
INNOVATIVE RESOURCE-SAVING
AUTONOMOUS ILLUMINATION SYSTEM (AIS)
TM-80
BASED ON HIGH-OUTPUT ULTRA LUMINOUS LED'S

THE GOALS OF TM-80 AIS INTRODUCTION

- 100% saving of energy costs
- Environment preservation
- Increase of street and road illumination quality

by introduction of

TM-80 AUTONOMOUS ILLUMINATION SYSTEM

an innovative solution for illumination of streets and roads without any connection to power supply lines

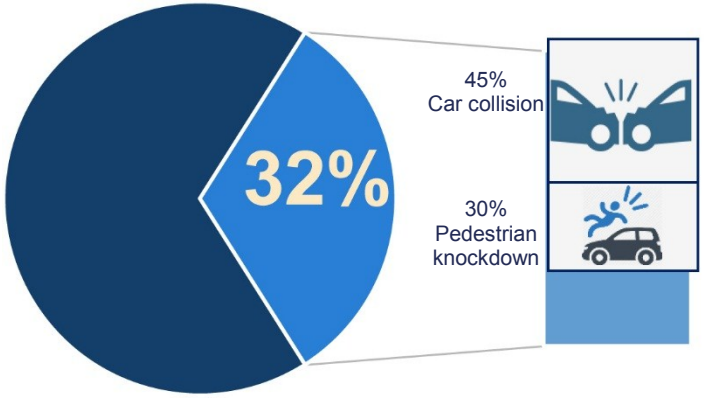
ASSISTANCE IN SOLVING ENERGY PROBLEMS

YOUR PROBLEM	OUR SOLUTION
Growth of energy source rates in the European Union countries	*100% saving of energy*
Negative impact of the existing energy on environment	*Operates autonomously preserving the environmental system*
Reduced consumption of conventional energy sources required	*Operates using solar energy*
Reduced CO2 emissions by 54% vs.1990 required*	*No emissions of polluting substances*

* According to EU 2050 Energy Strategy

IMPACT OF ROAD ILLUMINATION ON THE TALL OF THE ROAD

Statistics of the State Traffic Safety Inspectorate of Russia



32% of road traffic accidents occur at night time

Street illumination causes reduction of the number of accidents, it is found that:

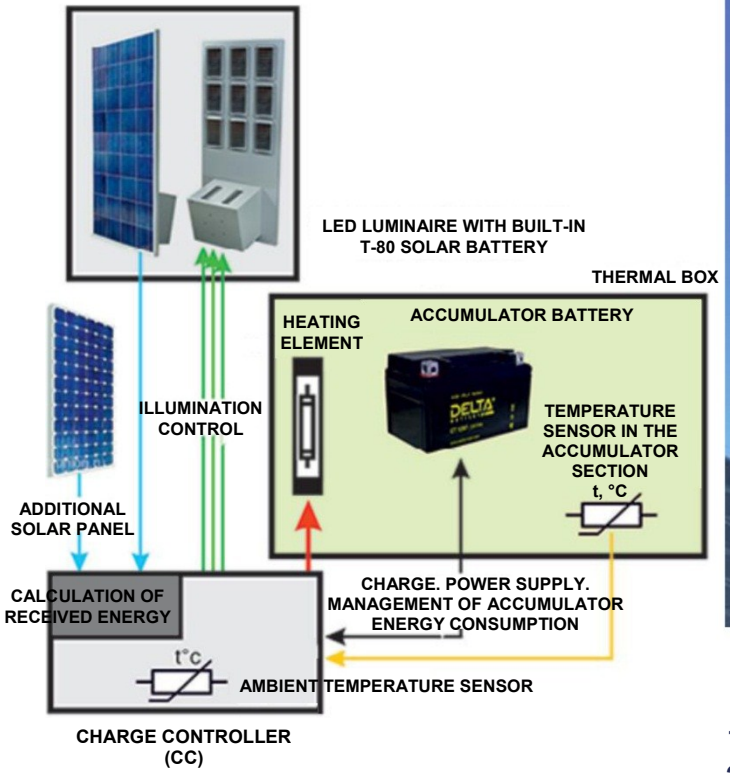
- Total number of road traffic accidents reduces by **30%**
- Number of road traffic accidents on classified roads and in areas of special hazard (e.g. crossings) reduces by **45%**
- Number of road traffic accidents with pedestrians, cyclists and motorcyclists reduces by **68%**
- Number of accidents has reduced by **45%**

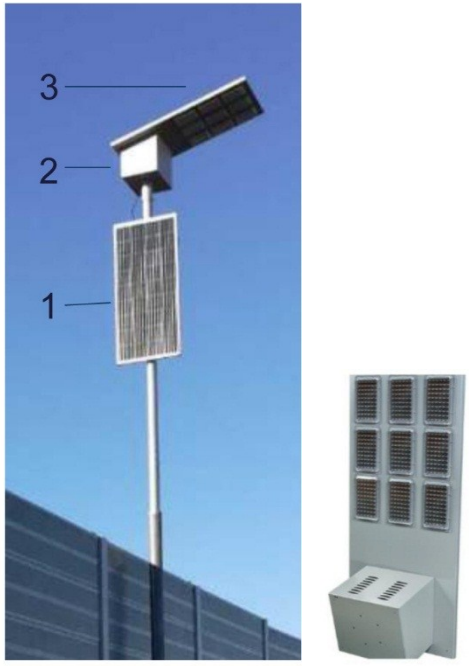
* The data is obtained as a result of the experiments conducted by order of the Ministry of Transport of Germany at ten road sections in six large cities

ADVANTAGES
OF TM-80 AUTONOMOUS ILLUMINATION SYSTEM

FULLY AUTONOMOUS It is charged by means of daylight accumulating of solar energy and operates autonomously during night time	**100% SAVING OF ENERGY** It does not require any connection to supply networks
HIGH ILLUMINATION OUTPUT It operates without any losses of illumination output	**WIDE RANGE OF APPLICATION** It is designed for illumination of roads, urban territories, gated communities

TM-80 AIS OPERATING PRINCIPLE





1. Solar battery
2. Accumulator battery
3. LED luminaire

1. During daytime, solar batteries accumulate solar energy

2. TM-80 AIS transform this energy into electricity and stores it in the battery accumulator

3. During nighttime, TM-80 AIS automatically switches on and uses the saved energy for operation of ultra LED's

4. The thermal box provides operation at temperatures ranging between +60°C and -50°C.

ACCUMULATOR BATTERY CHARGE CONTROLLER

The thermal box provides efficient operation irrespective of ambient temperature changes.

Sealed maintenance-free valve-regulated acid-lead accumulator. AGM technology. 100Ah/12V

- ***Optimal 3-mode charge of the accumulator battery with consideration of its temperature;***
- ***Calculates average values of light energy received within 4 days for forecasting and calculation of consumption for lighting in unfavourable weather conditions;***
- ***Determines the astronomical season, time for the given latitude to save the energy for illumination;***
- ***Significantly reduces expenses for maintenance of the accumulator battery, increases the operating life of the accumulator battery***

TM-80 AIS TECHNICAL SPECIFICATIONS

Illumination method	540 ultra-luminous high-output white LED's
Switching in/off	Automatic determination of day/night Operates during night time only
Type and capacity of the solar battery	Single-crystal silicon, 130W
Body	Anti-vandal galvanised steel sheet, aluminium inserts
Radiance	Equivalent of a 180W lamp Illuminance of more than 15lx
Power consumption	Operates with 12V network, consumes 19W
Battery capacity	12VDC, 100Ah
Dome Lamp	Ultraviolet polycarbonate reflector (9 clear prismatic lenses)
Recommended installation height	6–9 metres

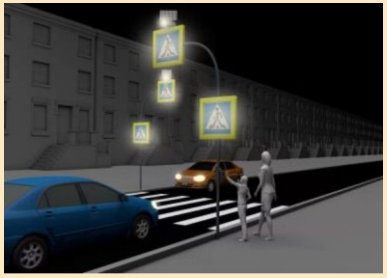
TM-80 AIS INTRODUCTION AND OPERATION EXPERIENCE

- *11 years of operation and modernisations*
- *Full production cycle*
- *Faultless operation of TM-80 AIS in bad weather conditions and frost*

FULL PRODUCTION CYCLE

WIDE RANGE OF TM-80 AIS APPLICATION OPTIONS

Motor roads



Pedestrian crossings

Street parkings

Gated communities

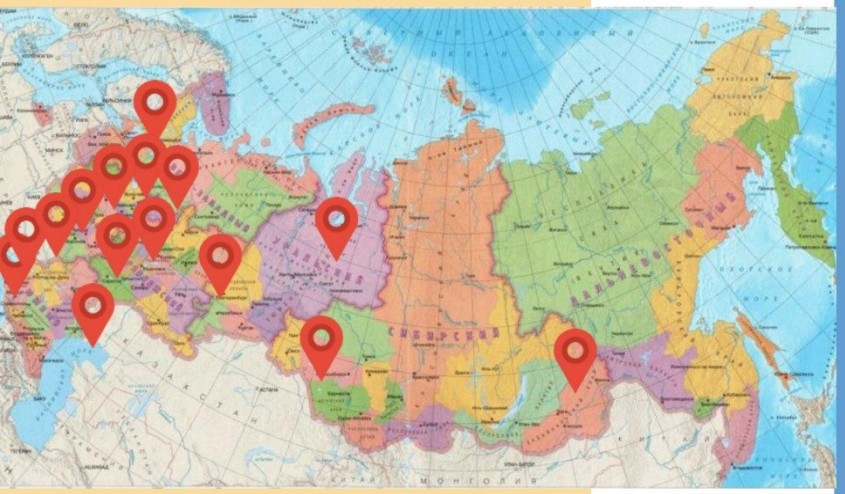
Sport grounds

Public transport stops

Urban and rural streets

Summer cottages

RUSSIA IMPLEMENTATION MAP (EXAMPLES)



Urban illumination systems

Moscow region

Nalchik (Kabardino-Balkaria)

Tikhoretsk district (Krasnodar territory)

Pedestrian crossings

Moscow region

Nalchik (Kabardino-Balkaria)

Birsk district (Bashkortostan)

Tikhoretsk district (Krasnodar territory)

Illumination of motor roads

M-5 (Ural)

M-4 (Don)

A-260 (Volgograd)

R-119 (Oryol-Tambov)

R-120 (Oryol-Smolensk)

R-22 (Kaspiy)

R-298 (Kursk-Saratov)

WORLD IMPLEMENTATION MAP (EXAMPLES)

- ***Introduction geography:***
- ***Russia***
- ***Egypt***
- ***Israel***
- ***Ukraine***

COMPARISON OF ALTERNATIVE SOURCES OF ILLUMINATION

SOURCE OF ILLUMINATION	TM-80 AUTONOMOUS ILLUMINATION SYSTEMS	LUMINAIRES WITH MERCURY LAMPS	LUMINAIRES WITH SODIUM LAMPS	LED LUMINAIRES
Service life	90,000h	10,000–13,000h	15,000–20,000h	45,000h
Presence of polluting substances	no	yes	yes	no
Power consumption	19W	250W	150W	100W
Annual energy consumption	0kW	1,095kW	657kW	438kW
Annual cost of consumed energy per 1 post (Russia)	–	87 euro	52 euro	35 euro
Annual cost of consumed energy per 1 post (Poland)	–	157 euro	94 euro	63 euro
Annual cost of consumed energy per 1 post (Denmark)	–	348 euro	209 euro	139 euro

Service life of TM-80 AIS exceeds that of the existing illumination systems by more than **2 times** and saves **100%** of energy expenses

ECONOMICAL EFFICIENCY OF TM-80 AIS OPERATION

SOURCES OF ILLUMINATION	TM-80 AUTONOMOUS ILLUMINATION SYSTEMS	ZhKU-60 LUMINAIRE*	SAVING, %
Annual power consumption	–	0.07kW	54%
Annual energy consumption**	–	306.6kW	
Energy tariff (average value in Russia)	–	0.08 euro/kW	
Annual cost of consumed energy (Russia)	–	24.27 euro	
Annual operational expenses (Russia)	25.28 euro	30.83 euro	
Total operational expenses of 1 lamp post for 1 year (Russia)	25.28 euro	55.10 euro	
Total operational expenses of 1 lamp post for 10 years (Russia)	252.8 euro	551 euro	

For example: Calculation of saving rate for a 1,200km-long road

Distance between lamp posts	60m
Number of lamp posts along the road	20,000
Annual operation cost with TM-80 AIS	505,555 euro
Annual operation cost with ZhKU-60	1,102,222 euro
Annual saving of operational expenses for a road	**596,667 euro**
Saving of operational expenses for 10 years	**5,966,667 euro**

* ZhKU luminaire: console yellow-light street luminaire

ECONOMICAL EFFICIENCY OF TM-80 AIS OPERATION

COUNTRY	COST OF ENERGY, euro/kWh	SAVING FOR A 1,200km-LONG ROAD, euro per year
Denmark	0.32	2,061,428
Germany	0.31	1,984,778
Belgium	0.30	1,942,194
Ireland	0.26	1,695,211
Spain	0.25	1,652,628
Portugal	0.23	1,541,911
Cyprus	0.22	1,473,778
Italy	0.22	1,456,744
United Kingdom	0.21	1,380,094
Austria	0.20	1,363,061
Sweden	0.20	1,328,994
Norway	0.19	1,277,894
France	0.18	1,235,311
The Netherlands	0.17	1,175,694
Finland	0.17	1,167,178
Poland	0.14	988,328
Russia	0.08	596,667

Saving is **100% of energy expenses**, the amount depends on energy tariff of a specific region

WHERE OUR SYSTEM IS NEEDED

- In regions where it is necessary to reconstruct road illumination
- In construction of new motor roads
- Enhancement of illumination in settlements, pedestrian crossings, city sites
- In areas where it is hard to construct power supply networks
- In regions where matters of energy resource saving are urgent
- For illumination of gated communities and villages

WE ARE RECOMMENDED BY

Russian railways

MINISTRY OF TRANSPORT
OF THE RUSSIAN FEDERATION
Mintrans of Russia

FEDERAL ROAD AGENCY
ROSAVTODOR

AVTODOR
TOLL ROADS

Major Road Traffic Safety Department
of the Ministry of Internal Affairs
(GUOBDD of MIA of Russia)

BENEFITS OF TM-80 AIS INTRODUCTION

ENERGY SAVING
100%

RECOMBINATION OF CO2
99%

REDUCTION OF OPERATIONAL EXPENSES
54%

REDUCTION OF THE NUMBER OF ROAD TRAFFIC ACCIDENTS
30%

THANK YOU FOR YOUR ATTENTION