

# ServusNet



knowledge is power

Operational Intelligence for Renewable Energy

[www.ServusNet.com](http://www.ServusNet.com)

# Team

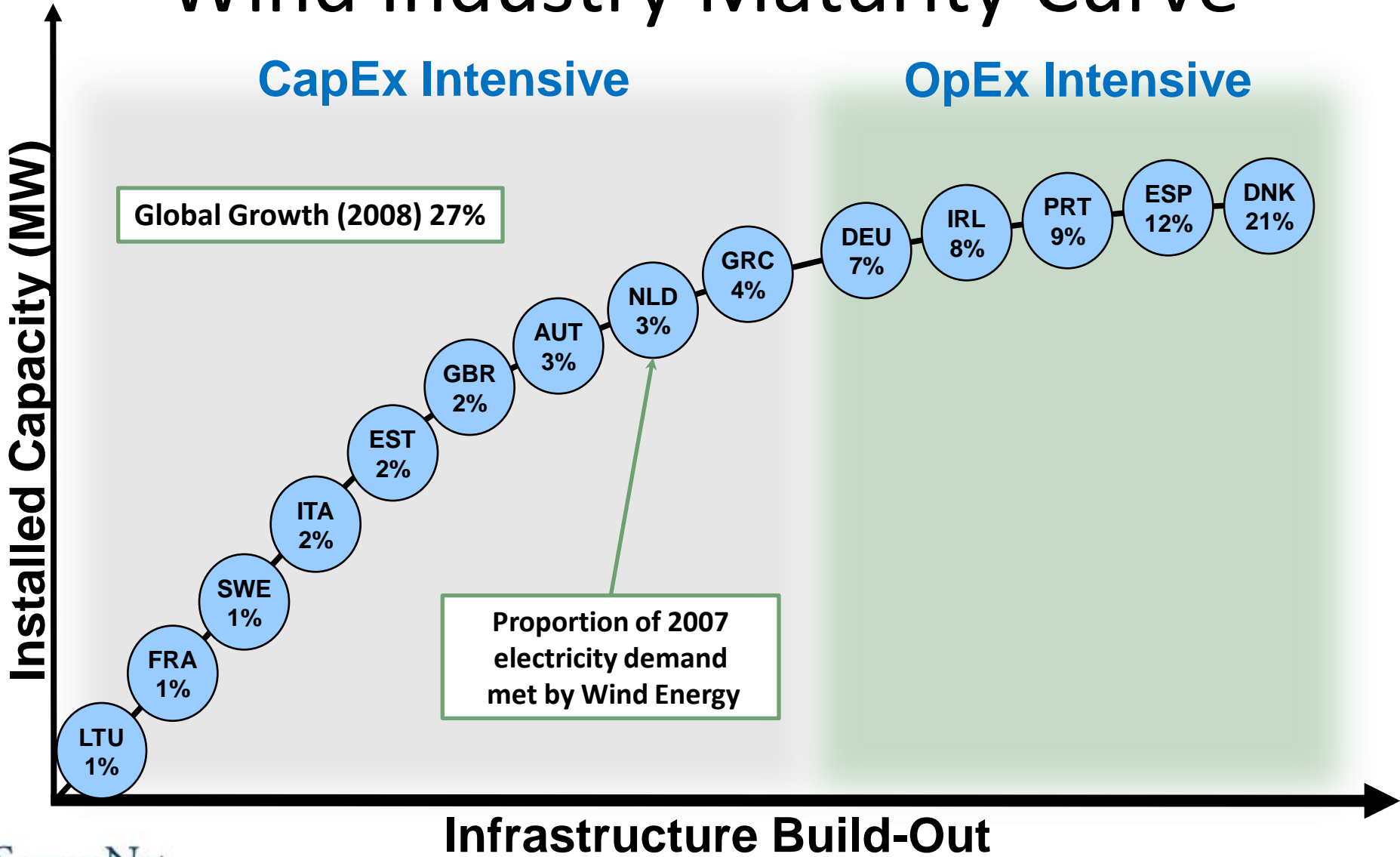
- Founders out of Motorola, Cork, Ireland since 2007
- Telecoms network management
  - collectively, circa 40 years experience
- Senior management or engineering roles in global corporations
- CFO co-founded Pace Soft Silicon
  - India-based video technology for mobile handsets
  - Sold to Nvidia Inc. in 2006
- Located at National Software Centre in Cork

# Wind Industry Maturity Curve

CapEx Intensive

OpEx Intensive

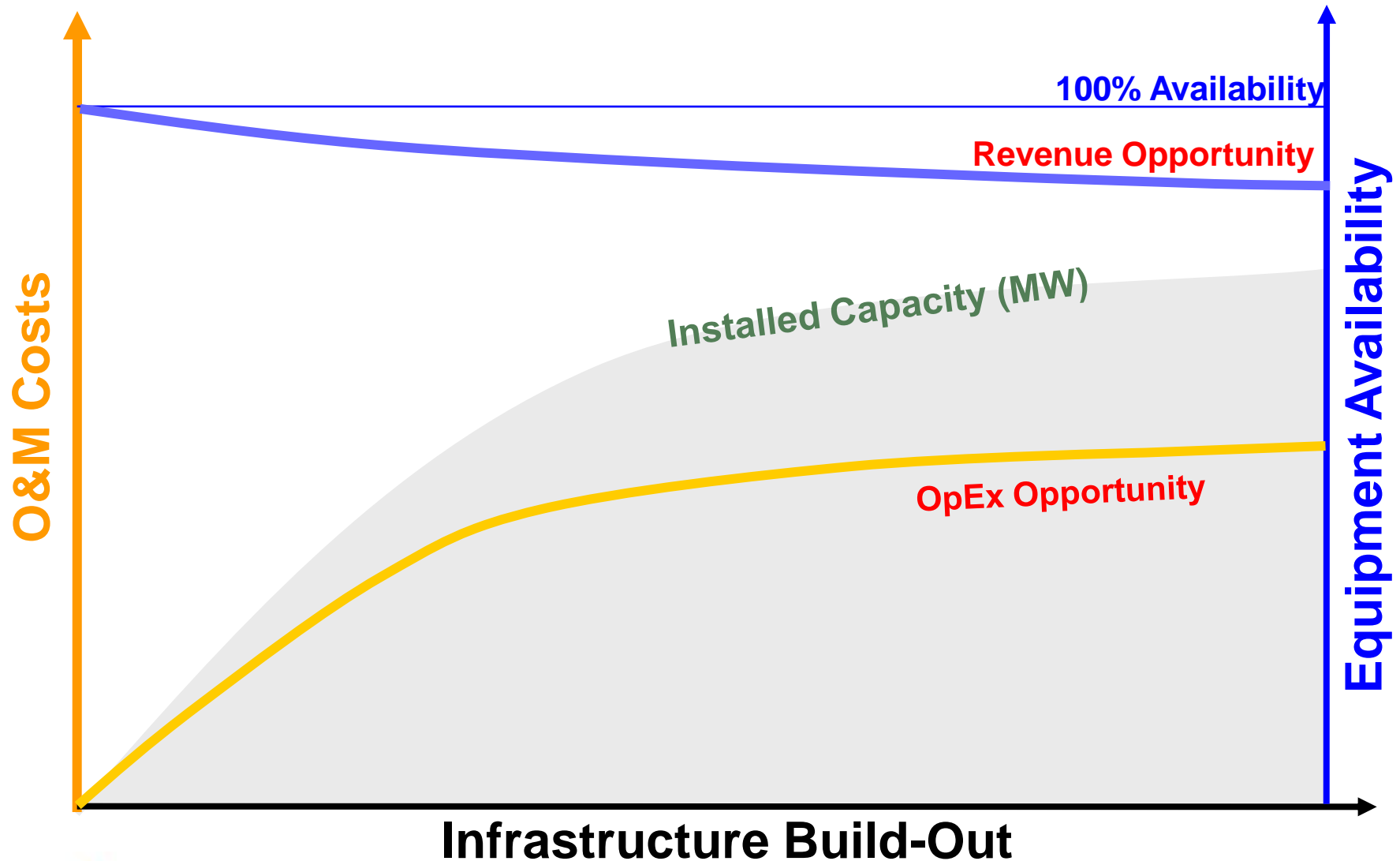
Global Growth (2008) 27%



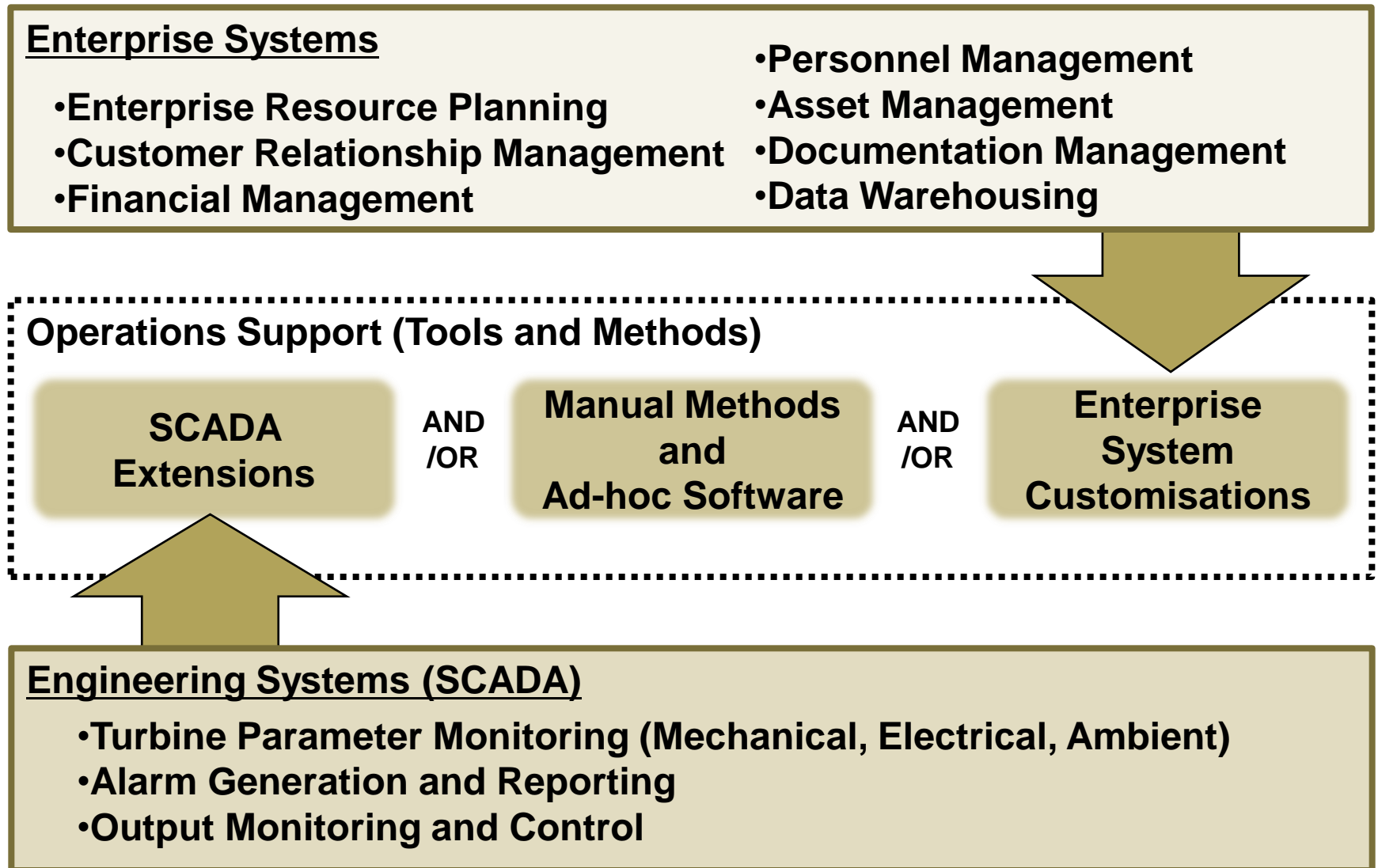
Proportion of 2007 electricity demand met by Wind Energy

Infrastructure Build-Out

# Wind Portfolio Operations Challenges



# Existing Distributed Energy IT Architecture



# Operations Support System for Renewable Energy

## Enterprise Systems

- Enterprise Resource Planning
- Customer Relationship Management
- Financial Management
- Personnel Management
- Asset Management
- Documentation Management
- Data Warehousing

## ServusNet's Operations Support System

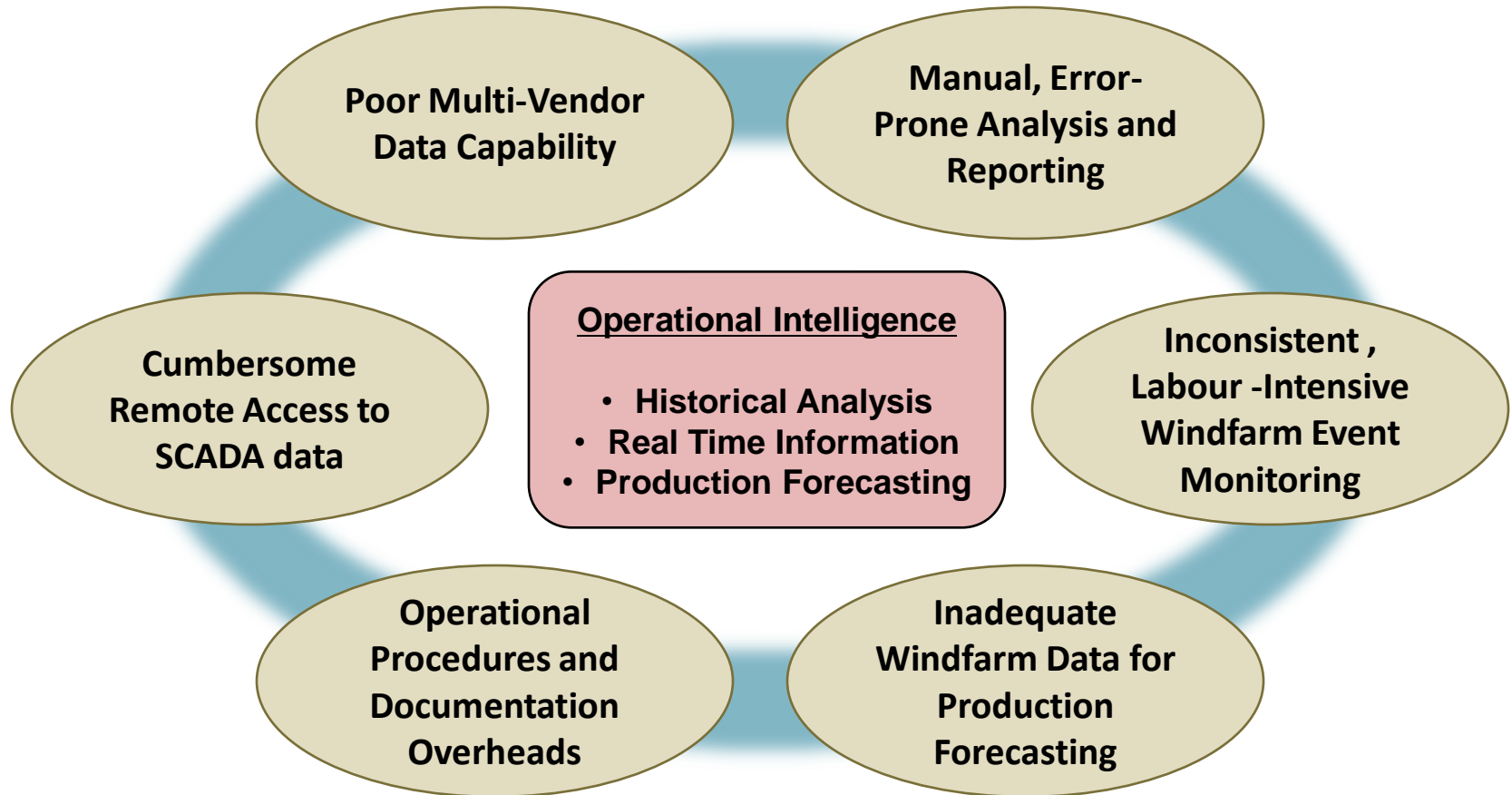
- Multi-Vendor, Multi-Windfarm Portfolio Management
- Decision Support at Operations Level
- Domain-Specific Value-Added Applications
- Focus on Cost Saving plus Revenue Enhancement
- Maximum Flexibility on Scalable Platform



## Engineering Systems (SCADA)

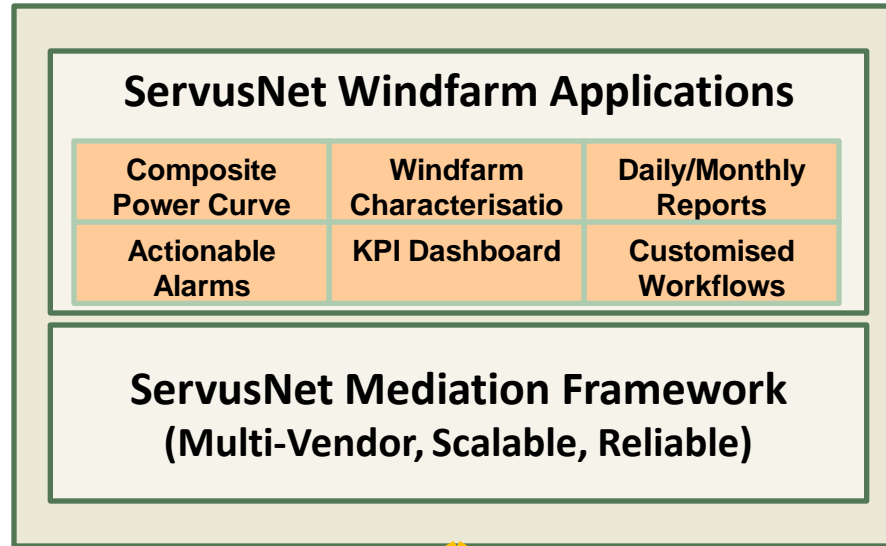
- Turbine Parameter Monitoring (Mechanical, Electrical, Ambient)
- Alarm Generation and Reporting
- Output Monitoring and Control

# Addressing Existing Pain Points

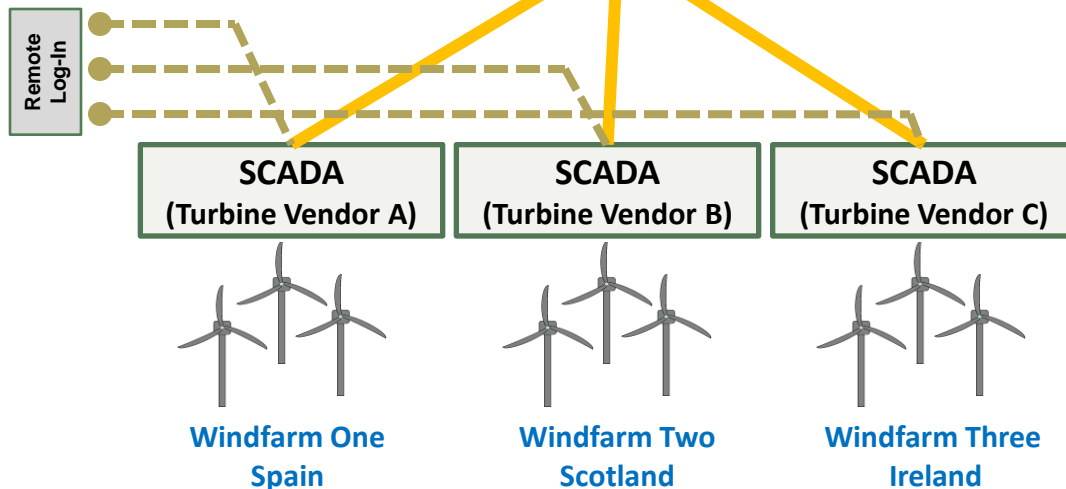


# ServusNet's Operations Support System

## Operations-Level Management



## Equipment Management





Folders

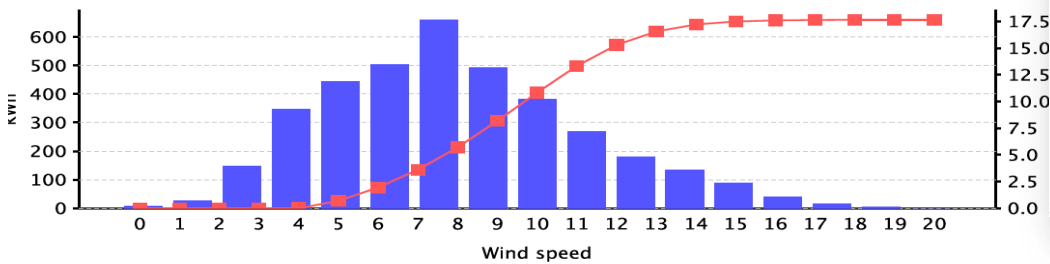
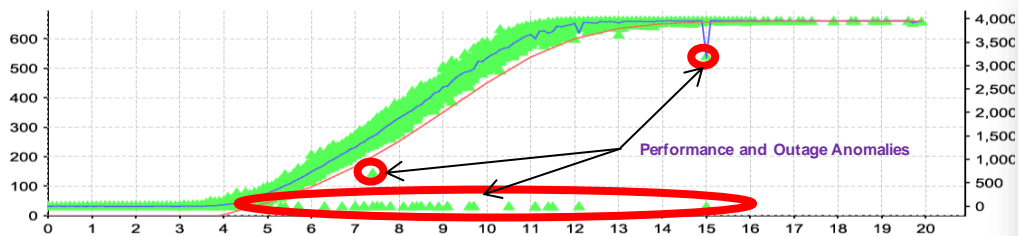
- root
  - Content files
  - Data Sources
  - Images
  - Input Controls
  - Input data types
  - ListofValues
  - Queries
  - Reports
    - Windfarm Reports**
  - subreports

Contents of: root > Reports > Windfarm Reports

Display Name	Description	Type	Creation Date
<b>Equipment Availability Downtime Report</b>	Per turbine availability report for a designated time period.	Report	10-12-2009 21:46
<b>Outage Event Report</b>	Report categorizing and listing turbine outage events and any associated engineer's logs for a wind farm for a designated period.	Report	10-12-2009 22:36
<b>Daily Wind Speed &amp; Distribution Profile</b>	Histogram of wind speed distribution + plot of daily average wind speed for a designated time period	Report	10-13-2009 12:33
<b>Operations Report</b>	A full wind farm operations report combining production, equipment availability, outage event and wind speed reports.	Report	10-15-2009 17:30
<b>Production Summary Report</b>	Wind farm production summary.	Report	10-12-2009 21:17
<b>Equipment Availability Uptime Report</b>	This report replicates the standard production report as would be provided on a SCADA system.	Report	10-12-2009 22:21
<b>Turbine Observed Power Curve</b>	A curve fitted plot of the observed power curve of a turbine based on the instantaneous power output readings for a designated time period.	Report	10-21-2009 11:16
<b>Turbine Observed Power v Wind Daily Figures</b>	Report showing all turbines for a windfarm, where the power is plotted against the wind.	Report	10-12-2009 21:12

Site Production Chart

From: 6/1/09 12:00 To: 7/1/09 12:00 Turbine: 300000001301



■ V47 Power Curve ■ Wind Histogram

Day-Ahead Forecast

Market Price	7 c/kWh
<b>Projected Production Optimum</b>	<b>952311 kWh</b>
<b>Projected Revenue Optimum</b>	<b>66661 Euro</b>
Projected Production Performance Adjusted	759998 kWh
Projected Revenue Performance Adjusted	53199 Euro
<b>Projected Loss Performance</b>	<b>13462 Euro</b>
Projected Production Dependability & Performance Adjusted	742682 kWh
<b>Projected Revenue Dependability &amp; Performance Adjusted</b>	<b>51987 Euro</b>
<b>Projected Loss Dependability</b>	<b>1212 Euro</b>

# Summary

- Distributed Generation is Maturing Rapidly
- Complex Portfolios Driving Operational Challenges
- Opportunity to Provide Operations Support Systems
- Exploiting Telecoms Expertise and Technology for Immediate Value-Add
- Scalable Product Anticipates Portfolio and Energy Market Trends