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The Smart Grid - Constant Energy in a World of Constant Change

Energy meets Intelligence

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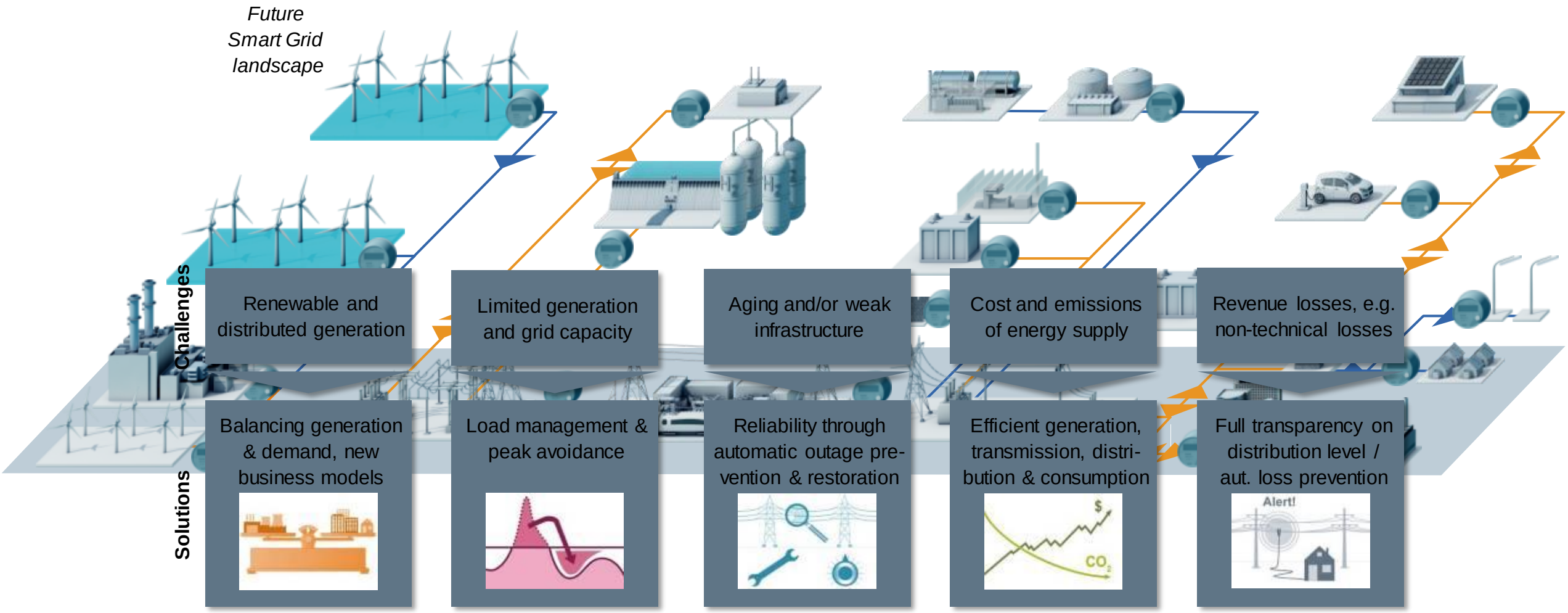
… require a new Smart Grid infrastructure



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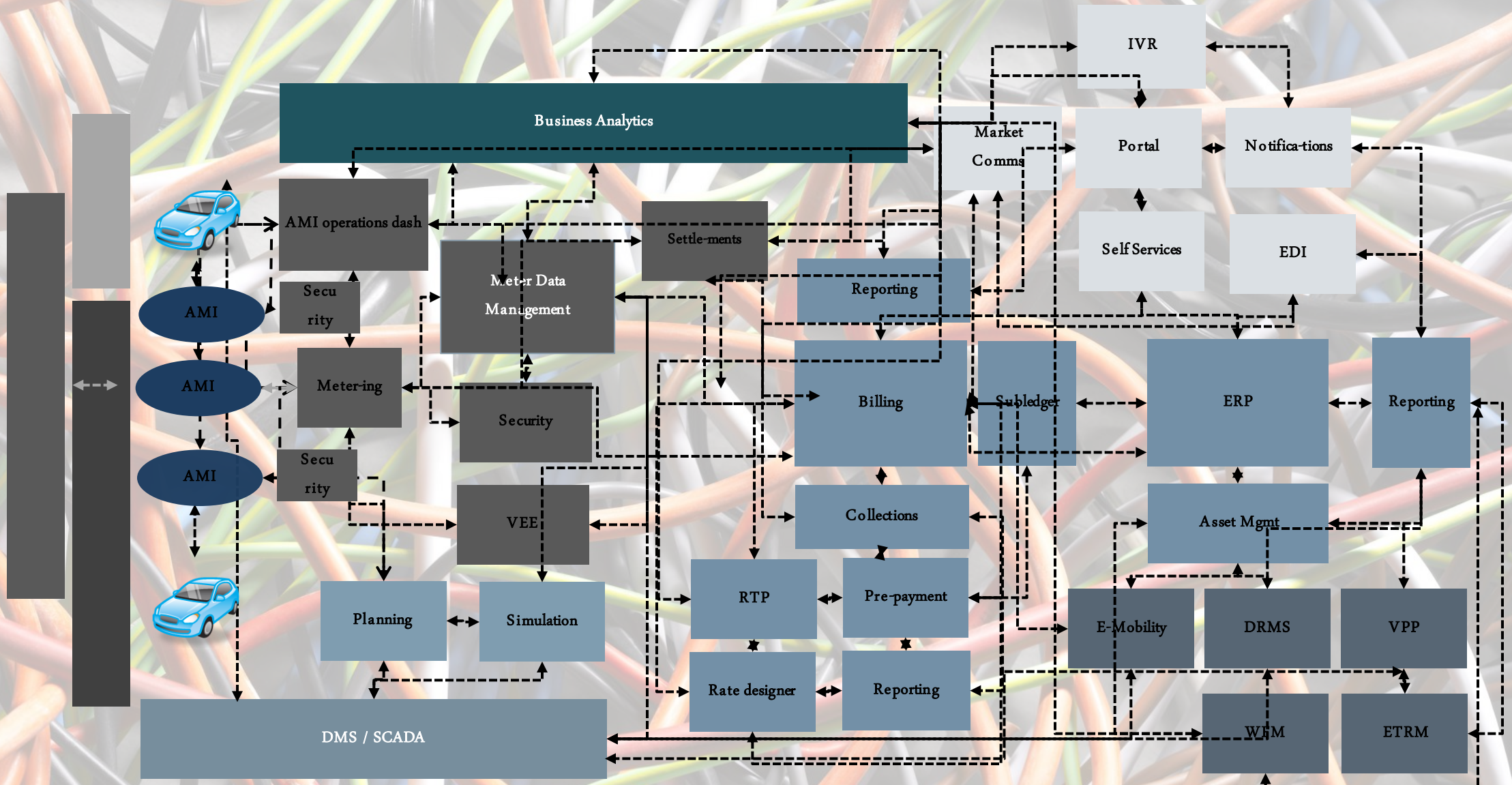
Adding application on application and silo thinking will lead us to infeasible complexity



Why Connecting Metering Information to Network Analysis

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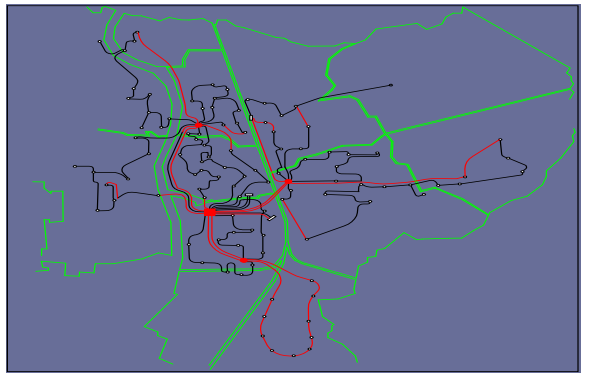
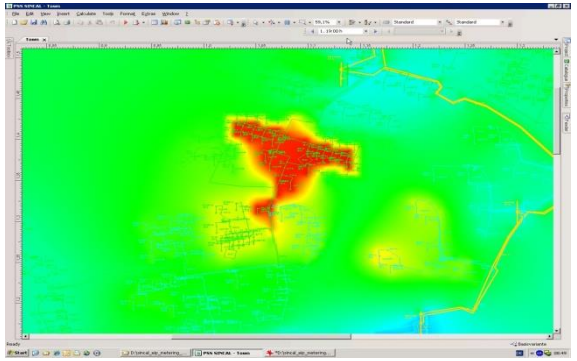
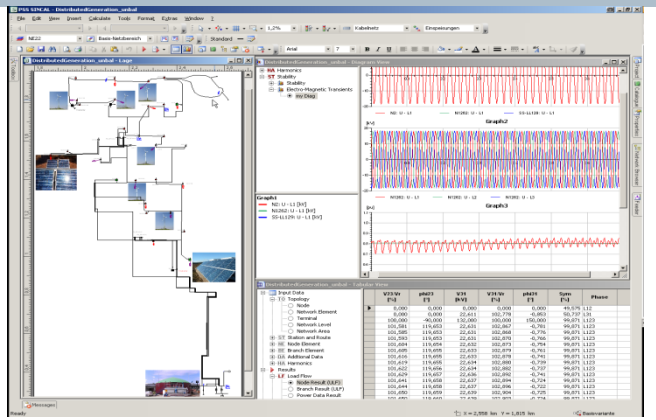
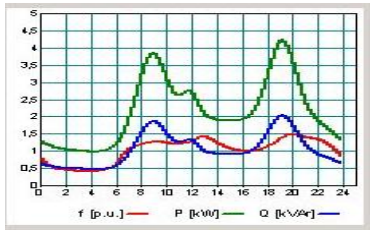
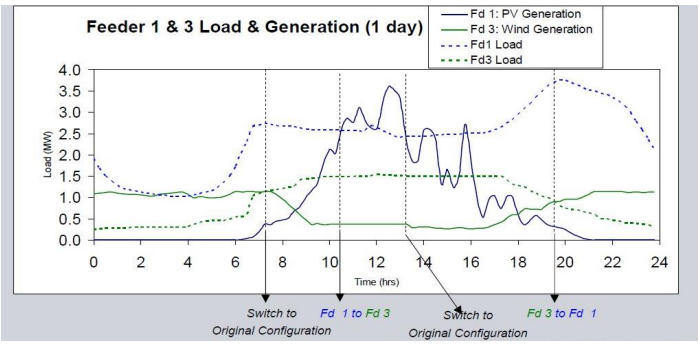
- Understand the actual networks and evaluate specific events (post mortem)
- Improve long term network planning based on profile data for loads and generators
- Develop more suitable „standard profiles“ for utility-specific clusters of customers.
- Recognize different trends in the network at an early stage











- Support „Operation Planning“ :
  - Influence the network configuration based on the actual situation
  - Optimize the loading of elements due to the conditions of the last period
  - Shift investments to a later date

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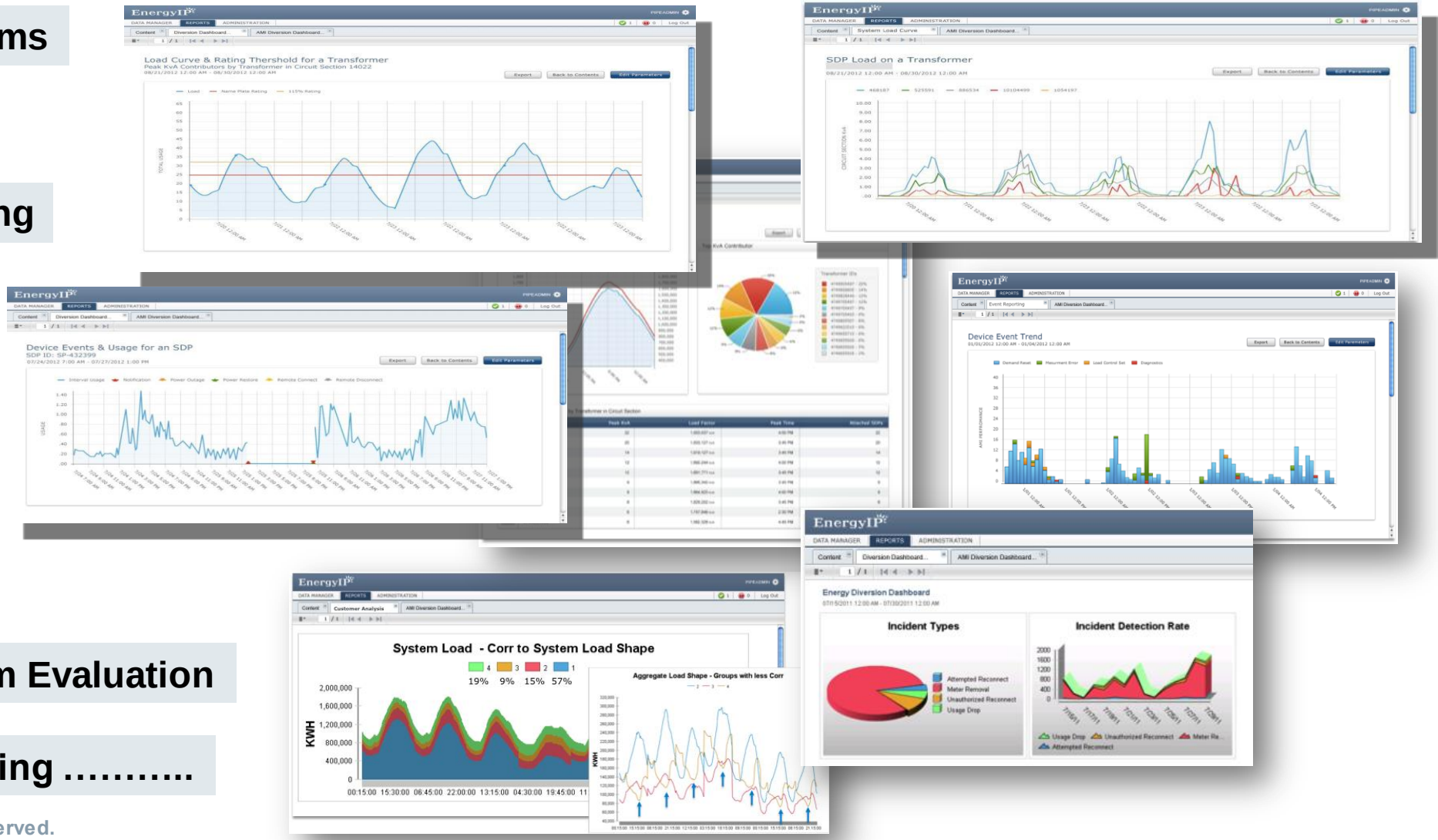
Existing Analytical Applications

- Modeling New Rate Programs
- Outage Analysis
- Event Tracking and Trending
- Load Profiling
- Data Collection Analysis
- Grid Loss
- Detection of Energy Theft
- Demand Response Program Evaluation
- Distribution Network Planning …….



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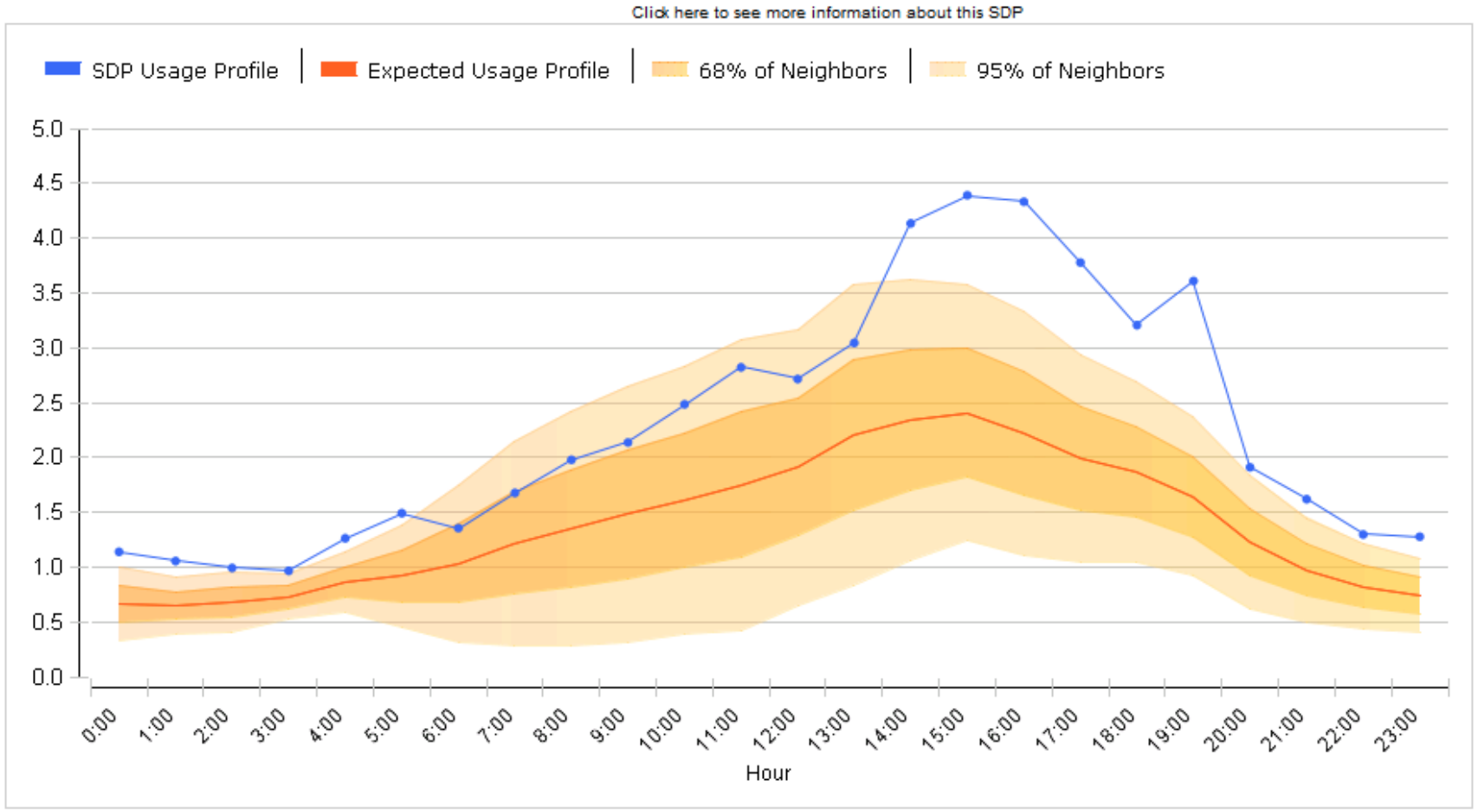
Can we better understand our consumers?

Profiling Load Patterns



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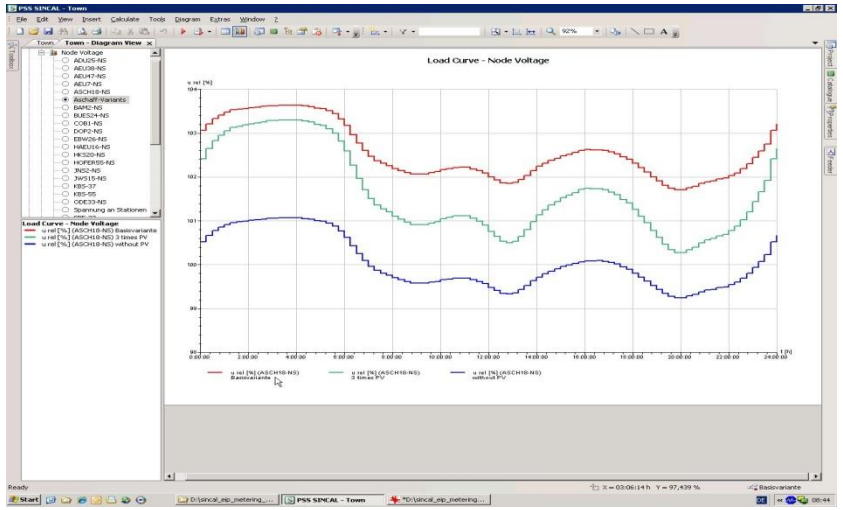
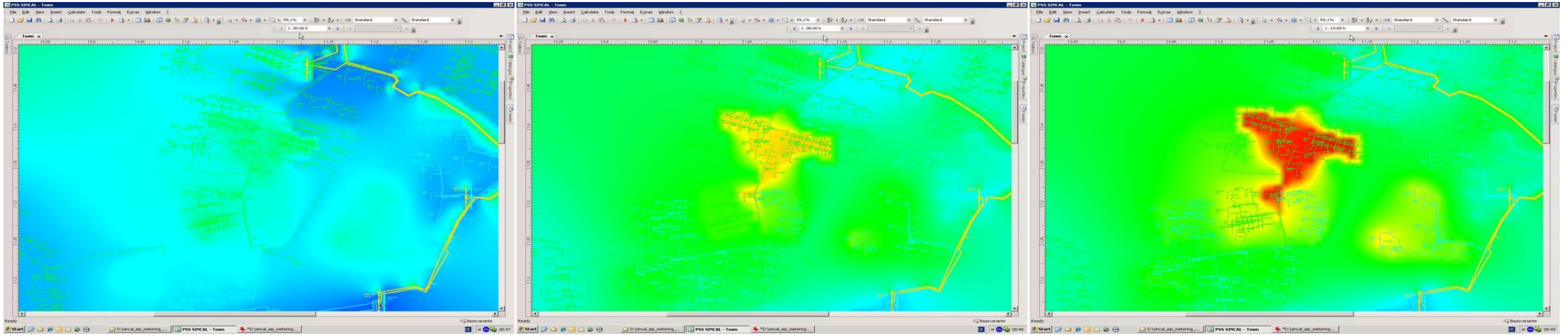
Scenario 1: Long Term Network Planning in PSS®SINCAL via MeterReadService from Energy IP



The network simulation gives you results for the loading of the network and for the voltage ranges during the day in every location

SINCAL also provides theme-maps for the whole network e.g. for the voltage at different times

This will lead to optimized network configuration for the future based on reliable evaluations



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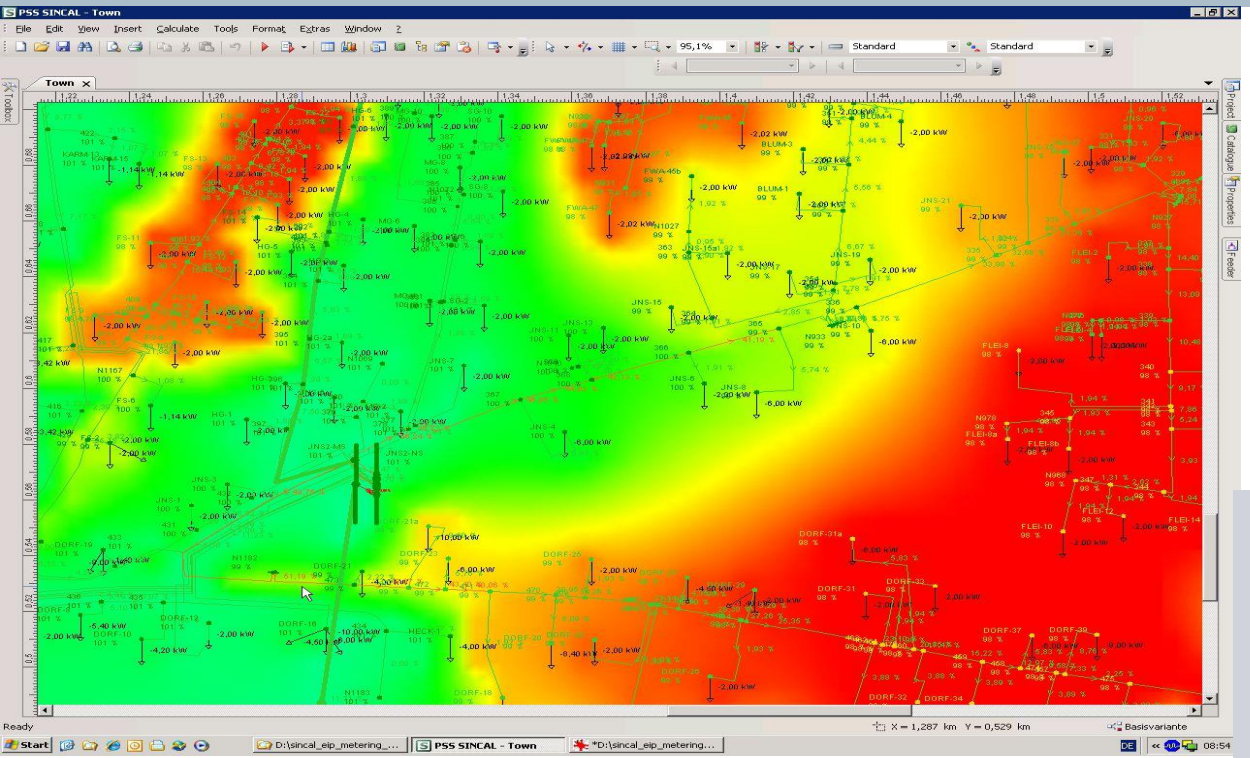
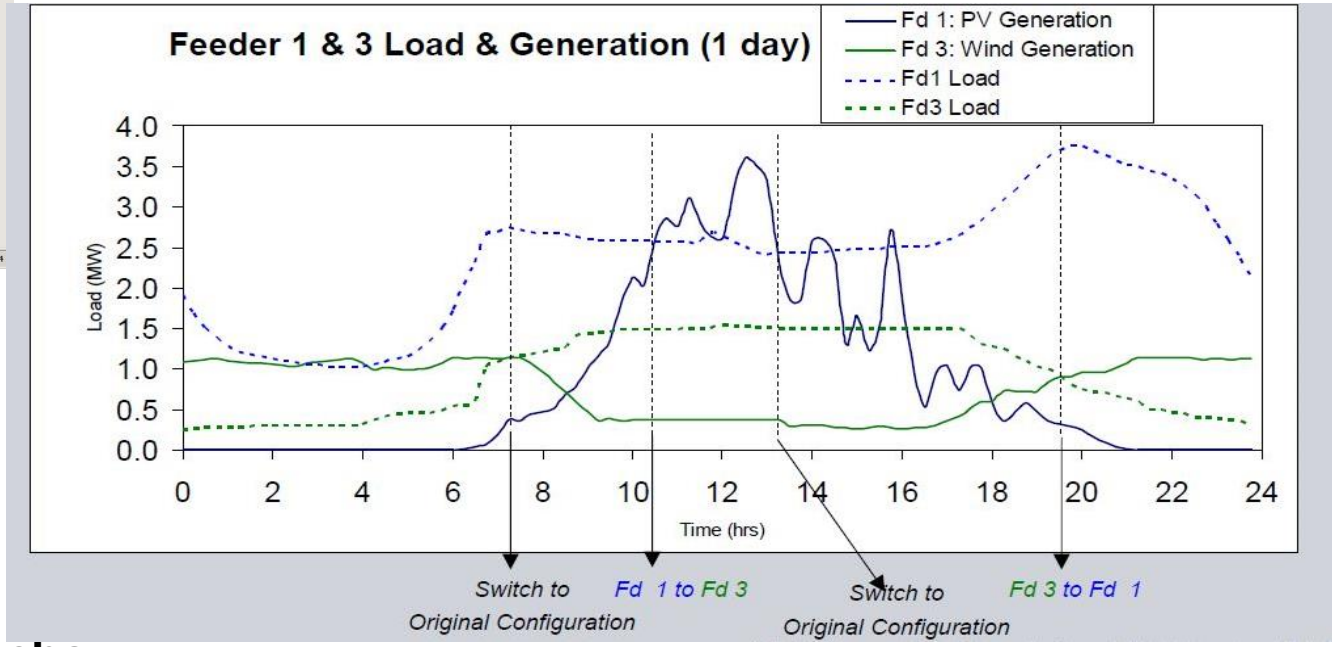
Scenario 2: Operation Network Planning in PSS®SINCAL via the ActivityGateway of Energy IP



The network simulation gives you results for the loading of the network and for the voltage ranges for the near real time situation



With a suitable network configuration a change of parts of a feeder to an adjacent feeder can optimize generation and losses in the network

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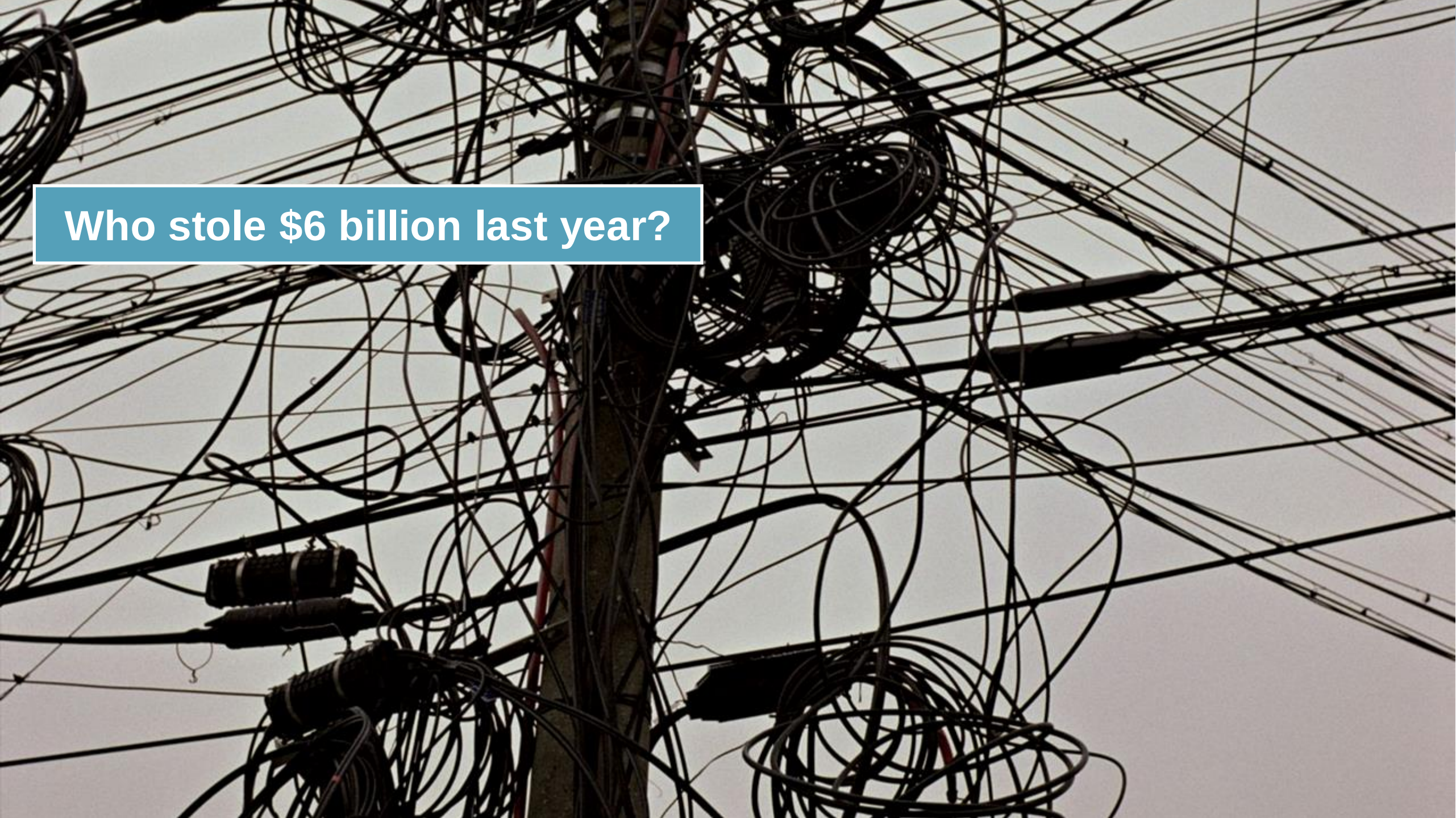
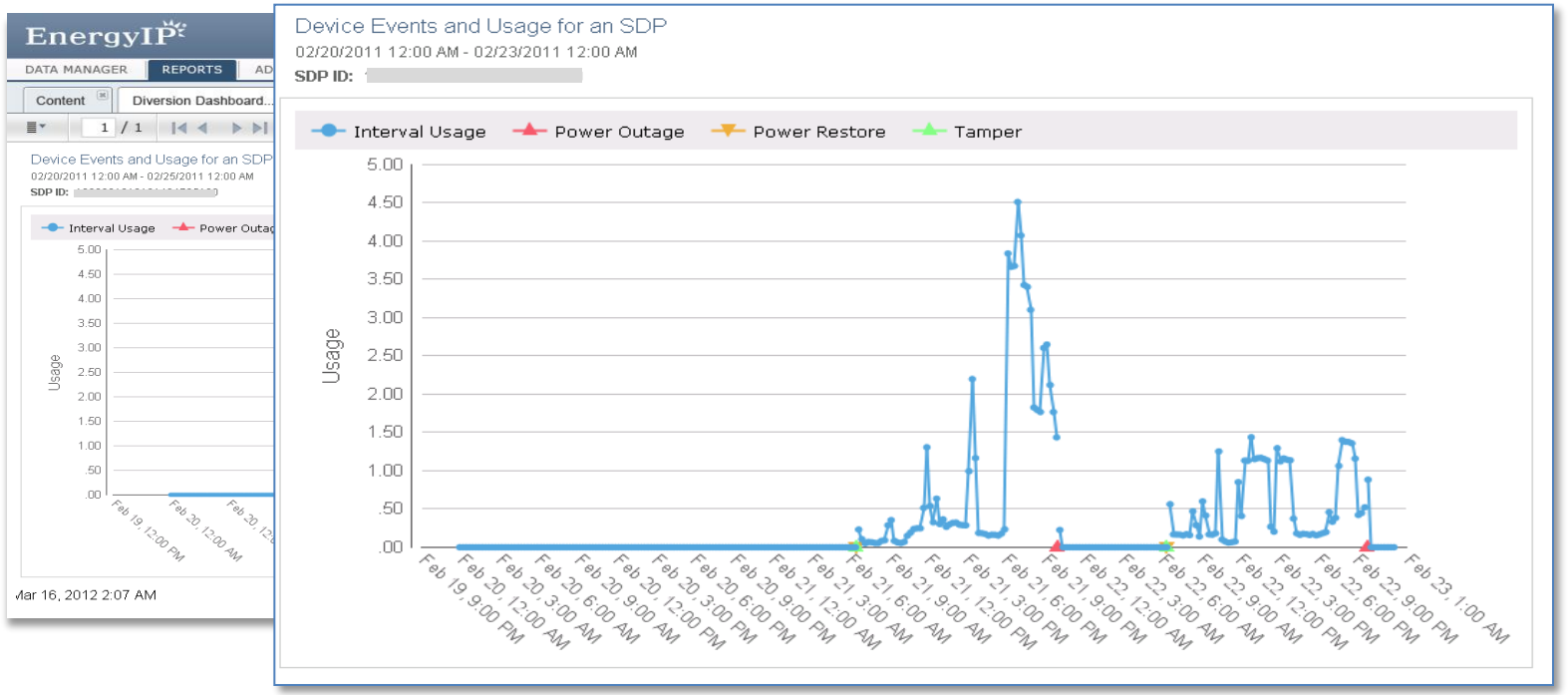
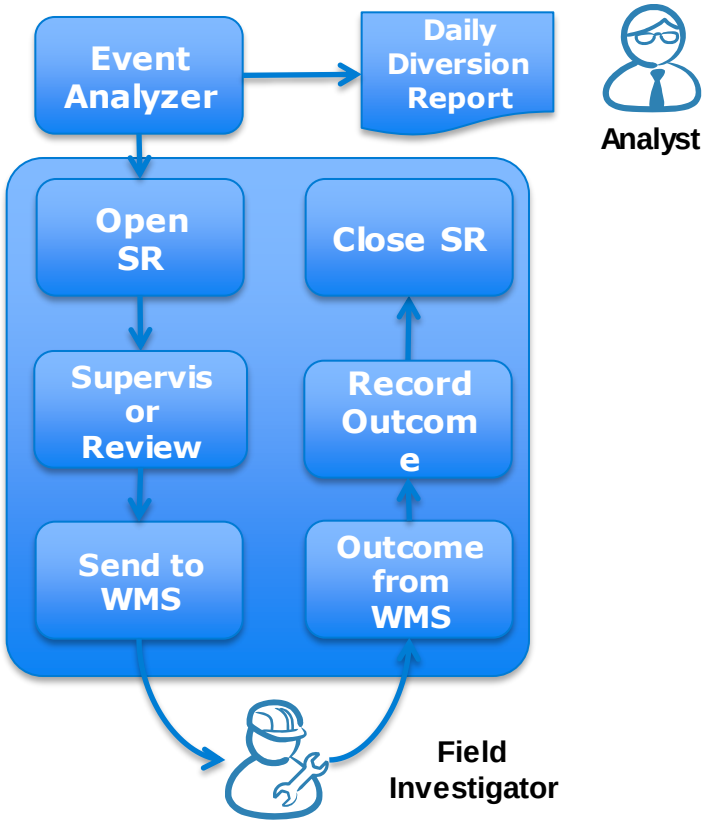

Who stole $6 billion last year?

Energy Diversion: Identifying Theft Patterns



Event Chronology
For May 13, 2011 12:00 AM to May 15, 2011 12:00 AM
SDP: 1-130I27

Event Date-Time	Event Type	Event Description
May 14, 2011 7:02:24 PM	Tamper	Source: History; Type: StatusEvent; Removal tamper
May 14, 2011 7:02:49 PM	Tamper	Source: History; Type: StatusEvent; Removal tamper
May 14, 2011 7:03:10 PM	Tamper	Source: History; Type: StatusEvent; Removal tamper
May 14, 2011 7:03:49 PM	Tamper	Source: ; Type: TamperAttempt;
May 14, 2011 7:06:38 PM	Tamper	Source: History; Type: StatusEvent; Removal tamper
May 14, 2011 7:07:30 PM	Tamper	Source: ; Type: TamperAttempt;
May 14, 2011 7:07:52 PM	Tamper	Source: ; Type: TamperAttempt;
May 14, 2011 7:11:45 PM	Tamper	Source: History; Type: StatusEvent; Removal tamper
May 14, 2011 7:13:17 PM	Tamper	Source: History; Type: StatusEvent; Removal tamper
May 14, 2011 7:13:56 PM	Tamper	Source: ; Type: TamperAttempt;
May 14, 2011 7:14:17 PM	Tamper	Source: ; Type: TamperAttempt;



Transformers fail. But why?

Transformer Overload Tracking
Business Process Improvement

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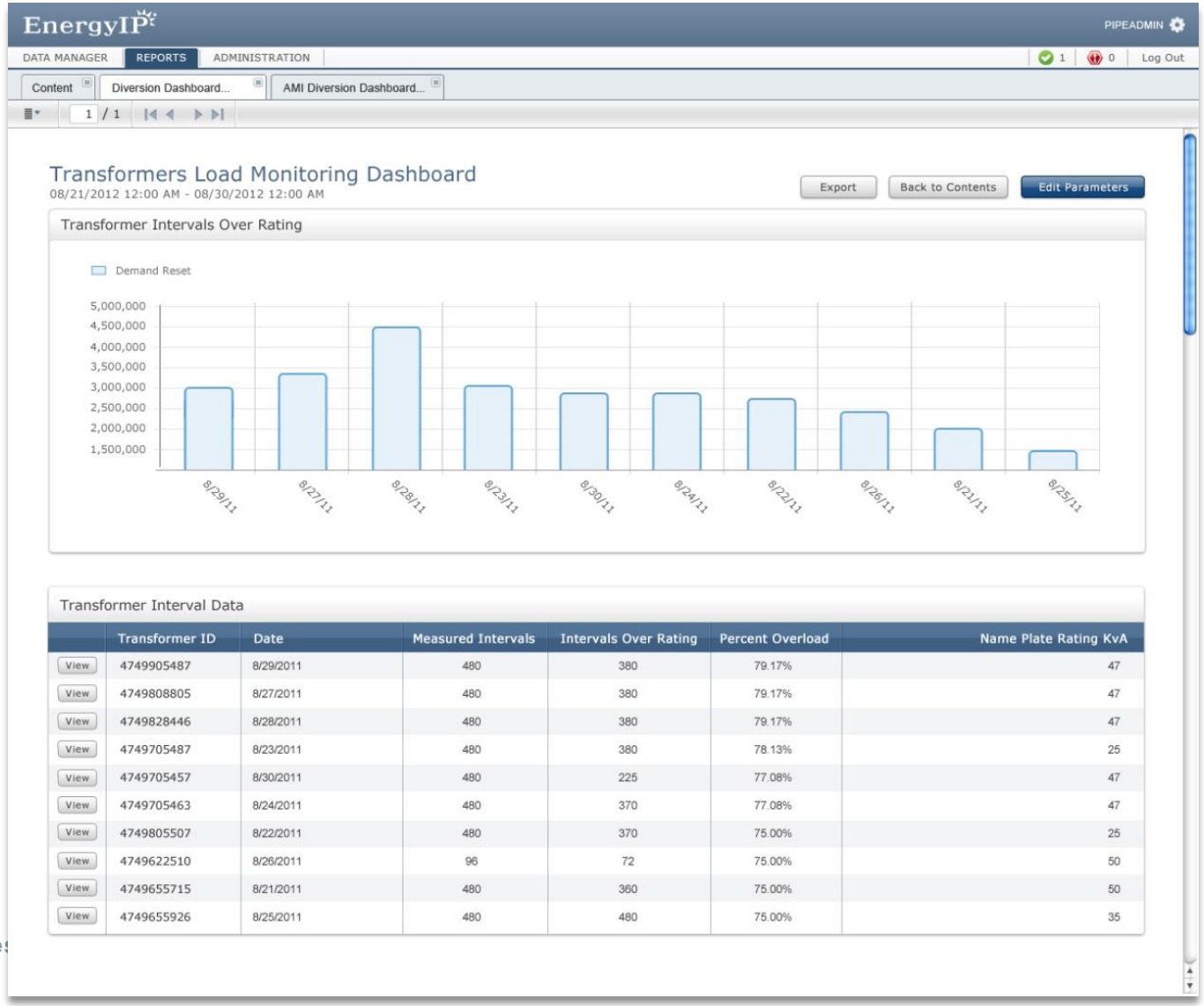

	Transformer ID	Date	Measured Intervals	Intervals Over Rating	Percent Overload	Name Plate Rating KvA
View	4749905487	8/29/2011	480	380	79.17%	47
View	4749808805	8/27/2011	480	380	79.17%	47
View	4749828446	8/28/2011	480	380	79.17%	47
View	4749705487	8/23/2011	480	380	78.13%	25
View	4749705457	8/30/2011	480	225	77.08%	47
View	4749705463	8/24/2011	480	370	77.08%	47
View	4749805507	8/22/2011	480	370	75.00%	25
View	4749622510	8/26/2011	96	72	75.00%	50
View	4749655715	8/21/2011	480	360	75.00%	50
View	4749655926	8/25/2011	480	480	75.00%	35

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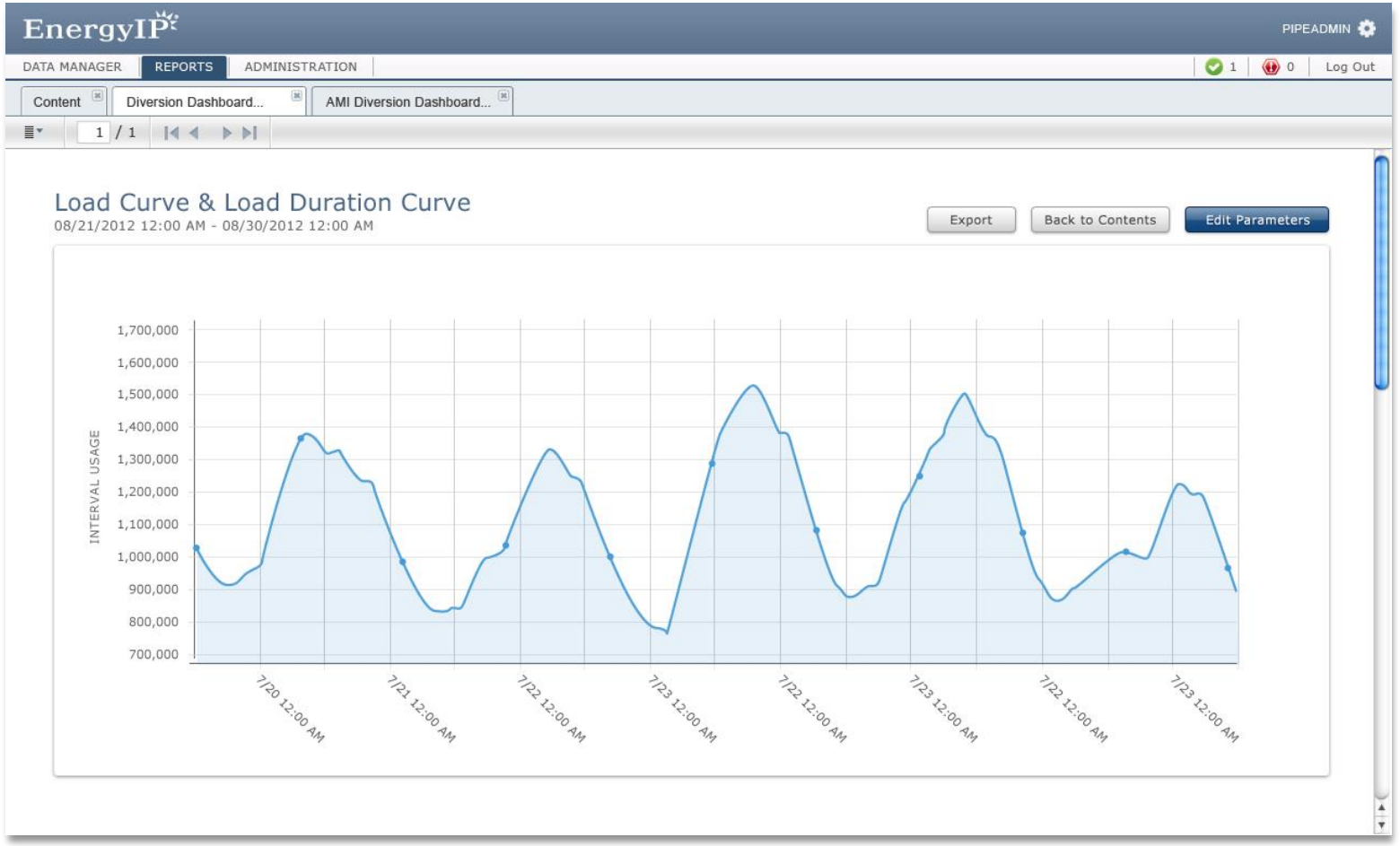
Operation: 15% of infrastructure is used 1% of time.
What can we do about it?

System Load



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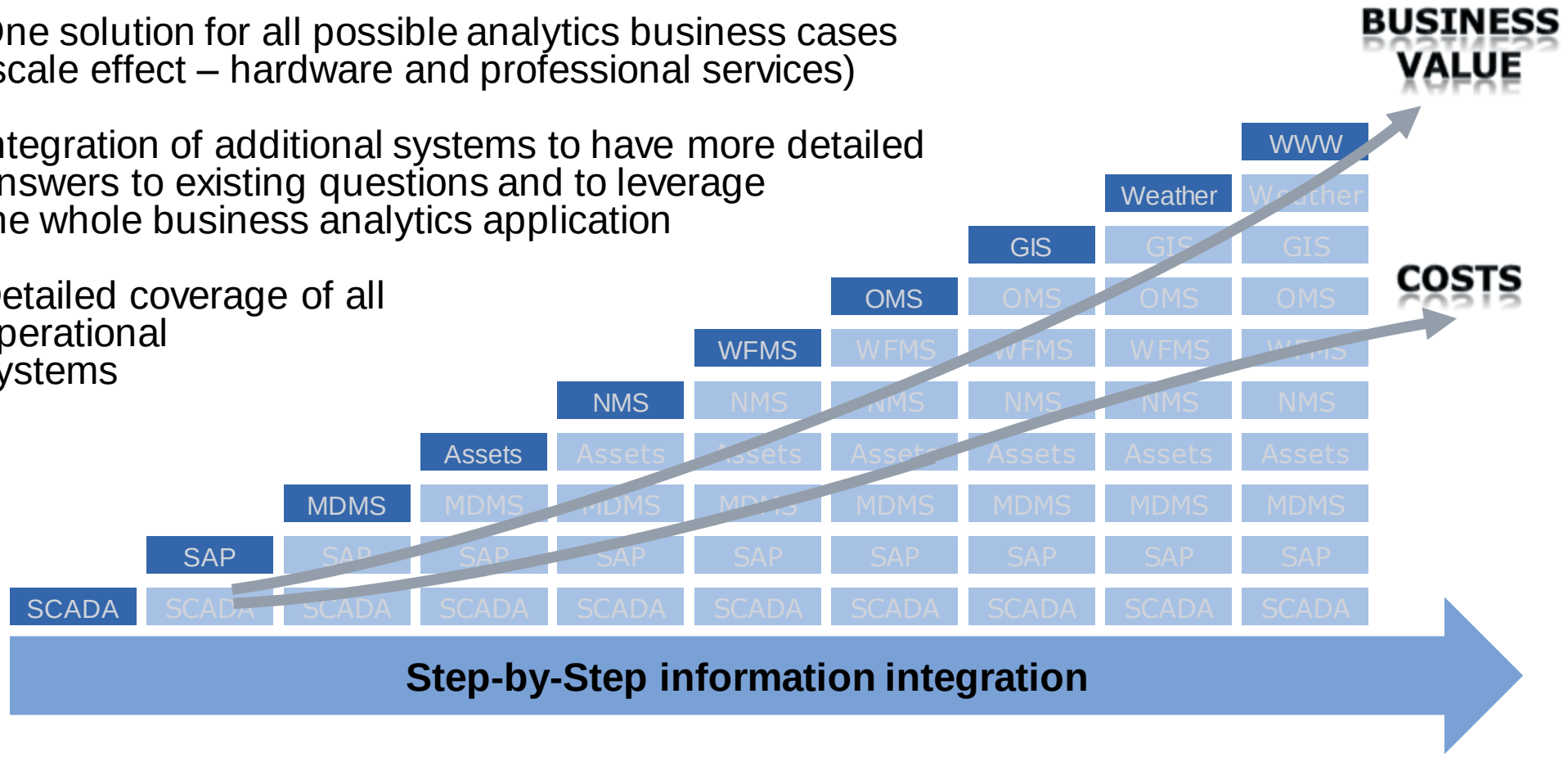
Business value focused implementation

- One solution for all possible analytics business cases (scale effect – hardware and professional services)
- Integration of additional systems to have more detailed answers to existing questions and to leverage the whole business analytics application
- Detailed coverage of all operational systems



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Emsdetten, Germany: Integrating renewable power sources into the grid

Monitoring decentralized energy power sources with SICAM MIC und SICAM CMIC

- Reduces grid overloads through controlled infeed
- Stabilizes the grid and power supply
- Maximizes network utilization

We enabled volatile renewable energy sources to be safely integrated into the city's power grid, reducing costs caused by overloads.

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Canada:
Building Microgrid demonstration project

Microgrid Energy Manager DEMS + SICAM PAS enable

- Secure & independent power supply for remote communities
- Reduce energy costs by replacing diesel-generator through more economic renewables
- Showcase for Canada

With our solution BC Hydro is moving actively implementing Microgrids in Remote Communities along the Canadian west coast in the next years.

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Wachtendonk, Germany:
Increased grid capacity for the integration of renewable energy sources

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Transforming conventional to intelligent substations

- Secures data transmission from the network to the utility's control center
- Increases grid capacity by 35%
- Eliminates the need for grid expansion
- Reduces outage times from hours to minutes

We modernized aging infrastructure and increased grid capacity to intelligently distribute power from renewable energy sources.

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Thank you for your attention

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