dataset Variables

- Energy consumption
- About the store:
 - Target temperature
 - Indoor temperature
 - Size of store (m2 and m3)
 - External temperature
 - Flagship store or not
 - Location
- About the manager:
 - Male/Female
 - Number of years of experience with the firm

Hypotheses

•Ho: Average engagement of managers in temperature control is identical between treated and non treated stores.

•Ho: Average differences between indoor and external temperatures are identical between treated and non treated stores.

Ho: Average engagement of managers is identical

Group	Number of changes	Std. Error
Non Treated	.898	.004
Treated	1.342	.007
	T-test	
Diference	-.443	.007
T-value (p-value)	-56.592 (0.000)	

Ho: No differences in temperatures between treated and non-treated

	Abs Difference between temperatures (Outside-Indoor)	Std. Error
Treated	6.630	
Non-Treated	6.680	0.0233
Difference	-.0500	.03003
T-value (p-value)	-1.6671 (0.0955)	

Non-Parametric Tests

Hypothesis	Kruskal-Wallis equality-of-populations rank te
(1) <i>Ho: Thermostat Changes (Treatment) = Thermostat Changes (Control)</i>	$\chi^2_{(1)} = 41.945$ (p-value=0.000)
(2) <i>Ho: Indoor – Outdoor DifTemp (Treatment) = Indoor – Outdoor DifTemp (Control)</i>	$\chi^2_{(1)} = 1849$ (p-value=0.000)

Difference-in-Difference Regression

$$Y_{lit} = \beta_0 + \beta_1 T_{lit} + \beta_2 A_{lit} + \beta_3 T_{lit} A_{lit} + \beta_4 Z_{lit} + \varepsilon_{lit}$$

Note: M1: modeling number of thermostat changes; M2: Model of the temperature gradient between indoor and outdoor temperatures

	$R^2 = 0.88$ M1			M2		
	Coef.	Std. Dev	P	Coef.	Std. Dev	P
Email	1.969	0.087	0.000	2.073	0.073	0.000
Product(DID)	1.523	0.097	0.000	-0.1622	0.075	0.032
year2016	-1.603	0.067	0.000	-1.316	0.049	0.000
year2017	-0.727	0.077	0.000	-1.355	0.055	0.000
Incharge	0.273	0.006	0.000	0.163	0.004	0.000
Ms2	-0.0005	0.000	0.000	0.003	0.0001	0.000
_cons	0.084	0.0733	0.000	2.561	0.0054	0.000
F(6, 55925) = 567.27				F(6,35903) = 241.36		

What may justify our results?

- Behavioral inertias (as in private households)
- Lack of incentives
- Agency problems: managers do not have to pay energy costs.
 - Managers may have different interests than the firm.

Conclusions

- Significant steps towards emission reductions may be achieved with small behavioral changes
- Information may encourage reductions in electricity and emissions
- Small in-store reductions may generate large savings when scaled up
- Field experiments may help in order to reveal the true nature of inefficiency gaps in energy consumption in the retail sector.

Future research

- How to design incentives so that managers promote energy saving behavior?
 - Non pecuniary and reputational incentives
- What is the role of cultural differences in terms of temperature settings?
- How can we design most effective interventions by managerial types?

Further empirical questions

- Principal Agent theory: Do agents have incentives different than those from the principal?
- How to align different motivation between the agent and the principal?