

EL RETO DE LAS REDES INTELIGENTES PARA LAS EMPRESAS ELECTRICAS



 CLUB ESPAÑOL
DE LA ENERGÍA
INSTITUTO ESPAÑOL DE LA ENERGÍA

accenture >

Madrid, 4 de Junio de 2014
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IBERDROLA

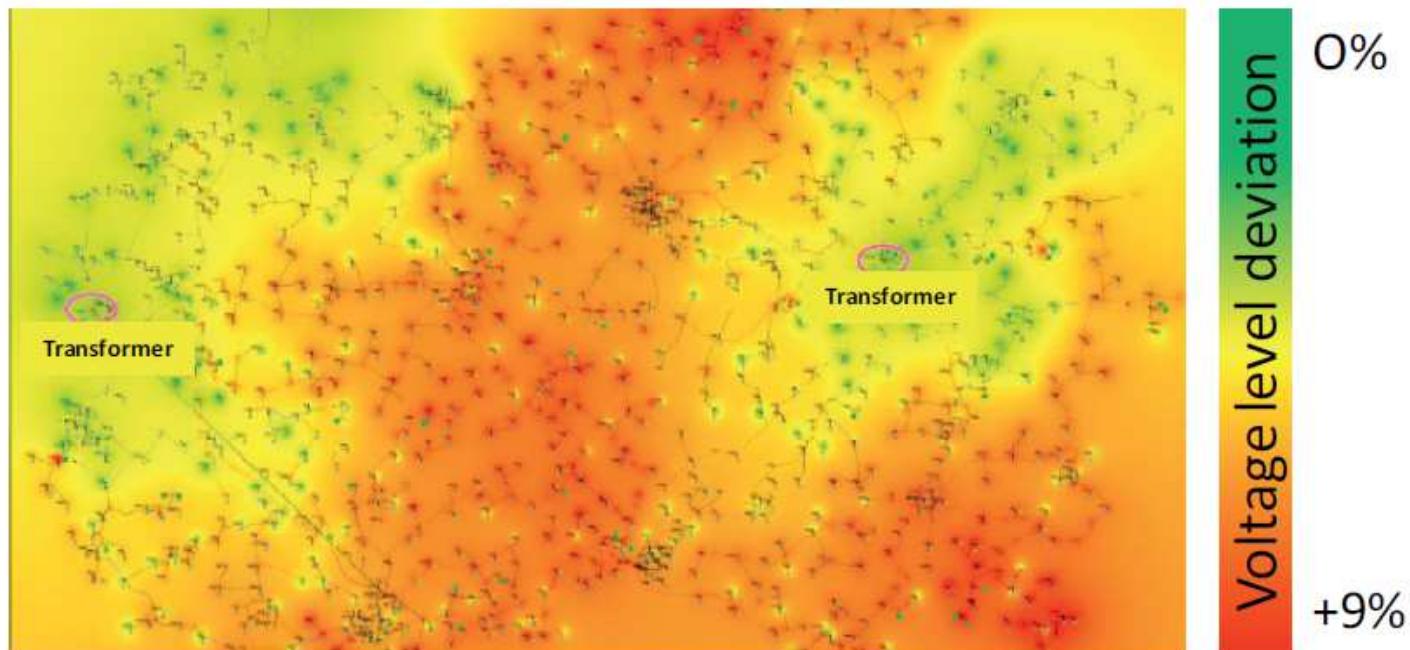


1. Las redes inteligentes son necesarias para nuestra sociedad
2. Las redes inteligentes afectan especialmente a las redes de distribución
3. ¿Qué debe hacerse en distribución para conseguir la Red Inteligente?
4. Financiación de las redes inteligentes
5. El caso de Iberdrola
6. Retos para el futuro

CASO ALEMAN

En 2012: 28.000MW conectados en Distribución

Figure 22 • Local voltage level variations at times of low demand and high solar generation



Source: E.ON Bayern, 2011.

Source: data from E.ON Bayern, 2012; EURELECTRIC, 2013.

Depends On A Resilient Grid

September 2012

1. Las redes inteligentes son necesarias para nuestra sociedad

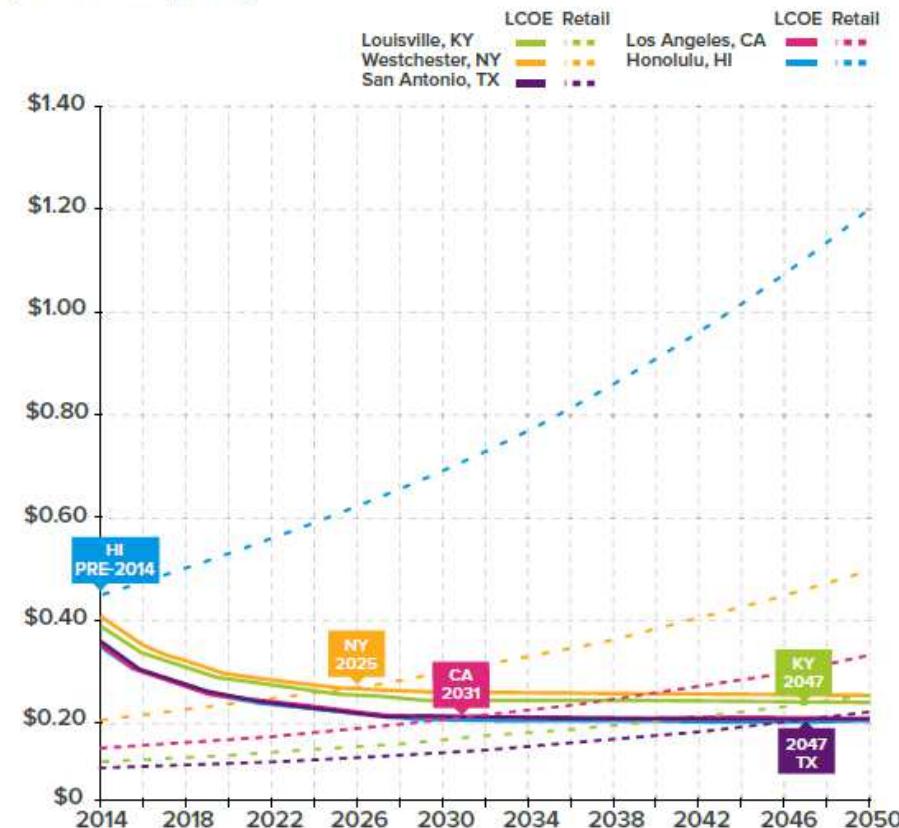


¿será económico el desconectar de la Red?

MOODY'S (November 2013)
“Rooftop Solar, Distributed Generation
Not Expected to pose Threat to Utilities”

MORGAN STANLEY (March 2014)
“Batteries + Distributed Generation
May Be or Negative for Utilities”

FIGURE 1: OFF-GRID VS. UTILITY PRICE PROJECTIONS
COMMERCIAL - BASE CASE
[Y-AXIS 2012\$/kWh]



1. Las redes inteligentes son necesarias para nuestra sociedad



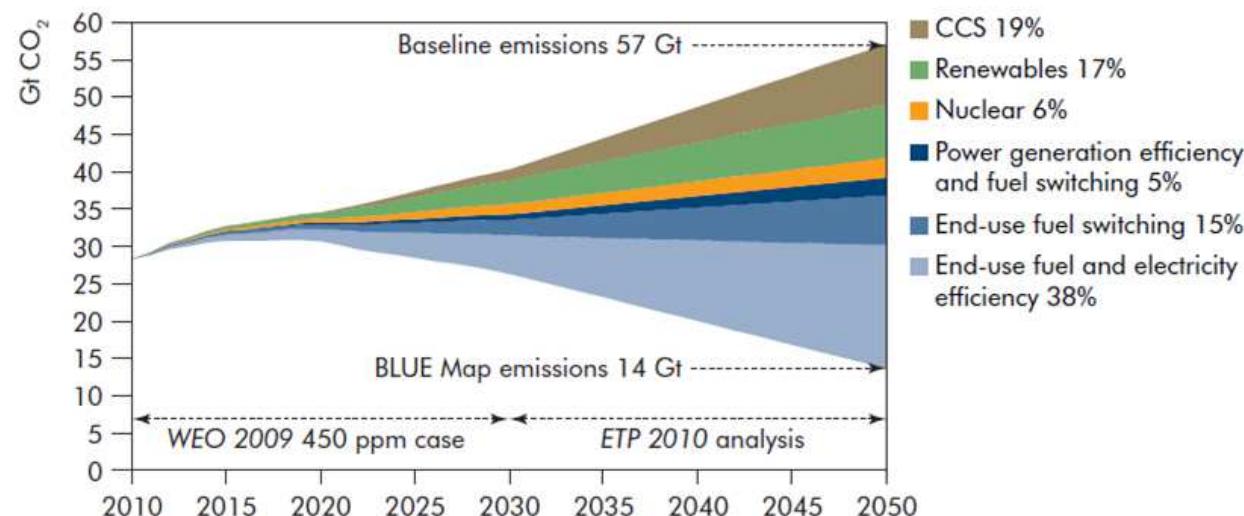
Por otra parte la energía eléctrica puede contribuir muy directamente a la reducción de contenido en carbono

1. LA ELECTRICIDAD COMO ELEMENTO BASICO EN EL FUTURO ENERGETICO

It is a must to reduce CO₂ emissions



Figure ES.1 ► Key technologies for reducing CO₂ emissions under the BLUE Map scenario



Key point

A wide range of technologies will be necessary to reduce energy-related CO₂ emissions substantially.

"IAEA Technology Perspectives 2010"

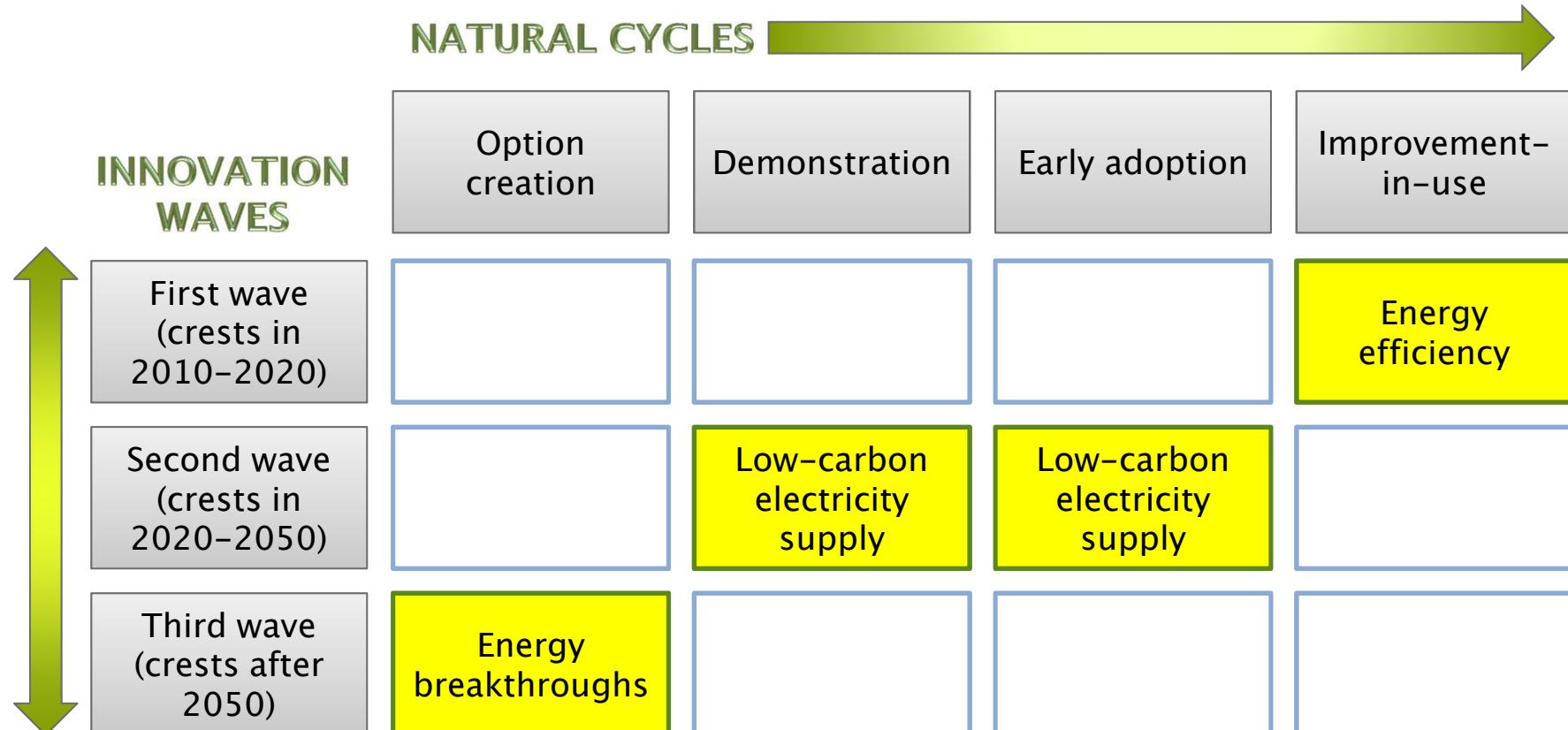
4



AMETIC

1. Las redes inteligentes son necesarias para nuestra sociedad

(from Richard Lester, Unlocking Energy Innovation, MIT press 2012)



NETWORKS HAVE TO BE READY FOR THE SECOND WAVE (WHICH WILL BE LED BY TECHNOLOGY AND COMPETITION) CENTERED IN LOW CARBON ELECTRICITY SUPPLY

DSO WILL BECOME AN INTEGRATOR OF DISTRIBUTED ENERGY RESOURCES

IN SPITE OF ENERGY
POLICIES UNCERTAINTIES
(SOURCE-PRICE, etc.)



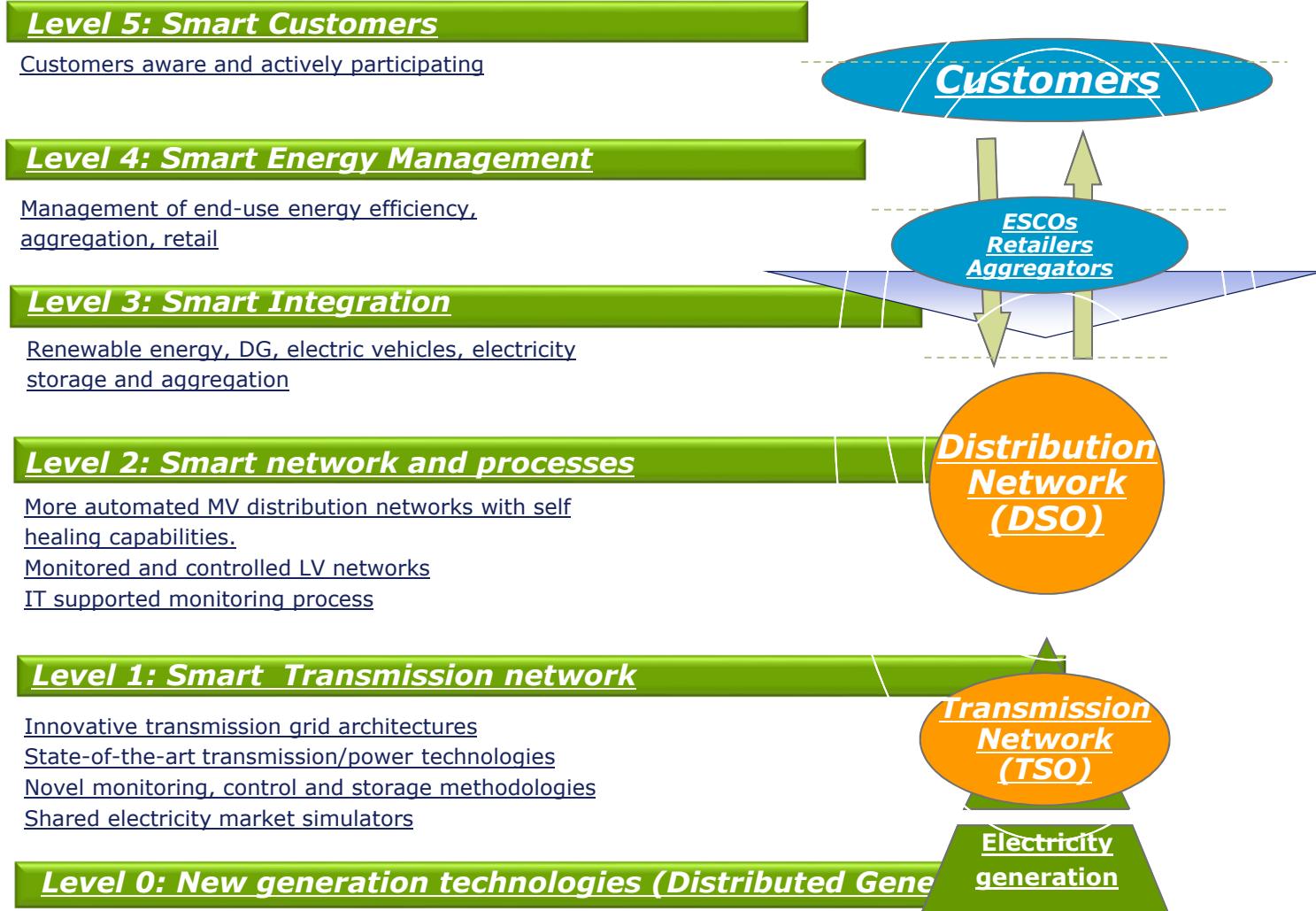
- Large integration of distributed generation, specially renewables of all types
- Large integration of electric transportation
- Improvement of efficiency
(better use of energy-active and managed demand)
- Maintaining/improving quality and security of supply

WILL HAPPEN

- 
- Looses control
 - Network resiliency
 - Operational improvements

2. Las redes inteligentes afectan especialmente a las redes de distribución

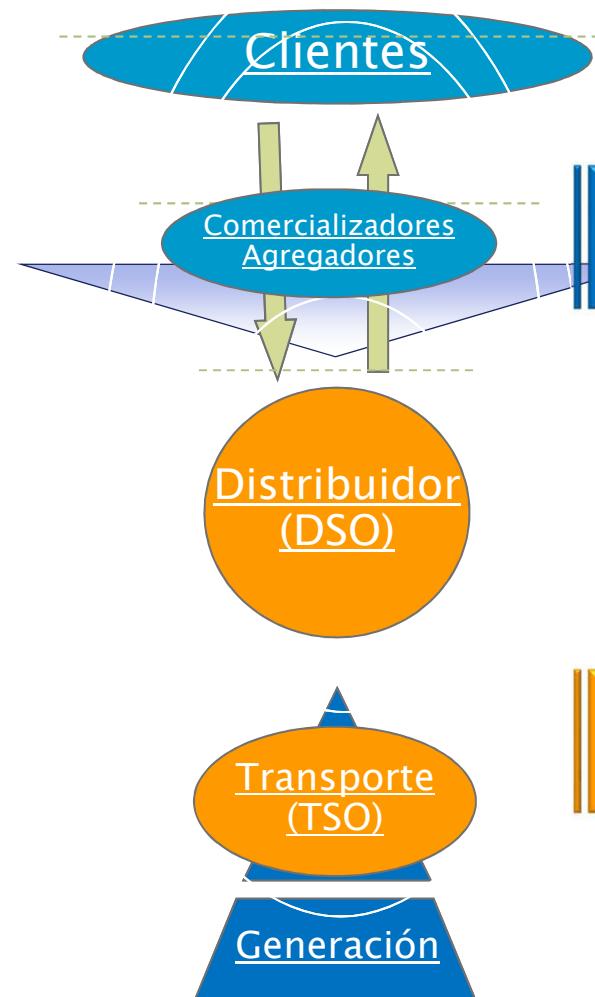
SMART GRIDS Functional level



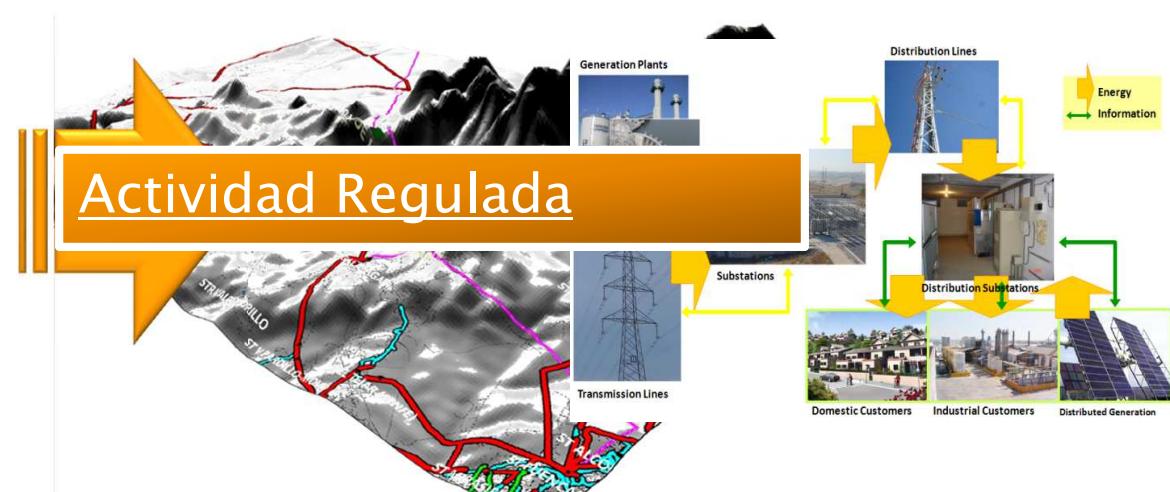
2. Las redes inteligentes afectan especialmente a las redes de distribución

REDES INTELIGENTES. Concepto

La Regulación es clave



Mercado en competencia



Actividad Regulada

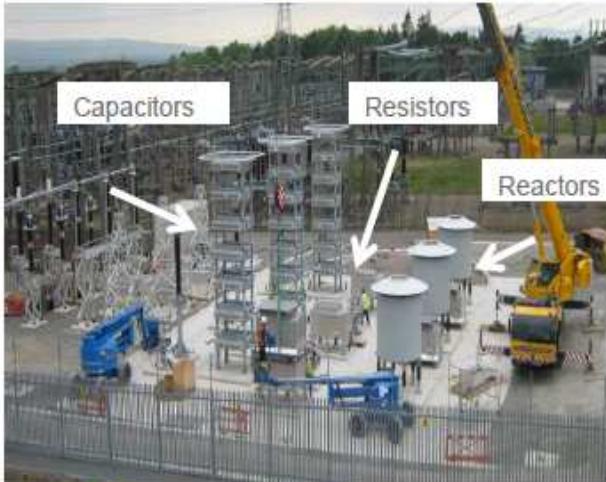


IBERDROLA

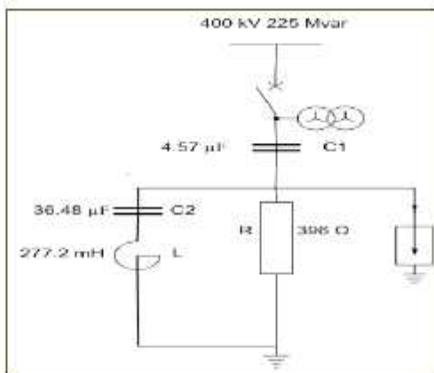
2. Las redes inteligentes afectan especialmente a las redes de distribución



3.3GW Upgrade (MSCDNs)



MSCDN at Windyhill



Circuit Diagram

Scope

- 400kV reconfiguration at Strathaven and installation of MSCDNs (mechanically switched capacitor damping networks) at 4 sites
- MSCDNs connecting in "shunt" configuration to support voltage during high power transfers
- Increase Scotland-England export capability to 3.3GW

Technical Challenges

- First use of MSCDN technology on SPT network
- Space extremely limited at Longannet s/s

Innovation

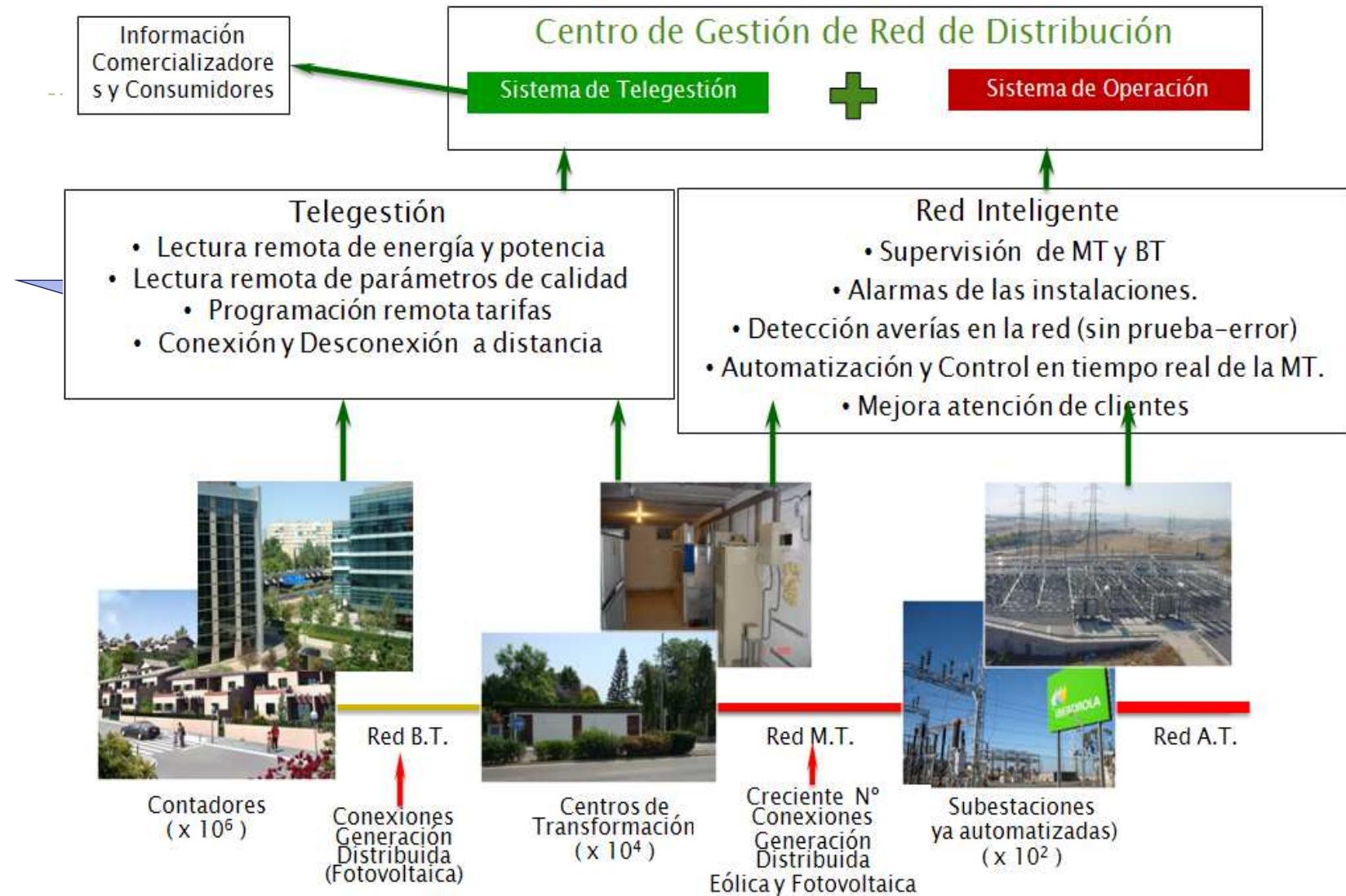
- Use of larger capacity MSCDNs at Longannet (not used in UK before) reducing footprint and removing need for new land and 275kV cable/switchgear

Timeline

- Windyhill & Elvanfoot sites commenced 2011, scheduled to complete end 2012
- Moffat & Longannet sites commenced 2012, scheduled to complete end 2013

Estimated cost circa £50m (€61m)

2. Las redes inteligentes afectan especialmente a las redes de distribución



2. Las redes inteligentes afectan especialmente a las redes de distribución

Active Demand: the ADDRESS Vision



Residential and small commercial consumers at LV level

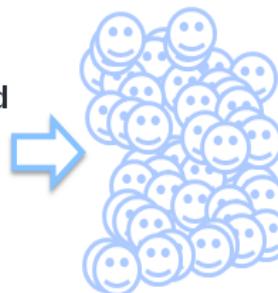
Their energy consumption can be made flexible in time and quantity



Controlling and managing the operation of: white goods; AC; electric heating (water and home); embedded storage and generation systems



- One consumer can provide only **limited flexibility**
- Consumer needs to know when and how much flexibility is worthwhile



- Many consumers, coordinated and with proper technology, can offer a flexibility that is **useful and interesting for the electrical system and its participants.**

coordination



aggregation

technology



ENERGY BOX

Smart white goods, smart plugs/in wall units, interfaces, HAN

3. ¿Qué debe hacerse en distribución para conseguir la Red Inteligente?



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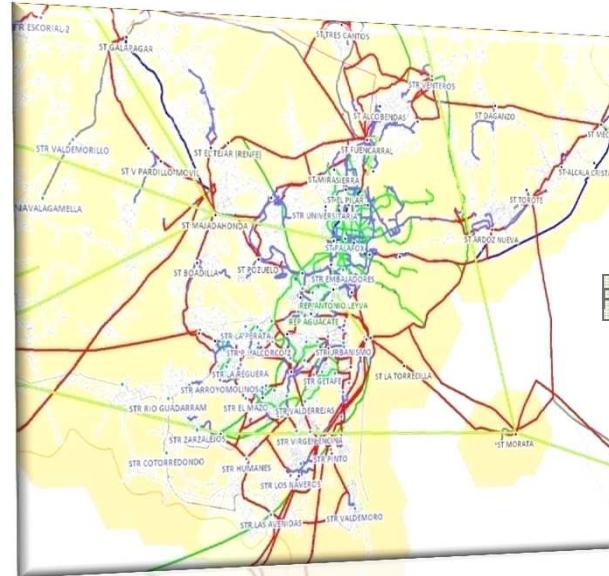
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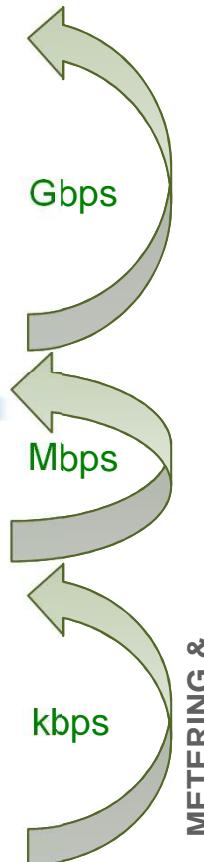
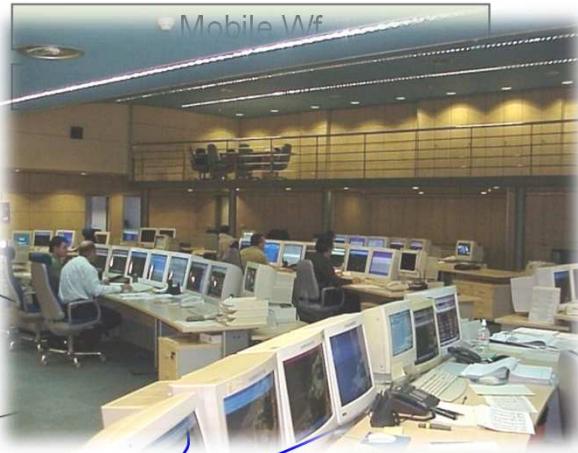
3. ¿Qué debe hacerse en distribución para conseguir la Red Inteligente?

Type	Numbers	
Substations (ST & STR)	Thousands (1.000 in IBD)	
Surface Distribution Substations + In Poles	Tens of thousands (34.000 + 25.000, IBD)	
Underground Distribution Substations	Tens of thousands (25.000, IBD)	
Points of supply	Millions (10.350.000, IBD)	

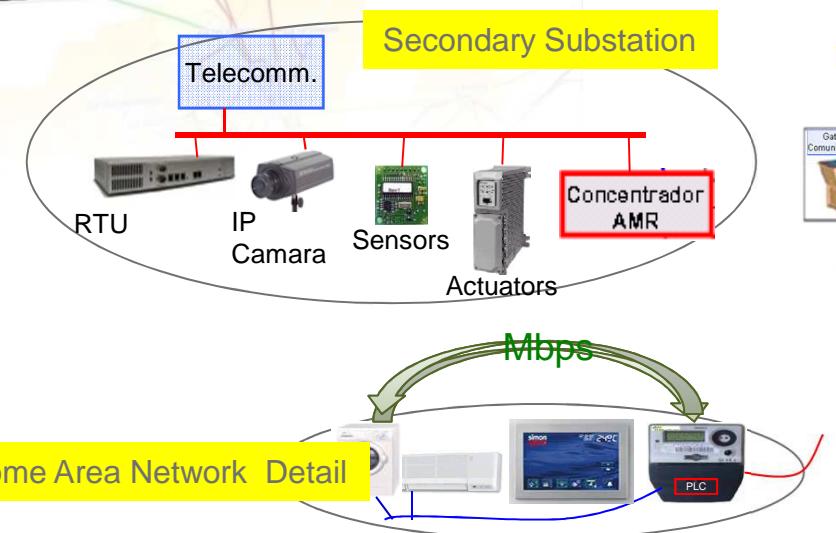
3. ¿Qué debe hacerse en distribución para conseguir la Red Inteligente?



Points of Supply
Retailers
TSO
Telecommunication Network



NETWORK IT & APPLICATIONS
METERING & DSM



3. ¿Qué debe hacerse en distribución para conseguir la Red Inteligente?

Smart Grids are the ones that allow smart supply and smart use of electricity.

BASED ON COPPER & IRON



ADDING ELECTRONICS



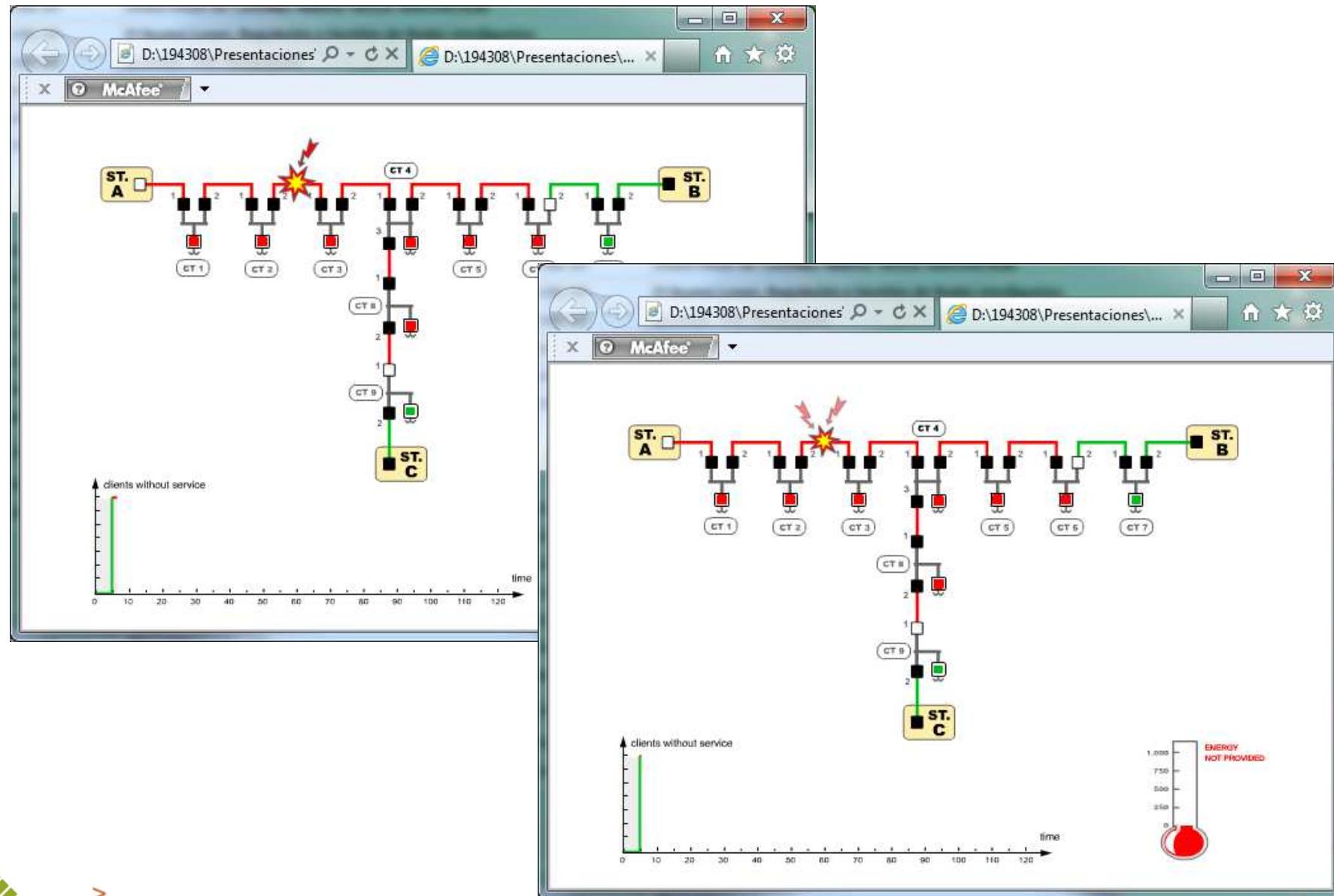
- REAL TIME SUPERVISION
- AUTOMATION
- ENORMOUS AMOUNT OF INFORMATION

IMPACTING ALL THE VALUE CHAIN



MUCH BETTER, TO REFER TO EVOLVING NETWORKS OF THE FUTURE

3. ¿Qué debe hacerse en distribución para conseguir la Red Inteligente?



LA INVERSION ES ENORME

- EPRI ESTIMA, SOLO PARA LAS REDES DE DISTRIBUCION EN EEUU, ENTRE 232.000 Y 340.000 MILLONES DE \$ (2011). EL DOE ESTIMA 334.000 M\$.
- LA C.E. ESTIMA 370.000 MILLONES DE €, EN LA EU-27, EN REDES DE DISTRIBUCION.

4. Financiación de las redes inteligentes

PREGUNTA OBVIA : ¿QUIEN TIENE QUE PAGAR LA INVERSION DE LAS ACTIVIDADES REGULADAS ? LA RESPUESTA SENCILLA

LOS BENEFICIARIOS

PERO, NO ES FACIL DISTRIBUIR LOS BENEFICIOS PORQUE

- ALGUNOS PUEDEN SER ASIGNADOS DIRECTAMENTE
- ALGUNOS DEBEN REPARTIRSE
- ALGUNOS DEBEN CONSEGUIRSE EN UN MERCADO QUE TODAVIA NO EXISTE

EN CUALQUIER CASO,

LOS BENEFICIOS DEBEN MEDIRSE Y COMPARARSE CON SUS COSTES.

4. Financiación de las redes inteligentes

LA SOLUCION: REGULACION

- QUE, DE FORMA ESTABLE, ASEGURE LA RECUPERACION DE LA INVERSION EN LAS ACTIVIDADES REGULADAS .
- QUE FACILITE EL MERCADO EN COMPETENCIA EN EL RESTO DE LAS ACTIVIDADES.

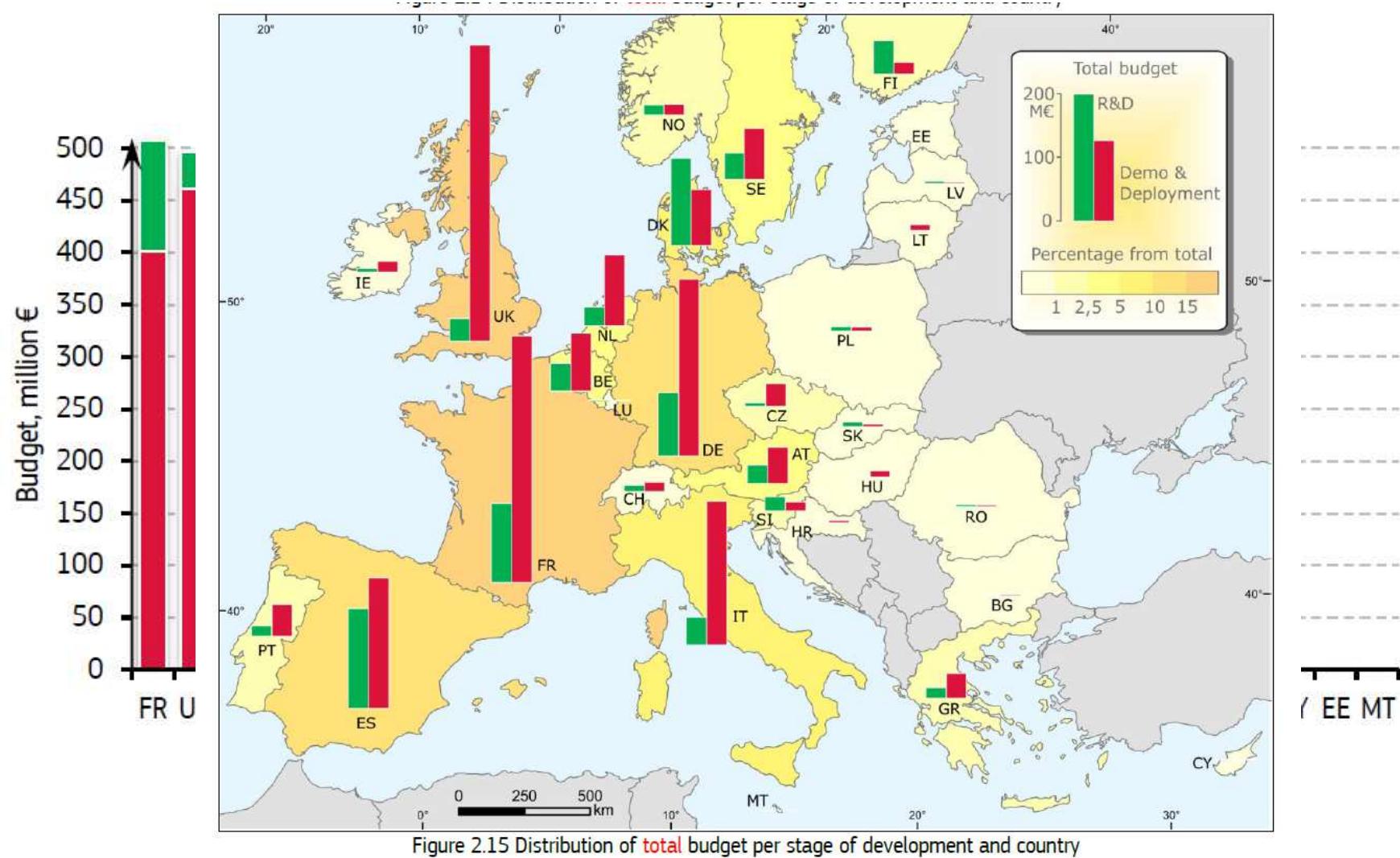
EL METODO, PROYECTOS DE DEMOSTRACION QUE PERMITAN MEDIR BENEFICIOS Y COSTES ASEGURANDO SU ESCALABILIDAD



- | | | |
|----------------------------------|---|------------------------|
| • Orientados a probar tecnología | • Problema de Financiación (compartición de riesgo) | • Regulación necesaria |
| • Mayoría completados | | |

4. Financiación de las redes inteligentes. EUROPA

PROYECTOS DE SMART GRIDS EN CATALOGO JRC (2014)



4. Financiación de las redes inteligentes. EUROPA

GRAN ESFUERZO DE COLABORACION. ESPAÑA LIDERA

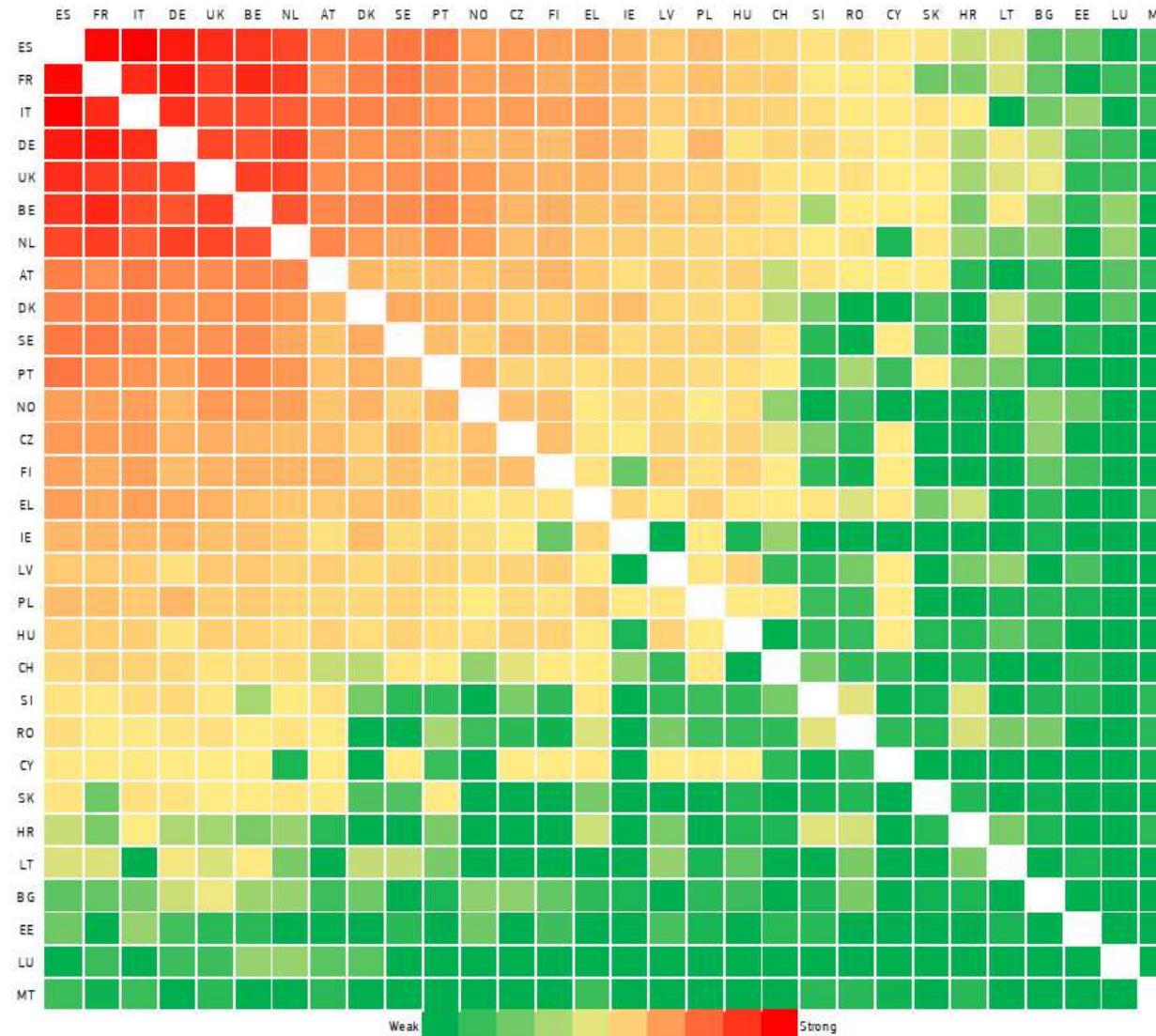
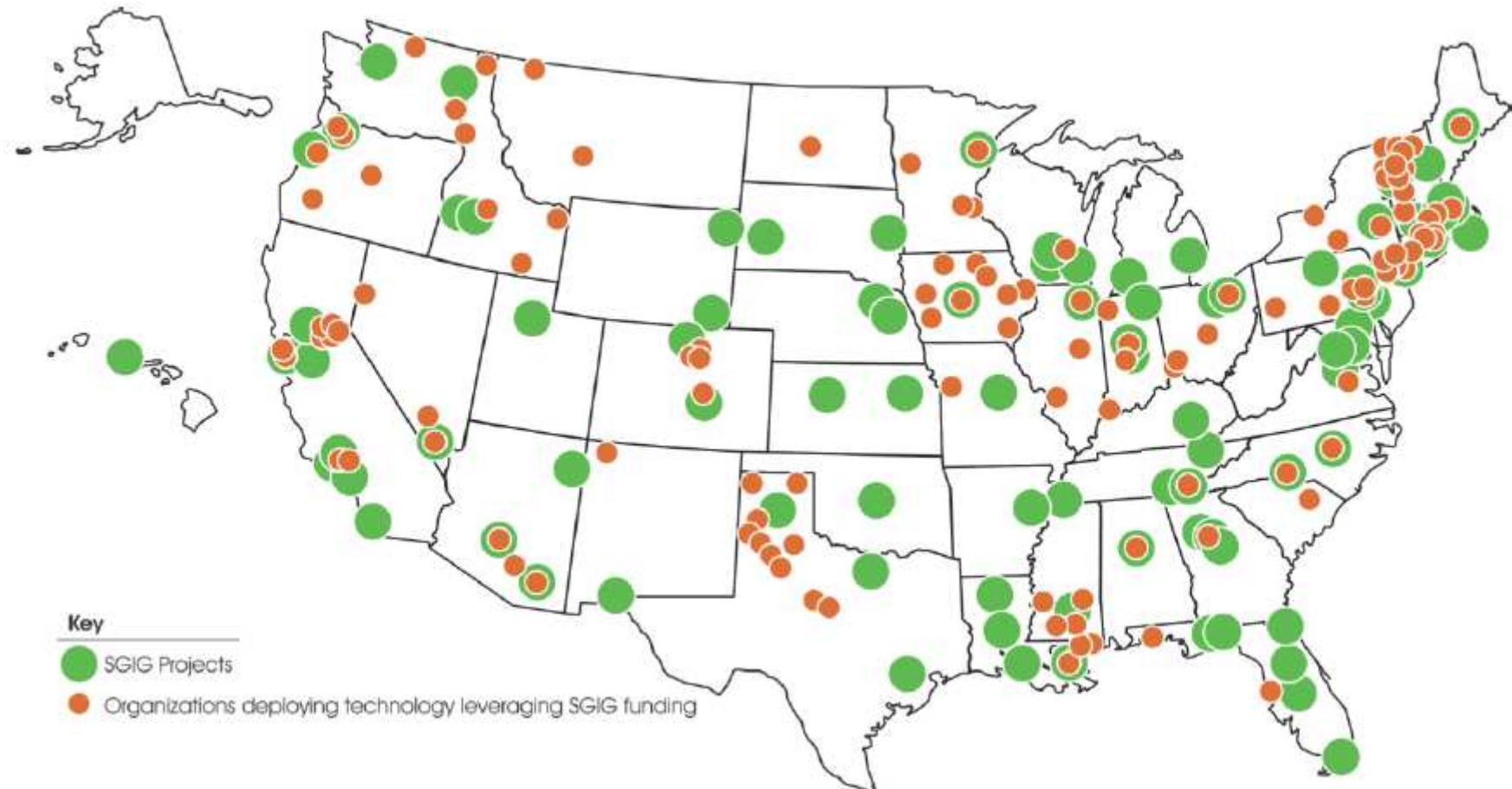


Figure 6.3 Collaboration links in European multinational projects
(weighted by **total** project budget, heat map representation)⁴⁴

4. Financiación de las redes inteligentes. ESTADOS UNIDOS



99 PROYECTOS CON UNA INVERSIÓN TOTAL DE 7.900M\$

4. Financiación de las redes inteligentes. ESTADOS UNIDOS

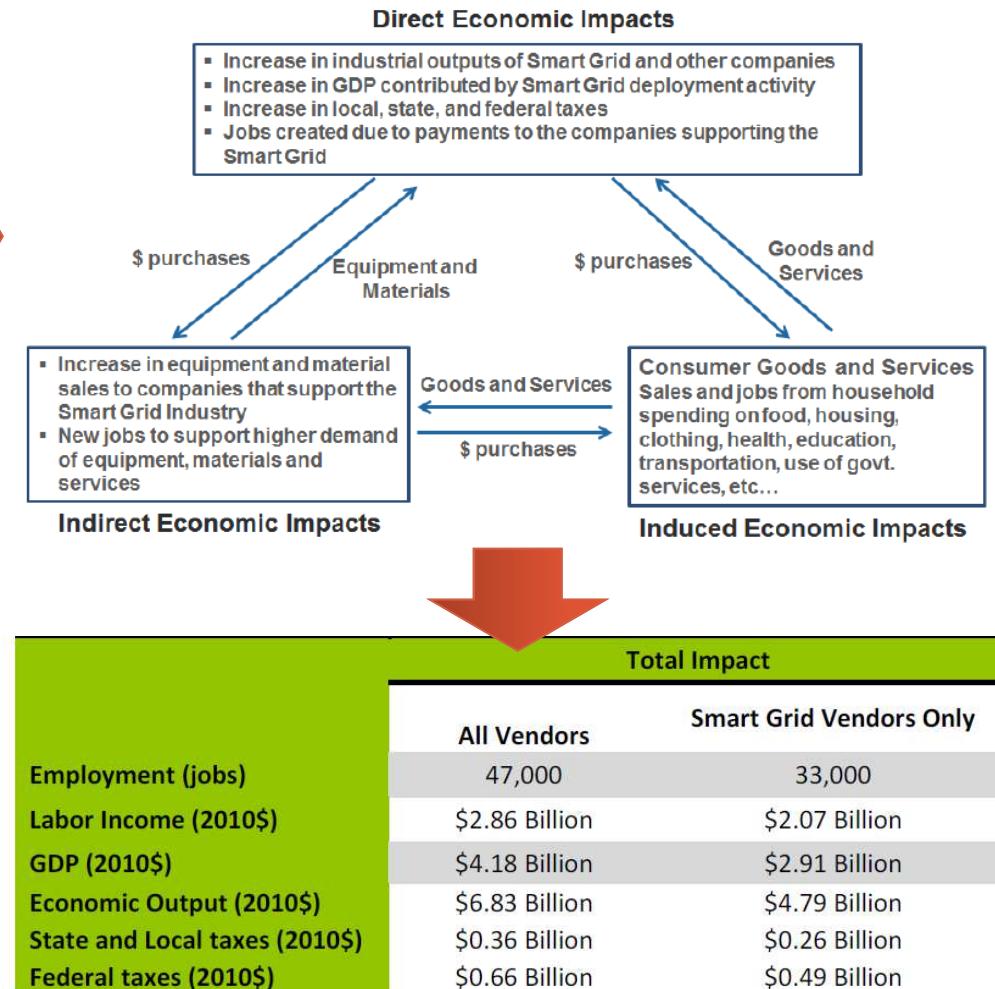
CON BENEFICIOS YA REGISTRADOS

DOE ARRA EVALUATION (Smart Grids Investment Grant Program)

TOTAL INVESTMENTS
(AS OF MARCH 2012)

ALL VENDORS 2,96B\$

SMART GRIDS
VENDORS ONLY 2,11B\$



4. Financiación de las redes inteligentes. EUROPA

DESPLIEGUES ACABADOS

PAIS	AÑO	CONTADORES (M)	INVERSIÓN (M€)
Italia	2008	36,00	2.100
Suecia	2009	5,20	1.500
Finlandia	2013	5,10	900
Malta	2013	0,25	86
		46,55	4.586

DESPLIEGUES EUROPEOS

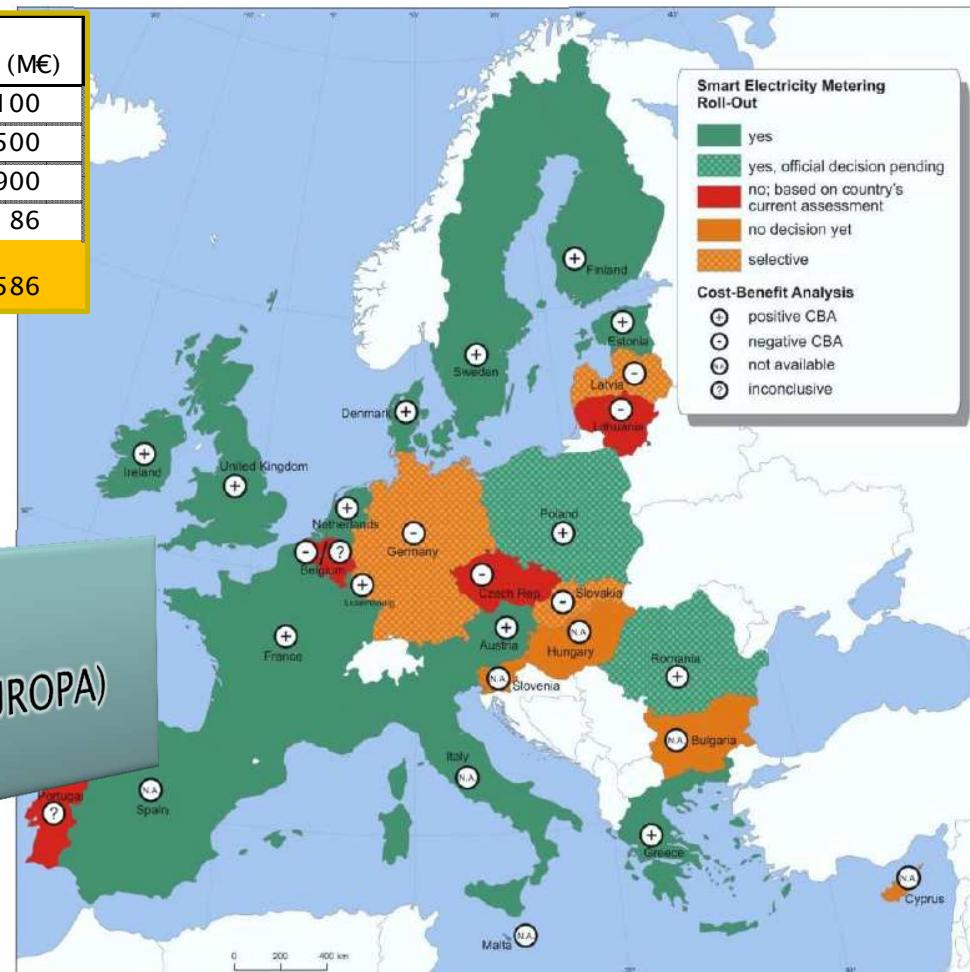
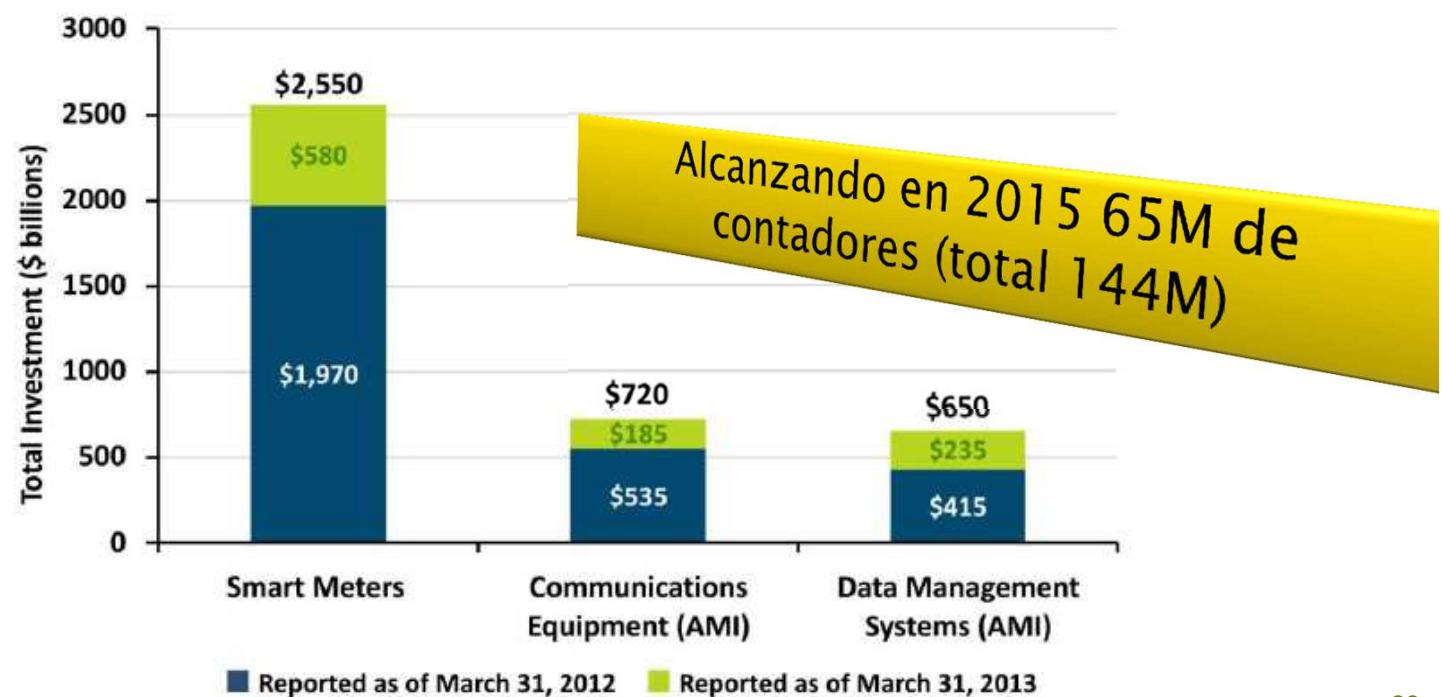


Figure 8.1 Overview of CBA outcomes for nation wide roll-out of electricity smart meters in Member States by 2020,
based on data available in July 2013

4. Financiación de las redes inteligentes. ESTADOS UNIDOS

CONTADORES INTELIGENTES (SMART METERS)

Smart Meters	
Number of Projects	65
Number of Smart Meters Expected at Completion	at least 15.5 million
Number of Smart Meters Installed (as of March 2013)	14.2 million
Investment to Date	\$2,550 million



4. Financiación de las redes inteligentes. Regulación comparada EEUU-UNION EUROPEA



Energy Independence and Security Act (Title XIII- Smart Grids)

FERC. National Action Plan on demand response

American Recovery and Reinvestment Act (ARRA)

A policy Framework for 21st Century

Plan on Energy Efficiency

Directive (2009/72/EC). Smart Metering across Europe

Communication (2010-639) Energy 2020

Communication (2011-202) Smart Grids

Directive (2011-0172) on Energy Efficiency

Directive (2013-0012) Alternative Fuels Infrastructure

Directive (2013-027) Information Security



4. Financiación de las redes inteligentes.

Regulación comparada EEUU-UNION EUROPEA

En resumen:

- En regulación federal para Smart Grids, en su conjunto, EEUU lleva la delantera.
- En EUROPA, la regulación efectiva se ha centrado en Smart Metering, manteniéndose un enfoque general en disminución de contenido de carbono.
- En Seguridad de Información para infraestructuras criticas, EEUU lleva la delantera.
- En aplicación práctica de gestión de la demanda EEUU lleva la delantera.
- Todo ello resulta en:

	INVERSIONES PREVISTAS (M€)	FINANCIACION TOTAL /PUBLICA PARA DESPLIEGUE (M€)	NUMERO DE CONTADORES INTELIGENTES
UNION EUROPEA	370.000	3.150/1.260	46,55 M
ESTADOS UNIDOS	334.000	5.700/2.450	15,5 M

5. El caso de Iberdrola

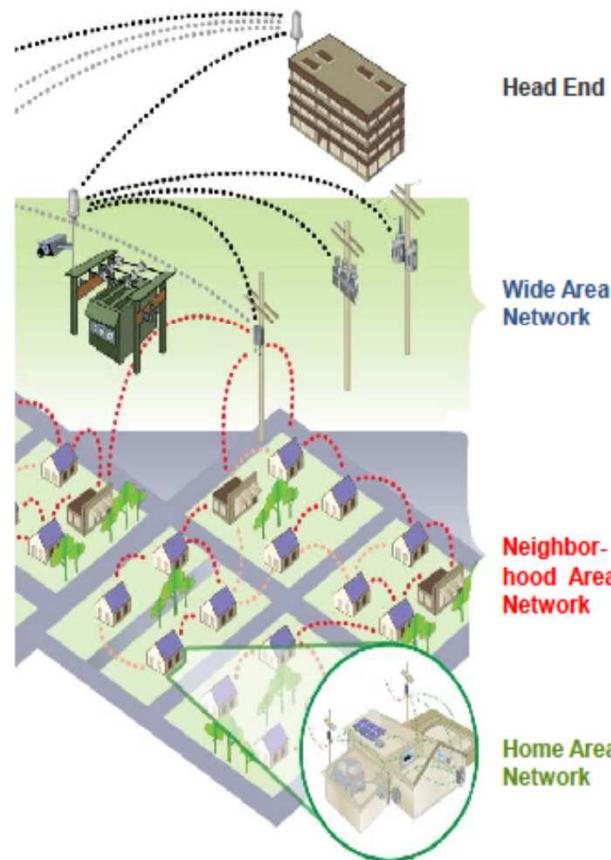


	SPAIN	UK	USA
REGULATION	SMART METERING REQUESTED	METERS IN RETAIL	DIFFERENT IN EACH STATE
BUSINESS	OPERATIONAL EFFICIENCY	UNDER EVALUATION	MAINE. FULL AMI FUNDED
CURRENT STATUS	DEPLOYING SMART GRIDS	SMART METERING TO BE DEPLOYED (STARTING 2014)	DEPLOYING AUTOMATION

AT THE END, THE NETWORKS OF THE FUTURE
WILL BE WHAT REGULATORS DECIDE

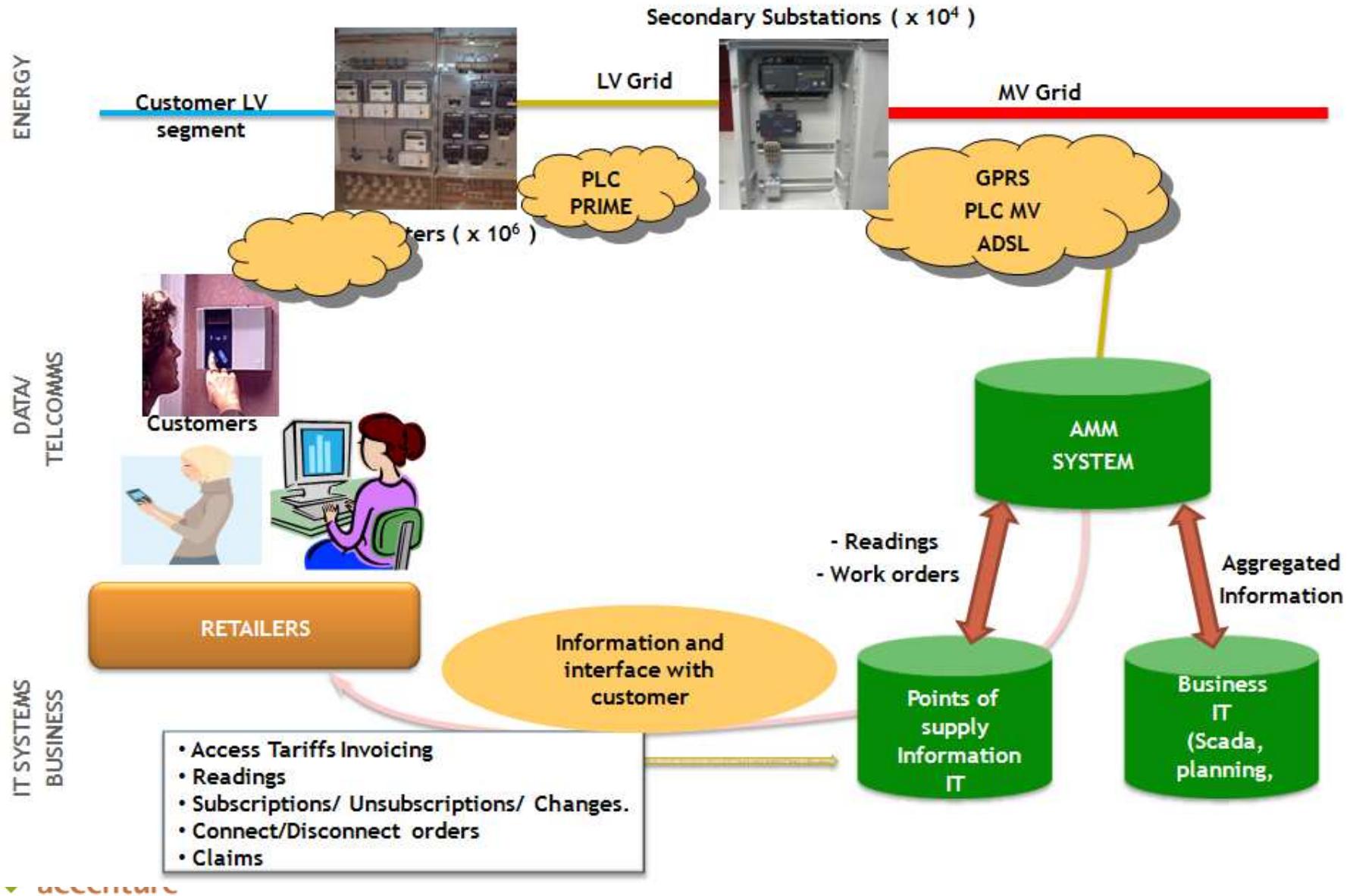
5. El caso de Iberdrola

Smart Meter Program Overview

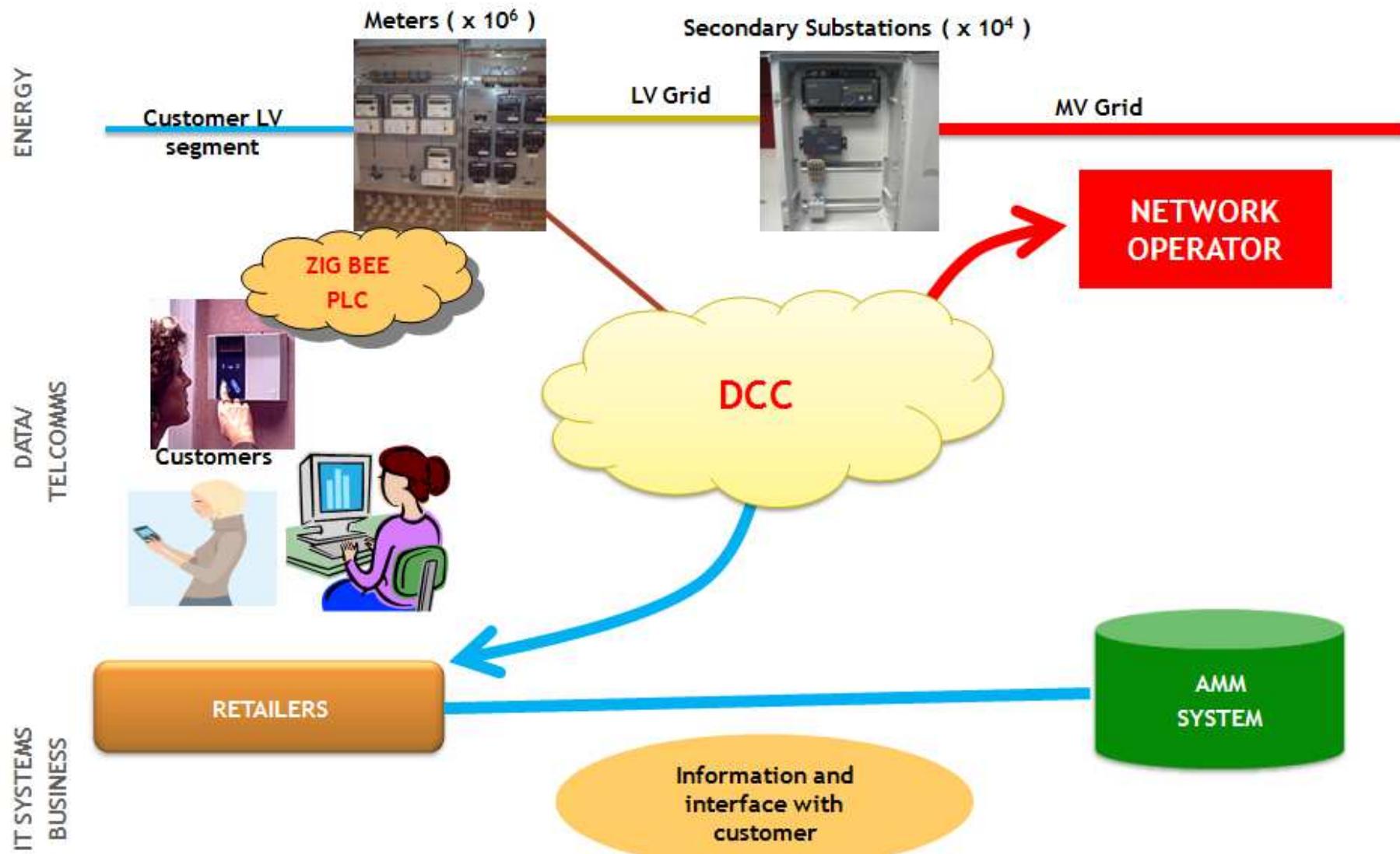


- Install more than 600k meters
- Deploy more than 5k network devices for 100% network coverage
- Upgrade or install more than 10 new IT systems
- Comprehensive re-engineering of all major processes
- Platform to support future Smart Grid initiatives
- Innovative customer-facing features and benefits
- More than 100 resources dedicated to the program

5. El caso de Iberdrola



5. El caso de Iberdrola



5. El caso de Iberdrola



Smart Cities

- Active Member of:
 - Sustainable Glasgow,
 - UK Research council for Heat and the City,
 - Clyde Gateway Regeneration
- Focus on creating innovative solutions to meet the future needs of cities such as decentralised energy solutions and understanding the impact on existing and future energy networks.

Flexible Networks

- £6.2m project, part of Ofgem run Low Carbon Network Fund.
- Trialling technology across St Andrews, Whitchurch (England) and Wrexham (Wales).
- Address the issues of increasing demand which is driving network reinforcement.
- Driven by uptake of Heat Pumps, Electric Vehicles and general demand increase.
- Variety of innovative technology being trialled.

Clyde Gateway

- Deployment of a novel technology across the network to serve a new industrial park of approximately 20 customers.
- Technology will help balance the network to allow more renewable generation to connect as well as greater loading such as heat pumps and Electric Vehicles.



5. El caso de Iberdrola



Fulfill the legal obligation for smartmetering

- 11 million smart meters for 2.018
- Open standards as a key driver for competitive prices

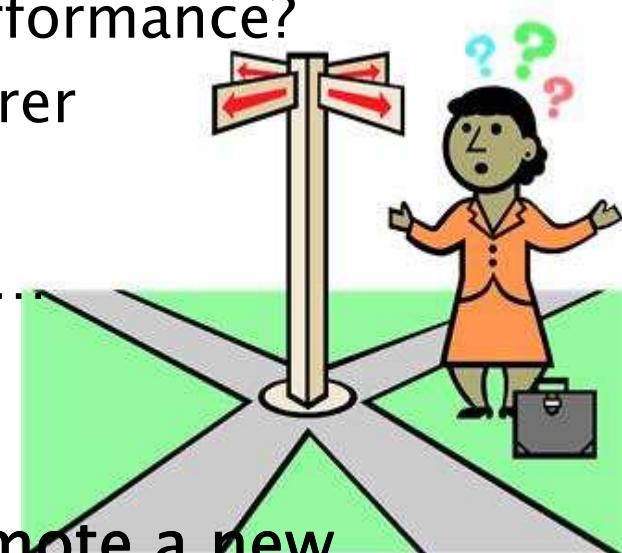


Leverage obligation to build smartgrid opportunity

- Pragmatic approach focused on
 - Quality of supply
 - Losses reduction
 - Operational efficiencies

Technological evolution as a foundation for a new way of managing distribution business

- 1. Buy whatever (proprietary) solution is available**
 - Mature solutions... adequate performance?
 - Captive of one single manufacturer
- 2. Become a meter manufacturer**
 - If it fits into your business plan...
- 3. Do nothing**
 - “Wait and see” approach
- 4. Change the status quo and promote a new standard**



Why are we in favour of open solutions ?

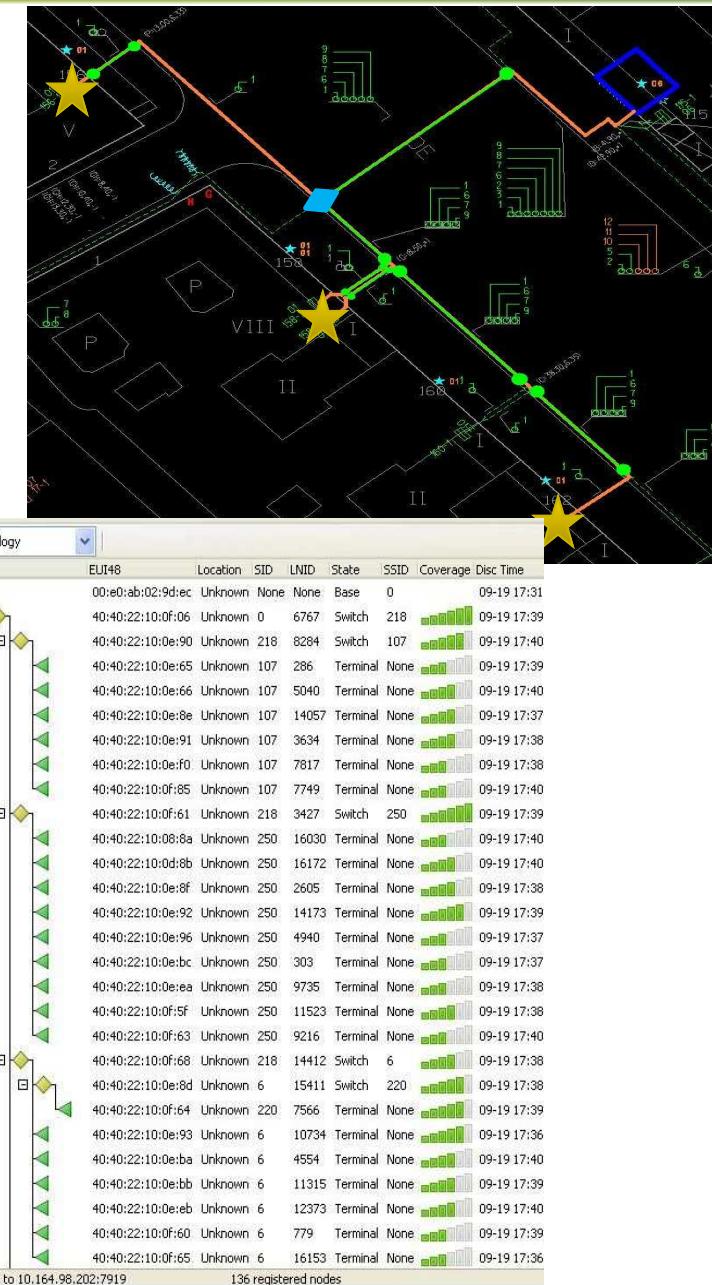
- ✓ Unlike other countries, metering assets are not directly included in the tariff
- ✓ Metering asset costs include
 - ✓ Meter
 - ✓ Meter installation
 - ✓ Meter operation and maintenance
- ✓ The Government has set a universal monthly rental fee of 0,81 euros per single phase meter (was 0,54 euros for a dumb meter)
- ✓ Few consumers decide to own their own meters

As the maximum income is fixed, the only opportunity to maximize the return is to lower the costs

5. El caso de Iberdrola

High performance

- ❑ OFDM multiplexing up to 130 kbps raw data rate
- ❑ 3 modulation schemes: DBPSK, DQPSK, D8PSK and 2 modes (1/2 convolutional code on/off)
- ❑ PRIME meters are plug-and-play
- ❑ PRIME meters can become switches automatically



5. El caso de Iberdrola



PRIME meters



Data concentrators



- Focus in creating a successful competitive smart metering market.
- Global benchmark for cost per point of supply.

5. El caso de Iberdrola



Compliance with legal requirement for smart Metering

- 11 million smart meter for 2018
- Based on open standards to leverage real competition



Taking the opportunity to deploy the Smart Grid

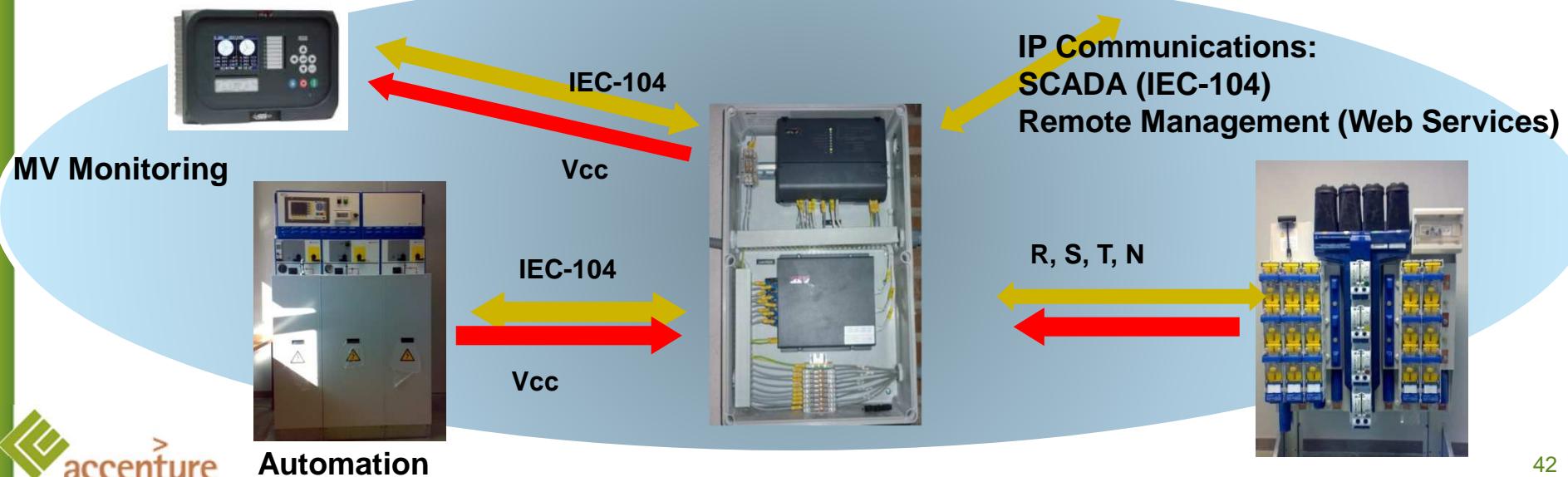
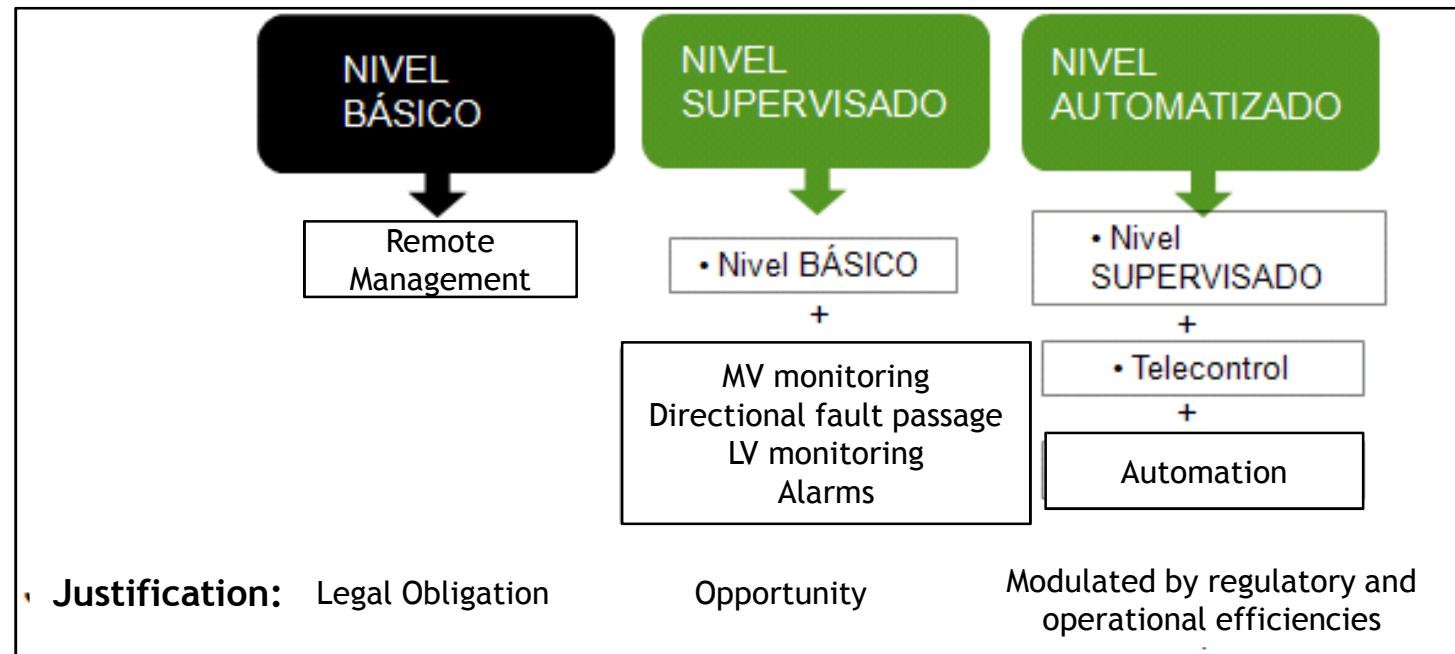
- Practical approach centered in:
 - Improvement of quality of service
 - Losses reduction
 - Big innovation through Low Voltage Networks

BIG OPPORTUNITY FOR THE SPANISH INDUSTRY

5. El caso de Iberdrola



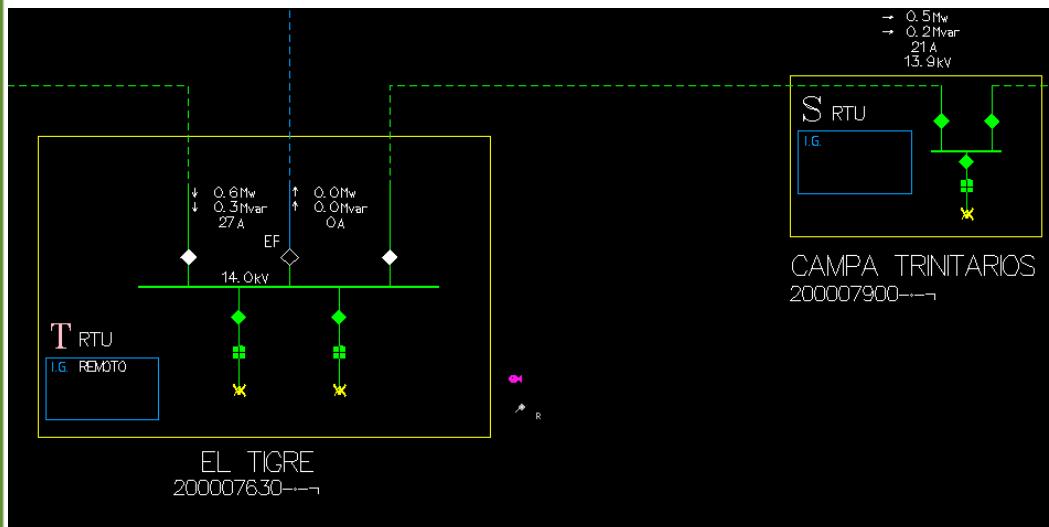
Three levels:



5. El caso de Iberdrola

We detect were the fault is and have MV measurements

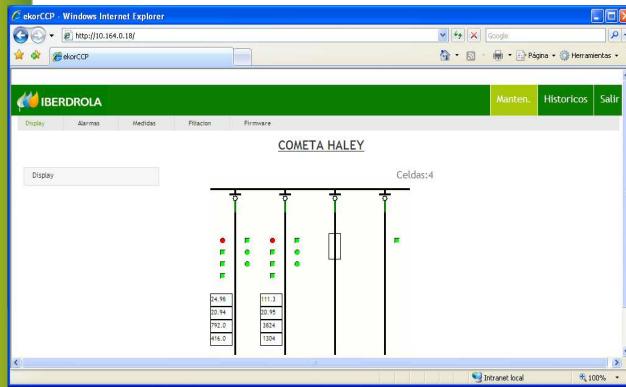
- ✓ Fault passage detector with improved functionality (inc. directional fault detection)
- ✓ Real time quality measurement (current, voltage, active and reactive power)
- ✓ Implementation using open standards (TCP/IP, IEC-104, HTML, SOAP, XML,...)
- ✓ Remote management of devices and remote configuration
- ✓ Generic solution that can be installed in nearly any type of switchgear
- ✓ N-1 line supervision, up to 3 MV lines



5. El caso de Iberdrola

We isolate the fault remotely and remote control the network from Scada

- ✓ Fault passage detector with improved functionality (inc. directional fault detection)
- ✓ Real time quality measurement (current, voltage, active and reactive power)
- ✓ Switchgear status, commands and alarms
- ✓ Fault isolation.
- ✓ Implementation using open standards (TCP/IP, IEC-104, HTML, SOAP, XML,...)
- ✓ Remote management of devices and remote configuration



5. El caso de Iberdrola

ARA is key for the future operation of the grid.

ARA: automatic software that runs on Scada that isolates and powers back an incidence based on advanced automation

Región: OPERACION ESTE | Zona: CASTELLON | STM: Sin STM | Linea: Sin Lineas | CTM: CTM | Fecha Inicio: 01/11/2012 | Fecha Fin: 26/11/2012 | Averías y Trabajos |

Inicio	Tipo	Tip Origen	Origen	Actua	Causa	Tipo Act	Anomalia	Nº Interrup	Durac máx. (hh:mm)	T - máx. (hh:mm)	Nº de CT-S	Nº Clientes	Potenc KVA	Energ KVAh
19/11/2012 08:12	IM	Línea Subterránea MT de ID	ST LA PLANA CASTELLON NORTE	ST LA PLANA 25C.INGLES LA PLANA 20 L-25 IN_2	Internas Instalaciones	11	No	6	1:02	1:02	44	3.734	18.666	312
	Nº :521.201	Comentario:	AVERIA ST LA PLANA - 20 - 25C.INGLES : AVERIA ST LA PLANA - 20 - 25C.INGLES EN CABLE SMT EN TERMINALES CELDA INCIAT. COM. VAL. EN CTD FRAVIFE SL.											

Evolución Mercado

AFFECTA

RECUPERA

SITUACIÓN

POTENCIA

POTENCIA

POTENCIA

CLIENTES

CLIENTES

CLIENTES

T1	Afectados	19/11/2012 08:12	18666	3734				18666	3734
T2	Recuperados	19/11/2012 08:14			4179	32		14487	3702
T3	Recuperados	19/11/2012 08:14			14016	3699		471	3
T4	Recuperados	19/11/2012 08:14			200	1		211	2
T5	Afectados	19/11/2012 08:52	260	1				471	3
T6	Recuperados	19/11/2012 08:52			393	2		78	1



MV real time control with impact on operational efficiencies and quality of supply

5. El caso de Iberdrola

- Right approach to deployment is critical due to project magnitudes.
- Castellon trial was an excellent learning opportunity for Iberdrola and the partners.
- Moving from a trial to a logistical deployment focused on business and based on processes:

Trial	Deployment
Technical focus	Business processes focus
Criteria and execution centralized	Centralized criteria, decentralized execution
Based on individual equipment	Based on integrated solutions
Specific solutions	Logistic solutions
Making technology work	Solutions form a competitive market
Receiving data	Getting value from data
Learn & get skills	Cultural change of organization

- Critical to coordinate skills and responsibilities dispersed in the organization.

5. El caso de Iberdrola

- Deployment calendar according to the legal requirement milestones.
- Areas in execution: 42 + 15 with previous activities.
- End of 2.013: 2,1 million meters deployed + 10.000 secondary substation adapted.
- IT are critical for an efficient deployment:
 - Planning
 - Workflow + Technical design
 - Testing
 - Troubleshooting
 - Scoreboard, statistics
 - Firmware update
 - Data analytics



5. El caso de Iberdrola



CSD | **RESPONSABLE STAR** | **SISCO** | **PLANIFICADOR** | **INFORMES** | **PROyecto STAR** | **DITEL SISCO**

MIS TRABAJOS | GESTION CTS | INFORMES | **SEGUIMIENTO** | AGENDA | DOCUMENTACIÓN

SIGRID 143843	ESTUDIO 74	REPLANTEO 12488	SISTEMAS 1364	FABRICACIÓN 1055	INSTALACIÓN 478	CUARENTENA 355	FINALIZADO 486	EXPLOTACIÓN 8245
TODOS 24545								

Todas las Regiones
Fecha Actualización: 16/12/2012 18:00:000

Sistema Telegestión Iberdrola

	Centro	Este	Madrid	Norte	Oeste	Sin Región	Total
Contadores Registrados	102.751	299.751	99.714	48.728	80.247	7	631.198
Contadores en SIC pendientes STG	21.381	104.143	72.263	40.608	20.958	14	259.377
Contadores en STG pendientes SIC	0	0	0	0	0	3.957	3.957
Contadores No Leídos Iberca	2.717	8.502	4.357	1.888	3.619	0	21.081
Tasa de lectura (leídos hoy)	87%	88%	86%	88%	84%	0%	87%
Tasa de lectura (leídos últimos 7 días)	94%	93%	91%	91%	89%	0%	93%
Tasa de lectura (leídos en el mes natural)	95%	94%	93%	93%	92%	0%	94%
Concentradores Registrados	870	1.938	504	264	356	0	3.732
Concentradores Registrados NO Accesibles	2%	2%	2%	5%	1%	0%	2%
TOTAL							

Exportar a EXCEL | Exportar a CSV

Informe Diario

Nombre CT	Zona Despl.	Fase Des.	Cel Des.	COM	Sub Cel	Tropical	España	IP	Concentr.	Con incl	Ping DC	% extro	Ping Rend.	%
SAN MARCOS 41-MAD	S1004	FA01	CD004	GPRS	-	N	FINALIZADO	10.156.111.106	CUR7938400926	N	100%	S	1	
MALDONADO 53	S1004	FA01	CD002	GPRS	-	N	FINALIZADO	10.162.111.234	CUR7938400590	N	100%	S	1	
CLAUDIO COELLO 108	S1004	FA01	CD01	GPRS	-	N	FINALIZADO	10.162.112.98	CUR7938400186	N	100%	S	1	
OCAÑA 1	S1006	FA01	CD04	PLC	302035	N	EXPLOTACION	10.156.166.133	ZIV0004315519	N	100%	N		
INDOCASA 1(T)	S1006	FA01	CD03	PLC	302032	N	FINALIZADO	10.156.165.195	ZIV0004314813	N	100%	S	1	
PROMOVISA 1	S1006	FA01	CD04	PLC	302033	N	EXPLOTACION	10.156.166.134	ZIV0004315395	S	100%	N		
COVIJO 1	S1006	FA01	CD04	PLC	302033	N	EXPLOTACION	10.156.166.136	ZIV0004318564	N	100%	N		
VOSA 1	S1006	FA01	CD03	PLC	302032	N	FINALIZADO	10.156.165.197	ZIV0004318950	N	100%	S	1	
FAMILIAR 1	S1006	FA01	CD03	PLC	302032	N	FINALIZADO	10.156.165.198	ZIV0004319097	N	100%	S	1	
PROMOVISA 3(T)	S1006	FA01	CD03	PLC	302032	N	FINALIZADO	10.156.165.199	ZIV0004314931	N	100%	S	1	
ALUCHE PARCELA B-12	S1006	FA01	CD02	PLC	302034	N	EXPLOTACION	10.156.165.194	ZIV0004318993	N	100%	S	1	
COVIMAR 1	S1006	FA01	CD03	PLC	302032	N	FINALIZADO	10.156.165.261	ZIV0004319092	N	100%	S	1	
PLAYMON	S1006	FA01	CD04	ADSL	302033	S	EXPLOTACION	10.156.166.130	ZIV0004315419	N	100%	N		
PROMOVISA 2	S1006	FA01	CD03	PLC	302032	N	FINALIZADO	10.156.165.282	ZIV0004318954	N	100%	S	1	
PROMOVISA 4(T)	S1006	FA01	CD03	PLC	302032	N	FINALIZADO	10.156.165.217	ZIV0004315097	S	100%	S	1	
YEBENES-MODULAR	S1006	FA01	CD05	GPRS	-	N	EXPLOTACION	10.162.49.716	ZIV0004314763	N	95%	S	1	
ILLESCAS 1(T)	S1006	FA01	CD02	GPRS	-	N	EXPLOTACION	10.162.101.166	ZIV0004319030	N	100%	S	1	
YEBENES 6	S1006	FA01	CD05	GPRS	-	N	EXPLOTACION	10.162.49.718	ZIV0004314905	N	100%	S	1	
YEBENES 7	S1006	FA01	CD02	GPRS	302034	S	EXPLOTACION	10.156.165.2	ZIV0004318819	N	95%	S	1	
NTRA SRA LUZ 2	S1006	FA01	CD04	GPRS	-	N	EXPLOTACION	10.162.49.226	ZIV0004311598	N	100%	S	1	

Mapa | **Satélite**

BIENVENIDO U127035 [DESCONECTAR] SISTEMAS DE TELEGESTIÓN ESPAÑOL INGLÉS ?

IBERDROLA | INICIO | INFORMES GENERALES | LECTURAS | COMUNICACIONES | INCIDENCIAS | DIAGNÓSTICO | UTILIDADES GRÁFICAS | ADMINISTRACIÓN | DITEL SISCO

INCIDENCIAS CN | **INCIDENCIAS CT**

Región/Zona/CT	Zona	Ámbito Despliegue	Zona Despliegue	Fase Despliegue	Célula Despliegue	CT
Este	Castellón	URBANO CASTELLÓN CAPITAL				
Madrid	Murcia	COSTA NORTE CASTELLÓN				
Norte	Torrevieja	COSTA SUR CASTELLÓN				

Id. Incidencia | Grupo de Usuarios | Fecha Creación: 7/12/2012 Hasta: 20/11/2012 | Fecha Cierre: Desde: Hasta:

Grupo Incidencia: CSD UTD Automatización Especialista AUT Especialista MED Especialista COM

Todas | Id. Incidencia | Busca | Completadas Correctamente | Fallidas | Descartadas

Círculo	COM	Célula PLC	Código CT	Nombre CT	Estado Actuación
20	GPRS	--	501000577	POLIDEPORTIVO-CS 2	Pendiente
47	PLC	501000470	501000481	SUI-10 CTD N°1 (T)	Pendiente
26	GPRS	--	501000373	SENSAL 2 CTD N°1	Pendiente
29	PLC	501000446	501000395	VILLADOLORES N°4	Pendiente
39	PLC	501000446	501000395	VILLADOLORES N°4	Pendiente
22	GPRS	--	501000208	CUADRA DEL SABONER	Pendiente
54	GPRS	--	501000386	ARANDA CT-2	Pendiente
24	GPRS	--	102220084	CAMINO CANET	Pendiente
38	GPRS	--	102220023	TRIADOR	Pendiente

Limpiar Filtros | Ocultar Filtro

accenture

TO

TO

5. El caso de Iberdrola

Smart metering: Point of supply business processes are running successfully

- Services are available on meters of 9 different manufacturers.
- Significant number of accumulated operations.
- Success objectives reached for reading and improving for orders.

Remote meter reading
Disconnect / Re-connect
Change of tariff
On-demand reading
Hourly consum. on web portal

Type of operations	Volumes
Invoices based on remote meter readings	8.229.572
Disconnection orders	58.115
Reconnection orders	43.779
Change of tariff orders	1.225.132
On-demand readings	113.146
Manual reading eliminated	780.000

Type of operations	Success ratio
Daily reading success	97%
7 days reading success	98%
Monthly reading success	99%
Disconnection orders	89%
Reconnection orders	92%

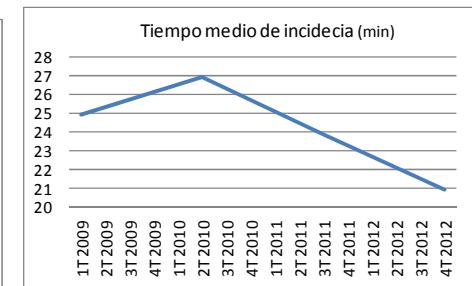
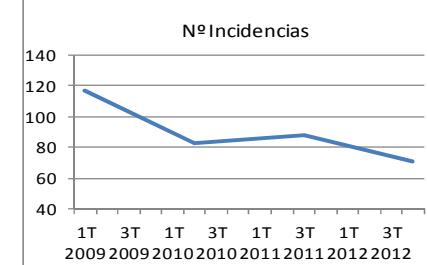
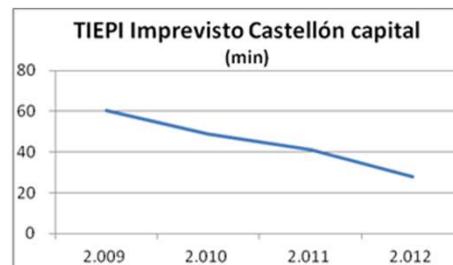
1.800.000 meters deployed and 9.200 secondary substations adapted



Smart Grid: Significant value is generated from the technical improvement

Fault detection

- SAIDI reduction (60%), # incidents reduction (40%), duration of incidents reduction (16%)



Automatic restoration

Meter events

- Operational efficiencies: 20% reduction in Castellón crew. Global plan designed (P2020).

LV Supervision

MV real time measurements

- Scada analyses, isolates and restores automatically.
- Remarkable innovation activity to explore new opportunities (Project Bidelek).

Automation is growing significantly in the grid

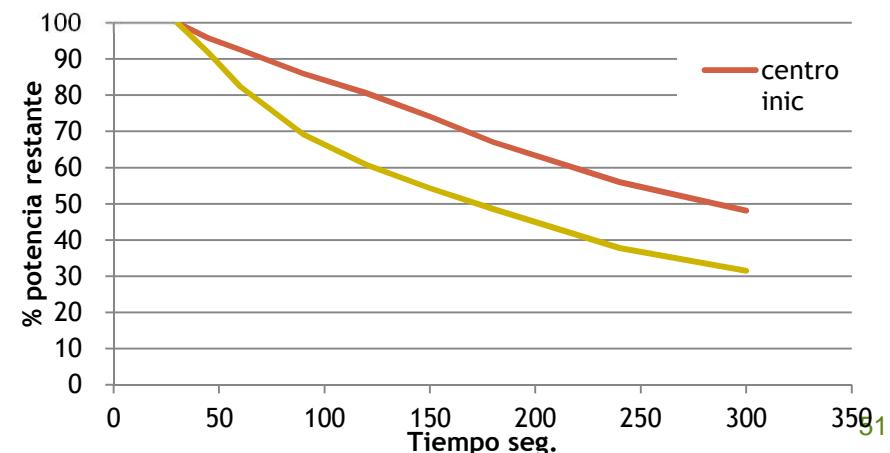
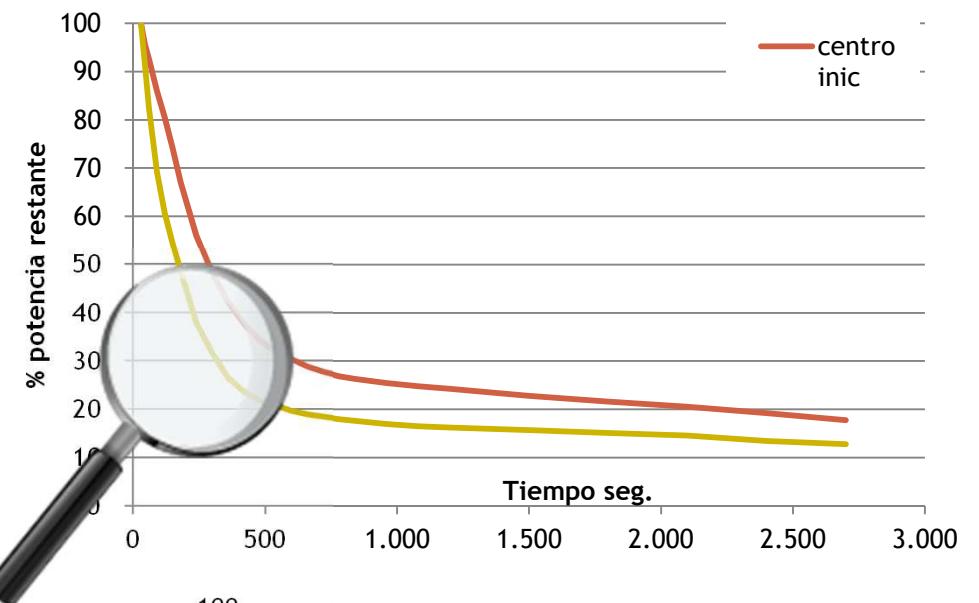
5. El caso de Iberdrola

Improving our service to end-users

Centro



The screenshot shows the Iberdrola website's "Telemedida On Line" section. It features a sidebar with options like "Mi consumo", "Cuentas consumidor", "Residuo", "Vecinos", "Yo", "Cuentas consumo", "Cuentas de suministro", "Intervenciones en el consumo", "Configuración", and "Datos personales". The main area displays a bar chart titled "¿Cuánto consumo?" with data for "Yo" and "Vecinos". Below the chart are sections for "Consumo total" and "Comparar consumo". A large button labeled "Comparar consumo con..." is present. At the bottom, there is a "Tel. Distribución" section with a phone number and a map.



Organization:

The largest challenge of Star is the cultural change of the organization

Technological

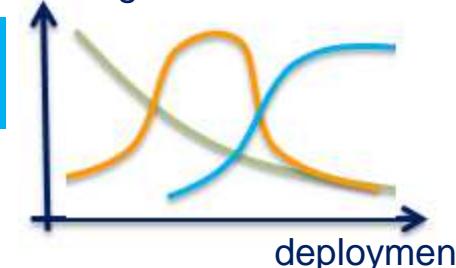


Industrial deployment



cultural change

Challenge



- People: the most valuable asset + the biggest challenge.
- Deployment based on our own organization:
 - Centralized criteria.
 - Decentralized installation (contracted activity).
- New model:
 - All organization involved in smart grid:
 - + Experts
 - + Specialized
 - + Basic skills
 - Electronic equipment control room
 - IT & applications

Star will be the technological lever to a new, more efficient organization

5. El caso de Iberdrola

Leverage the project to lead the evolution

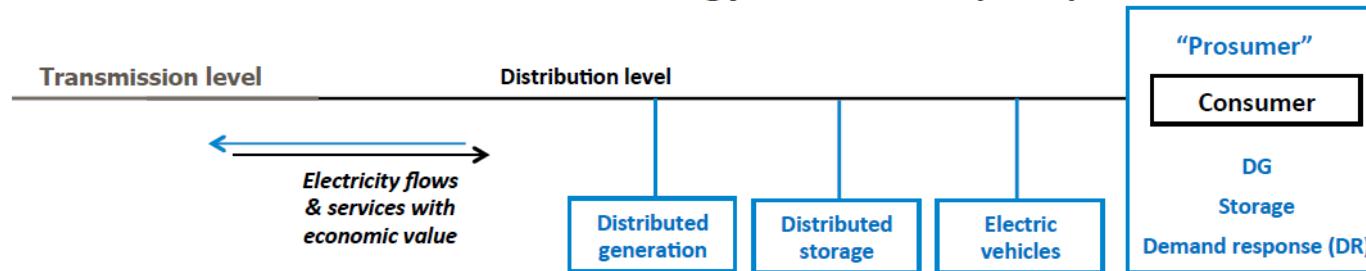
- Iberdrola has designed our business vision for 2020, deeply impacted by the project.
- Organization is affected in multiple ways:
 - Control centers:
 - MV and LV automation.
 - Complete value chain management (HV-MV-LV-point of supply).
 - Remote operations on electronic equipment.
 - Operations:
 - Electronics integrated into power assets
 - Software, IT, part of daily business
 - Skills of the organization
- Business process optimized based on data intelligence (operations, planning, maintenance).
- Standards based.
- Parallel evolutions of partners and subcontractors.

6. Retos para el futuro

Partimos de una regulación que debe adaptarse a los avances tecnológicos, que incluso cambian el mercado y sus actores.

Technological advances are reshaping today's electricity market

Advent of “Distributed Energy Resources (DER)”



Challenges:

- Network users will not be what they used to be
- Much variation and uncertainty of flows in D grid and at T interface (even reverse flows)
 - Distribution network architecture is becoming more complex & expensive

Potentials:

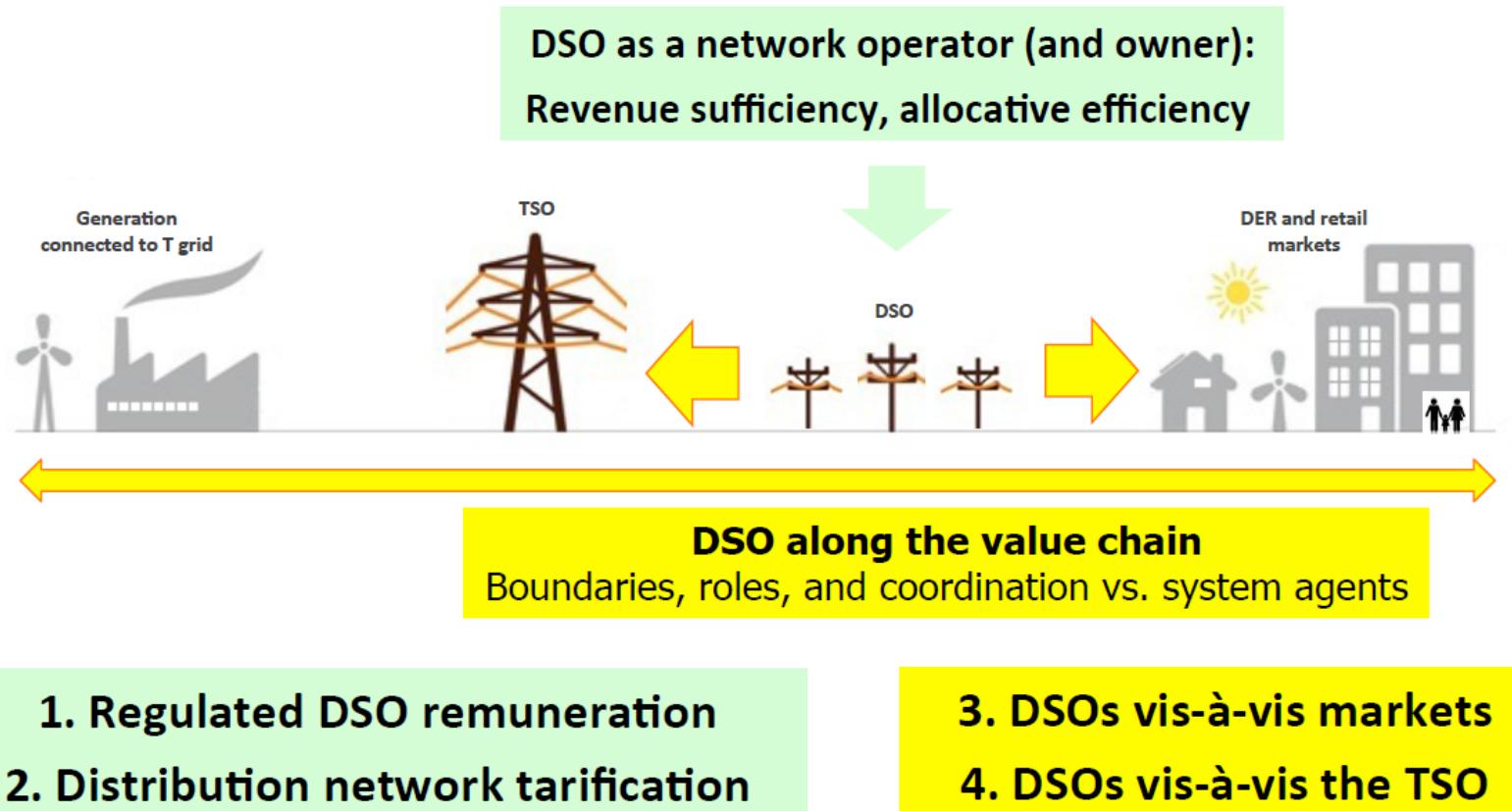
- Diversity of services with economic value in local electricity markets
 - DER may successfully compete with centralized generation
 - New tools for system control by the DSO

6. Retos para el futuro

Pero, además, es el distribuidor quien debe desempeñar más funciones para permitir el futuro.

Regulation of the DSO is the critical issue

Four areas of regulation need to be reviewed



NYSPSC lo llama “Distributed System Platform Provider”

6. Retos para el futuro

En estos momentos se están analizando 2 cuestiones técnicas de la mayor importancia.

CONCEPTO Y CONDICIONES
DE FLEXIBILIDAD
(SMART GRIDS TASK FORCE
EG3)

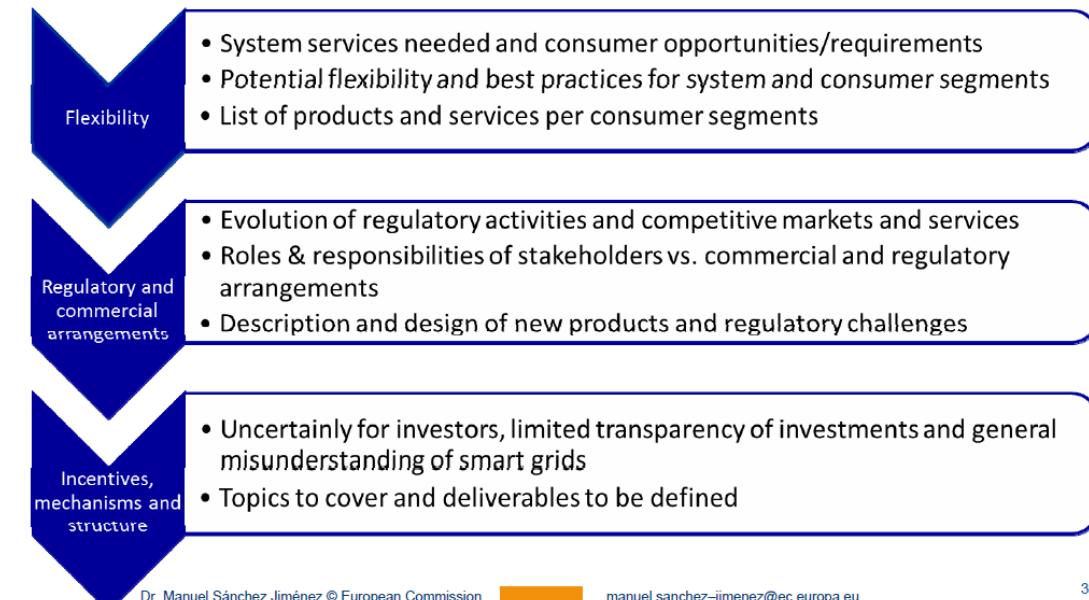
“NETWORK CODES”
PROPUESTOS POR ENTSO-E

QUE REGULAN CONDICIONES
DE CONEXIÓN Y OPERACIÓN
DE LAS REDES

Proposed PoW



Regulatory and commercial challenges of smart grids in energy markets



Dr. Manuel Sánchez Jiménez © European Commission

manuel.sanchez-jimenez@ec.europa.eu

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6. Retos para el futuro

Dado el mandato M490 de la C.E. se está haciendo un enorme trabajo por CEN-CENELEC-ETSI

M490 – Smart Grids



Phase I - 6/2011 until 12/2012

Reference Architecture -> SGAM,
conceptual model

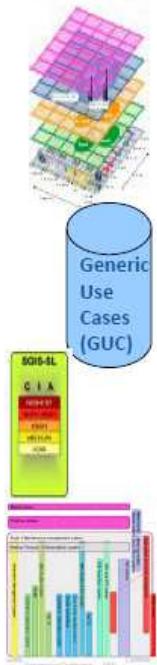
Sustainable processes ->Use
Cases

Smart Grid Information security
(SGIS) – SGIS Toolbox

First standards

- Prioritisation, work programme
- First set of standards

Framework for new
standardization process for
complex systems



Phase II - until end of 2014

Methodology (Use Cases,
reference architecture, SGAM,
conceptual model, market and
flexibility, new applications)

SGIS

Set of Standards (Update)

Interoperability
(recommendations, Excel tool)

All reports of phase 1 are available under

http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm

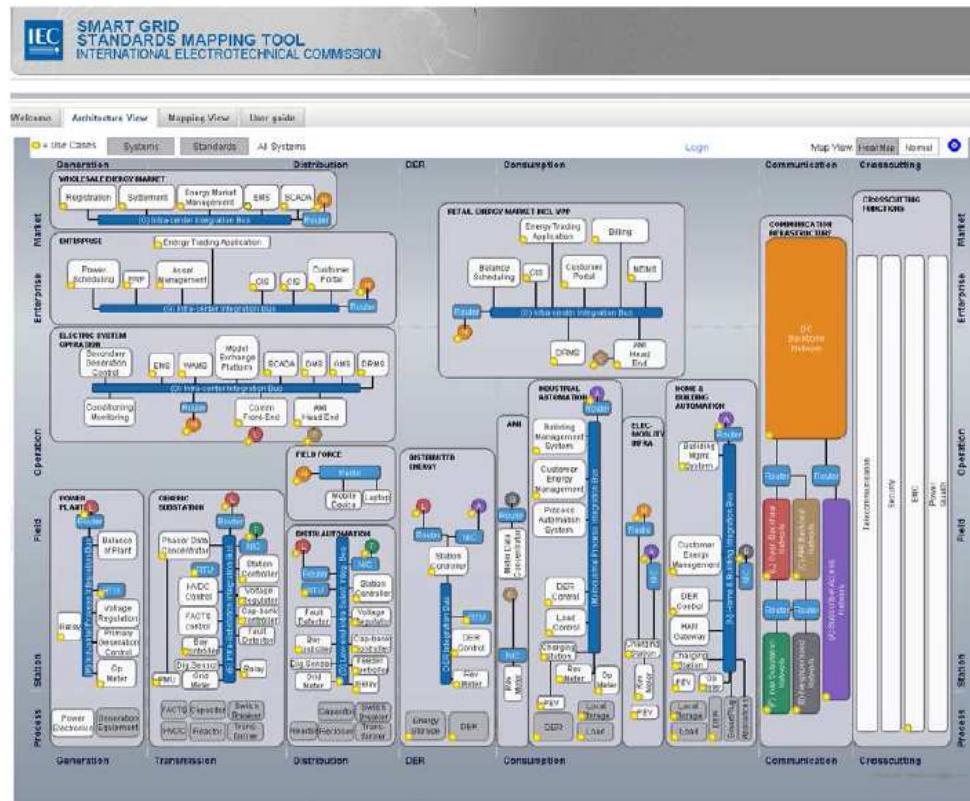
<http://www.cencenelec.eu/standards/HotTopics/SmartGrids/Pages/default.aspx>

6. Retos para el futuro

En un campo de actuación muy extenso y con el detalle necesario, siempre coordinado internacionalmente.

Mapping chart

- IEC has developed an interactive web tool to make standard selection easier



- SG-CG is considering this tool for "profiling" the European set of standards

6. Retos para el futuro

Con resultados ya alcanzados y un programa que se cumple a final de este año.

Achievements and Next Steps

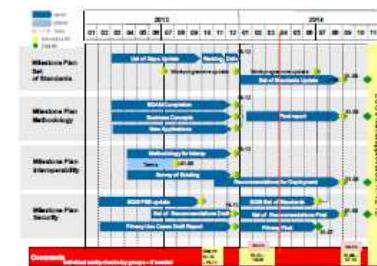


General Achievements

- On time
(All Work packages on time)
- Quality
(wide acceptance of results, e.g. best practice ICT Rolling plan exclusively refers to SG-CG work, no additional actions necessary)
- International acknowledgement
(results used and referred to by e.g. IEC, NIST, Japan etc.)

Next Steps

- Finalization of reports
(Deadline 01.09.14; final approval end of 2014)
(Update of Set of Standards; Prioritization of Assessment and Testing needs)
- Dissemination of Results
(Qualitative Assessment, Workshops on SG-CG results, Proposal for EC conference beginning of 2015)



Para cada equipo y cada función se conocerán las normas disponibles y las que deben desarrollarse dentro de la prioridad a establecer.

6. Retos para el futuro



Security Governance and incidents



Situación muy compleja en la que los estados miembros tienen la principal responsabilidad limitándose la comisión a:

- Recomendar, a través de la Agencia ENISA.
- Completar el proceso de aprobación en el parlamento europeo de la directiva 2013/027 sobre Seguridad de la Información.

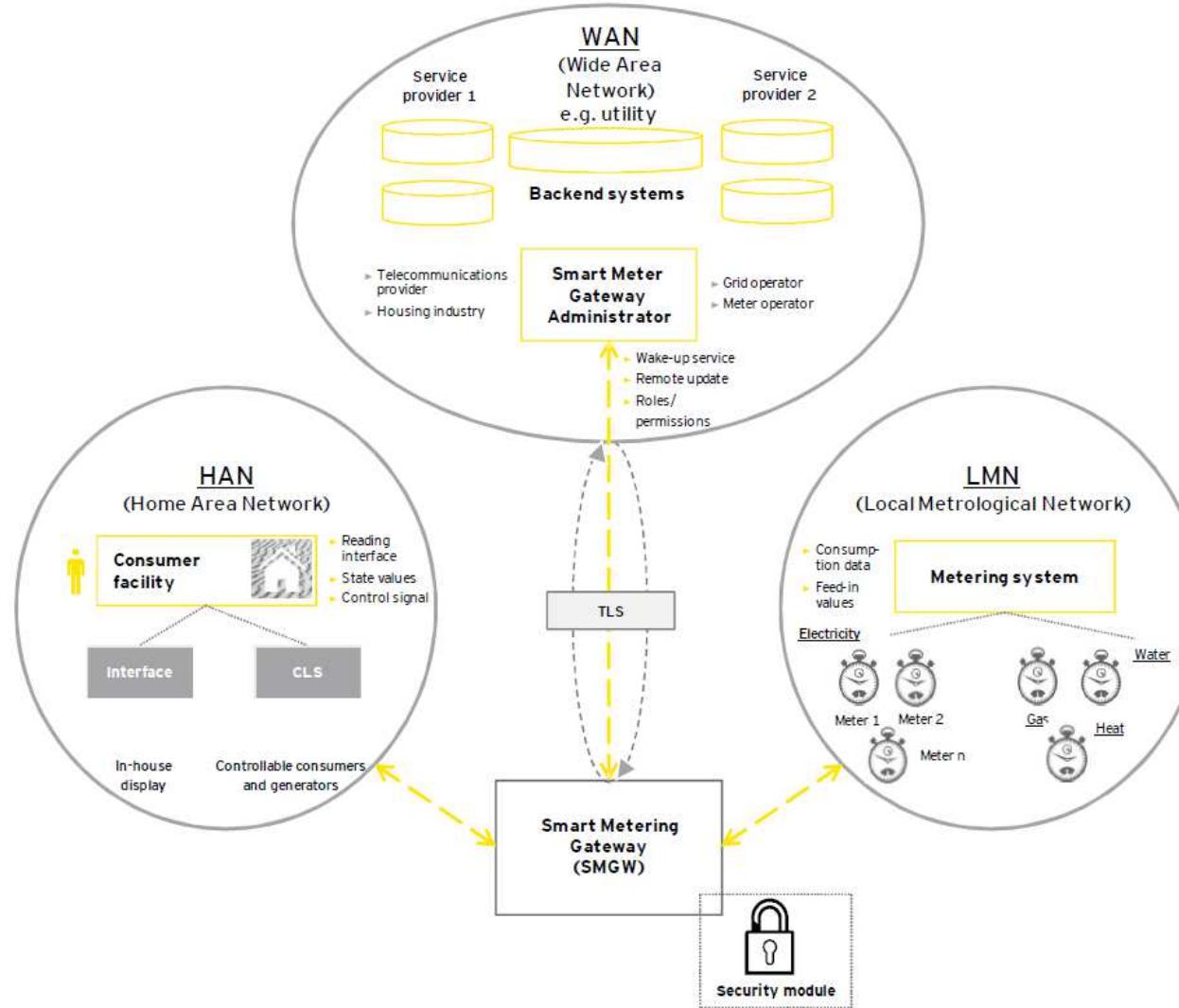
www.enisa.europa.eu  8

En cualquier caso, gran retraso frente a EEUU (normas Nist, Ferc, etc.)

6. Retos para el futuro

La imposición de normas demasiado estrictas puede llevar a la ineficiencia del conjunto.

Figure 2: System architecture of smart metering systems according to the BSI Protection Profile



Source: Ernst & Young in conformity with BSI

6. Retos para el futuro

La solución imaginativa y no probada, pero impuesta, puede llevar a una ineficiencia intrínseca.

