

# Utilizing technology to reduce costs in Winter Service under constrained budgets

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## 0. CONTENT

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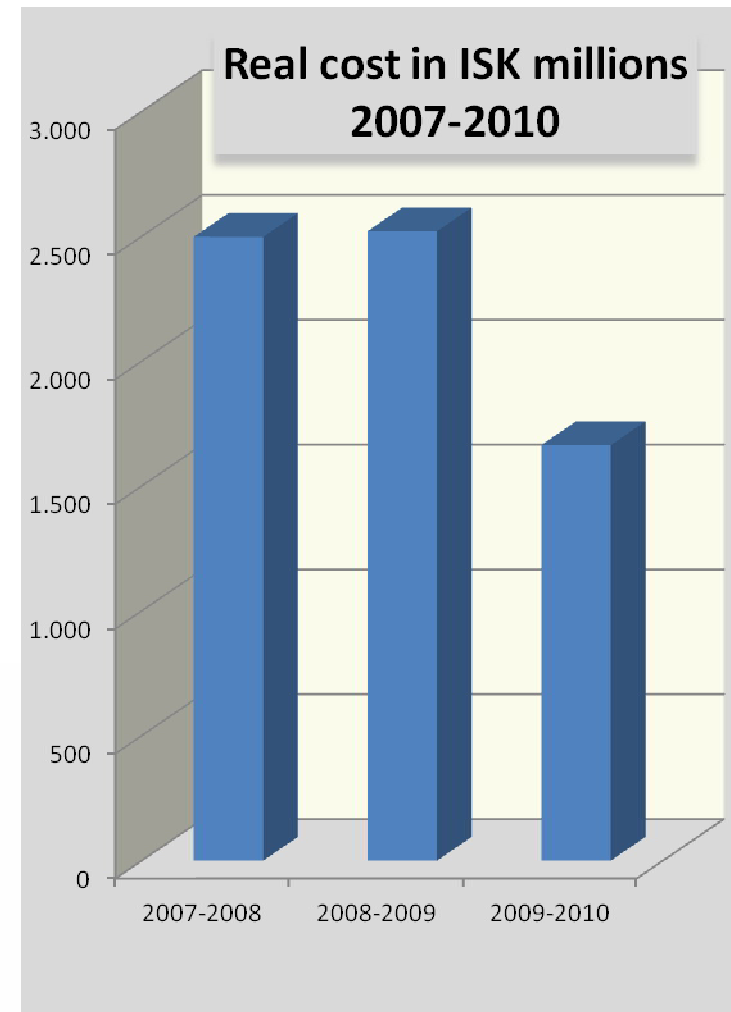
1. Introduction
2. Economic crisis – Budgetary cuts
3. Analysis of the task/assignment
4. Organisational changes
5. Operations centrals
6. Results
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## 1. INTRODUCTION

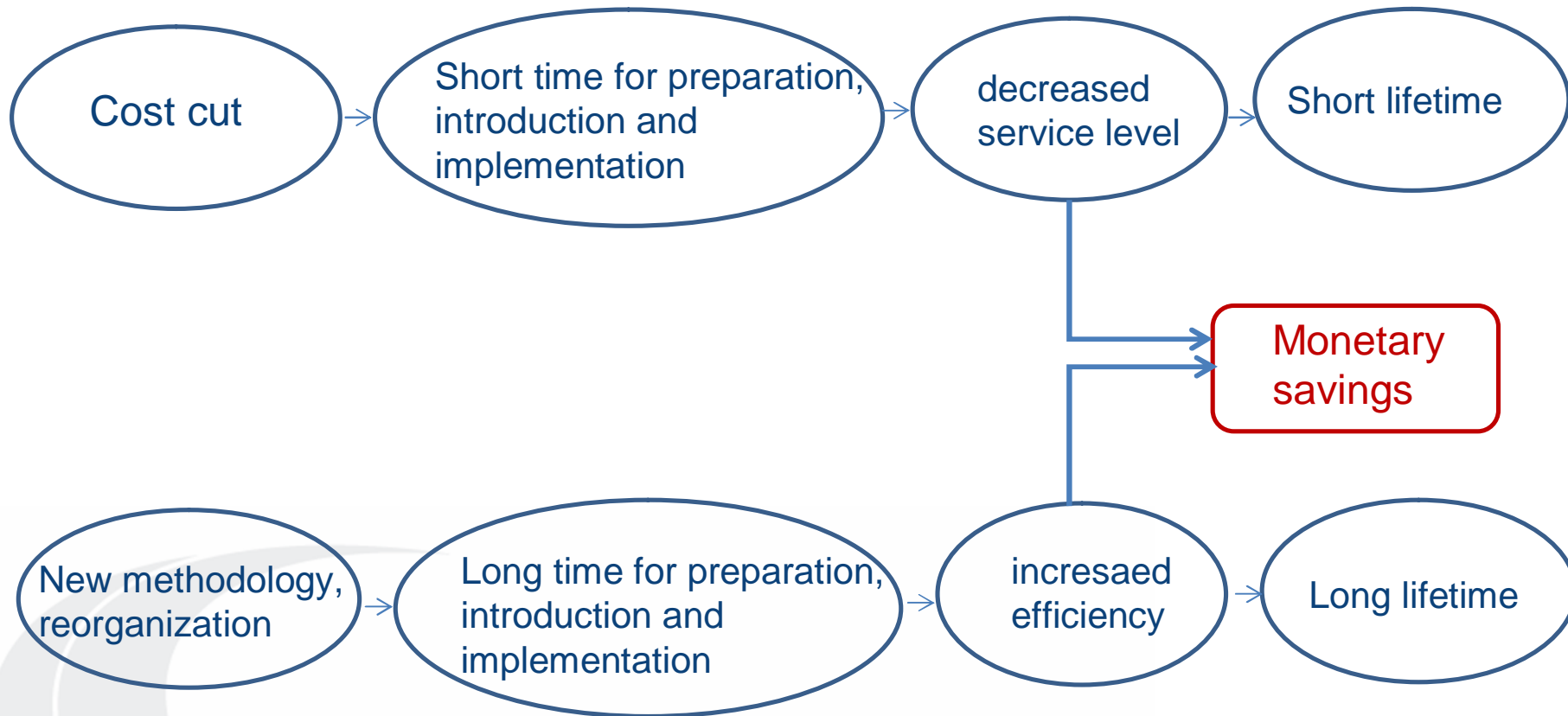
When, in the autumn of 2008, the crisis struck in Iceland, there was an immediate and continued call for austerity.

Harsh measures were taken, orders issued for increased efficiency and cost cuts in the society in general.

Cost cuts in the winter maintenance in the winter 2009-2010 was decided 40%



# 1. INTRODUCTION



## 2. ECONOMIC CRISIS – BUDGETARY CUTS

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Cost cuts in Winter Services consisting in

- decreased service level
- shorter service hours
- reduced quality.

Cost-cutting in Winter Services affect:

- the service capability of the traffic system
- restrict the possibilities of the business sector
- negative effect on social life in the country

Cost cuts have to be looked upon as a short-term and have to be explored leading to more effective use of available financing through better technology/techniques, better organization and more targeted management.

### 3. ANALYSIS OF THE TASK/ASSIGNMENT

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Approach the winter service projects from the outside for a new firm, not bound by current arrangements:

- Organisation
- Management systems
- Methodology
- Equipment /vehicles
- Measuring techniques
- Data systems
- Deicing materials
- Meteorological forecasts
- Experience and knowledge
- Stock control

### 3. ANALYSIS OF THE TASK/ASSIGNMENT

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The analysis disclosed that following main aspects should be greatly emphasised:

- Centralised and coordinated management
- Improved and optimal route planning
- Measurements of residual road salt
- Efficient control of the use of salt
- Education/instruction and training.

## 4. ORGANISATIONAL CHANGES

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Known problems in old firms:

- Certain habits and customs have developed
- General staff and management may be reluctant to change work methods

Supports to implement change work processes

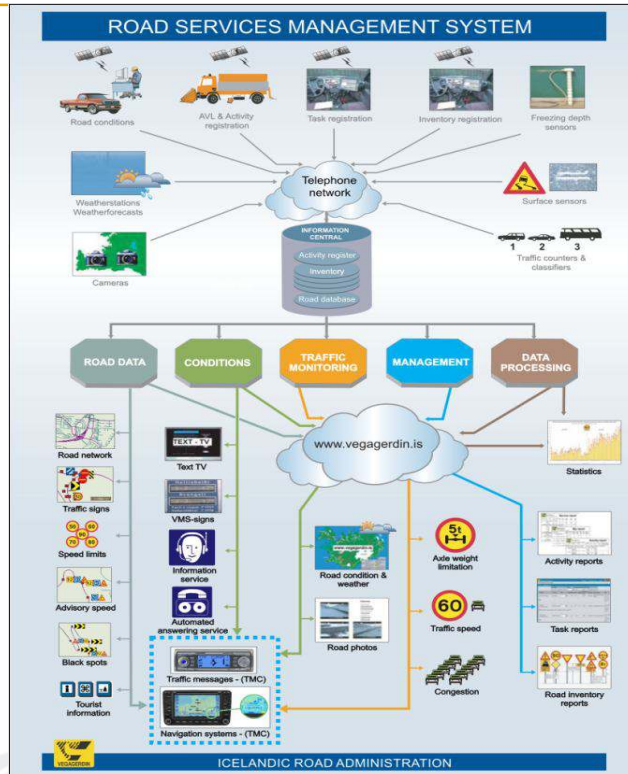
- Improved equipment
- Improved work methods
- New measuring technology

Organisational changes, complicated and time-consuming operation

- Demands intensive preparation
- Consultation, presentation, instruction
- Activate all staff and other parties involved in the task/project,
- Coordination and change of work processes
- Changes of areas of responsibility and the duties



## 4. ORGANISATIONAL CHANGES



### Road Service Management System

The system's database includes:

- Information on service routes
  - Degrees of service for particular routes,
  - Information on work procedures
  - Materials and use of materials
  - Information about parties performing procedures
  - Shift plans
  - Work rules and working procedures on particular routes
  - Agreements/contracts
  - Price lists and unit prices, etc.
- Road and road-side equipment, about 800 measuring devices
  - Cameras and sensors monitor on the main part of the road system.
  - Automated operational vehicle tracking in all snow removal equipment /vehicles.

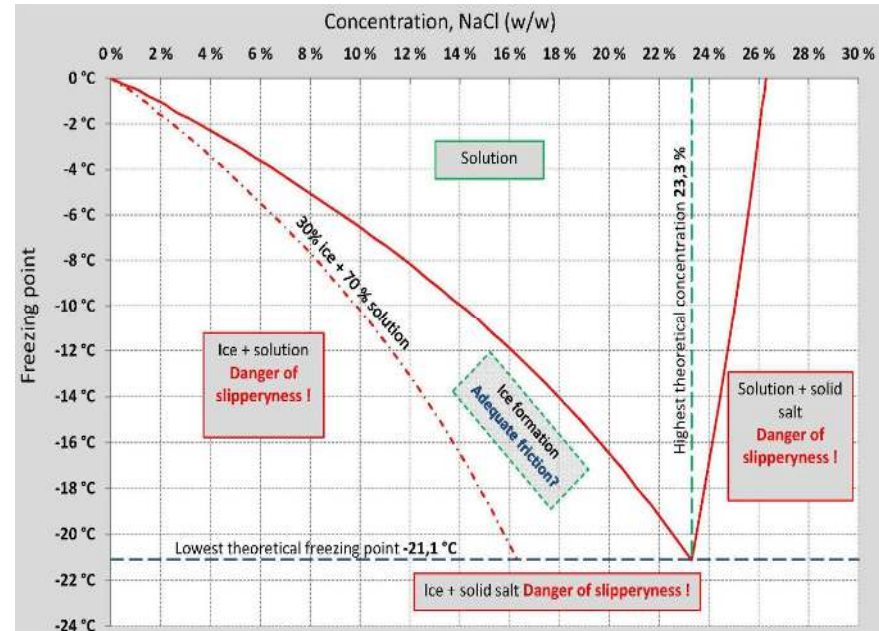
## 4. ORGANISATIONAL CHANGES

### Emphasis in snow removal

- Goal is to practice preventive salting before weather events causing slipperiness
- Not remove snow through salting.
- Attaining “a black road” as soon as possible before salting,
- Salt is used during snowfall in order to avoid snow compaction and to ease snow removal.

### Monitoring road conditions and residual salt.

- Sensors on the road which provide information on temperature, surface moisture and residual salt
- Manual methods are also employed to evaluate road surface moisture and residual salt.



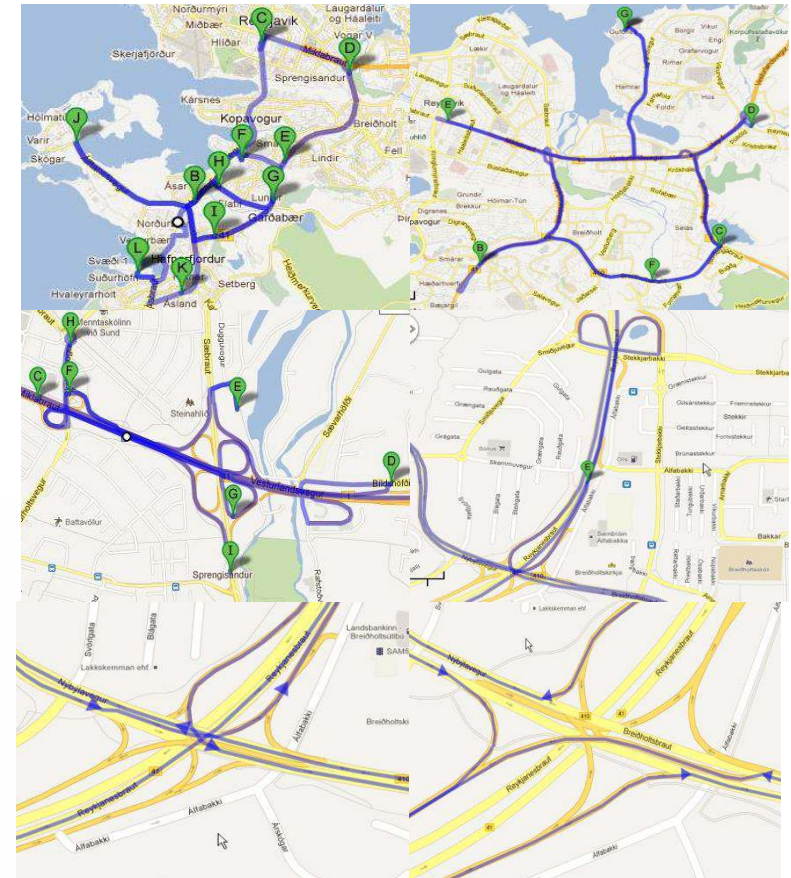
**Salt dosage is determined on the basis of road temperature, residual salt, the time of day, road surface moisture, current weather and weather forecast.**

## 4. ORGANISATIONAL CHANGES

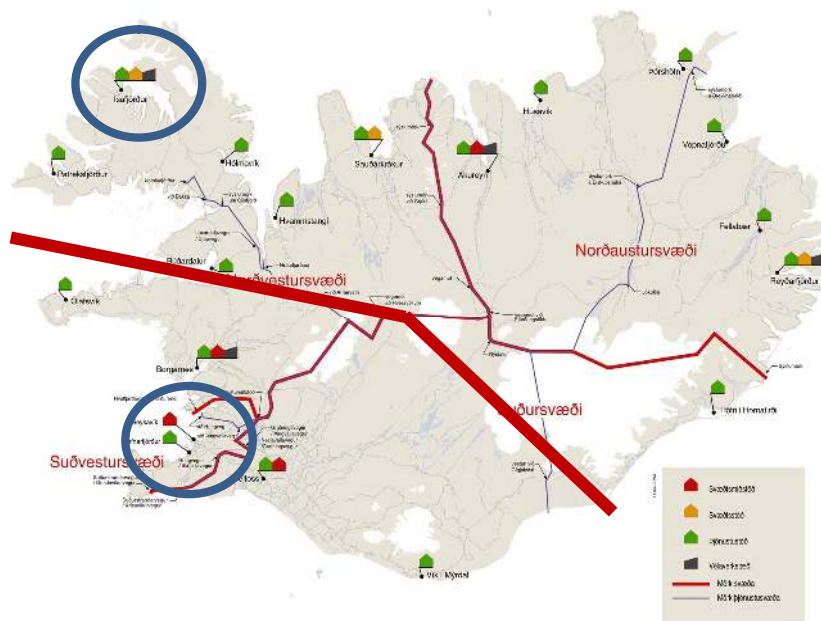
# Optimal route planning

Various aspects may have an influence – difficult to take all of these into consideration

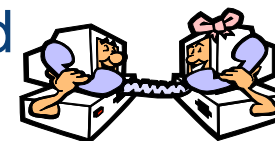
- Different types of vehicles
- Vehicle speed and capacity
- Location/initial position of equipment/vehicles
- Permitted speed and speed possibilities.
- Possibilities to turn around and come back
- Permitted operation/activity time pr. road
- Minimum number of routes for each combination
- Total number of routes/vehicles
- Special limiting circumstances (road width, one-directional stretches, etc.)



## 5. OPERATIONS CENTRALS



- Winter Service management is centralised, with two operation centrals covering the whole country.
- All operations are determined by the centrals in consultation with on-site supervisors and inspectors.
- All decisions are registered and constantly re-evaluated with regard to results from operations.



## 5. OPERATIONS CENTRALS



Management systems in the operational centrals contain the following information/data:

- Management data for each supervision area
- System for on-duty and the activation of a task
- System for the registration of operations, tasks and other observations (logbook):
- System for settlement and situation evaluation

**Snow removal and de-icing**  
Date from 01.03.2006 to 15.03.2006

Vehicle	Chore no.	Chore element	Treatment event	Salt used (tons)	Treatment length (km)	Treatment Cost (€)
<b>07.03.2006</b>						
341-0000	0041-20	Hyppurun-Rugstøð	0.0	28.2	11.60€	
341-0000	0043	Göndurkoma	1.0	28.0	12.011€	
341-0000	0044	Hvítavangi	0.0	17.4	7.022€	
341-0000	0045	Gulbakaganga	0.0	18.0	7.322€	
341-0000	0050-10	Hvítáflingur	2.2	24.2	11.288€	
341-0000	0452-20	Plankjarn-Göndur	0.0	0.4	160.0€	
341-0000	0459	Sandgerðavegur	0.4	0.0	2.080.0€	
<b>Data total:</b>				<b>4.0</b>	<b>121.0</b>	<b>49.390€</b>
<b>08.03.2006</b>						
341-0000	0041-10	Neðstakjósakur	0.5	11.0	5.170.0€	
341-0000	0041-20	Hyppurun-Rugstøð	0.0	0.0	0.000.0€	
<b>Data total:</b>				<b>4.0</b>	<b>96.4</b>	<b>39.177€</b>
<b>Vehið sumtalt:</b>				<b>10.4</b>	<b>216.4</b>	<b>88.564€</b>
<b>08.03.2006</b>						
341-0000	0041-10	Neðstakjósakur	0.0	0.0	4.273.0€	
341-0000	0041-20	Hyppurun-Rugstøð	0.2	12.0	54.728.0€	
341-0000	0043	Göndurkoma	2.2	28.0	13.462.0€	
341-0000	0021	Vagnvegur	0.2	2.7	1.208.0€	
341-0000	0027	Hvítáflingur	0.0	0.0	240.0€	

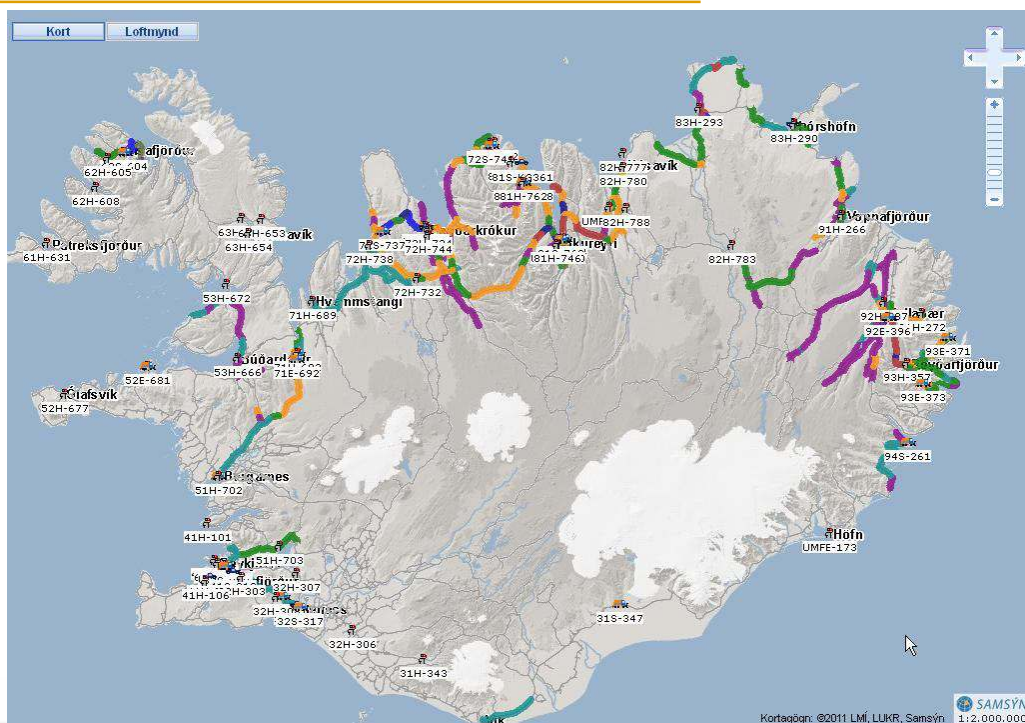
  

Vekudagur	Vindblátt	Hvít, vindblátt	Aldur, koskubla, 2005	Fáringar, 2005	Hlutf.
ÞET-4000	0001-10	Báttur-Veig	25.200	25.000	100.0%
ÞET-4000	0002-20	Óröðun-Þingvöðun	14.034	42.792	34.3%
ÞET-4000	0003-20	Þingvöðun-Göng	3.056	21.856	41.4%
ÞET-4000	0006-10	Þingvöðun-Ólafur	5.904	4.011	148.0%
ÞET-4000	0006-20	Ólafur-Þingvöðun	5.314	5.300	99.9%
ÞET-4000	0040	Hvítáflingur	12.744	34.702	89.7%
ÞET-4000	0041-10	Neðstakjósakur	22.872	29.270	131.0%
ÞET-4000	0041-20	Hyppurun-Rugstøð	74.621	67.310	85.5%
ÞET-4000	0042-10	Þingvöðun-Þingvöðun	3.084	2.964	104.0%
ÞET-4000	0042-20	Þingvöðun-Ólafur	5.940	6.300	124.4%
ÞET-4000	0043	Göndurkoma	11.500	12.200	111.7%
ÞET-4000	0044	Hvítáflingur (lífrættur við 0025-10)	4.000	2.360	169.0%
ÞET-4000	0045	Hvítáflingur	10.170	17.020	57.0%
<b>Samtölur:</b>			<b>253,028</b>	<b>334,715</b>	<b>75.6%</b>

Each week, key figures are issued on:

- Costs
- Unit prices
- Kilometres of snow removal or deicing
- Use of salt and brine
- Hours of work carried out etc.

## 5. OPERATIONS CENTRALS

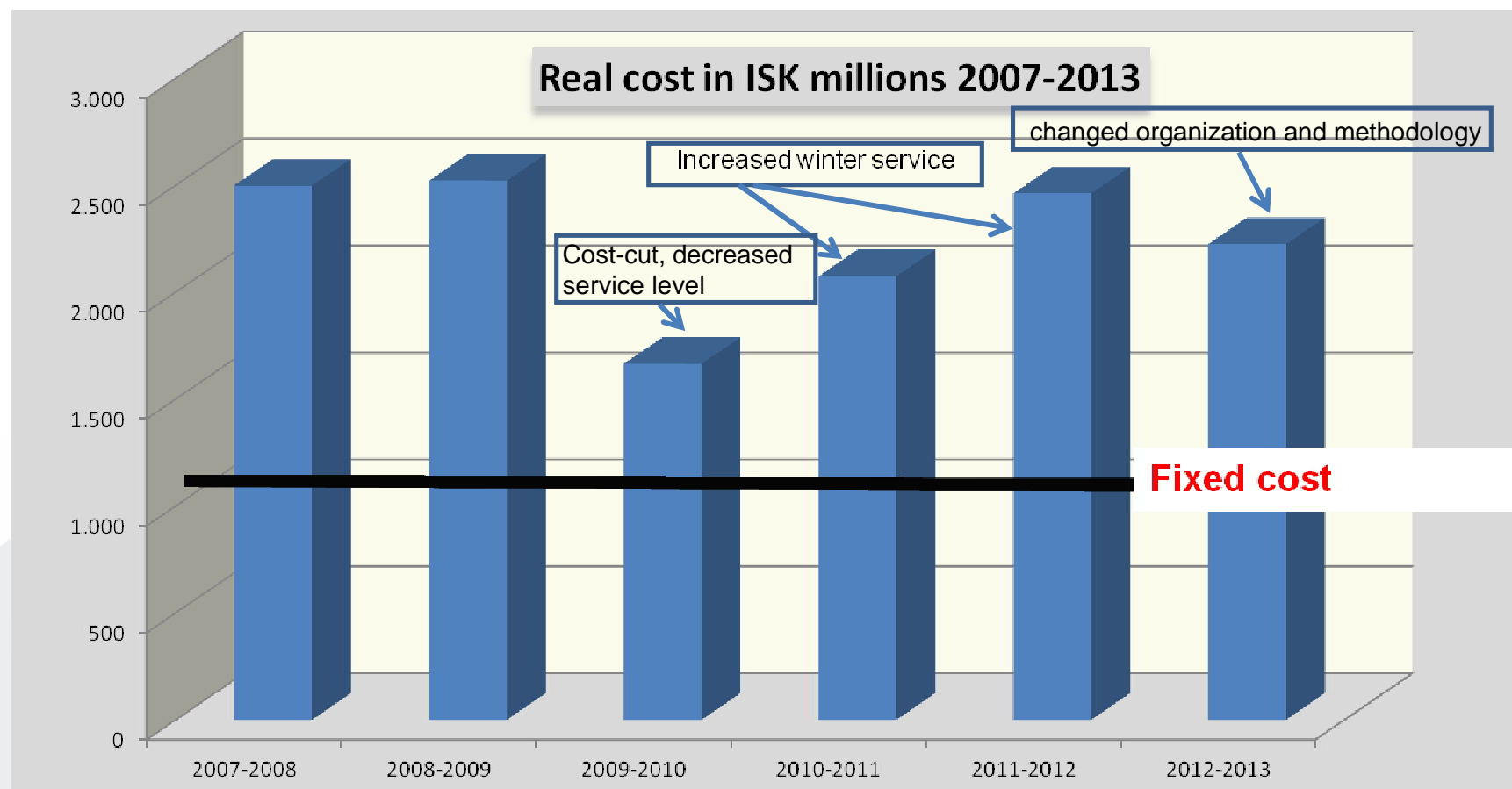


Through vehicle activity monitoring and a road condition registration system, information is registered on the situation

- When, whether and where snow removal or deicing is in process
- Whether activities are on time
- When operations will be completed
- Whether there is any local information, s.a. bad weather on certain stretches of road, etc.

## 6. RESULTS

### Changed arrangements 2012-2013 and the resulting cost



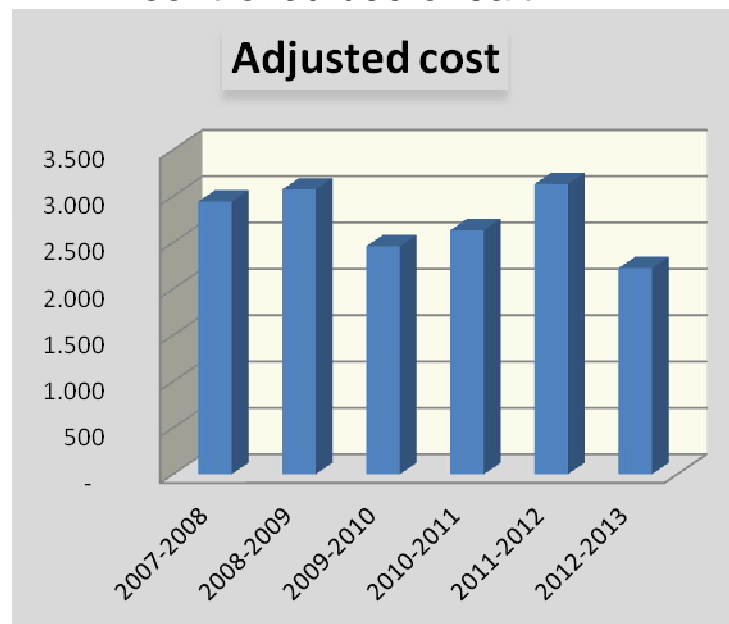
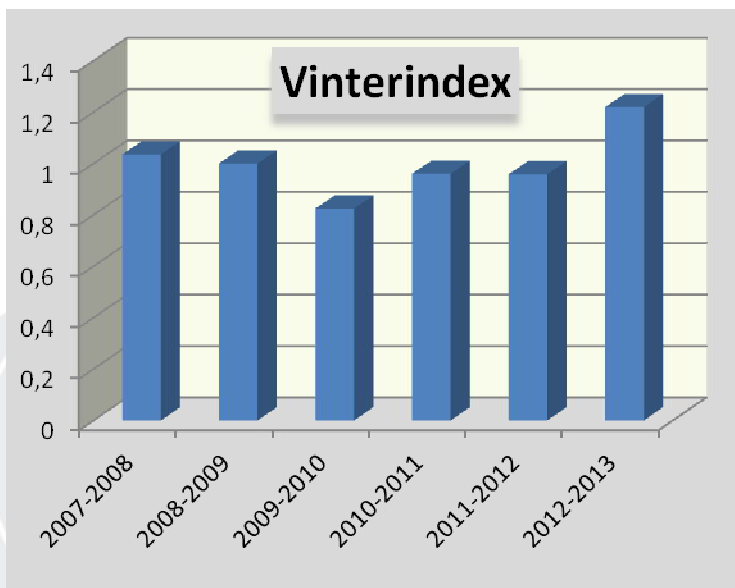
## 6. RESULTS

### Adjusted cost

Winter of 2012-2013 registered unusually heavy with the winter index about 25% higher than the year before.

The factors which gives most cost savings are:

- measuring techniques
- optimal route planning
- vehicle tracking
- measurements of residual road salt
- controlled use of salt.





## 6. RESULTS

### Accidents due to slippery roads

- Decrease in the number of traffic accidents in the wake of the crisis
- In part may be traced to less traffic in general
- Since that time, changes in skid accidents have not been noticeable.



## 7. CONCLUSION

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### What stands out:

- To cut down the scope of tasks is a relatively simple method with a short lifetime.
- Organisational changes are complicated and time-consuming operations which require a great deal of work
- Crisis can have a positive effect for in such a situation, all possible means must be explored for increased economy and efficiency, we have to think all aspects anew and from a very different viewpoint than before

# Thank you