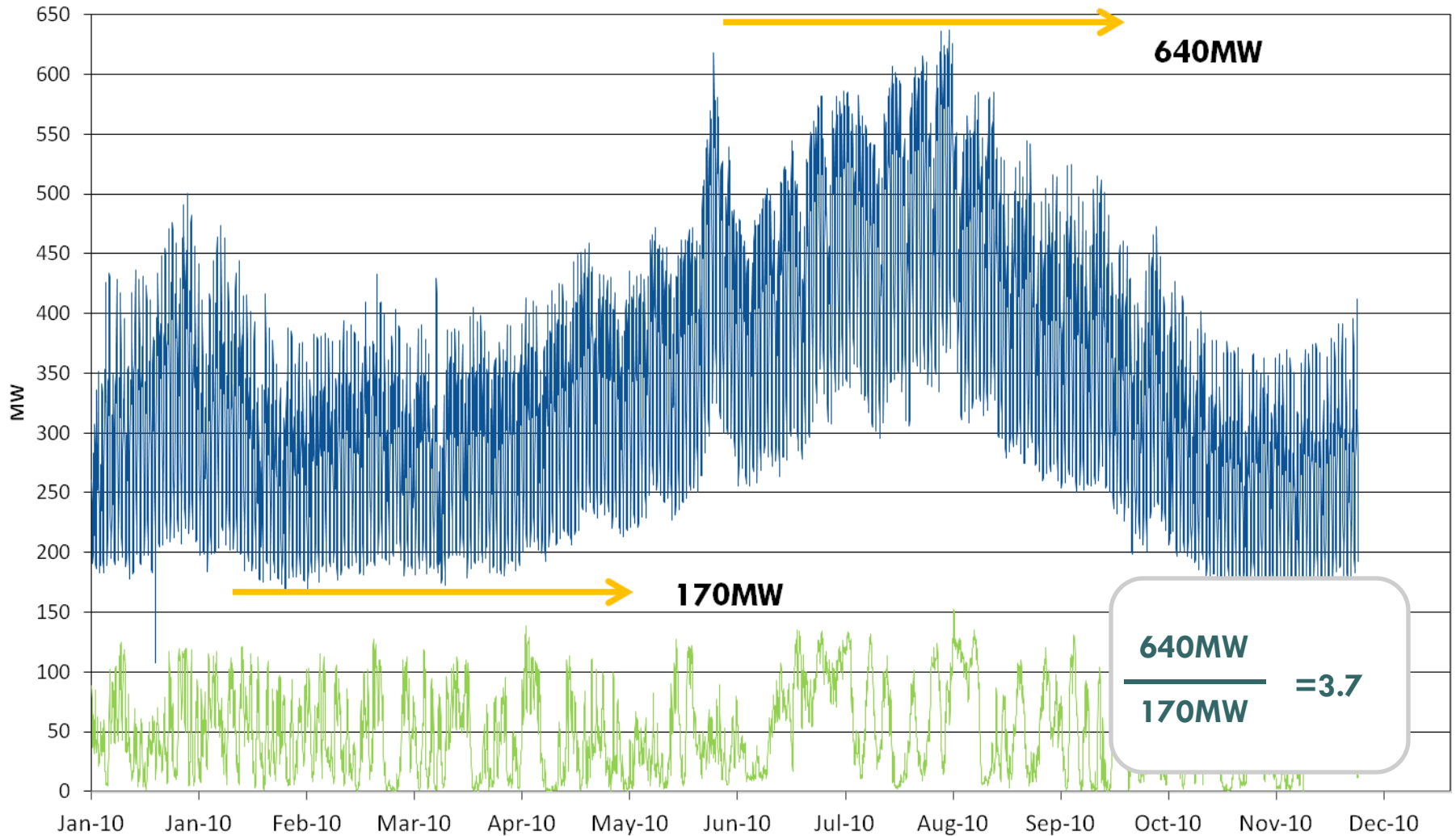


# Wind Power in Crete

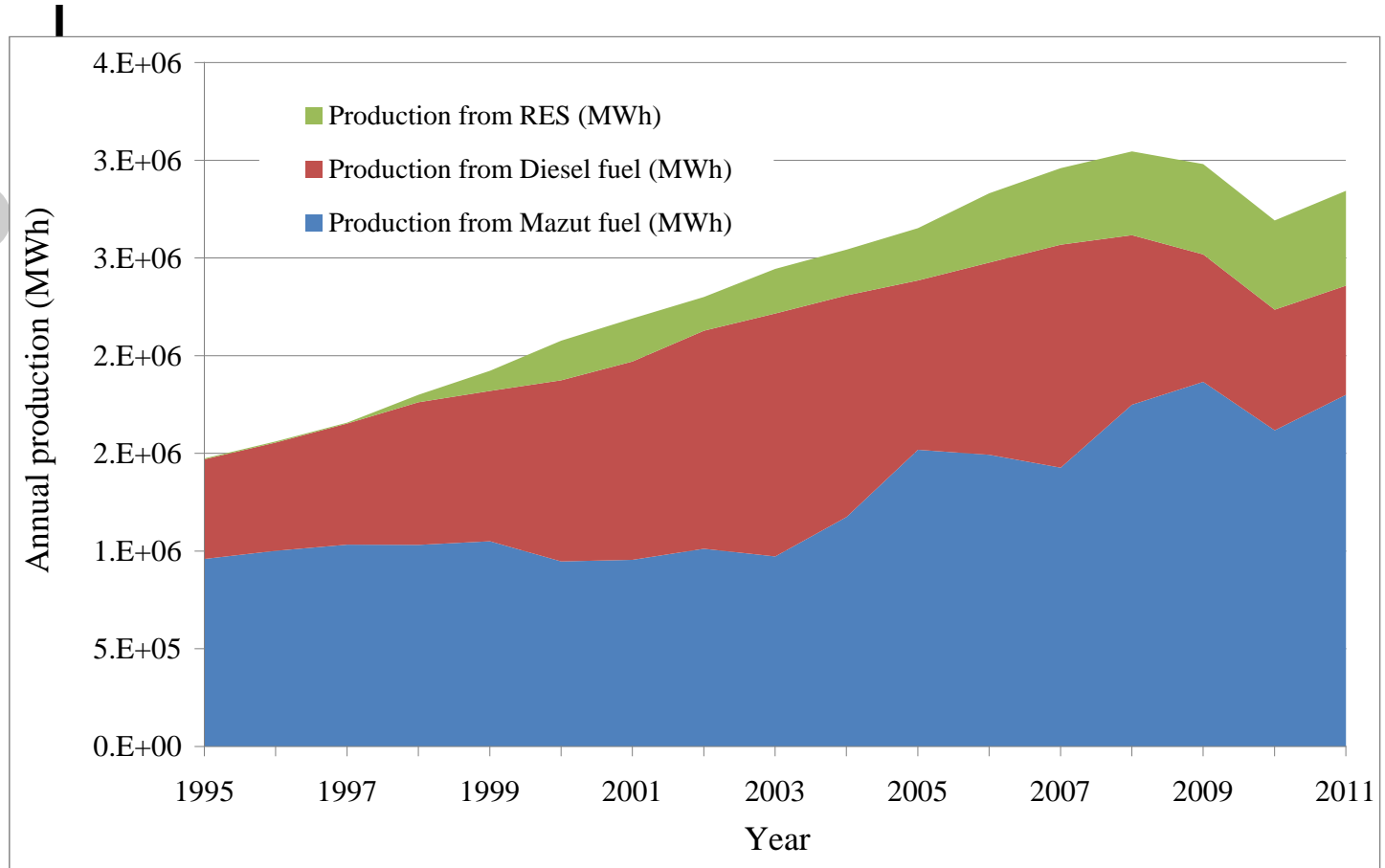


Prof. Nikos Hatziargyriou

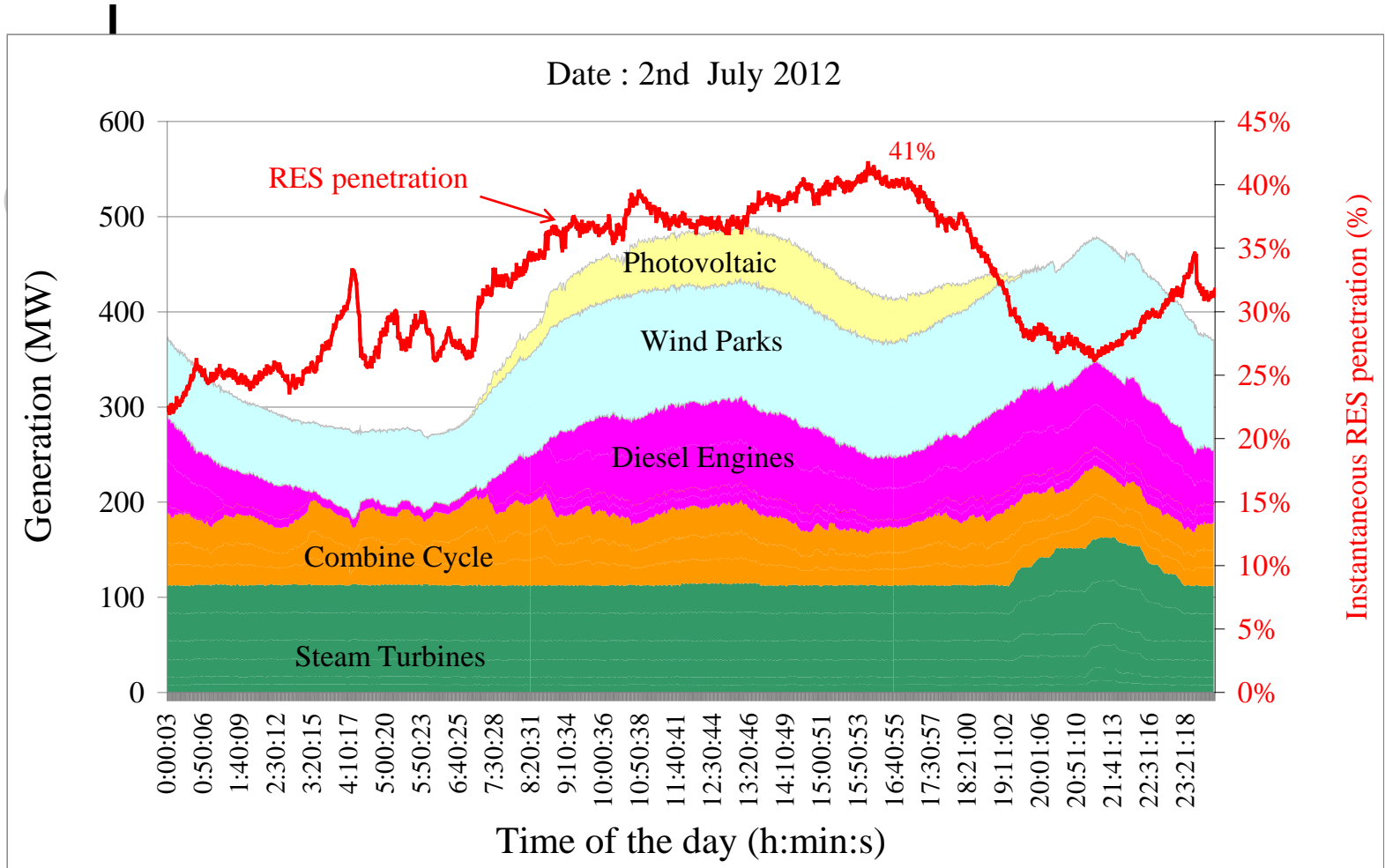
# Load and Wind Farm production in Crete system during 2010



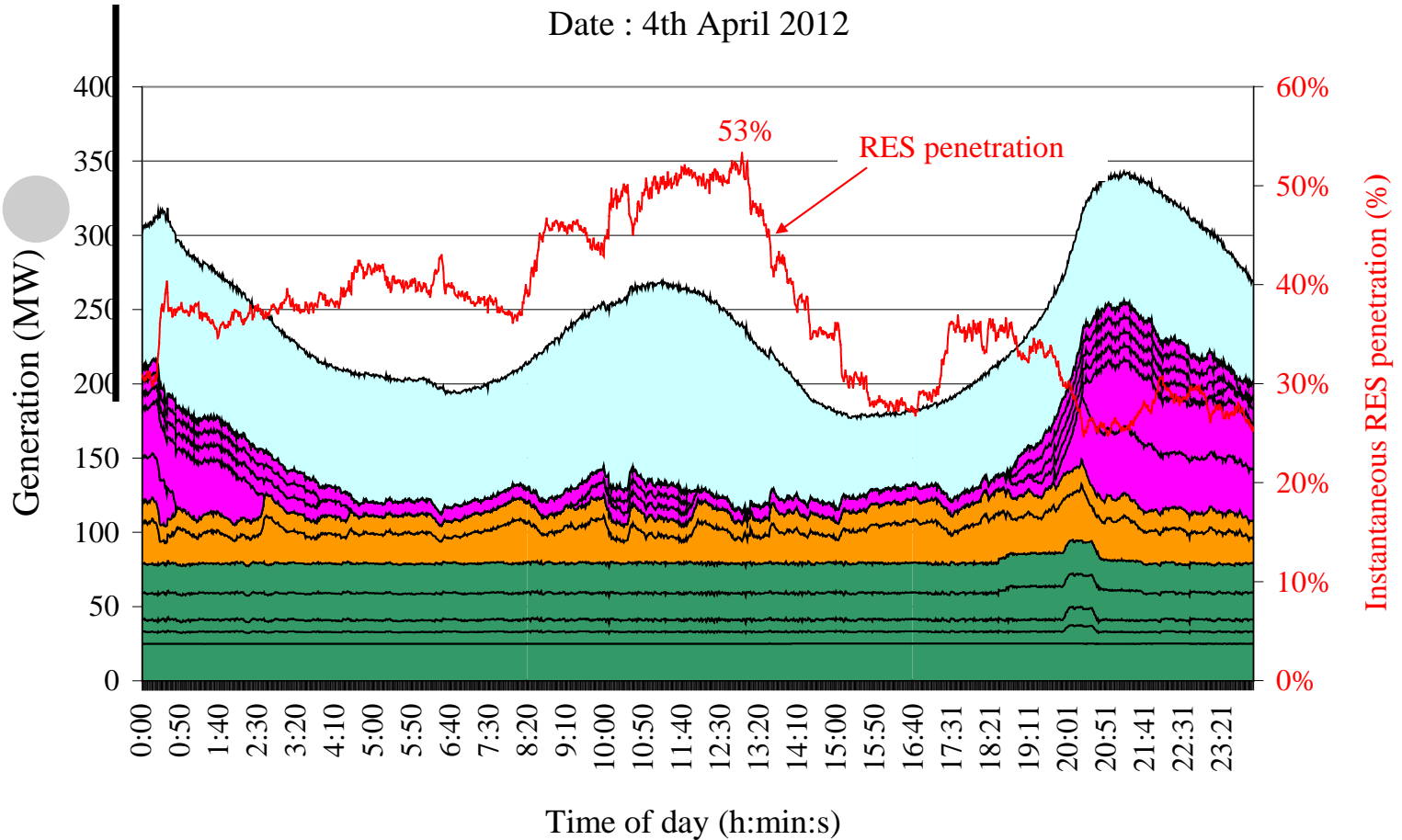
# Annual production from various sources



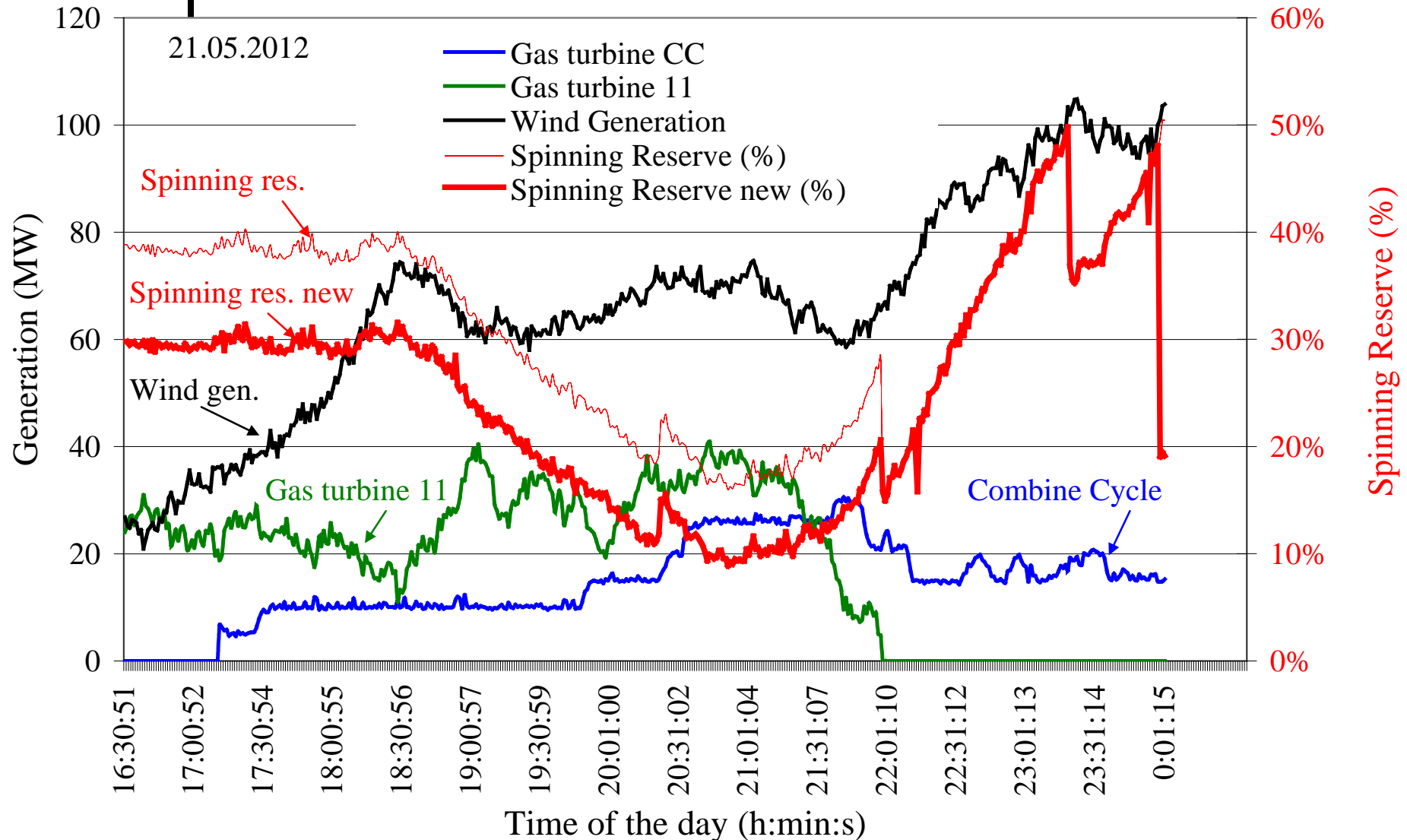
# Generation from various technologies and mean hourly RES penetration in Crete at 2<sup>nd</sup> July 2012



# Generation from various technologies and mean hourly RES penetration in Crete at 4th April 2012



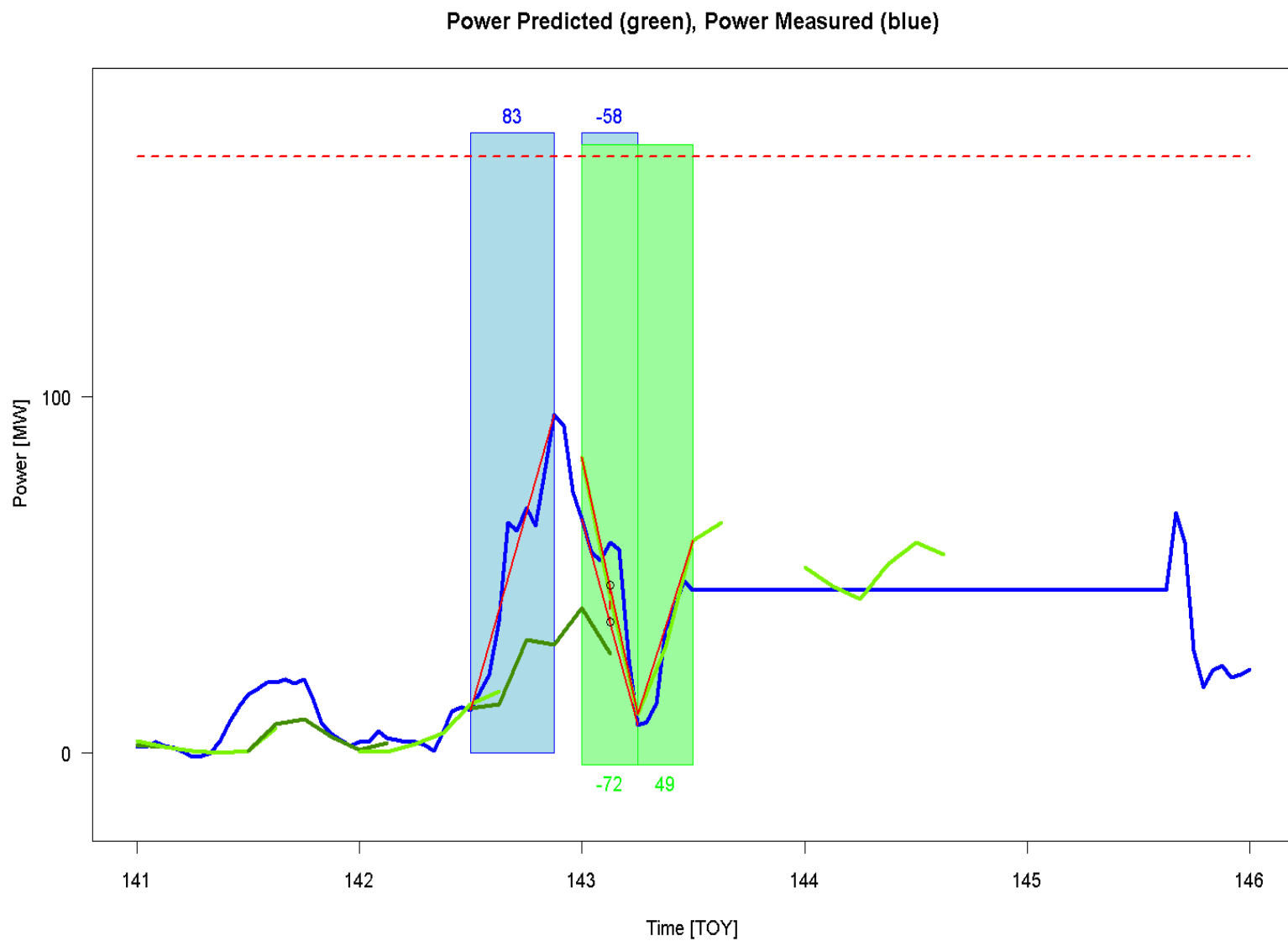
# A day with a high wind generation ramp



# Economic benefit

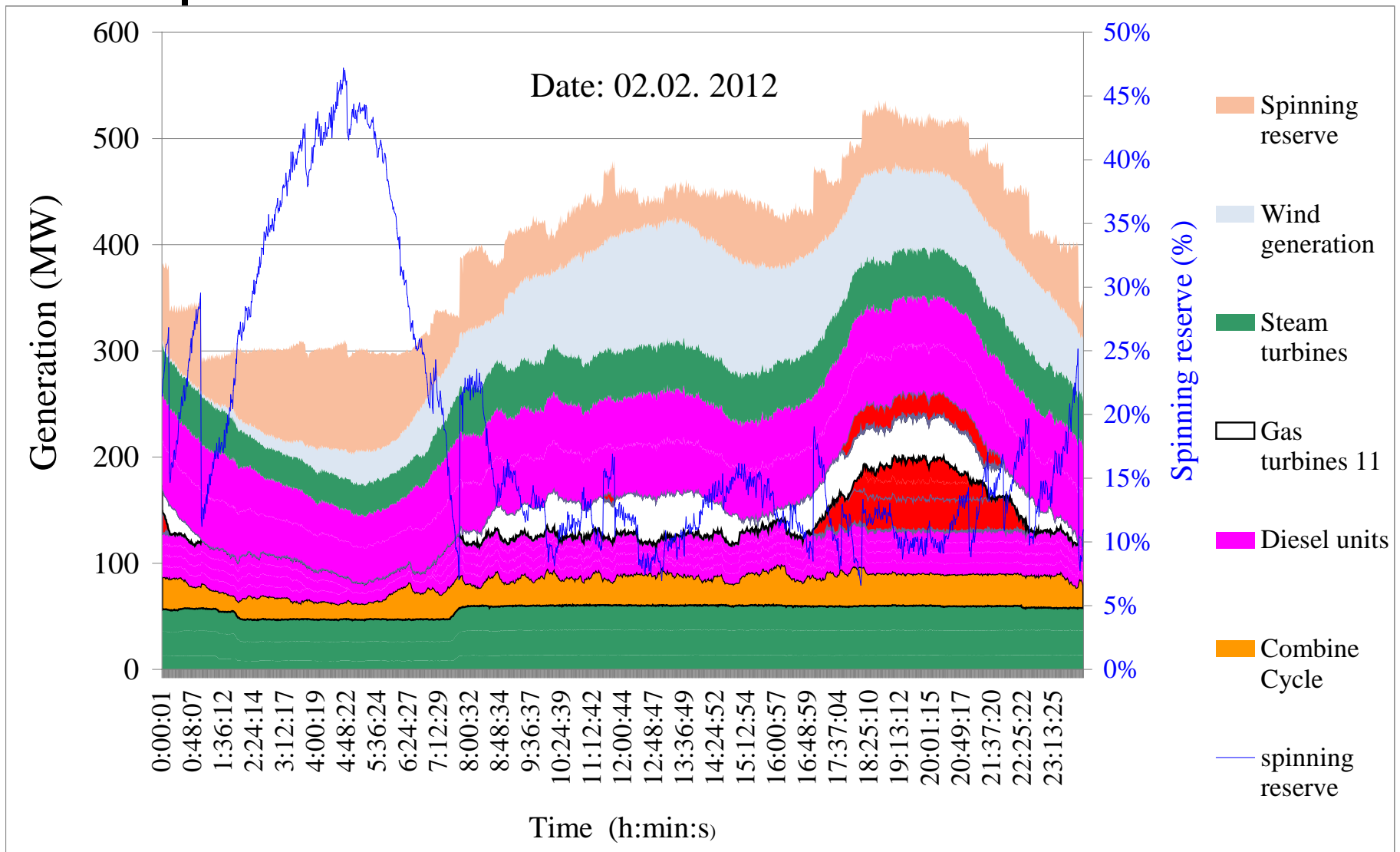
The CC started after a necessary repair, at 17:11. At that time the Gas turbine 11 was in operation and the load demand has started to increase. For this reason, and in absence of the information that wind generation was going to increase substantially, the Gas turbine 11 remained in operation. If this information was available, Gas turbine 11 could stop and the economic benefit is shown in the next table.

		Gas Turbine 11	Combine Cycle	Total	Min spinning reserve
Production (MWh)	as system operated	143.71	109.42	253.13	9.38%
	with the information of the wind increase	0	253.13	253.13	16.36%
Cost of operation (€)	as system operated	42,972	44,418	87,390	
	with the information of the wind increase		75,180	75,180	
Economic benefit (€)				12,210	





# A very important case



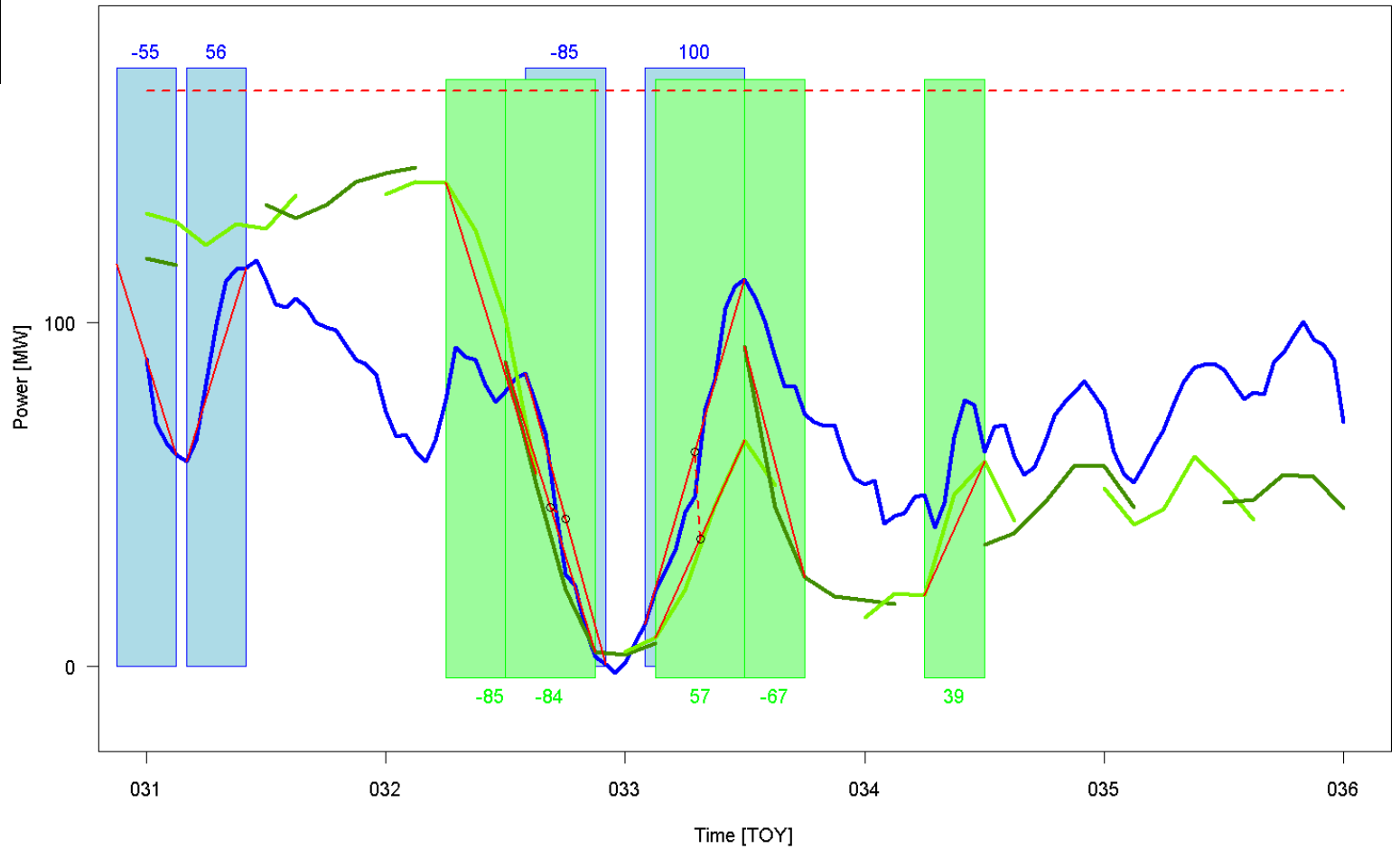


# Economic benefit

The Gas turbine 11 started at 07:45 in order to cover the morning rise of the load demand, taking into account that wind generation at that time was low. If the information of considerable wind generation during the following hours of the day was available, the start up and long operation of the Gas turbine 11 could be avoided. The white color in the previous diagram gives the total gas turbine production which is 512 MWh and the respective economic benefit is estimated to 163,000euros. It is interesting to mention that the spinning reserve with the new way of operation is maintained higher than 10% almost all the time.



Power Predicted (green), Power Measured (blue)





**Thank You!**

