



Energy Management for Train Operation in a Sustainable Environment

Presenter: Hamed Darbandi

Inputs



Train

Track Speed limits, Gradient
Train specs



Time-table

Travel time duration
Flexible travel times



PV generation

Time/Date
Weather condition



Battery

(Dis)charging rate
Capacity

Capabilities



Energy Management

Management by Profile Steering
Battery state of charge



Power Generation Profile

Solar production
Regenerative energy



Peak Shaving

With focus on a substation (or hub)
Decrease power limit or Extend time



Adapting to time-table

Driving strategy (adjusted to Peak Shaving)