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## **SERVE – Upgrade 400 buildings in Rural Ireland**

WSED

Wels, Austria, March 2011



CONCERTO is co-funded by the European Commission

# CORE PROJECT ACTIVITIES

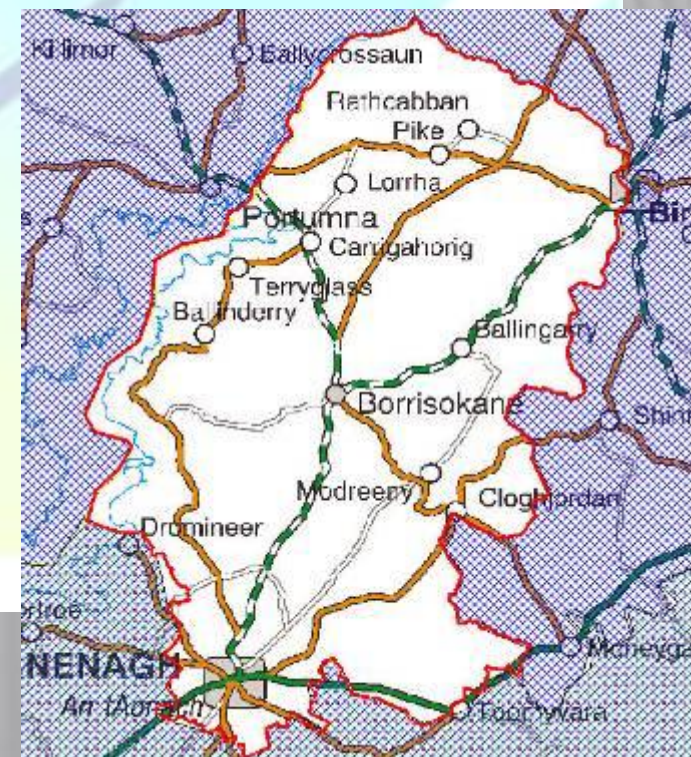
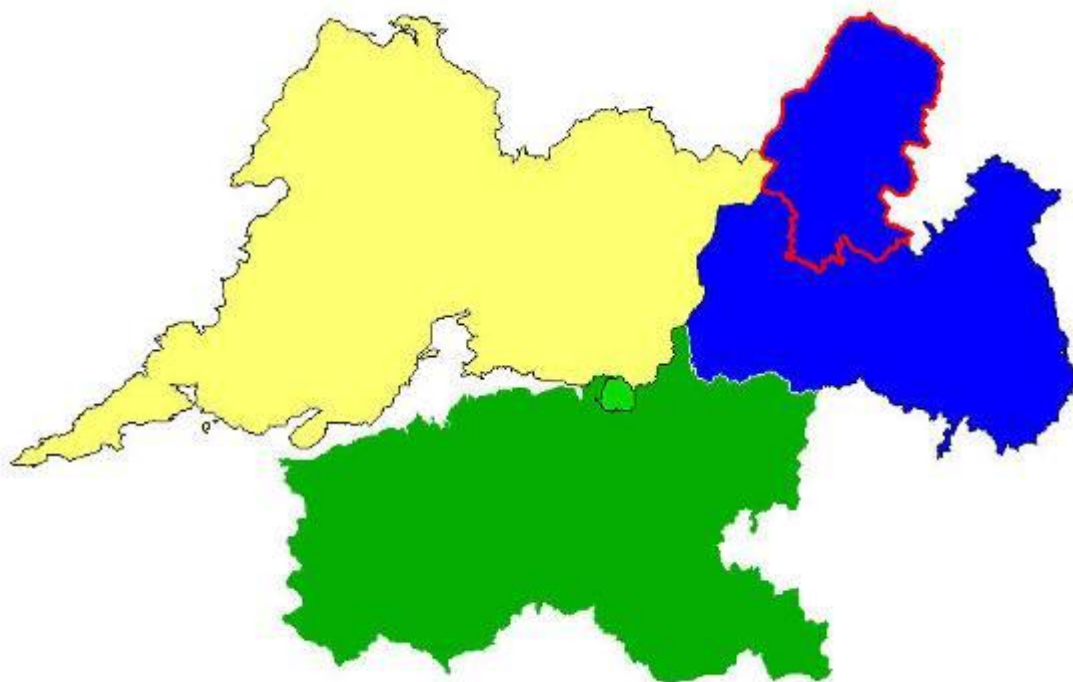
- ✘ **Retrofitting for Existing Houses and Buildings**
  - + Target 400 homes and 20 non-residential buildings
  - + Reduce Energy Consumption by 30-40%
  - + Increase use of renewables by 100%
- ✘ **New Buildings**
  - + Build 132 highly efficient new buildings in eco-village
  - + A new sustainable community
  - + 100% Supply of Heat from Renewables
- ✘ **Monitor** what we do and prove results
- ✘ **Research** on socio-economic impacts and sustainable electricity options
- ✘ **Train** people to build up skills





# SERVE REGION

- Rural
- 600 square kilometres
- 12,000 people
- 6,000 Dwellings
- 60% constructed pre 1981



# PROFILE OF IRISH HOUSING STOCK

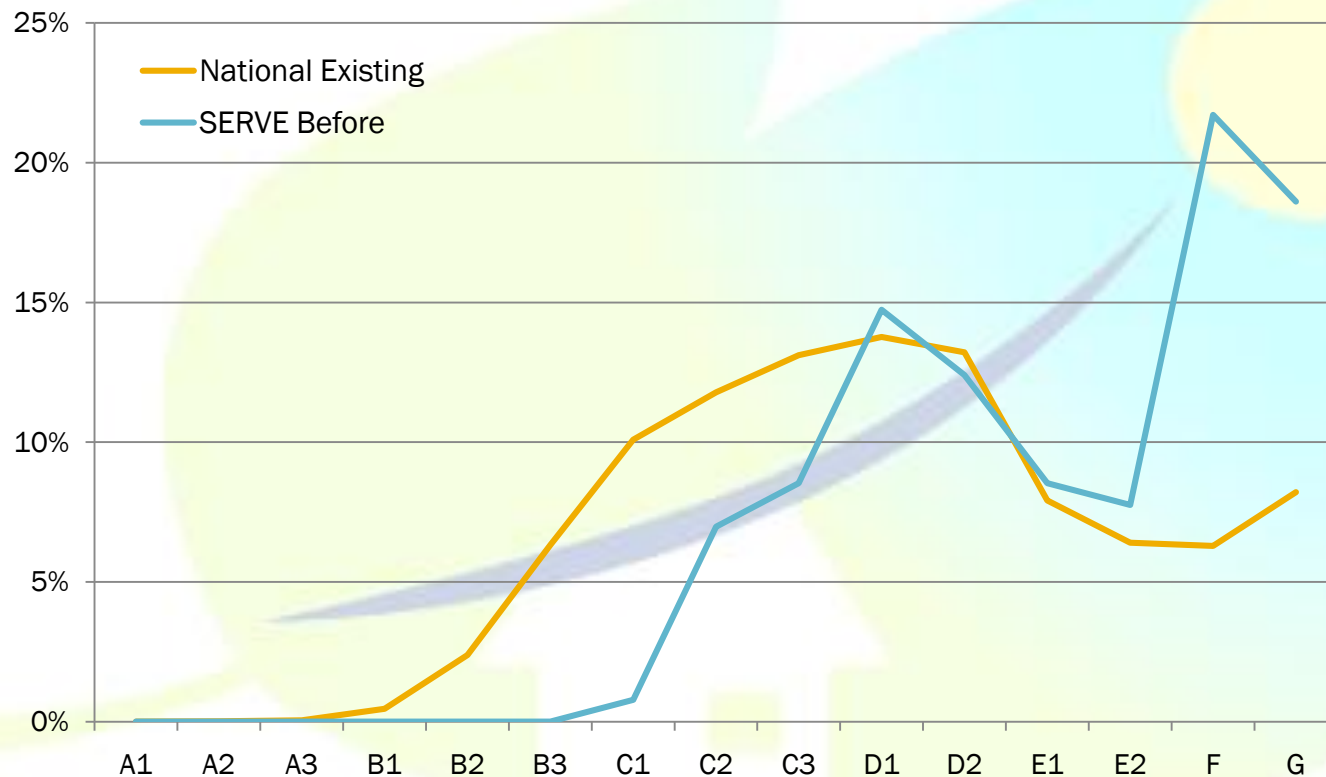
- ✗ Comparing energy usage per dwelling in 2006,
  - + Ireland was 27% above the average for the UK and in 2005,
  - + 36% above the EU-27 average.
- ✗ In 2006 the “average” dwelling consumed a total of 25,304 kWh of energy based on climate corrected data.
- ✗ In 2006 the “average” dwelling was responsible for emitting approximately 8.1 tonnes of CO<sub>2</sub>.
- ✗ 1,462,296 private households in permanent housing units.
- ✗ Just under 50% of the housing stock were built before the first thermal energy insulation requirements came formally into effect in 1979.

# SERVE RETROFITTING CHALLENGES

- ✗ No history of retrofitting
  - + Lack of trained installers
  - + Lack of approved products/systems
- ✗ Lack of knowledge of buildings owners
  - ✗ What measures, What standards, Which installer...
- ✗ National policy changes
  - + BER, National Retrofitting Scheme,
- ✗ Rural area – dispersed housing units
- ✗ Heating systems – controls and appliances
- ✗ Financial crisis

# COMPARISON ENERGY RATINGS

## SERVE Energy Upgrade - Phase 2 Sample - 116 Dwellings





# SOLUTIONS

- ✘ Information Campaigns
  - + Engagement with individuals, groups, use of media
- ✘ Never underestimate the impact of ‘word of mouth’
- ✘ Financing
  - + Investigated alternative financing solutions
  - + Ireland ‘not ready yet’ when SERVE started
  - + Emerging options now reaching the market
    - ✘ ‘Pay as You Save’; TPF etc

# SOLUTIONS

## ✖ Quality control

- + Requiring or providing training e.g. heating controls
- + Working with National Agency to set standards
- + Inspection of works

## ✖ National Policy

- + Introduction of National Home Energy Savings Scheme – piloted in SERVE region
- + SERVE Analysis/input to design National scheme



# RETROFITTING EXISTING HOUSES



From Old (65% efficiency)

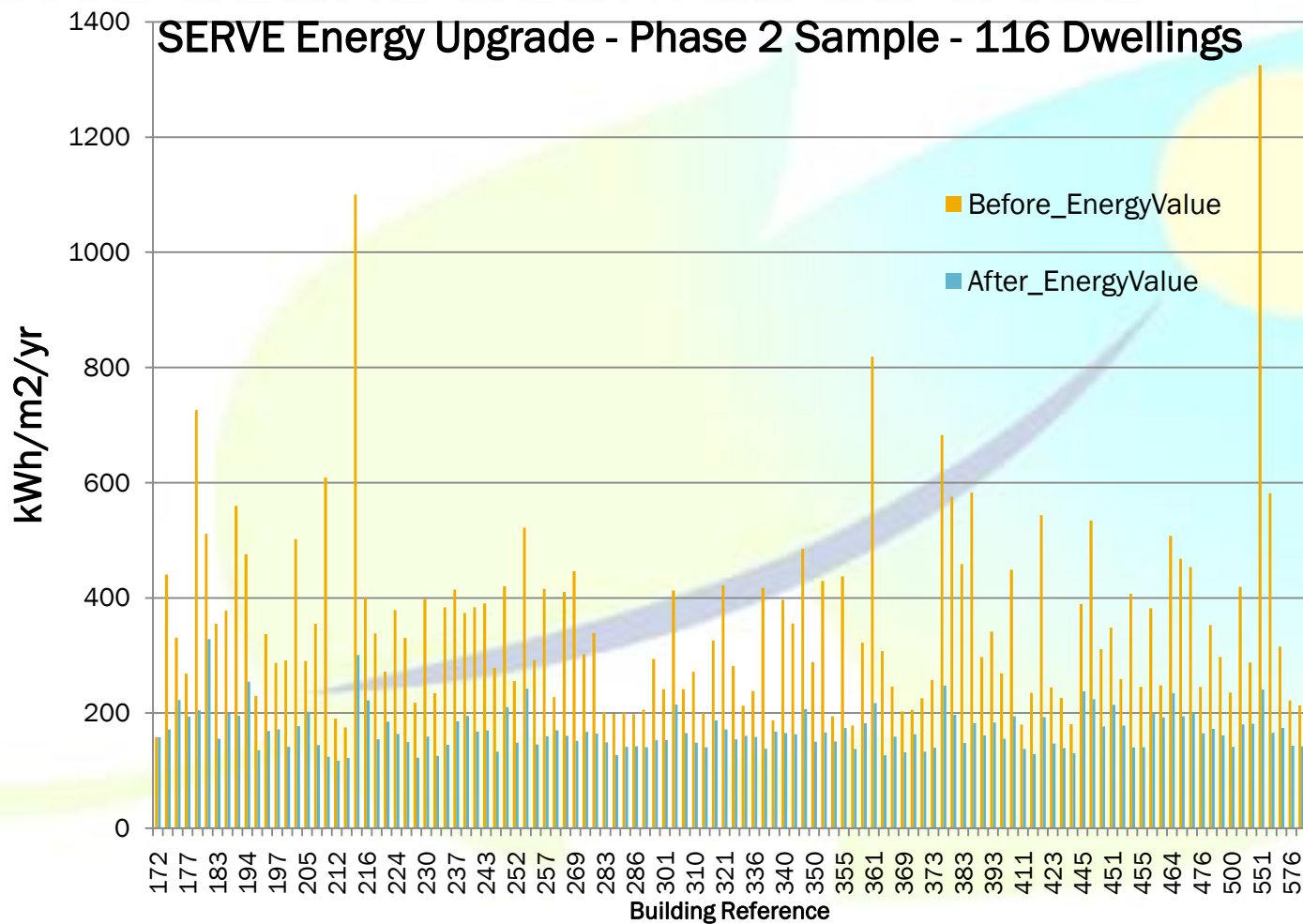
To New (95% efficiency)



# COMPREHENSIVE RETROFITTING

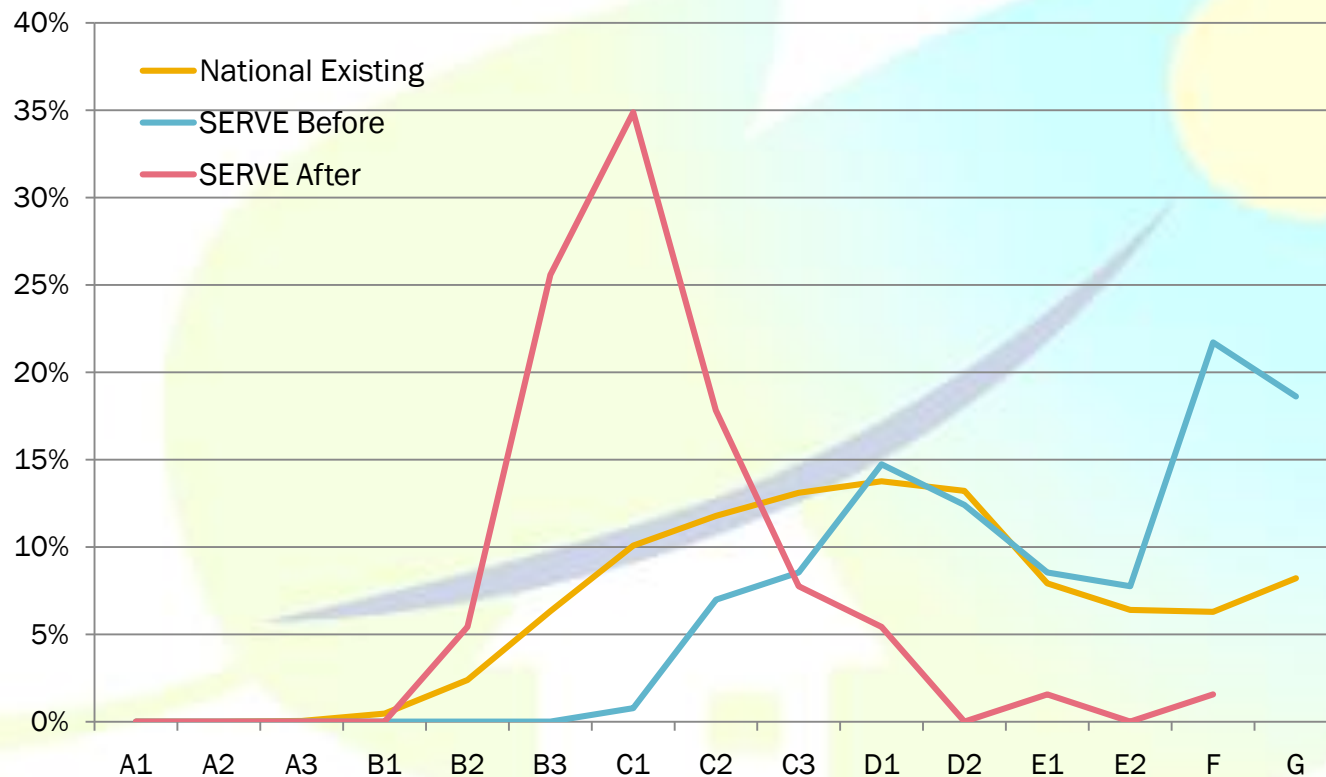
- ✗ Avoiding single measure actions
  - + e.g. attic only – high interaction cost with low energy savings
- ✗ Strategic Supports
  - + Linking supports to energy performance
  - + Integrating energy efficiency and renewable energy
  - + Both now being integrated into revised National Scheme
- ✗ Combination of
  - + mandatory measures (walls, roof, heating controls) and
  - + additional measures (menu) to suit house requirements

# SOME SERVE RESULTS TO DATE



# COMPARISON ENERGY RATINGS

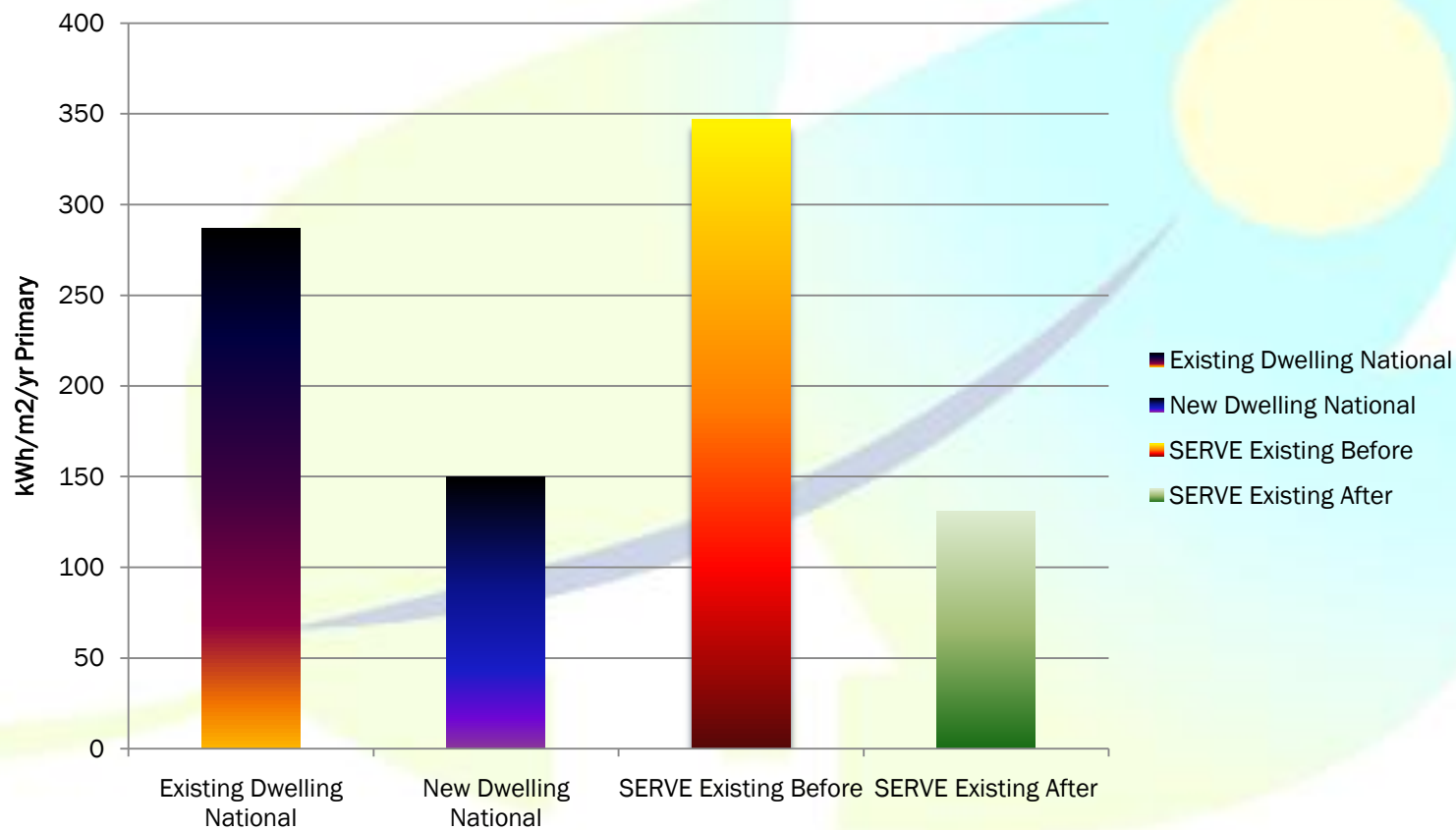
## SERVE Energy Upgrade - Phase 2 Sample - 116 Dwellings





# SERVE ENERGY IMPACTS

## Energy Performance Comparison



# MONETARY SAVINGS- RETROFITTING

- ✖ Significant savings within the region from retrofitting alone
  - + Estimated current energy spend: €900,000/annum
  - + Total Investment: €3,500,000/annum
  - + Net Cost to Homeowner: €1,900,000/annum
  - + Annual Savings: €350,000/annum
- ✖ SERVE now starting to do detailed energy bill analysis to confirm energy savings

# NON RESIDENTIAL EXAMPLE

## ✕ Gurteen Agricultural college

- + Insulation of buildings
- + Lighting upgrades
- + Heating controls
- + 50kW wind turbine
- + 600kW biomass boiler
- + 23 ha willow (energy crops) (further 23ha this year)
- + Plans of PV and waster water treatment
- + Sustainable energy centre



# SERVE RENEWABLES

- ✗ District Heating
  - + Eco Village: 1000kw Biomass & 506m<sup>2</sup> solar array
  - + Gurteen College: 600kw biomass district heating
- ✗ Biomass Heating
  - ✗ Nenagh Pool: 400kW biomass heating
  - ✗ Nenagh VEC School: 200kW biomass heating
- ✗ Retrofitting Renewables
  - ✗ Solar, Wood Stoves and Wood Boilers (over individual 400 units so far)
  - ✗ Micro Generation – Very Difficult due to lack of national support.
- ✗ Total Investment of €3.5m for all types of RES installations



# SERVE INFLUENCING NATIONAL POLICY

- ✖ Pilot Retrofitting Scheme for Ireland completed by SERVE
  - + Demonstrating cost effectiveness, standards and impact
  - + National Retrofitting Programme based on SERVE research
- ✖ Heating Controls
  - + SERVE input to standards, development of training and influence of National funding
- ✖ Wood Stoves
  - + Clarification of definition and certification of wood stoves
  - + SERVE definition used for National Building Energy Rating Methodology
- ✖ Monitoring
  - + Developing and implementing new monitoring systems

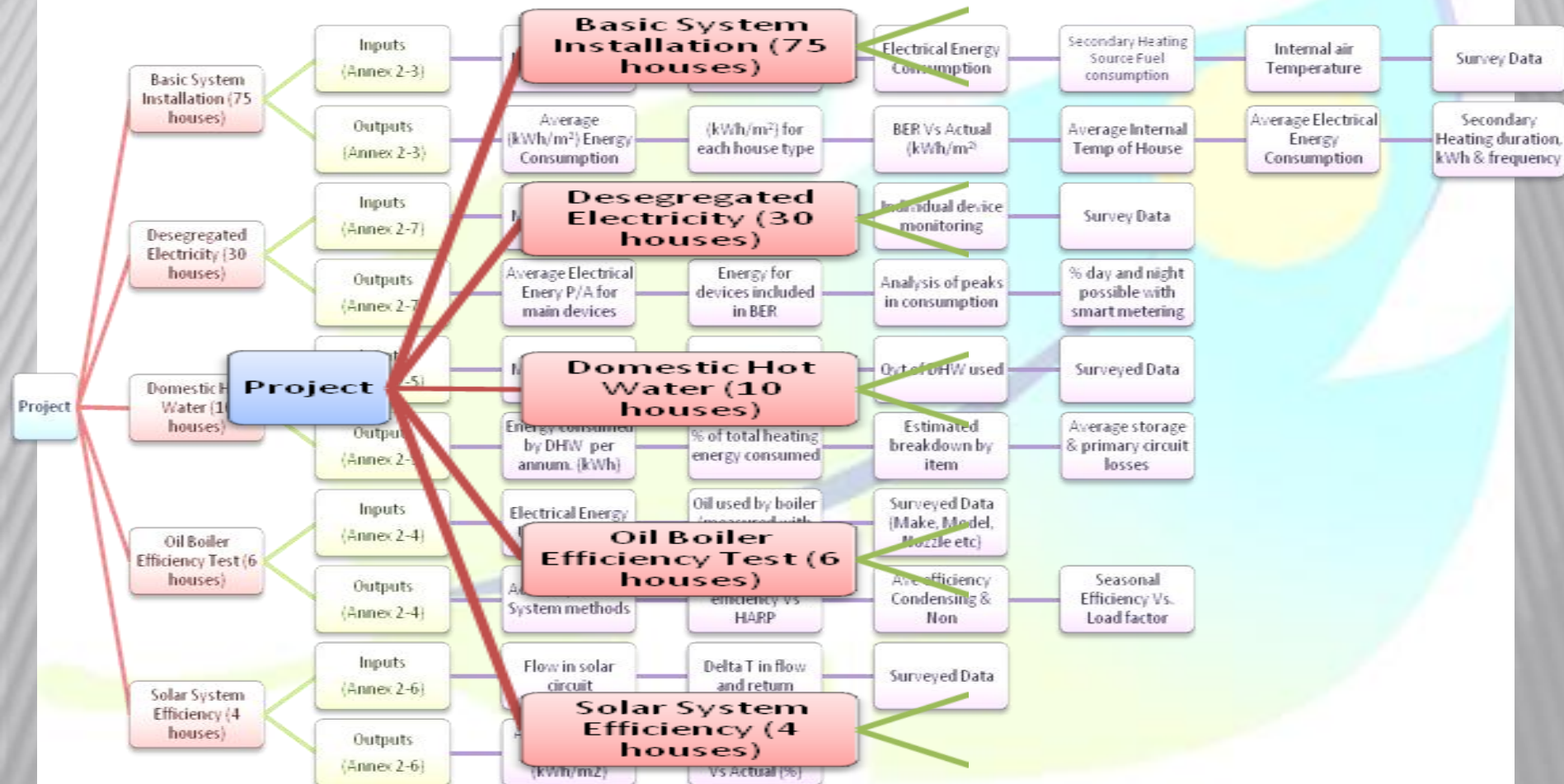
# MONITORING IMPACTS - TECHNICAL

- ✗ Need to gather data on
  - + Impact of energy efficiency measures
    - ✗ kWh saved, boiler efficiency, internal temperature, BER Change etc
  - + Energy production from renewables
    - ✗ kWh produced, % contribution to demand etc.
- ✗ Combined monitored data with economic data to determine
  - + Cost effectiveness, €/T CO<sub>2</sub> saved

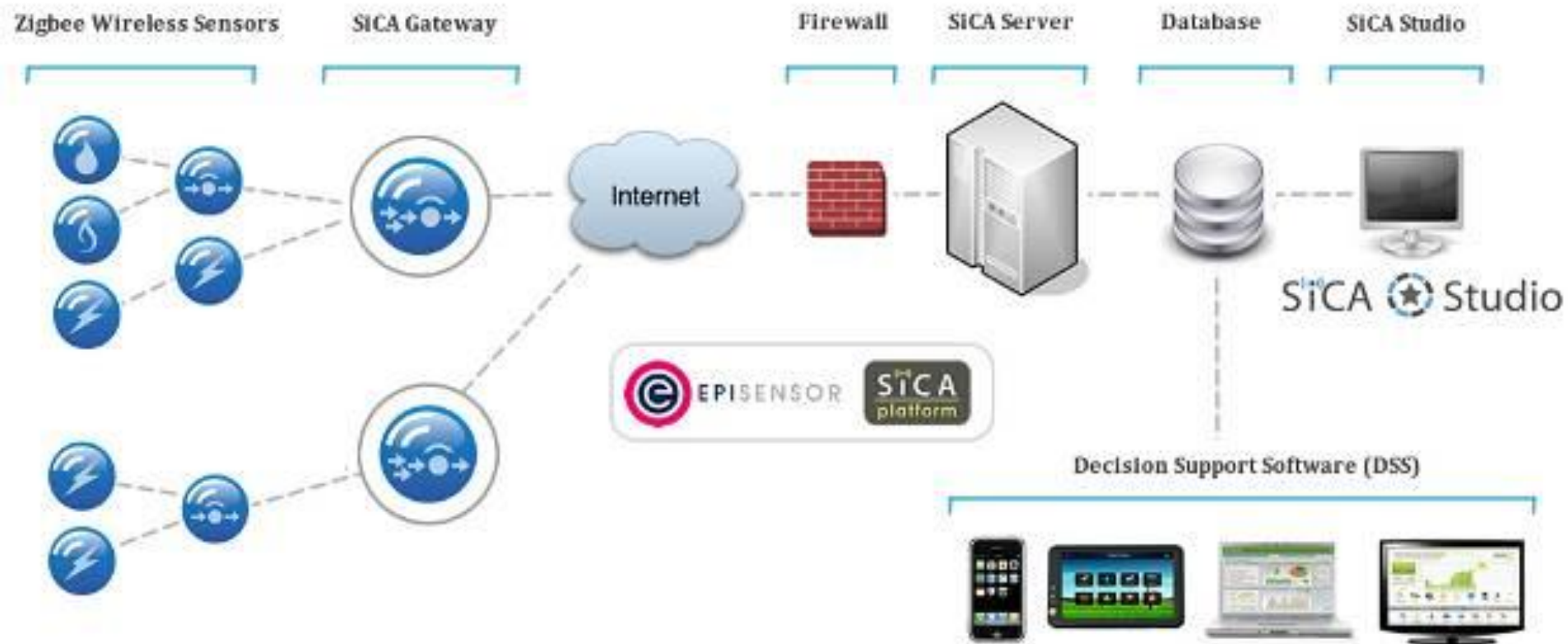
Eugster, S (2010)



# WIDE RANGE OF DATA TO BE COLLECTED



# MONITORING SYSTEM FOR RETROFITTING





# SERVE LESSONS

- ✗ Awareness vs Information
  - + People have a lot of information via many sources
  - + Path from Information to Awareness to Action can be a long one
- ✗ People trust people they know
  - + Generating a critical mass of retrofitted projects is vital
  - + Touching, feeling, seeing is important
- + Many challenges with developing a new industry
  - + Standards, knowledge, systems, training
  - + A lot more to do
- ✗ Financial Crisis
  - + How to get people to see insulation as an investment
- + Train/check/monitor
  - + Train installers/check work/monitor impacts

# Thank you.

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