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TRACTION ENERGY ACCOUNTING

POWERED BY HUNGARIAN STATE RAILWAYS



OUR AIM „MEASURED ENERGY TO EVERYBODY!”

POWERED BY MÁV CO.

LOGIC OF MEASUREMENT BASED ACCOUNTING

IMPORTANCE

BENEFITS



INFO ABOUT MÁV



LENGTH OF RAILWAY NETWORK:

7246 KM



LENGTH OF ELECTRIFIED RAILWAY NETWORK:

2686 KM



NUMBER OF STATIONS:

616



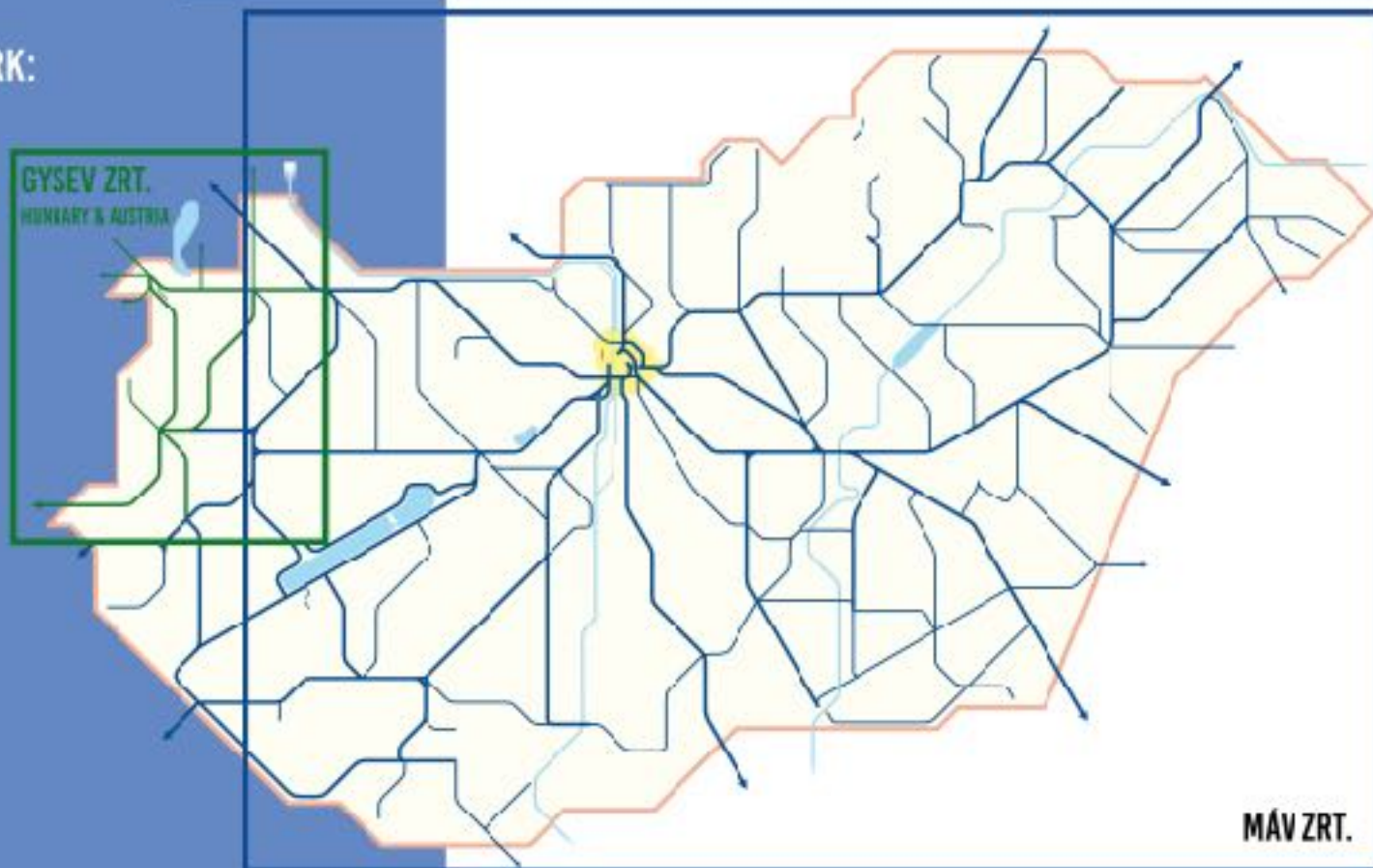
NUMBER OF STOPS:

728

FOR CUSTOMERS:
MÁV CO. WELCOMES EVERY TRAIN!

IMS IN HUNGARY

MÁV CO. & GYSEV CO.



MÁV ZRT.

VOLUME OF THE ENERGY CONSUMPTION

OF THE RAILWAY SERVICE



0,004%



0,03%

CA. 2000 KWH ENERGY
CONSUMPTION/HOUSEHOLD



1,7%

879 GWH = 61 MILLION EUR



FOR CUSTOMERS: USE MODERN
LOCOS TO IMPROVE EFFICIENCY!

MAIN PERFORMANCE INDICATORS

49

RAILWAY
UNDERTAKINGS

2 686 KM

ELECTRIFIED RAILWAY LINE
37% OF THE TOTAL NETWORK

1 500 PCS

ELECTRIC LOCOMOTIVES

80 PCS

ELECTRIC LOCOMOTIVES
WITH ENERGY METERS

MAIN TRANSIT DIRECTIONS

UA ↔ AT

RO ↔ AT

UA ↔ HR

GREAT CONNECTION FROM/
TO THE SEA/AS A HUB!



ANNUAL DATA



291 MILLION €

NETWORK ACCESS CONTRACT INCOME



1 MILLION

PIECES OF TRAIN



101 MILLION

TRAIN-KILOMETERS



41 BILLION

ELECTRIC GROSS TONE KILOMETERS



36 BILLION

ELECTRIC GROSSTONNE-KILOMETERS



879 GWH

ELECTRIC ENERGY CONSUMPTION

320 HUF/EUR

Y2006– ESTIMATION

LOCOMOTIVE TYPE PARAMETER (L)
TRAIN TYPE (T)
GROSS TONNE KM (G)
SEASONAL COEFFICIENT VALUES (C)



$$\text{ENERGY} = G * C (L, T)$$

Y2016–

MEASURING – RECEIVED DATA

- ONLY FOR LOCOS WITH FOREIGN METERS
- BASED ON THE OTHER IM'S DATA SERVICE
- NO-BO CERTIFICATE MUST BE GIVEN

Y2020–

MEASURING – OWN DATA

- FOR ALL LOCOS WITH NATIONAL METERS
- BASED ON THE MÁV'S DATA COLLECTION
- NO-BO CERTIFICATE MUST BE AVAILBLE

MONTHLY BALANCE BETWEEN

TWO ACCOUNTING METHODS

Monthly balance between two accounting methods



MEASURING IS THE FIRST PRIORITY...

...AND MÁV IS READY FOR THAT!

ACTION IS A MUST!

~88 GWH ENERGY = WASTED ENERGY

STATISTICS

6%

MEASURED ENERGY

55 GWH

OF THE TOTAL CONSUMPTION (879 GWH)

10%

UNPRODUCTIVE ENERGY

~88 GWH

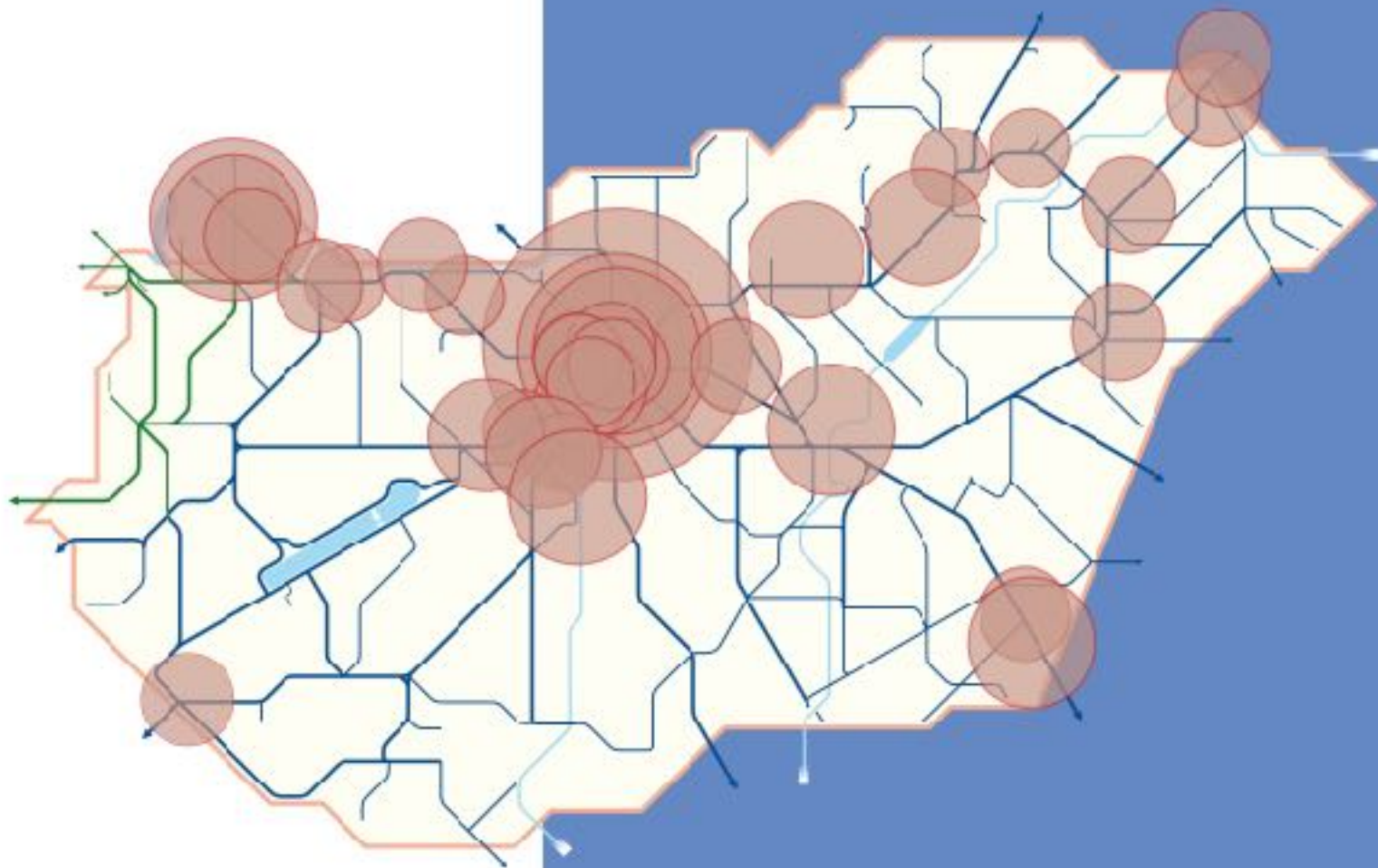
OF THE TOTAL CONSUMPTION (879 GWH)

11%

REGENERATED ENERGY

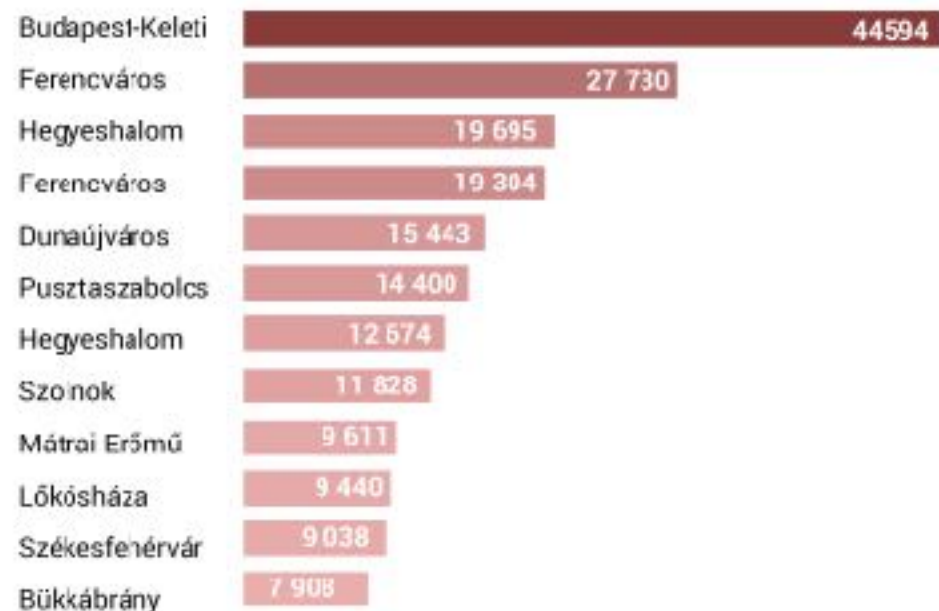
~38 GWH

OF THE LOCOS WHICH CAN REGENERATE (351 GWH)

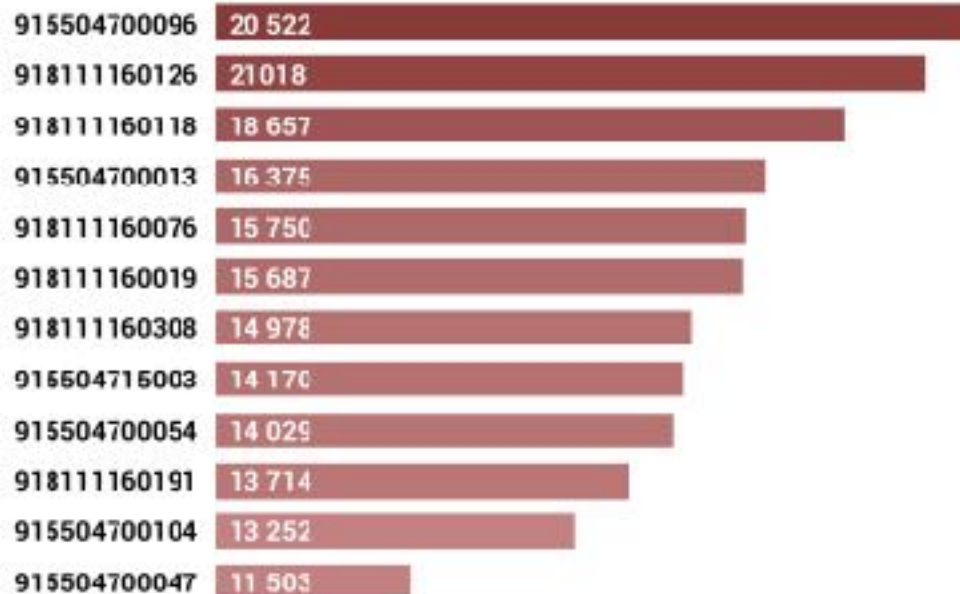


HOW? WHEN? WHO? WHY?

IMPRODUCTIVE ENERGY CONSUMPTION PER STATION (KWH)



IMPRODUCTIVE ENERGY CONSUMPTION PER LOCOMOTIVE(KWH)



FOR CUSTOMERS:

SPECIALIZED INFO ABOUT ENERGY KPI BY MÁV EVERY QUARTER!

FREIGHT TRANSPORT ANALYSIS

DAY/NIGHT CONSUMPTION



4:00-10:00

→ 1,27 KWH/100 BTKM

10:00-18:00

→ 1,25 KWH/100 BTKM

CURRENTLY MORE FREIGHT TRAINS
RUN IN THE DAYTIME!



18:00-22:00

→ 1,21 KWH/100 BTKM

22:00-4:00

→ 1,17 KWH/100 BTKM

TRAFFIC MANAGEMENT FROM ENERGY
POINT OF VIEW!

400

FREIGHT TRAINS PER A DAY

244 (61%)
TRAINS PER DAYTIME

156 (39%)
TRAINS PER NIGHT

FREIGHT TRANSPORT



AVERAGE ENERGY CONSUMPTION IN THE DAYTIME

1,26

KWH/100 GROSSTON-KM

DAY/NIGHT



AVERAGE ENERGY CONSUMPTION AT NIGHT

1,19

KWH/100 GROSSTON-KM



IF **7** FREIGHT TRAINS RAN AT NIGHT INSTEAD OF DAYTIME



IF **ALL** FREIGHT TRAINS RAN AT NIGHT INSTEAD OF DAYTIME



IF **ALL** FREIGHT TRAINS RAN AT NIGHT INSTEAD OF DAY IN A YEAR

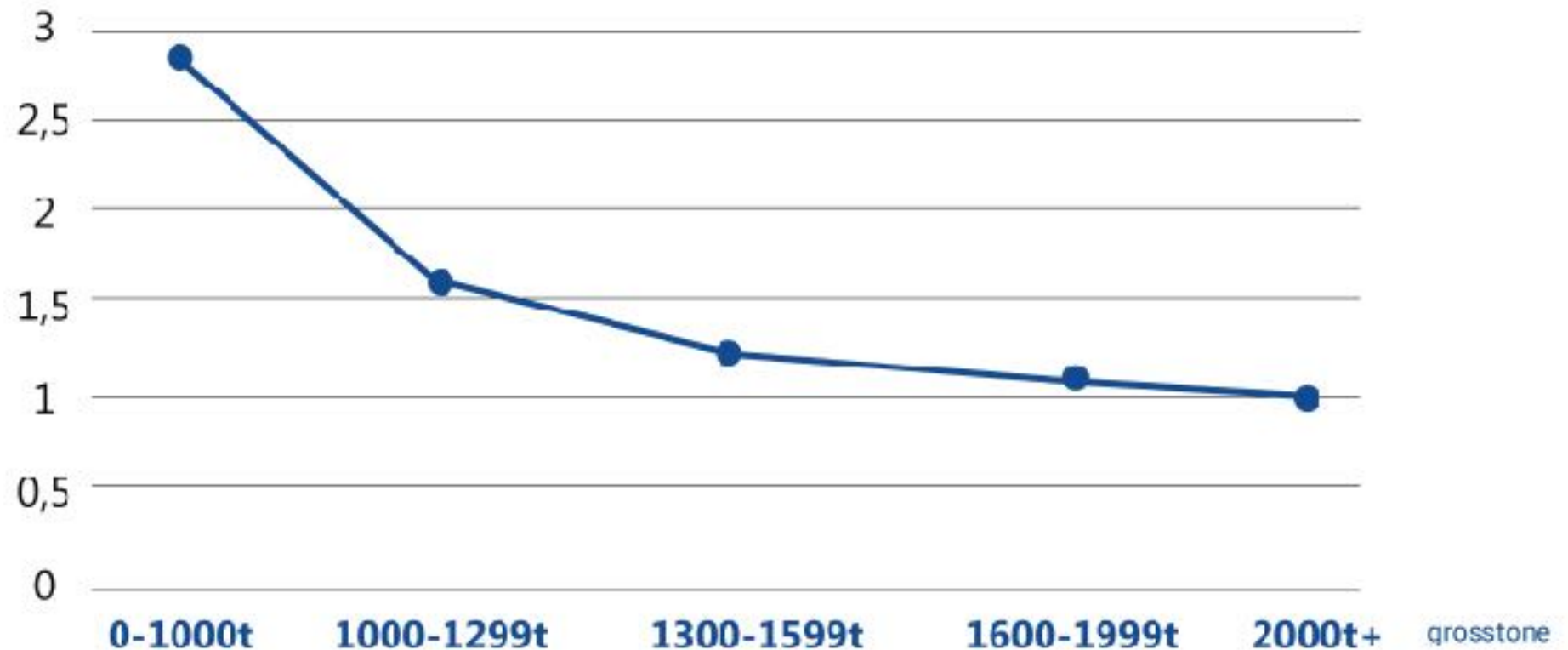


THE SAVED ENERGY WOULD BE AN AVERAGE ANNUAL CONSUMPTION OF A TYPICAL DUTCH HOUSEHOLD

ENERGY EFFICIENCY OF FREIGHT TRANSPORT

AVERAGE ENERGY OF ALL TRANSPORT

CORRELATION
-0.35



MORE WEIGHT, MORE EFFICIENT ENERGY CONSUMPTION!

COMPLEX INFO SHARING

FEEDBACK FROM JANUARY 1ST → GOAL: ENERGY REDUCTION

Energy certificate

about the traction energy consumption of MÁV Co.
-2017-

Energy consumption	Railway Undertaking	MÁV Co.
Amount of used energy	841 016 640 kWh	1 011 880 kWh
Share of RU's consumption	0,12%	
Proportion of used energy for regenerative braking vehicles	36,43%	2,21%
Proportion of used energy on the basis of metering	7,01%	-
Proportion of unproductive energy	7,30%	-
Proportion of used renewable energy	7,54%	7,62%

B

B

A

Based on the data, the MÁV Co. belongs to the following energy efficiency category:
LESS FAVORABLE THAN THE AVERAGE (B)

much better than the average

better than average

average

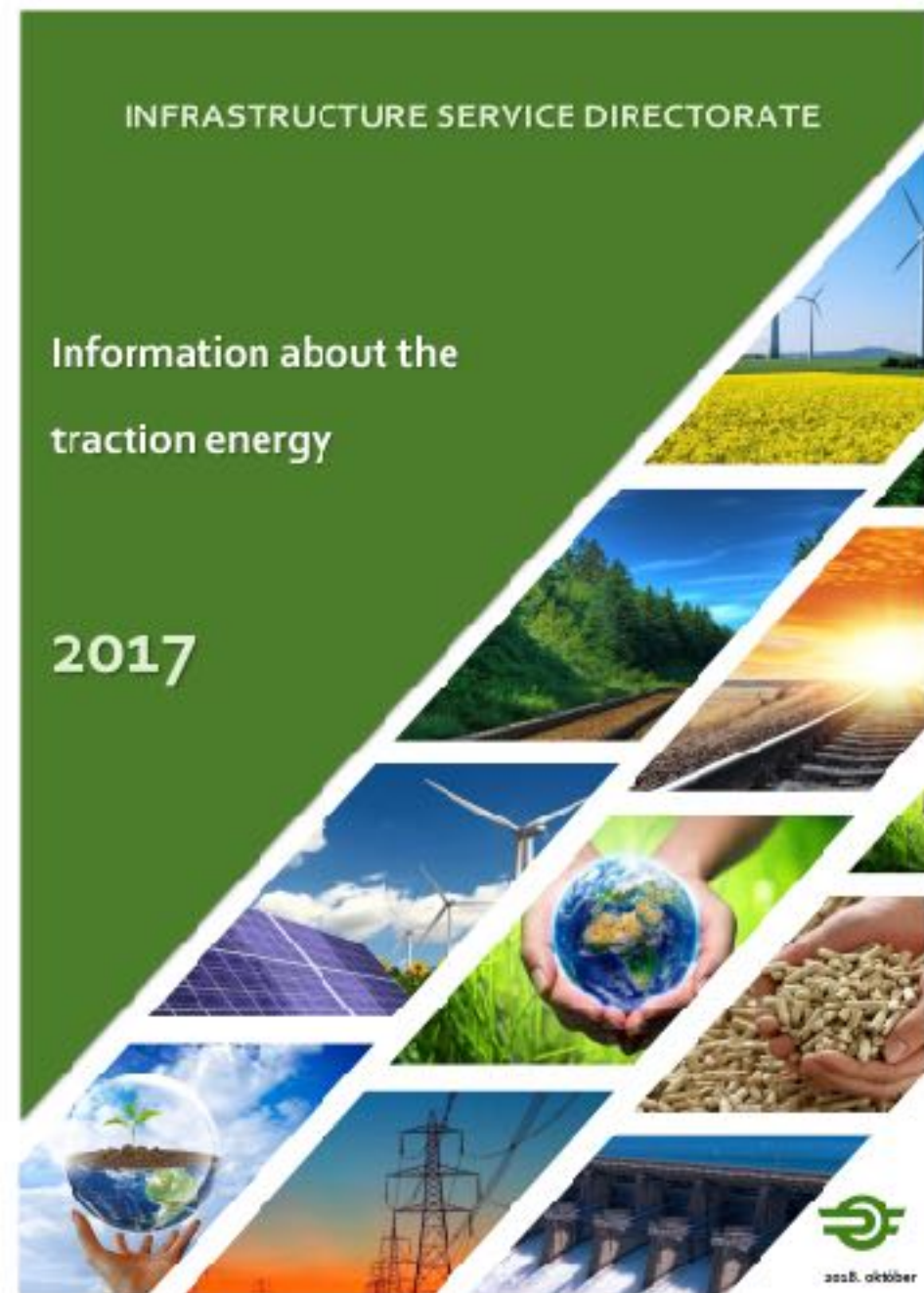
less favorable than the average

much less favorable than the average

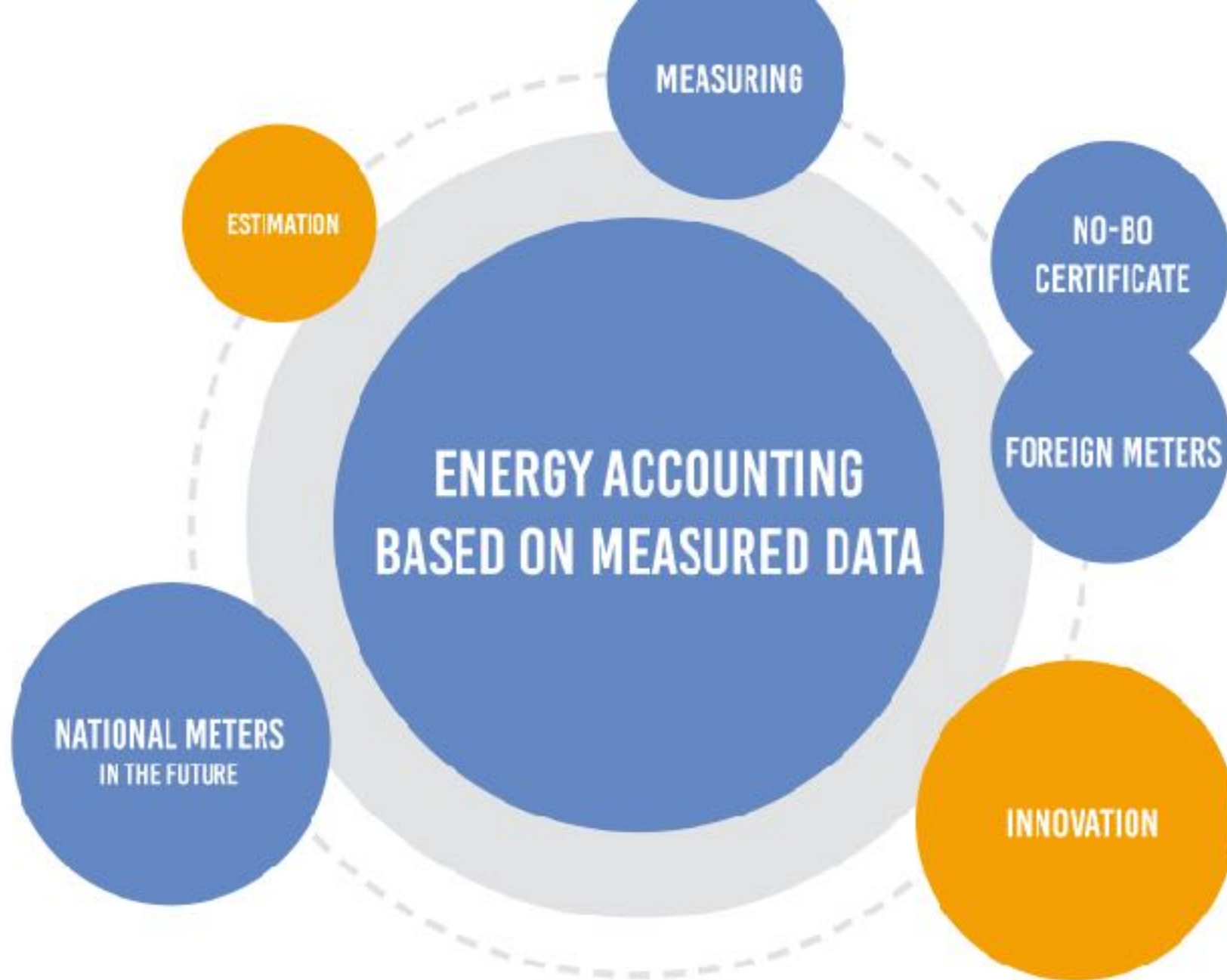
INFRASTRUCTURE SERVICE DIRECTORATE

Information about the
traction energy

2017



2018. október



**THANK
YOU FOR
YOUR
ATTENTION!**