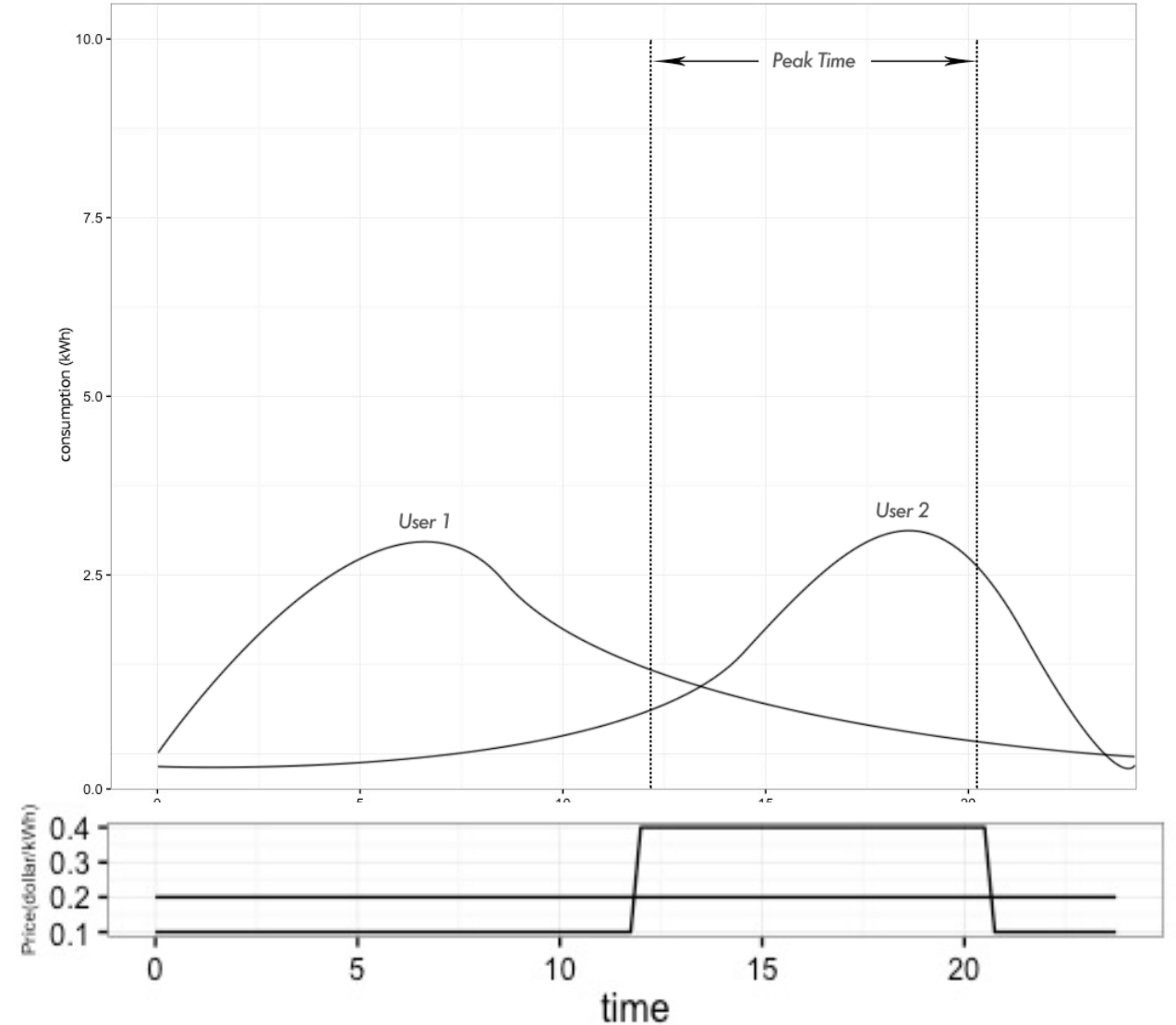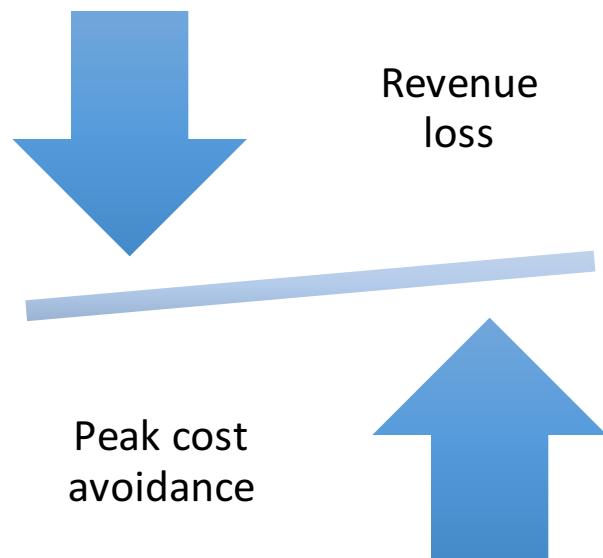# Customized differential pricing for different user groups

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- Success is not guaranteed in real world application
  - Trade off: revenue loss from low off peak price VS cost avoidance from peak shaving for utility
 - Real world: Adverse selection

Revenue loss

Peak cost avoidance

User 2 is "premium users" to be targeted by TOU. With voluntary TOU, however, user 2 is most likely to opt out.

- Is it possible to offer customized program to different users?
  - Smart metering data.
  - Data mining techniques is used to segment consumption data into Typical load profiles (TLPs)
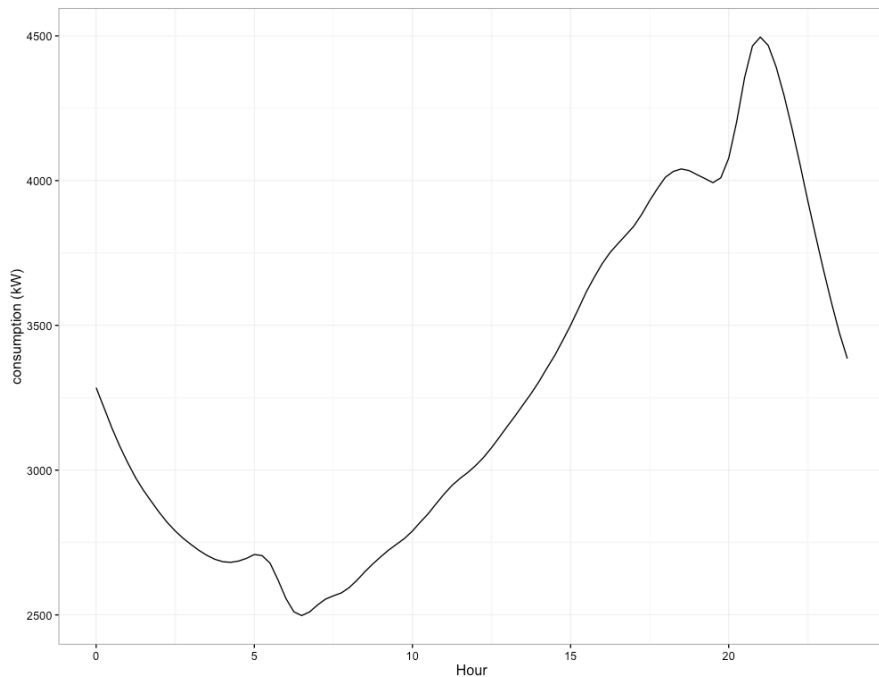
System load profile

Clustering
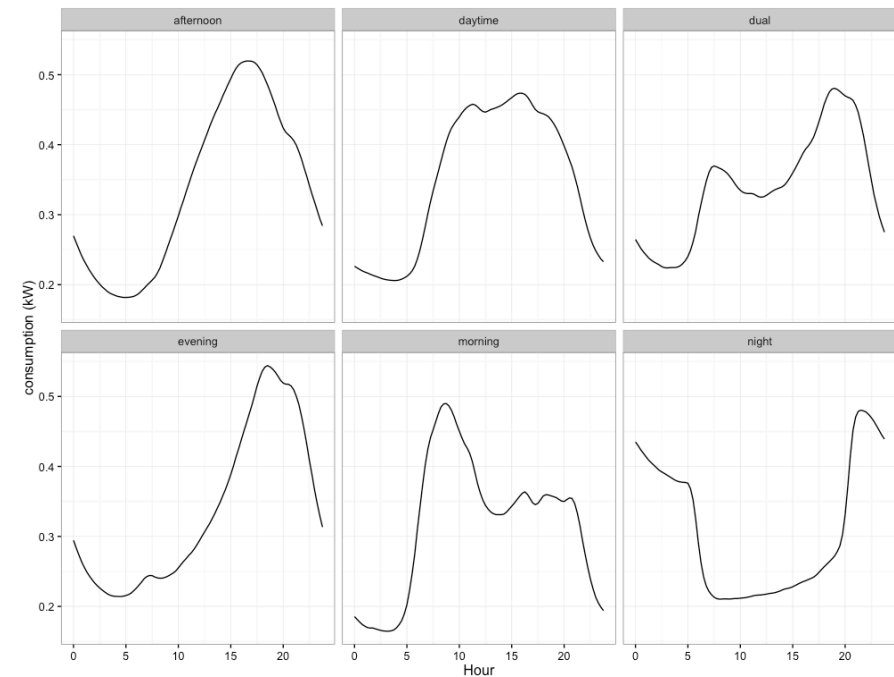
TLPs

Results

- Threshold=3600 kW
  - Gross profit = revenue – variable cost (mainly fuel)
  - Operation profit = gross profit – peak cost

	Gross profit	Peak cost	Operation profit	Profit increase (Dollar/Day)
Design 1	5625	1168	4457	
Design 2	3789	1770	2019	2438

Put in Perspective:
a. Daily revenue at $15600 per day for the studied 6,662. users[1].

b. Average Profit margin of U.S. utilities: 9%   (2014)

	afternoon	daytime	dual	evening	morning	night
Design1	(0.18,0.22)	0.2 (Flat rate)	0.2 (Flat rate)	(0.18,0.22)	0.2 (Flat rate)	(0.1,0.4)
Design2	0.2 (Opt out)	(0.02,0.48)	0.2 (Opt out)	0.2 (Opt out)	(0.02,0.48)	(0.02,0.48)

[1] The figure is computed based on total users consumption of 78,000 kWh at flat rate of $0.2 per kWh