

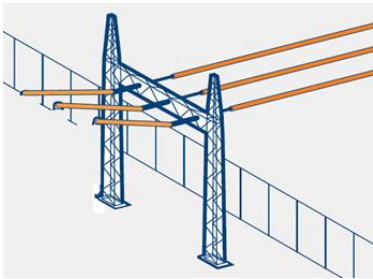
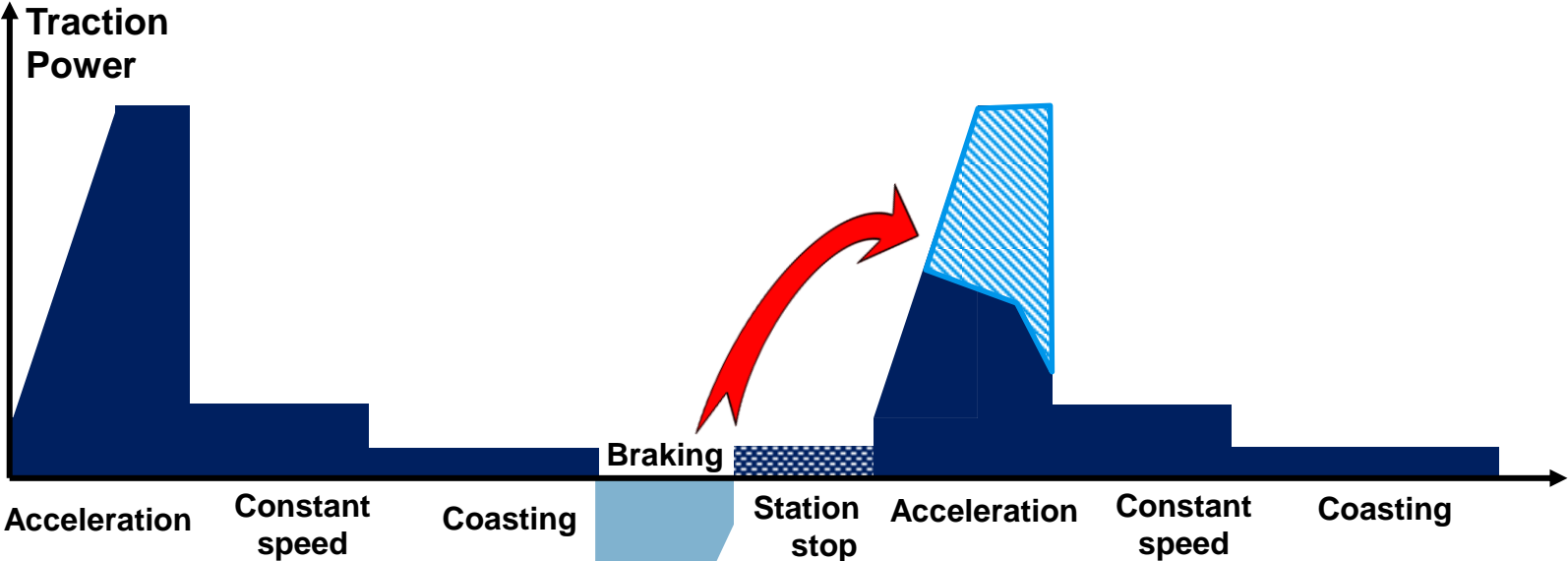


ABB Poland 2015 Maciej Kordas – Rail Conference Siofok 2015

ENVILINE EMS Energy Management System for Braking Train Energy Recovery

The braking energy opportunity

ENVILINE recovers the braking energy

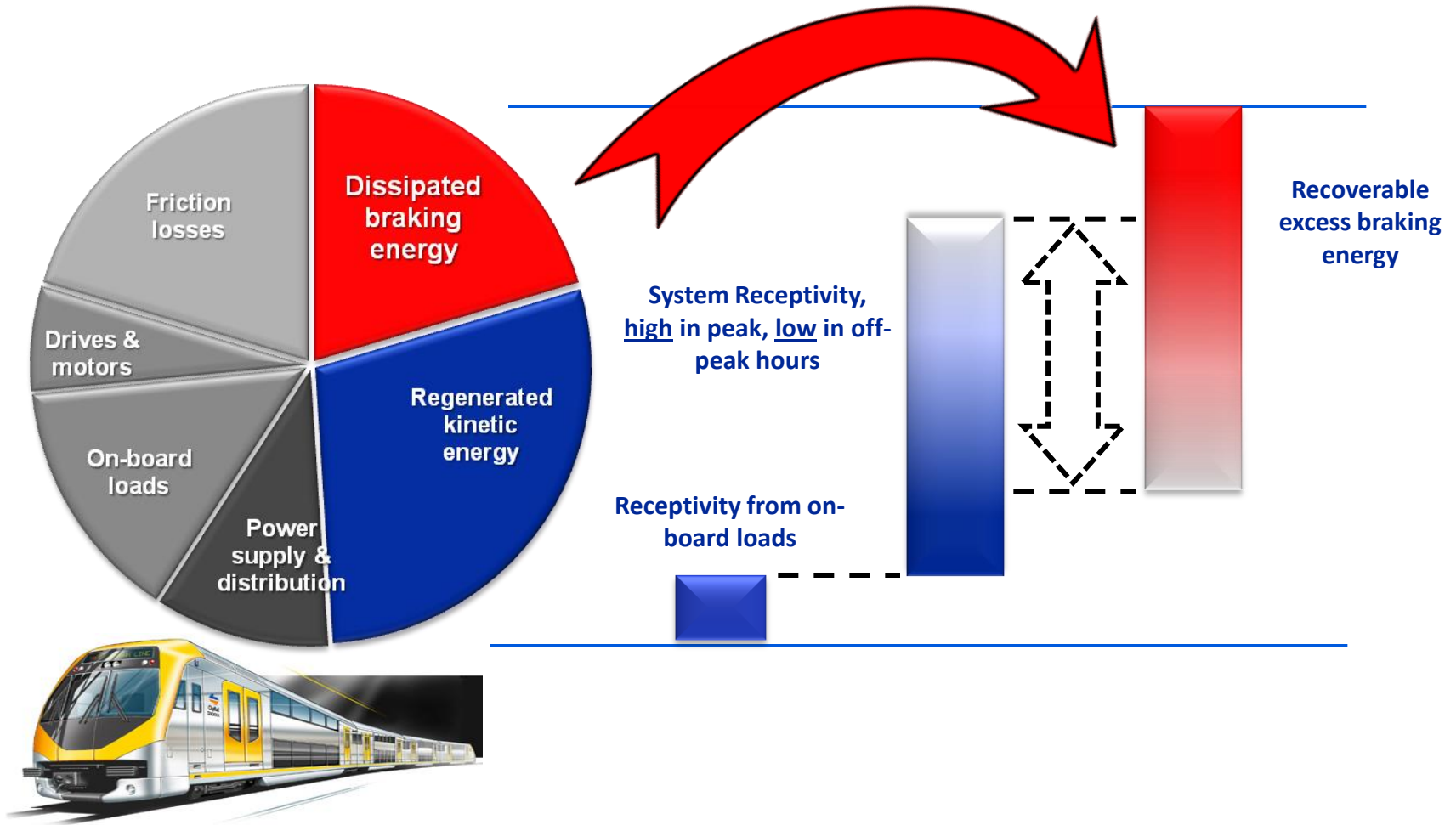


Back to AC

Only a few kilowatt hours, each time, but thousands of times every day

Recovery of the Surplus Braking Energy

5-20% Energy Savings

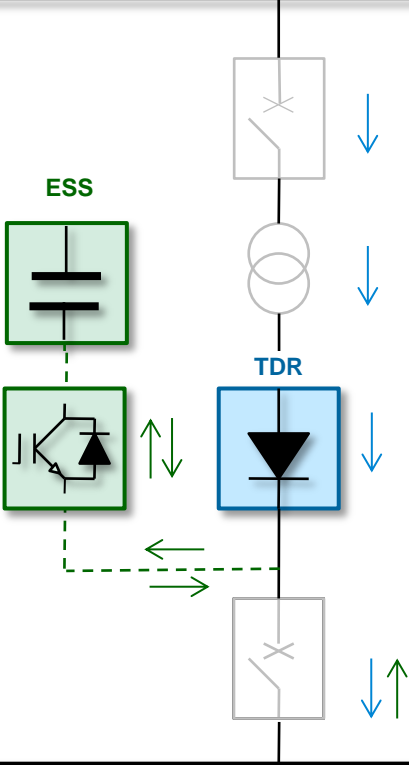


ENVILINE ESS with super capacitors

Captures braking energy, sustains acceleration

MV/HV Network

AC ~

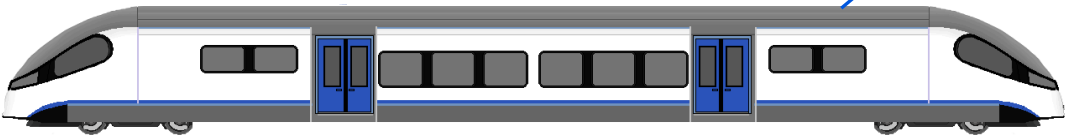


Legend

- TDR energy rectification - acceleration
- ESS energy storage - braking



**ESNA 2014,
Innovation Award**



DC +

DC -



ENVILINE ESS

Energy Storage System

Operating voltage
range:
500 – 1000 VDC
1000 – 1850 VDC



Applications

Braking energy management
with no AC connection needed

Benefits

Reduces energy costs
Improves quality of DC power network
Provides quick payback

End customers

Transit authorities, DC traction system
owners / operators
Integrators, engineering companies

Starting Power and Demand Charge

A major cost item for Transit Authorities



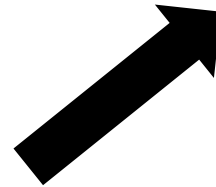
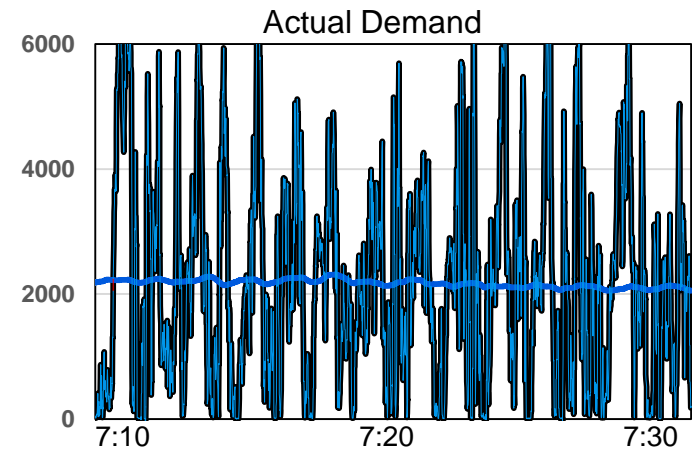
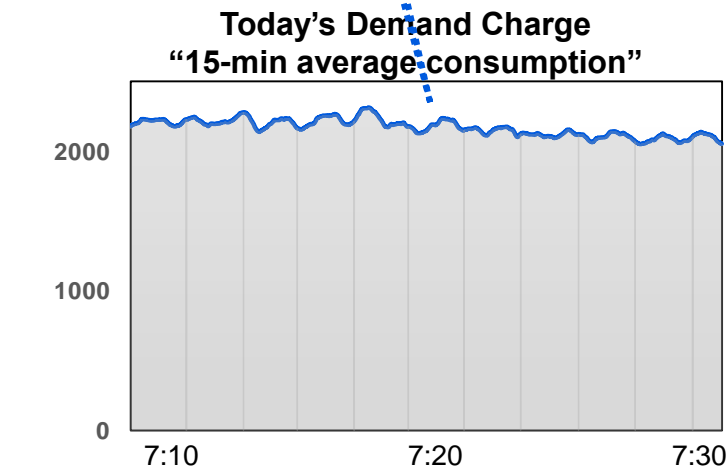
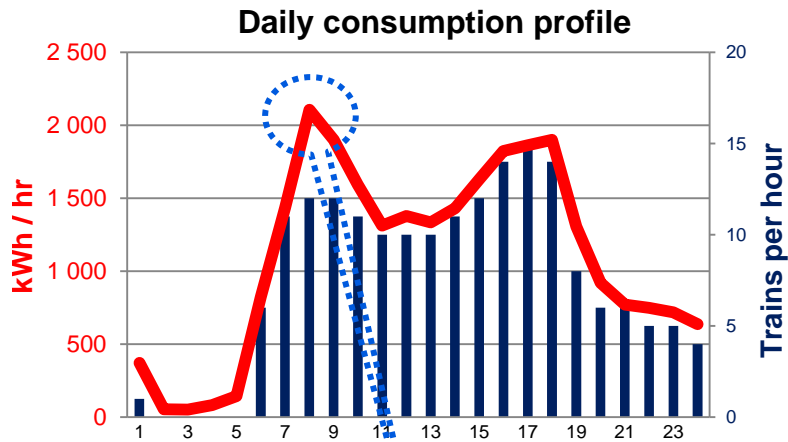
Rate Schedule: E20P Service to Custs with Max Demands of 1000 kW or More			
Customer Charge	29 days	@ \$49.28131	\$1,429.16
Demand Charge 1			
Max Peak	5,186.000000	kW @ \$16.86000	87,435.96
Max Part Peak	4,919.000000	kW @ \$3.49000	17,167.31
Max Demand	5,186.000000	kW @ \$9.97000	51,704.42
Energy Charges			
Peak	537,270.000000	kWh @ \$0.14791	79,467.61
Part Peak	573,790.000000	kWh @ \$0.10421	59,794.66
Off Peak	907,891.000000	kWh @ \$0.07865	71,405.63
Power Factor Adjustment (@ 97.00% Power Factor)			-1,211.37
Energy Commission Tax			585.50
Total Electric Charges			\$367,778.88

43% of
the cost

- Car analogy
 - Odometer indicates the amount of energy, or “Energy Consumption”,
 - Speedometer indicates the power level, or “Demand Charge”,
 - Utility customers pay for consumption (“mileage”), but also significantly for demand (“maximum speed”)

Beyond the Utility Metered Demand Charge

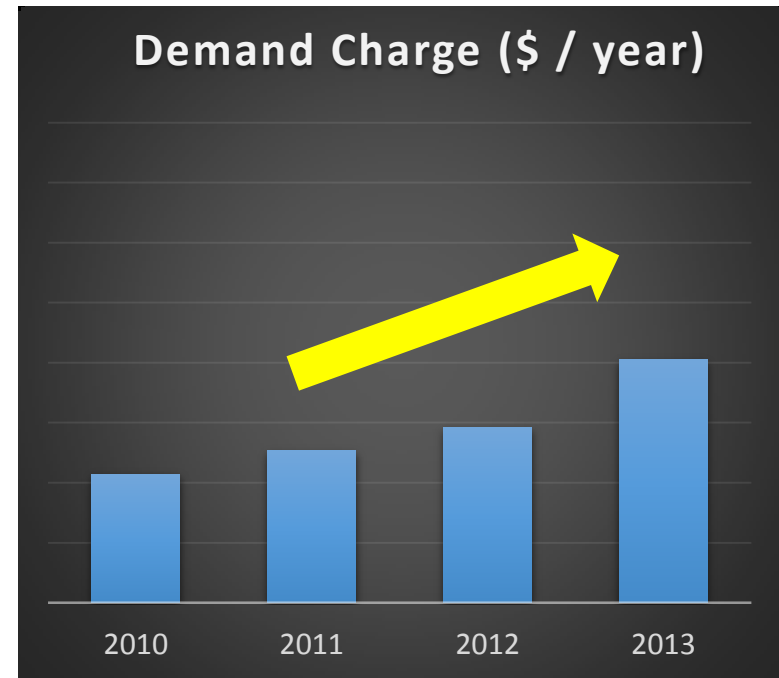
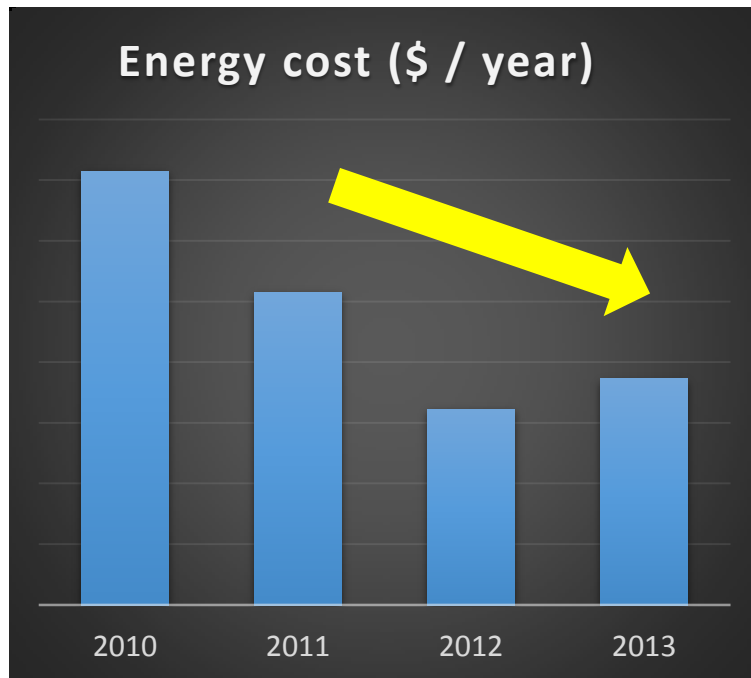
Power peaks well beyond the measured demand



- Today's demand charge is based on the kWh consumption during a 15-minute window
- The real demand is much higher, imposing a worse strain on the grid than reflected by the rate

Energy & Demand Cost Evolution

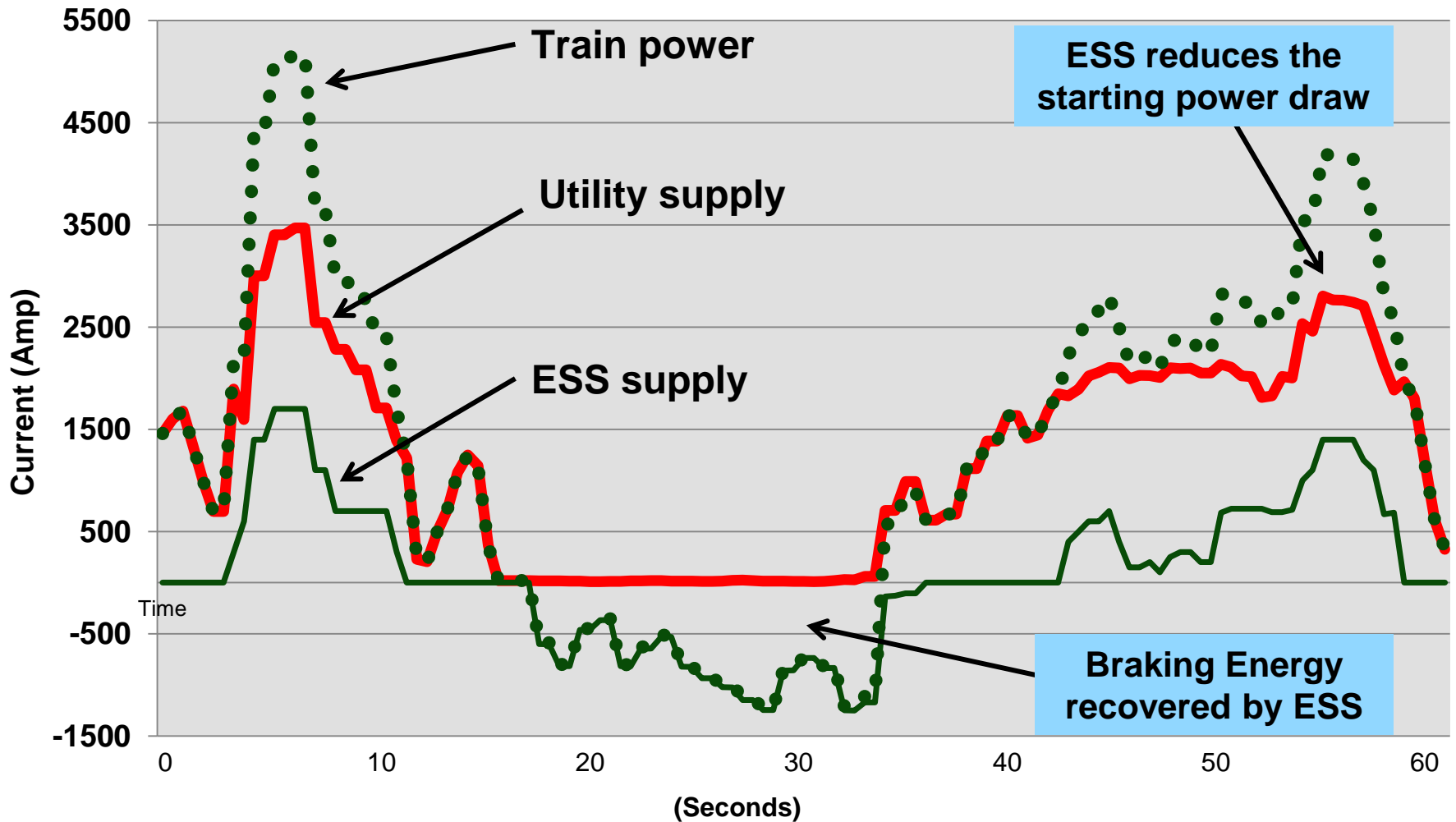
Shift from energy toward power mitigation focus



Data is courtesy of Valley Metro in Phoenix

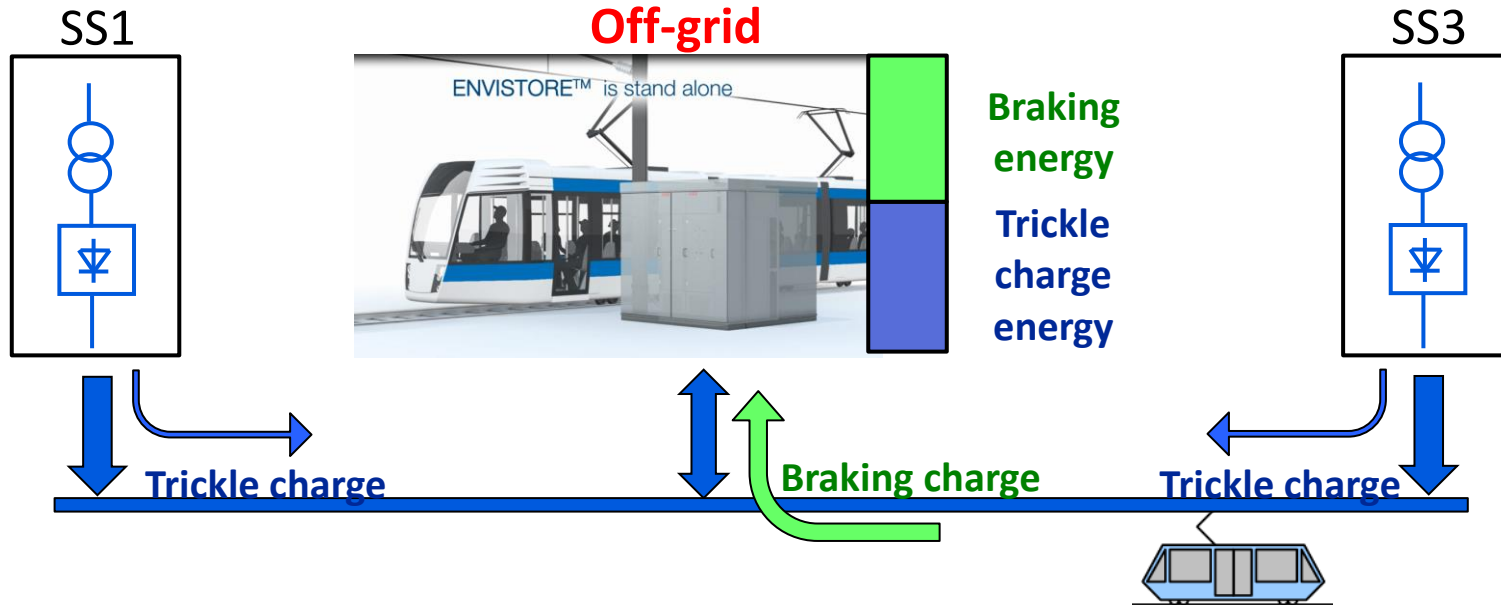
Average Demand Charge increased 19.5%
in California over last 3 years

ENVILINE ESS recovers the braking energy And reduces the starting power demand from the grid



ENVILINE ESS - Off Grid Operation

#3 – Increases power capacity with no grid connection

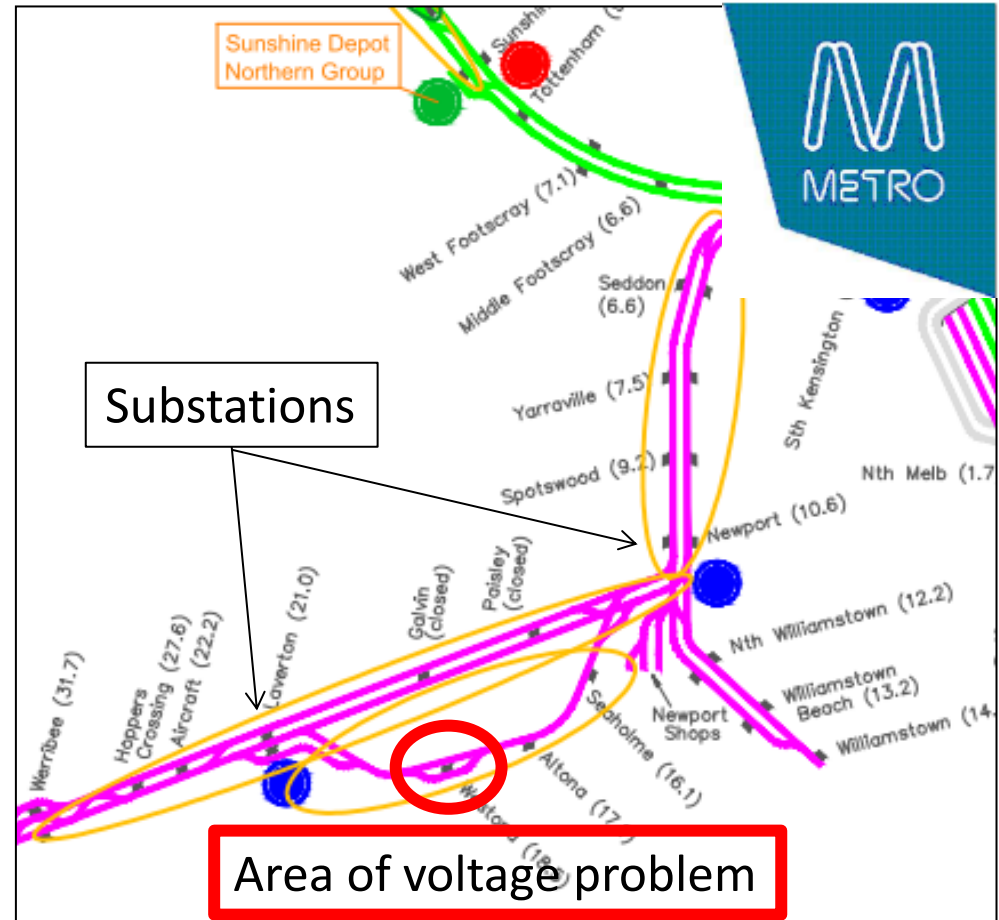


- Supplies the power without any grid connection
- Charges during coasting and braking, idle time
- Possibility of complementary battery if energy requirements are high (ie peak periods)

Metro Trains Melbourne - MTM Westona Mid-Span Voltage Support



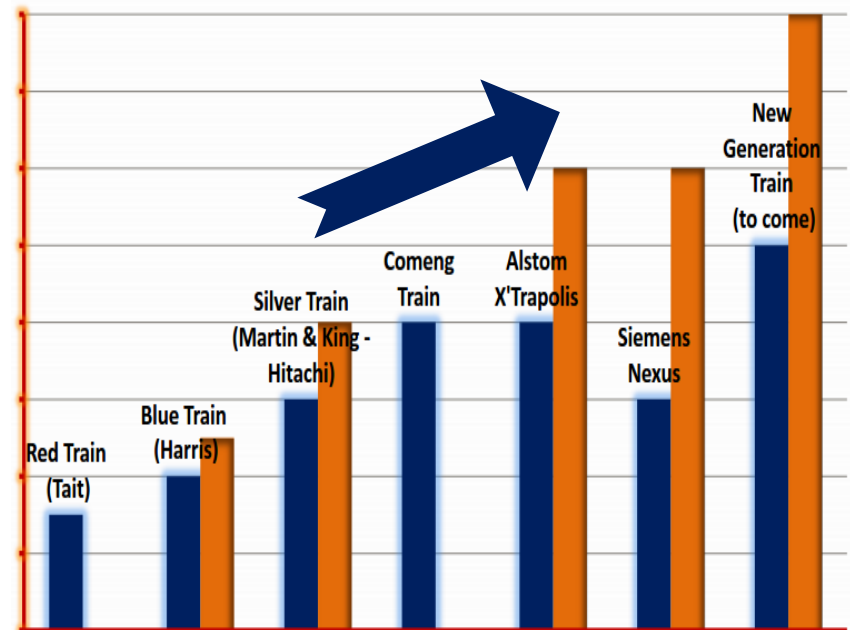
- Configuration of ENVILINE modules for a total capacity of 2.2 MW / 24 MJ with super capacitors
- Traction support and energy recuperation
- Cost of deployment at 40% of a traditional substation solution, with on-going energy savings



ENVILINE™ Energy Storage Webinar

Rail Industry challenges

- Rail operators amongst the largest electricity consumers
 - A substation consumes as much as 500-750 homes
- Extremely high and rising peak power demand
 - Higher starting power of new trains
- Sustainability and energy efficiency improvement targets



Courtesy of Metro Trains Melbourne

Orange = train capacity / Blue = power limitation

Warsaw Metro Line 2, Poland

Braking and Gravitational Energy Recovery



- 10 module ENVILINE configuration with a total capacity of 3.3MW / 40 MJ with super capacitors
- Dimensioned to capture the braking and gravitational energy of the trains
- Weekly and weekend average savings: **3MWh/day**

ENVILINE on the web www.abb.com/enviline

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ENVILINE™ dla metra, lekkiego transportu szynowego oraz międzymiastowej komunikacji kolejowej

Pełne spektrum rozwiązań dla infrastruktury przytorowej prądu stałego

Obecnie temat oszczędności energii oraz wpływu na środowisko transportu kolejowego znajduje się w centrum uwagi firm przewozowych oraz przedstawicieli władz. Rozwiązania ENVILINE wpływają na zwiększenie efektywności energetycznej, poprawę niezawodności posiadanych zasobów oraz pozwalają na spełnienie norm w zakresie ochrony środowiska.

Nasza oferta:

- Zasilanie w prąd stały (prostowniki diodowe, prostowniki sterowalne, pakiety zasilające)
- Rozwiązania z zakresu zarządzania energią (systemy odzysku energii, magazynowania energii oraz rozpraszania energii)
- Zabezpieczenia (automatyczny system uziemiający, systemy przesyłu danych)

Twoje korzyści:

- Niezawodne, efektywne kosztowo oraz elastyczne rozwiązania
- Oszczędności energii do 30%
- Zwiększone bezpieczeństwo pasażerów i personelu obsługi
- Oferta w pełni pokrywająca Twoje potrzeby
- Wsparcie w trakcie całego cyklu życia produktu

Nasza oferta

→ [DC Power Supply \[EN\]](#)

→ [Energy Management](#)

→ [Protection Technologies \[EN\]](#)



Watch the video!

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+ [Oceń tę stronę](#)

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Twoje preferencje:

Skontaktuj się z ABB w Białorusi

→ [Maciej Kordas](#)

Dokumentacja

Dokumentacja do przeglądania lub pobrania w zakresie:

→ [Rozwiązania prądu stałego Wayside](#)

Links

→ [ENVILINE](#)

Wideo obrazujące system ENVILINE do odzysku energii elektrycznej

→ [Envitech Energy](#)

Strona Internetowa firmy Envitech Energy należącej do Grupy ABB

www.abb.com/enviline

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