

# PIVIT Initiative

Pig Improvement Via Information Technology

*...using data in pig production*

**BPEX Innovation Conference 2014**

**24<sup>th</sup> June 2014**

**Hugh Crabtree – Farmex**

# The virtuous pathway....

...turning **data** into **information** into **knowledge** into ***profit***  
→→→→→→→ → → → → → → → → → → → → → → →

# PIVIT Objectives

- Most professional UK pig production sites on line within 10 years
- Comprehensive production monitoring – temperature, feed, water, energy, growth, pig flow
- Industry “owned” central knowledge resource – the PIVIT bureau
- Commercially self-sustaining within 3 years

# Two Concurrent R&D Projects

- **PIVIT Yorkshire**
  - Funded by DEFRA
  - 5 producer partners + Farmex
  - Focused on existing tools
  - All about people
  - Project finished but...
  - Continuation of collaboration
- **TSB-SPP**
  - Funded by TSB
  - 3 commercial partners  
ARM / Farmex / DTL
  - ~ 12 associated producers
  - All about extending the tool kit and new tools
  - Commercial exploitation very important
  - New Co proposal

# What have we learned?

- It all takes time
- Must have multiple options for data capture
- Facilitation is a must = extension = KTP = Pro-active customer support = BUREAU = Subscriptions
- Even the experienced learn
- Lots of systems out there not working as planned
- It's a continuous, rather slow road to improvement that demands investment and commitment – *NOT EASY*

# Demand for Service

- Professional facilities regarded as plant
- System Commissioning
- Routine Servicing
- Pro-active technical support
- **Growth rate and feed conversion in REAL TIME**
- Then the rest will follow on...

# Partner Results – P1

	<b>Wean to Finish</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	<b>9kWhr</b>	<b>8.8kWhr</b>
Water	<b>770 litre</b>	<b>525 litre</b>
FCR	<b>2.5</b>	<b>2.48</b>
Growth	<b>920 gpd</b>	<b>965 gpd</b>

# Partner Results – P3

	<b>Finisher 1</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	10 KWH	9.6 KWH
Water	0.54 m3	0.51 m3
FCR	2.75	2.70
Growth	860 g/day	930 g/day

	<b>Finisher 2</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	10 KWH	9.4 KWH
Water	0.58 m3	0.58 m3
FCR	2.68	2.62
Growth	880 g/day	930 g/day

	<b>Finisher 3</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	2 KWH	2 KWH
Water	0.63 m3	0.64 m3
FCR	2.95	2.95
Growth	850 g/day	830 g/day



# Partner Results – P4

	<b>Nursery</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	196,549kWhr	137,002kWhr
Water	1.19m <sup>3</sup>	0.45m <sup>3</sup>
FCR	1.85	1.64
Growth	545 g/day	611 g/day

	<b>Finisher 1</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	219,515kWhr	132,673kWhr
Water	1.2m <sup>3</sup>	0.77m <sup>3</sup>
FCR	2.1	2.36
Growth	750 g/day	710 g/day

	<b>Finisher 2</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	180,000kWhr	140,178kWhr
Water	0.93m <sup>3</sup>	0.63m <sup>3</sup>
FCR	2.5	2.45
Growth	828 g/day	878 g/day

# Partner Results – P5

	<b>Nursery</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	7.8kWh	7.78kWh
Water	95l	96l
FCR	1.61	1.55
Growth	495	547

	<b>Finisher 1</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	9.8Kwh	9.6Kwh
Water	350l	348l
FCR	2.75	2.63
Growth	880g/day	882g/day

	<b>Finisher 2</b>	
	<b>BASELINE</b>	<b>END</b>
Energy	9.8kWh	9.77kWh
Water	350l	352l
FCR	2.75	2.65
Growth	850g/day	855g/day

# Achievable Improvements

- Reduced finishing time 5-10 days
- Narrowing variation by 50% SD
- 50% reduction in fossil fuel use
- 80% reduction in water waste

# What is changing?

- Managing more and more pigs with less and less man hours
- Impact of regulation
  - environment
  - climate change
  - welfare
- Impact of ICT or Smart Pig Farming

***“you can’t control what you don’t measure!”***

# What have we learned?

- Shit happens !
- Lots of “normals”
- Don't need to measure everything but must measure temp / water / energy / feed / growth
- *And.....*

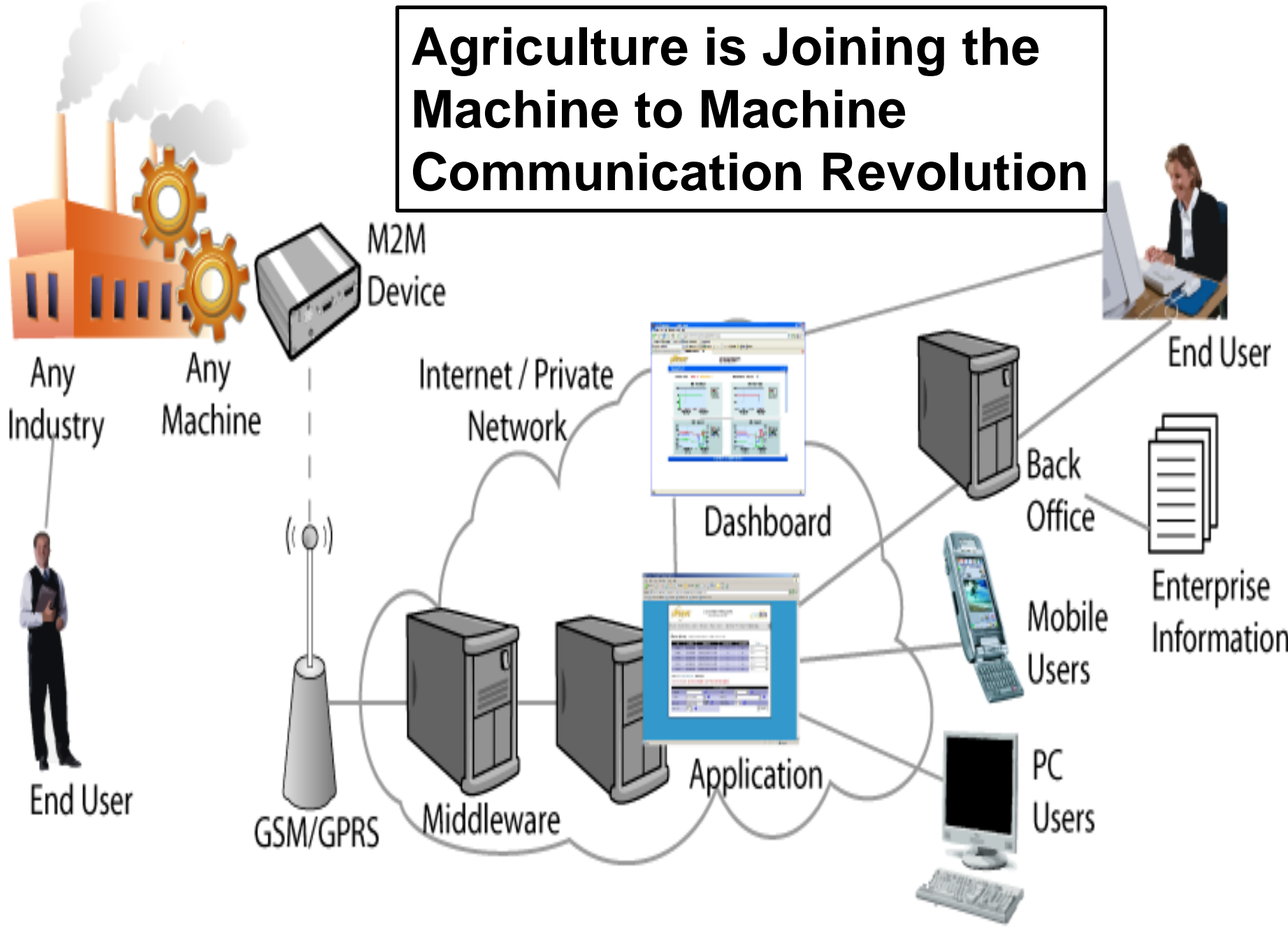
# In pig production we monitor

- The pigs?
- The equipment?
- ***The people operating the equipment!***

# How to use data to improve performance:

- Just get:  
*more things,*  
*more right,*  
*more of the time*
- **Training and Monitoring** must go hand in hand  
*continuously*

# Agriculture is Joining the Machine to Machine Communication Revolution



End User Application

Comtech Communication

Application End User



**Production Sites**

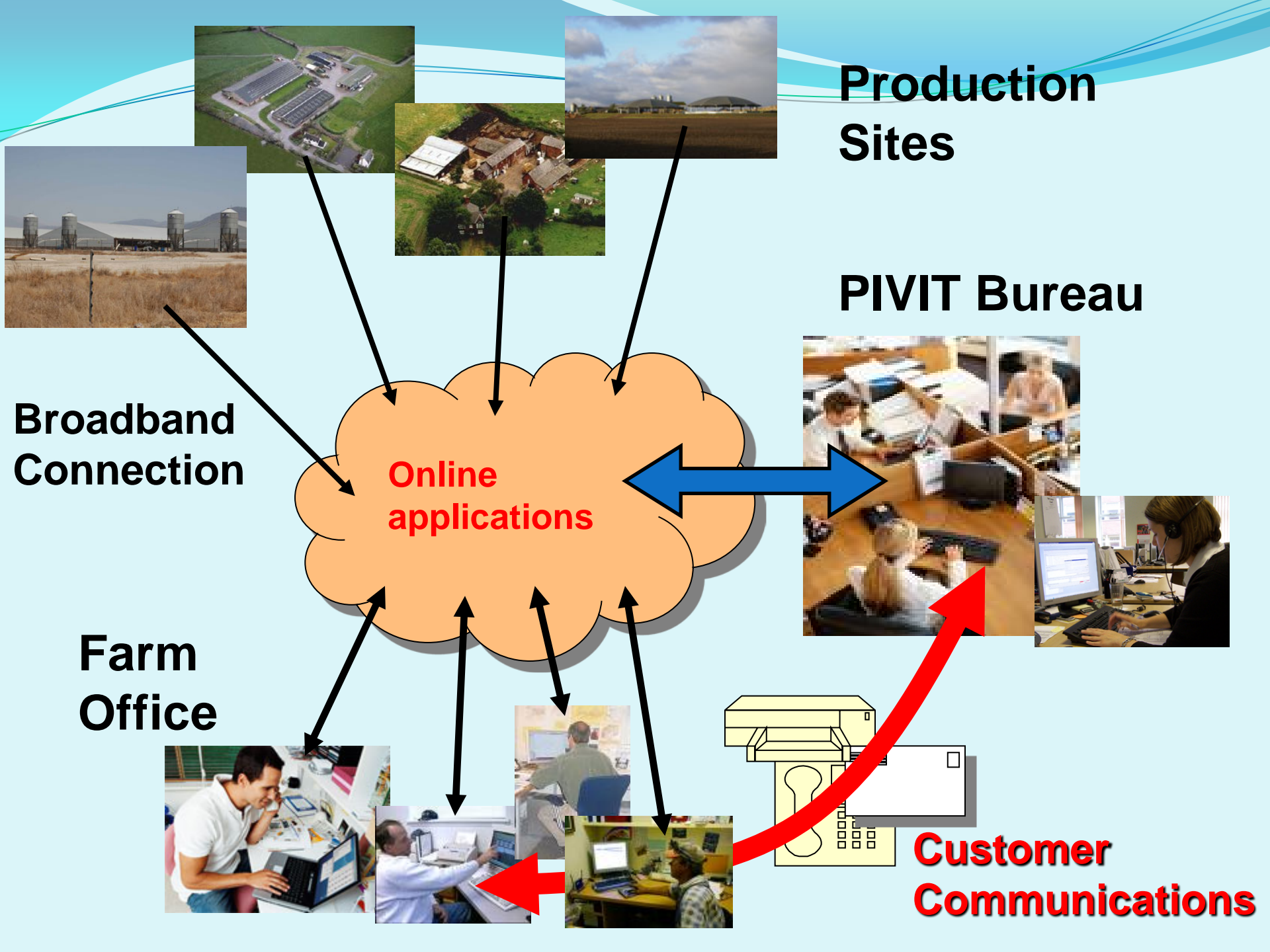
**PIVIT Bureau**

**Online applications**

**Broadband Connection**

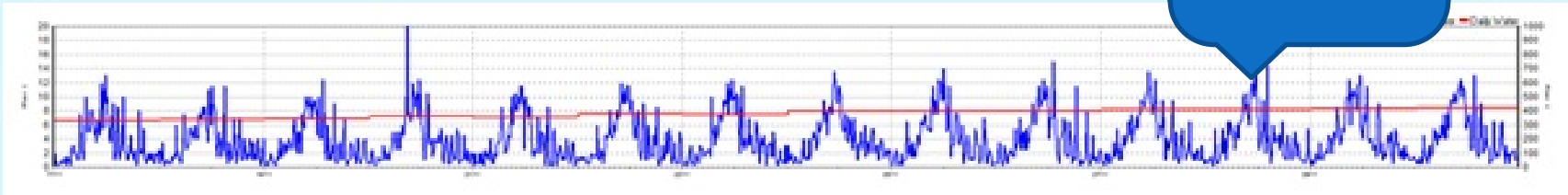
**Farm Office**

**Customer Communications**



# Define your normality

What is happening



What should be happening



# Automated data analysis

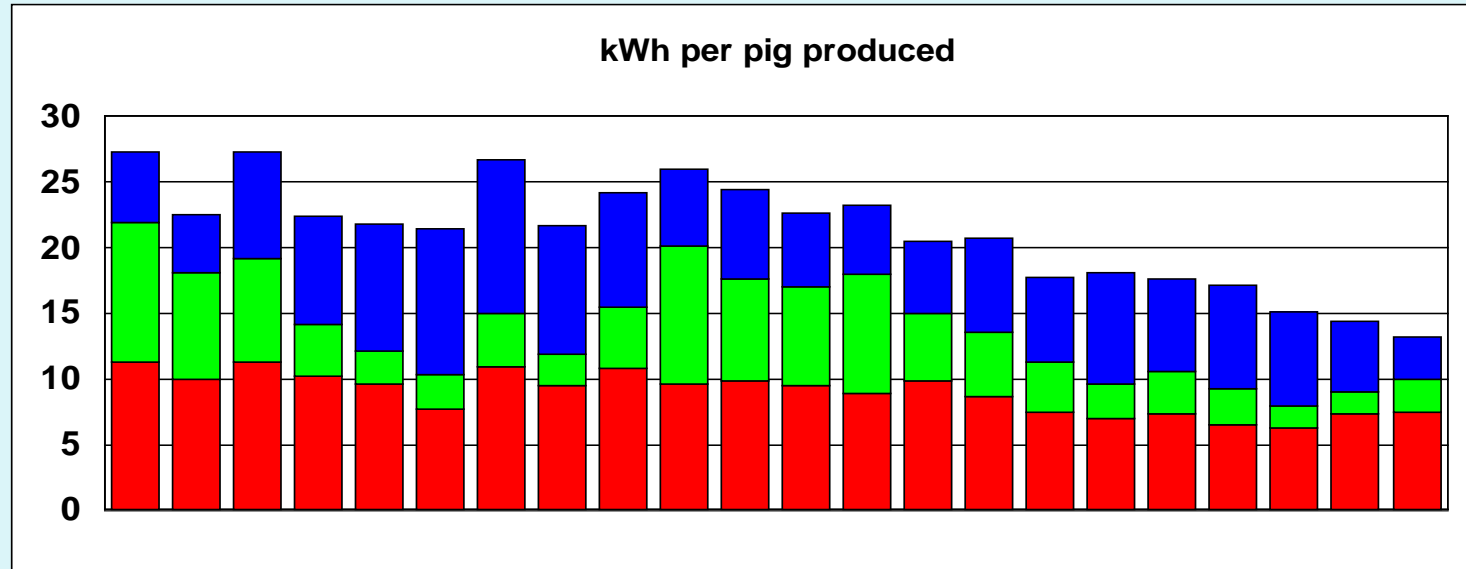
Quicker  
delivery of  
value

**BetterScore**

[Graphs](#)

Zone	Feed	Water	Temp			
Site						
Barn 7						
Barn 8						
Barn 9						
Barn 10						
Barn 15						
Barn 16						
Barn 17						
Barn 18						
Barn 23						

# Low hanging fruit



***....more things, more right, more of the time !***

# Impact of Monitoring - 1

Quantified Impact			
	Before	After	Annual Saving
Annual Heating Cost	£13,165	£4,288	<b>£8,877</b>
Cost per pig produced	£1.27	£0.41	<b>£0.86</b>
kWh per pig produced	14.4	4.7	<b>9.7</b>
Tonnes CO2 per year	81	26	<b>55T</b>
Cost			<b>&lt;£4,000</b>
Non-quantified benefits	Easier Management. Better temperatures. Improved welfare		
Cause of improvement	Feedback of conditions and running costs leading to improved management of ventilation rates		

# Impact of Monitoring - 2

1350 Place Weaner Building					
	Batch 1	Batch 2	Batch 3	Batch 4	Saving
Cost per batch	£1,206	£736	£436	£469	
Cost per pig	£0.89	£0.55	£0.32	£0.35	<b>£0.56</b>
kWh per pig	10.2	6.2	3.7	3.9	<b>6.4</b>
Annual Cost	£12,546		£4,706		<b>£7,840</b>
Tonnes CO2	77.0		28.9		<b>48.1</b>

# Electricity Cost Per Finished Pig

	kWh/pig	Cost/pig
Industry Average	40	£3.52
Industry Typical	36	£3.17
AMP	16	£1.41

Source of Data

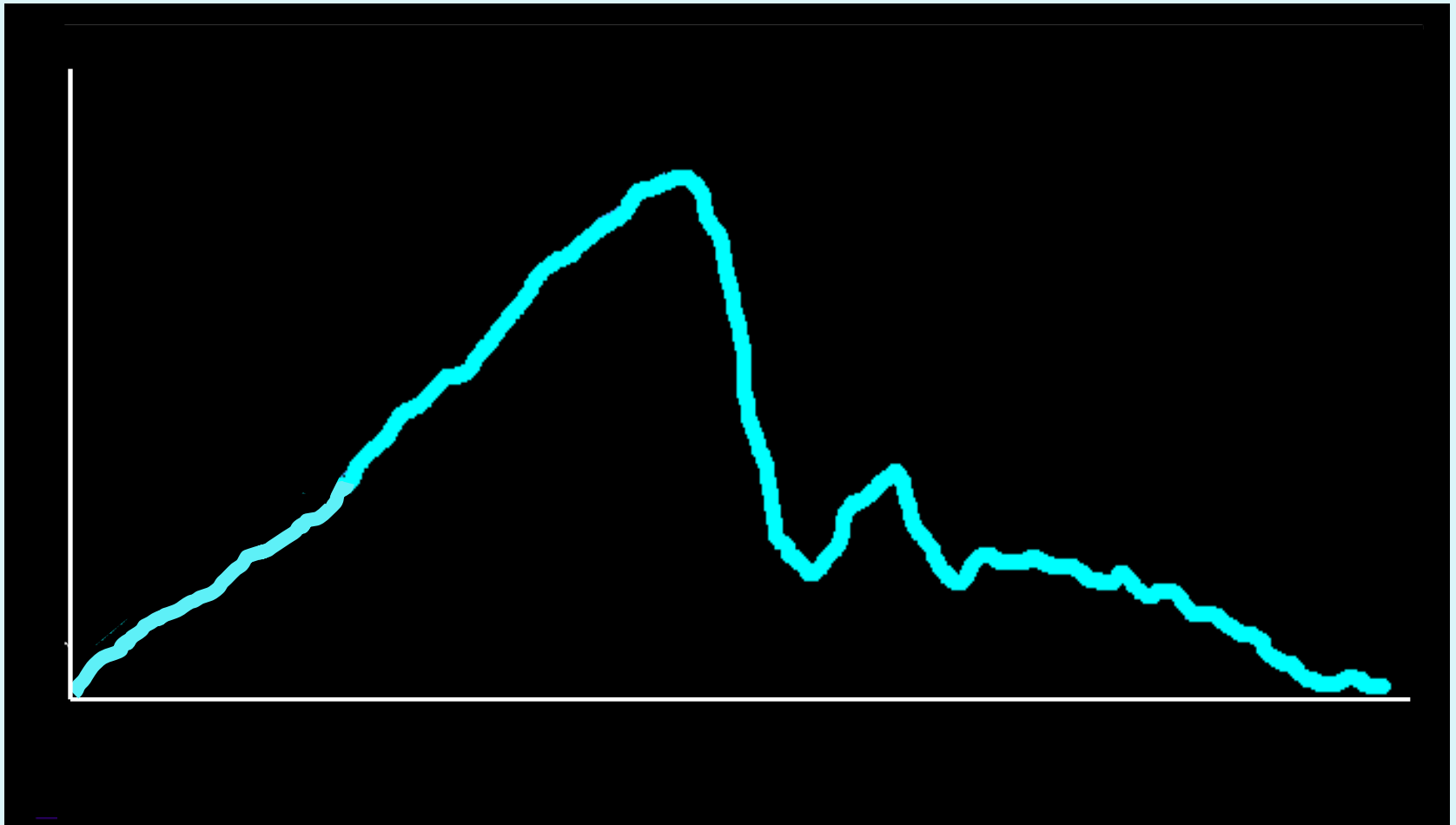
Industry Average – BPEX, CCL Data

Typical – Carbon Trust (FEC Services)

**AMP – Actual measured performance**

N.B. Average close to typical means there must be some with much worse electricity costs per pig than this!

# Finishing pig water intake





MONITORING HELPS YOU GET

*...more things, more  
right, more of the  
time !*

**Production Sites**

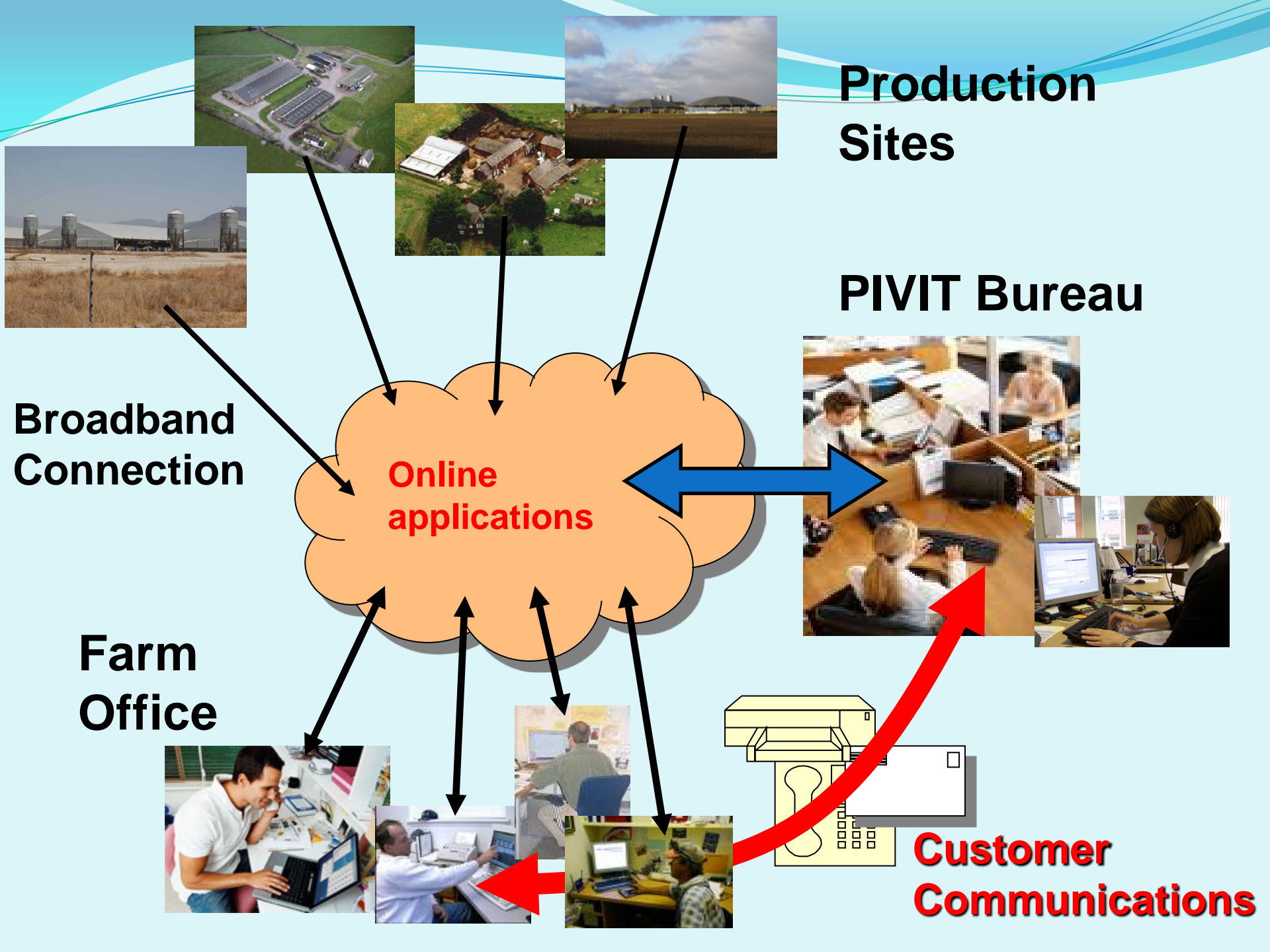
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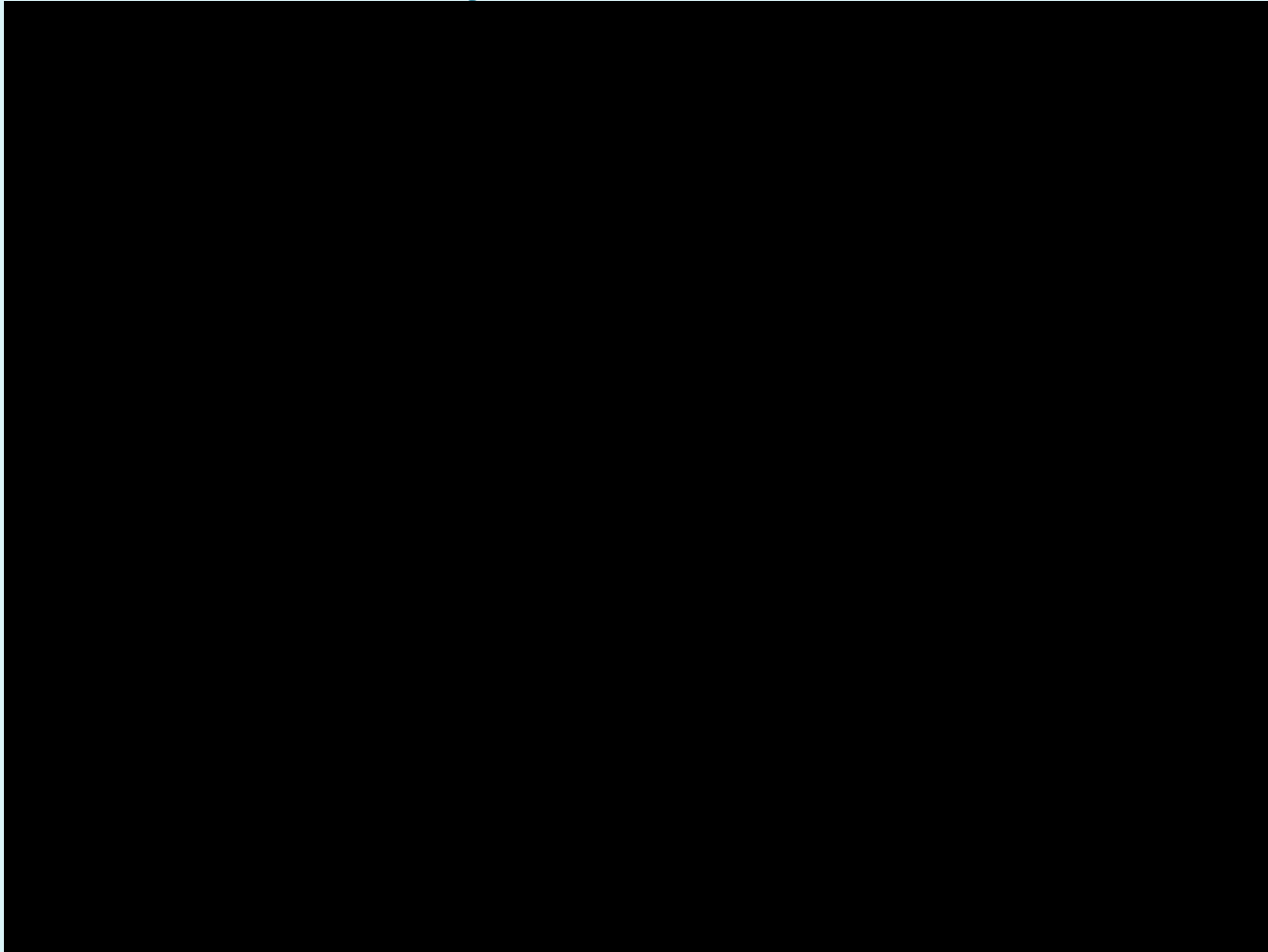


***“...if you can deliver  
growth rate and feed  
conversion in real time  
... job’s a good ’n ”***

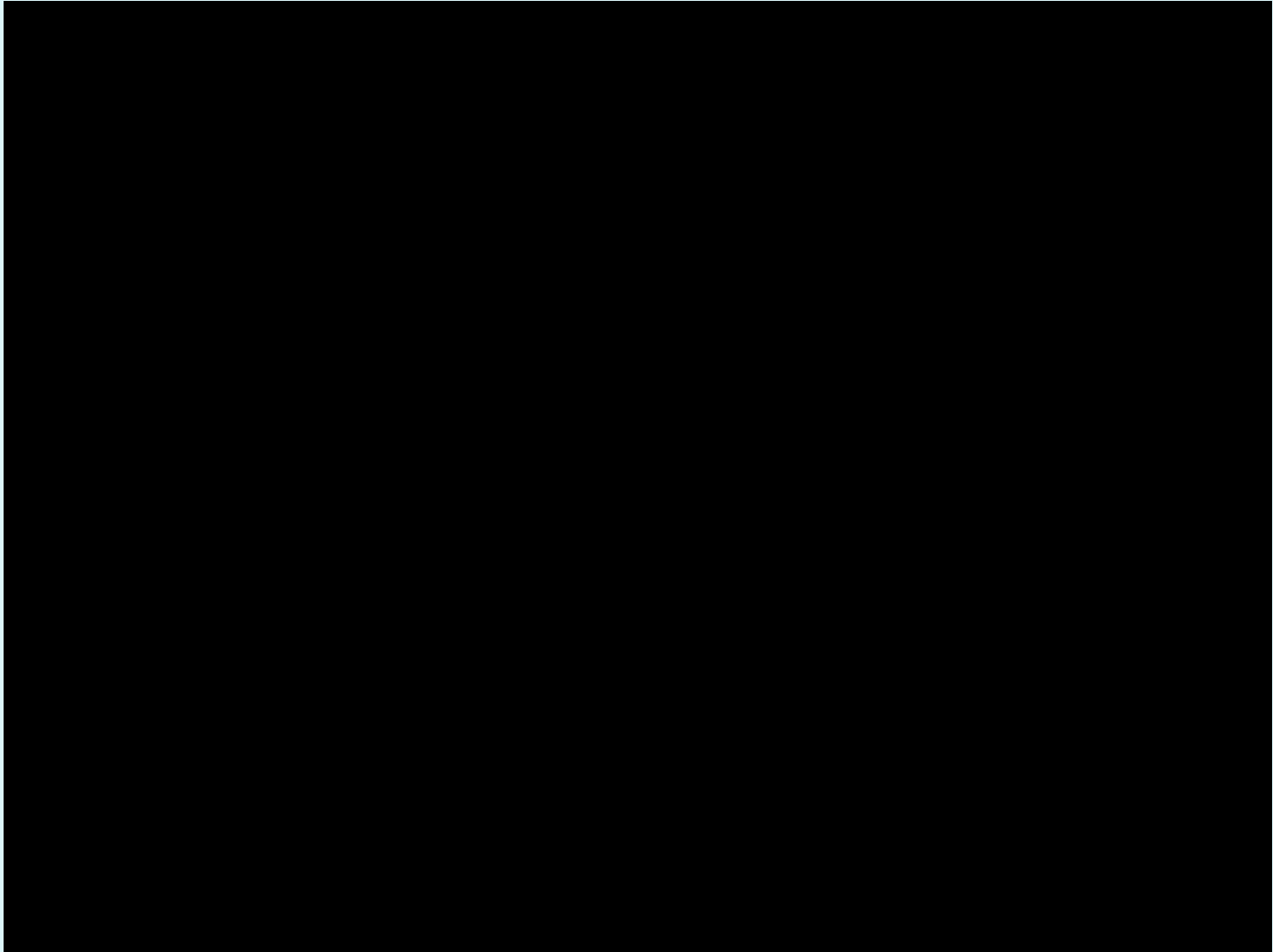
PIVIT Partners Feb 2014



# In-pen Voluntary Access Growth Sensor



# Automated Observation



**AXRM**